

Bombay. Agriculture  
Reports  
1923-26

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No. P—11 of 1924.

From

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BOMBAY PRESIDENCY, POONA ;

To

THE CHIEF SECRETARY TO GOVERNMENT,  
REVENUE DEPARTMENT,  
BOMBAY.

Poona, 13th October 1924

Sir,

I have the honour to submit herewith the Annual Season and Crop Report of the Bombay Presidency for the year ending 31st July 1924.

I have the honour to be,  
Sir,  
Your most obedient servant,  
  
T. F. MAIN,  
Ag. Director of Agriculture.

## SEASON AND CROP REPORT OF THE BOMBAY PRESIDENCY FOR 1923-24.

### I. CHARACTER OF THE SEASON.

1. The most noticeable peculiarity of the agricultural season of 1923-24 was the late breaking of the monsoon and its abrupt withdrawal much before the usual time, causing thereby much delay in *kharif* sowings and great deficiency of moisture for the *rabi* crops. As might be expected, the result was that except in the Konkan, in the vicinity of the Western Ghats, and in irrigated areas the outturn of crops—both *kharif* and *rabi*—fell far short of the average. In Sind, however, the crop yields were, on the whole, satisfactory. Details regarding the season in its various aspects are noted below.

2. Statement No. 1 (pages 22-23) compares the rainfall of the year with the average fall of rain at each representative station in the Presidency and in Sind. The average rainfall figures for each station are, as during the last year, those supplied by the Indian Meteorological Department, based on the rainfall statistics available up to and including 1920.

The *kharif* rains in the Deccan were up to the standard in the north but were considerably below it throughout the remaining portion and especially in Poona and Satara. In the Karnatak they were much better than the average at Belgaum and Dharwar and in the hilly portion but were very defective at Bijapur where they were slightly above half the average. In Gujarat, these rains were very poor, being about two-thirds of the normal at Surat and Godhra (Panch Mahals) and were worse still at Ahmedabad, Kaira and Broach, where they did not reach even half the usual amount. The Konkan, however, was more fortunate in its rainfall than any of the other divisions of the Presidency, and here the *kharif* rains were in excess of the average throughout. In Sind, the rainfall was higher than the average at Sukkur and Jacobabad but below normal elsewhere, being especially deficient at Nawabshah and Larkana.

The *rabi* rains were most disappointing throughout the Presidency. They were practically absent in the Konkan, Gujarat and Sind and amounted only to a few drops in the Deccan and Karnatak.

The hot-weather rains present no features of importance.

3. The following remarks will show in detail the nature of the season in each division of the Presidency.

*Deccan.*—The monsoon started in July about a month behind the usual time. Good rain in this month enabled completion of *kharif* sowings. In August the rain was up to requirements in the west but inadequate elsewhere. The September rains, however, were fairly good both as regards amount and distribution and relieved the tension. *Rabi* crops were sown on the strength of

these rains but the drought in the following months stunted the crops which, except in favourable situations, failed to mature. As a result both the *kharif* and *rabi* crops returned poor yields, and in certain localities entirely or partially failed to mature. Owing to delay in sowings and short duration of the rains the yield of sugarcane and other principal crops fell far short of expectations. The abnormally high prices of cotton, however, amply compensated for the loss in yield. As regards crop diseases, the attack of moth borer on sugarcane was rather serious on the Mutha and Nira Canals. On the Godavari and Pravara it was not so bad.

*Karnatak.*—Rains in June were scanty and sowings had to be postponed to July when they were completed under the favourable rains of that month. In August, the rainfall was not well distributed, being excessive in the west and poor in the east, and crops suffered in consequence. In September fairly good rain occurred which while helping the *kharif* crops gave a stimulus to *rabi* sowings. Rains, however, failed subsequently and the crops suffered heavily. The season was thus unsatisfactory in most parts of the division and necessitated liberal grants of suspensions and remissions in many parts of Bijapur and Dharwar. It would have been worse still if the prices of cotton realised had not been so good.

*Konkan.*—The regular monsoon commenced about the second week of June and the sowing of rice was done in time, though owing to a partial break in the rains in the latter half of the month the growth of seedlings was checked in the districts of Ratnagiri, Kolaba and Thana. There were heavy and continuous falls throughout July and rice in low-lying fields along the river banks suffered from water-logging; and in the Kanara district large areas of rice and sugarcane along the banks of rivers were washed away. Except in Kanara where the rain in August was again excessive, the fall of the month was only light in the other districts and there was almost a total suspension of rains from the end of August to the middle of September with the result that the rice crop in high-lying fields suffered and its yield was reported to be reduced from ten to twenty-five per cent. Conditions in all parts of the Konkan were somewhat relieved by the copious rain received about the middle of September. From the last week of this month however, there was no rainfall with the result that late rice suffered in outturn, and want of sufficient moisture to sow *rabi* crops was experienced in less favoured situations. Regarding crop diseases the "*Koleroga*" appeared as usual on betel-nut in Kanara and stem borer on rice was reported from the Ratnagiri taluka.

*Gujarat.*—The monsoon started in July and ended in September and even in this brief duration the rains were not adequate except perhaps in the Surat district where they were much better. *Kharif* crops were sown in July and continued fairly well under the moderate but seasonable rain of August, though this rain proved quite inadequate for transplanting rice. The break in the first half of September, however, was ruinous and marred prospects. Some beneficial rain occurred in the latter half of the month and improved the outlook, but this rain was rather too late to undo the effect of

the previous drought. Rains practically ceased from the end of September and *kharif* crops were reduced in outturn; and late crops could not be sown except in areas commanded by irrigation. As a result, remissions and suspensions of land-revenue were necessary on a large scale over a large area. The district of Surat or roughly the part south of the Narbada was however on the whole comparatively much better than the rest of Gujarat and here the yield of the crops approached the normal. The outturn of cotton was better in the Province than what was expected; and this, coupled with the very high prices fetched by the crop, made amends to a great extent for the loss in other crops. Excepting some slight injury to crops in North Gujarat by hairy caterpillars no damage from insect pests was reported during the year.

*Sind*.—The *kharif* rains were more or less normal except in Middle Sind, but *rabi* rains were practically absent. The inundation, on the whole, was not altogether satisfactory as the river rose late and fell off abruptly in the first week of September and there were falls at critical periods which affected the area of *kharif* sowings in North and Middle Sind. Good water-supply was, however, available both on the Jamrao and Mithrao during *kharif* and hence good crops of cotton and rice were obtained. The *rabi* supply was unfortunately very inadequate with the result that the wheat crop on the Jamrao was a complete failure. There was a severe frost in December in North and Lower Sind which killed the potato crop outright and also damaged standing cotton on the Jamrao Canal. The dust storms in March were also responsible for some damage to the wheat crop. As for crop diseases, except "*rati*" on cotton in Middle Sind no other serious crop disease was reported. Crop yields were, on the whole, satisfactory. Cotton prices specially ruled very high and as the cotton crop also was exceptionally good the cultivators of this crop were considerably benefited.

## II. AREA CULTIVATED AND UNCULTIVATED.

(Statement No. II—pages 24 to 29).

4. The total number of villages in the Presidency (22,913½) dropped by ten. In the Ahmedabad district one village of Dholka taluka was amalgamated with one of the South Dascroi taluka and three other villages of the Dholka taluka were amalgamated with the adjoining villages of the same taluka, the district thus showing a net decline of four villages. Kolaba also shows a decrease of six villages owing to nine *inam* villages being amalgamated into three. Twenty-eight villages of Dhanduka taluka and one of Viramgaon taluka in the Ahmedabad district were surveyed and transferred from the class of "unavailable" to "available" statistics.

5. The total area shows a slight increase of 982 acres mostly in Ahmedabad (+702 acres) and Ahmednagar (+271 acres) districts due to corrections in survey records.

6. In Sind, the total number of villages increased by nine. Three new *dehs* were formed in each of the Karachi and Larkana

districts and four in the district of Sukkur due to survey operations. Against this, one village in Thar and Parkar declined owing to its amalgamation with the adjoining village. The total area advanced by about 7,000 acres mostly in Sukkur (+ 5,000 acres) and Nawabshah (+ 1,500 acres) due to survey operations.

7. The total area for which statistics are regularly collected and reported in the Presidency rose by 275,000 acres with very nearly an equal corresponding reduction (-274,000 acres) under the non-reporting area. The increase in reported area is mostly perceptible in Ahmedabad (+109,000 acres), East Khandesh (+ 190,000 acres), Ahmednagar (+ 3,000 acres) and Kaira (+ 2,500 acres) due to survey operations. West Khandesh on the other hand shows a decrease (- 30,000 acres), due to the same cause. Variations in other districts are small and are mostly due to corrections in survey records. Estimates for the probable cropping in the areas for which statistics were not forthcoming were as usual received from all the districts in the Presidency inclusive of Sind except Ratnagiri for which they had to be added in the Director's office.

8. In Sind, the total area reported receded by about 134,000 acres, the decrease being mostly noticeable in Larkana where one *deh* with an area of nearly 141,000 acres which was formerly wrongly shown under "available" statistics was transferred to the right heading, *viz.*, "unavailable" statistics. Sukkur and Nawabshah, on the other hand, showed an increase of 5,000 and 2,000 acres respectively in the reported area, due to survey operations. The variations in other districts are too small to call for any remarks.

9. *Cultivated, i.e., occupied area.*—Appendix A (page 15) shows the cultivated and uncultivated areas as compared with those in the previous year. In the Presidency proper, the gross area cropped declined by 232,000 acres, the districts that mainly contributed to this decline being the whole of Gujarat (-127,000 acres), Ahmednagar (-71,000 acres), Poona (-109,000 acres), Satara (-77,000 acres) and Belgaum (-48,000 acres) due to unfavourable rains. Against this there was a rise in West Khandesh (+44,000 acres), Nasik (+90,000 acres), Bijapur (+57,000 acres) and Dharwar (+37,000 acres), due to the suitability of rains at sowing time. The area cropped more than once showed a decrease of 389,000 acres, the decrease being shared by all the districts,—thus reflecting the deficiency of the monsoon during the year. The net area cropped increased by 156,000 acres, the districts which were mainly responsible for the increase being West Khandesh (+49,000 acres), Nasik (+115,000 acres), Bijapur (+57,000 acres) and Dharwar (+46,000 acres) where the rains at sowing time were encouraging. The whole of Gujarat (-41,000 acres), Poona (-22,000 acres), Satara (-11,000 acres) and Belgaum (-38,000 acres) showed on the other hand a set back due to deficiency of rain. In consequence of the extension under the net cropped area (+156,000 acres), as noted above, the area under fallows receded by about the same extent (-153,000 acres).

In Sind, the gross and net cropped areas rose by 59 and 88 thousand acres or by 1.4 and 2.2 per cent., respectively, mostly in the



south, but the twice cropped area declined by about 30,000 acres, the decrease being shared by all the districts.

The assessed occupied area remained almost the same in the Presidency and in Sind but the unassessed cultivated area fell by 5.3 per cent. in the Presidency and rose by 11.4 per cent. in Sind.

10. *Uncultivated, i.e., unoccupied area.*—Variations under this head correspond generally with those under the occupied area which have been noticed above. About 62,000 acres of forest lands were given out for temporary cultivation mainly in West Khandesh (14,000 acres), Poona (25,000 acres), Thana (9,000 acres), and Sholapur (7,000 acres) and about 49,000 acres of culturable waste mainly in Ahmedabad (17,000 acres), Nasik (8,000 acres), Ahmednagar (4,000 acres), Thana (8,000 acres), Belgaum (4,000 acres), Broach (3,000 acres), Kolaba (1,000 acres) and Surat (3,000 acres) were similarly dealt with in the Presidency. In Sind, the area under "Culturable Waste" and "Forest" was almost the same as last year. The miscellaneous unoccupied area, however, fell by 32,000 acres mostly in Karachi (- 17,000 acres), Hyderabad (- 10,000 acres) and Nawabshah (- 4,000 acres).

### III. CROPPED AREA OF THE YEAR.

(Statement No. III—pages 30 to 47.)

11. The main features of the season and of the harvest of the year have been described elsewhere in the report. Appendix B (pages 16-17) shows the effect of the season under report on the area sown as compared with the average and with the preceding year's areas under the principal crops. In the Presidency proper, the area under food crops receded by 5.4 and 2.2 per cent. respectively, below the previous year, and the normal. *Jowar* (chiefly *rabi*), wheat and gram showed a considerable drop in their cultivation owing to the deficiency of late rains. Among non-food crops the area under oil-seeds showed a decline but that under tobacco, sugarcane and cotton considerably advanced due to the incentive of high prices. The net result was a decline of 232,000 acres in the total cropped area below that of last year.

12. In Sind, *jowar* and wheat under food crops and tobacco and oil-seeds under non-food crops showed a decline in their area owing partly to the exigencies of the season and partly to the devotion of larger areas to the other more paying crops like paddy, sugarcane and cotton, the increase in area under which more than counter-balanced the decrease in the above crops (*i.e.*, *jowar*, wheat, tobacco and oil-seeds).

13. The following table compares as usual the *kharif* and *rabi* seasons of the year in the Presidency proper with those of the preceding two years. It will be seen that the *kharif* season was slightly better than last year though much below the season of 1921-22. The *rabi* season was a failure both as regards cereals and pulses when compared with the last year as well as the year preceding it (1921-22). There was a net reduction of 1,067 thousand acres

in the total area under cereals and pulses, as compared with last year and of 1,871 thousand acres as compared with 1921-22.

Variety.	Area in thousands of acres (i.e. 000 omitted).					
	1921-22.		1922-23.		1923-24.	
	Cereals.	Pulses.	Cereals.	Pulses.	Cereals.	Pulses.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Kharif	11,275	1,517	9,614	1,496	9,991	1,653
Rabi	6,952	621	7,747	701	6,376	471
Total	18,227	2,138	17,361	2,197	16,367	2,124

14. The detailed remarks below explain variations under the principal crops :—

*Jowar and Bajri.*—The following table compares the extent of the cultivation of these staple grains in the different tracts. Owing to the almost complete failure of the late rains in most parts of the Presidency where *jowar* is grown the area under this cereal fell by 790 thousand acres, the districts mainly contributing to the decline being the three Karnatak districts (– 516,000 acres) and three districts in the Deccan, *viz.*, Ahmednagar (– 176,000 acres), Poona (– 114,000 acres) and Sholapur (– 23,000 acres). But the decrease under *jowar* was partly made up by a net increase of 332,000 acres in the area under *bajri* mostly in the districts of Nasik (+ 162,000 acres), Ahmednagar (+ 77,000 acres), Poona (+ 34,000 acres) and Belgaum (+ 29,000 acres), due to favourable early rains. In Sind, the area under *jowar* dropped slightly but that under *bajri* advanced by 87,000 acres mostly in Thar and Parkar where more area was put under the crop in the Desert portion in anticipation of rains.

Division.	Area in thousands of acres (i.e. 000 omitted).					
	Normal.*	Jowar.		Normal.*	Bajri.	
		1922-23.	1923-24.		1922-23.	1923-24.
Gujarat	610	574	632	426	385	357
Deccan	4,595	4,780	4,448	3,419	3,372	3,535
Karnatak	2,697	2,833	2,367	394	261	458
Total Presidency.	7,902	8,237	7,447	4,239	4,018	4,350
Sind	593	432	455	1,029	926	1,013
Grand Total	8,500	8,719	7,902	5,268	4,944	5,363

\* Average of the five years 1916-17 to 1922-23 excluding the two abnormal years 1918-19 and 1920-21.

*Wheat.*—In the Presidency proper the area under this cereal receded from 1526 thousand acres to 1,131 thousand acres or 25·9 per cent. below the previous year and by 496 thousand acres or 30·5 per cent. below the average. The decrease was general in the Presidency owing to absence or insufficiency of late rains except for some slight increase in Nasik (+21,000 acres) and Ahmednagar (+32,000 acres) where the September rains induced the cultivators to sow this more paying crop in preference to *jowar*. In Sind, the decrease (-69,000 acres) was shared by almost all the districts and was due to premature cutting off of the water-supply of canals.

*Rice.*—This shows a decline of 68,000 acres in Gujarat and 14,000 acres in Dharwar owing to scanty rains at sowing and transplantation, against which was an increase of 8,000 acres in the Konkan. In Sind, the cultivation of rice extended by 18,000 acres owing mainly to the good water supply available on the Jamrao and Mitharo Canals.

*Other Cereals and Pulses.*—Among these the area under barley showed a decline of 9,000 acres in the Presidency and 1,500 acres in Sind. *Ragi* also receded in area by 31,000 acres in the Presidency, the decrease being most marked in Kaira (-5,000 acres), Nasik (-18,000 acres) and Dharwar (-13,000 acres) due to insufficiency of rains. The same cause brought about a decline in the area under maize by about 3,500 acres in the Presidency mostly in the Panch Mahals (-2,600 acres). Gram showed a net decline of 164,000 acres in the Presidency due to the absence or insufficiency of late rains and the decrease was shared by all the districts. In Sind the area under gram was the same as last year. The area under other food crops was higher by 68,000 acres in the Presidency and 4,000 acres in Sind.

*Oil-seeds.*—The area under oil-seeds in the Presidency proper fell by 11,000 acres or 1·1 per cent. below the previous year but rose by 84,000 acres or 9·5 per cent. over the average. In Sind, it dropped by 51,000 acres or 17·3 per cent. below preceding year's area and by 114,000 acres or 31·9 per cent. below the normal. The table in the

Increase or decrease in thousands of acres as compared with the last year.		
Name of oil-seed.	Presidency.	Sind.
Linseed ...	-36	...
Sesame ...	+9	-1
Rapeseed ...	-3	-44
Groundnut ...	+30	...
Castorseed ...	+2	-5
Cocoanut ...	...	...
Others ...	-13	...

margin shows the variations under the principal oil-seeds as compared with the previous year. The area under linseed dropped by 36,000 acres in the Presidency due to absence or deficiency of late rains principally in Sholapur (-4,000 acres), Bijapur (-28,000 acres) and Dharwar (-6,000 acres) against which was a slight advance of about 3,000 acres each in West Khandesh and Nasik. Sowings under sesame extended owing to the incentive of high prices in Poona (+20,000 acres), Bijapur (+7,000 acres) and Panch Mahals

(+4,000 acres) but receded almost everywhere else. The area under rapeseed extended by only 3,000 acres in the Presidency but in Sind where the oil-seed is mainly cultivated, the area dropped by 44,000 acres due to the cutting off of the water-supply of canals. Groundnut continued to attract new areas in Gujarat, Khandesh and Satara where its cultivation advanced by 37,000 acres mostly under the foreign varieties introduced some years back by the Agricultural Department, these varieties having the double advantage of maturing earlier and commanding a higher price than the local ones.

*Cotton.*—On account of the stimulus of high prices fetched by the crop, the total area under cotton advanced further to 4,547 thousand acres in the Presidency or by 22·7 per cent. over the last year and 17·8 per cent. over the normal. In Sind, the area rose to 342,000 acres which meant an increase of 27·6 per cent. as compared with the previous year and of 40·2 per cent. as compared with the average. To the total increase, Gujarat contributed 263,000 acres and Karnatak 614,000 acres though the Deccan showed a net decline of 40,000 acres, as compared with the last year. The increase of 74,000 acres in Sind was general.

*Sugarcane.*—The area under sugarcane rose by 8,500 acres mostly in Ahmednagar (+3,500 acres), Satara (+2,000 acres) and Belgaum (+1,000 acres) due to adequate water supply in irrigation sources, and in Kanara (+1,800 acres) due to good rainfall.

*Other crops.*—Among other crops the area under tobacco rose by about 5,000 acres mostly in Kaira, the variations in other districts being small. In Sind the area receded by about 2,500 acres and the decrease was shared by all the tobacco growing districts. The fall under fruits and vegetables in the Presidency of 38,000 acres was general and due to deficiency of water-supply, while in Sind the area was almost stationary. Both in the Presidency and in Sind the demand for fodder and the high rates commanded in the market induced larger cultivation almost everywhere.

15. Appendix C (pages 18-19) shows, as usual, the distribution in each district of the Presidency and of Sind, of the principal food and non-food crops in percentages of the gross area cropped.

#### IV. IRRIGATED AREA.

(Statement No. IV—pages 48 to 55.)

16. During the year under report the total irrigated area (938,000 acres) of the Presidency proper, showed a slight advance of 6,000 acres or 0·6 per cent. over the area of the previous year. The increase is mainly attributable to Kaira (+4,000 acres), Ahmednagar, Sholapur and Ratnagiri (+11,000 acres each) and Satara (+6,000 acres) against a decline in Nasik (−13,000 acres), Poona (−9,000 acres) and Ahmedabad (−4,000 acres). The Panch Mahals, West Khandesh, East Khandesh, Belgaum and Bijapur also showed a fall of about 2,500 acres each in the total area irrigated.

17. In Sind, the area irrigated (3,070 thousand acres) dropped by 82,000 acres or 2·6 per cent. below the last year, mostly under

Government Canals, due to low inundation of the year. Except in Karachi and Hyderabad which showed an advance of 14 and 26 thousand acres respectively, the decrease was general and was particularly considerable in the north where Larkana, Sukkar and Upper Sind Frontier showed a drop of 20, 31, and 52 thousand acres respectively.

18. Appendix D (page 20) shows variations under the several heads of irrigation and crops irrigated as compared with similar details of the previous year. In the Presidency proper irrigation from Government Canals rose by 4,000 acres mainly in the Deccan (+15,000 acres) where all districts except Nasik, which showed a set back of 5,000 acres, contributed to the increase. Against this there was a decline of nearly ten thousand acres mostly in Ahmedabad and Kaira. Irrigation from private canals extended by 6,000 acres mainly in Poona (+3,000 acres), Nasik (+2,000 acres), Ratnagiri (+1,500 acres), and Ahmednagar (+1,000 acres) against a decrease of about one thousand acres each in West Khandesh and Satara. Similarly, irrigation from wells was resorted to to a greater extent particularly in Ahmedabad (+7,000 acres), Kaira (+8,000 acres), Ahmednagar (+7,000 acres), Sholapur (+10,000 acres), Satara (+6,000 acres) and Ratnagiri (+7,000 acres) against which was a decline in the Panch Mahals (-2,000 acres), North Deccan (-15,000 acres), Poona (-19,000 acres) and Bijapur (-2,000 acres). The decline of 9,000 acres in the area irrigated by tanks was perceptible throughout the Presidency and particularly in Ahmedabad (-4,000 acres) and Belgaum (-3,000 acres). Irrigation by other sources showed a net decrease of 3,000 acres mainly in Poona (-6,500 acres), and Satara (-1,000 acres) against which was an increase in Ahmedabad and Dharwar (+1,000 acres each) and in Ratnagiri (+2,500 acres).

19. In Sind, which is mainly dependent for its cultivation on irrigation, the area irrigated by Government Canals fell by 93,000 acres and the fall was shared by all the districts except Karachi and Hyderabad, which showed an advance of 5 and 23 thousand acres respectively. Well irrigation extended by 12,000 acres mostly in Karachi (+3,000 acres) and Sukkar (+7,000 acres). The area irrigated by private canals and tanks was, as usual, small and also showed little variation as compared with the last year. Under other sources Karachi, Hyderabad and Upper Sind Frontier showed a rise of 6, 2 and 5 thousand acres respectively but this rise was more than counterbalanced by a fall in Larkana (-8,000 acres) and Sukkar (-7,000 acres) the net result being a decline of 2,000 acres for the Province.

20. As regards the crops grown under irrigation in the Presidency the area under rice was extended in Satara (+2,000 acres) and Ratnagiri (+4,000 acres) but declined in Gujarat (-17,000 acres) and Karnatak (-9,000 acres). The variations in the other districts are small. Wheat showed an appreciable increase in Poona (+2,000 acres) and a slight one in Kaira and Dharwar (+1,000 acres—both together) but fell everywhere else to the total extent of over 20,000 acres. Irrigated *jowar* dropped by

10,000 acres in the Presidency of which the Deccan and Karnatak contributed 8,000 and 2,000 acres respectively. Of the total irrigated area under *bajri* of 83,000 acres in the Presidency, Deccan alone accounted for 82,000 acres and here there was a net rise of 3,500 acres as compared with the previous year—the decline in Nasik (—3,500 acres) and Satara (—3,000 acres) being more than made up by the extension in Ahmednagar (+5,500 acres) and Poona (+4,500 acres). Owing to the incentive of high prices sugarcane and cotton showed an advance of nearly ten thousand acres each. The irrigated area under the various cereals and pulses rose by about 22,000 acres and that under miscellaneous non-food crops by 24,000 acres but the area under the miscellaneous food-crops dropped by 10,000 acres.

21. In Sind, except cotton, rice, and sugarcane which were irrigated to a larger extent under the stimulus of high prices, and the minor cereals and pulses which also rose slightly in area, the decline in all other crops was general owing to the late inundation and sudden fall of the river.

#### V. OUTTURN OF CROPS.

(Statements V & VI, pages 56-57.)

22. Statement V (pages 56-57) shows the estimated yield of the principal *kharif* and *rabi* crops in parts of 100 which is taken as normal. It is prepared from the district estimates which are returned in annas taking twelve annas to represent a normal crop. The figures are therefore approximate only.

23. The character of the season has already been described above. Except in Bijapur and Broach where the outturn of *bajri* and *kharif jowar* respectively came to about one-third of the normal the yield of these two staples varied from one-half to three-fourths of the normal in the Presidency and Sind. Rice was almost normal in the Konkan and in Surat but was a failure in the other districts of Gujarat, where it returned only from one-sixth to one-third the usual amount. Elsewhere in the Presidency and Sind its yield ranged between one-half and three-fourths of the normal. Cotton returned about the normal in the North Deccan and Surat, from one-half to three fourths of it in the Panch Mahals, South Deccan, Karnatak and Sind and a little short of one-half in Gujarat except Surat and the Panch Mahals. Sesame gave a poor return—one-third to two-fifths of the normal—in Ahmedabad, Kaira, Broach, Poona, Bijapur and Dharwar. Elsewhere its outturn ranged from one-half to three fourths of the normal. The outturns of the other *kharif* crops corresponded generally with those of the principal ones dealt with above.

24. As regards *rabi* crops, the yield of *jowar* was more than three fourths of the normal in Surat and Khandesh and between one-half and two-thirds of it in the South Deccan and Dharwar. In Belgaum, Bijapur and Broach, however, it ranged from one-fourth to two-fifths of the normal. The outturn of wheat varied from one-half to four-fifths of the normal in Sind, Deccan, Thana, Surat and

the Panch Mahals but was lower elsewhere ranging between one-fourth to two-fifths of the normal. The yield of gram corresponded generally with that of wheat except in Ahmedabad, Poona and Satara where it was much lower. Except in Ahmedabad and Karachi where it was only two-fifths of the normal, the yield of tobacco ranged between one-half and three-fourths of the normal. The outturn was particularly good in Surat and West Khandesh where it came to more than four-fifths of the usual amount. The outturn of linseed was rather disappointing in Kaira, Poona, Sholapur, Belgaum and Bijapur where it ranged from one-fourth to two-fifths of the normal. In the other districts the yield varied from one-half to two-thirds the usual quantity. The yield of rape seed and mustard was poor in Ahmedabad and Kaira coming to only one-fourth of the normal. In West Khandesh and Nasik the yield came up to the normal and varied between one-half and two-thirds of it in Sind and elsewhere. Sugarcane yielded from one-half to a full normal in all the districts of the Presidency and Sind.

25. Statement VI (pages 58 to 72) compares the acreage under food grain crops (cereals and pulses) in the various divisions of the Presidency, and their approximate outturn in tons during the year under report with similar statistics for the two preceding years.

The following table sums up the result :—

Acreage & outturn.	Gujarat.	Deccan.	Karnatak.	Konkan.	Total Presidency proper.	Sind.
<i>A. Acreage.</i>	In thousands of acres (000 omitted).					
1923-24	1,941	10,575	4,897	1,599	18,492	3,624
1922-23	2,350	10,716	4,896	1,596	19,558	3,615
1921-22	2,555	10,895	5,317	1,598	20,365	3,618
<i>B. Outturn.</i>	In thousands of tons (000 omitted).					
1923-24	498	1,611	549	642	3,200	933
1922-23	803	1,854	717	702	4,076	1,182
1921-22	780	1,753	1,032	716	4,281	1,021

It will be noticed that while the area under food grains in the Presidency declined by 5.5 per cent. below the previous year, the total outturn fell by as much as 18.5 per cent. short of the yield of that year. In Sind, the area advanced slightly—by 0.2 per cent. over the previous year but the yield receded by 21.1 per cent. as compared with that year.

## VI. PRICES, TRADE AND STOCK.

26. The appended statement (Table VII, pages 73-75) shows in detail the prices of the principal staples and of fodder ruling at harvest time at each district head-quarter station in the Presidency and in Sind. The detailed remarks below explain the variations in prices of the principal articles.

*Jowar*.—*Jowar* was sold cheaper by  $2\frac{1}{2}$  seers per rupee at Godhra (Panch Mahals) and  $1\frac{1}{2}$  seers per rupee at Ahmednagar, and was stationary at Ahmedabad, Poona, Ratnagiri and Jalgaon (East Khandesh). At the other stations of the Presidency it was dearer by from  $1\frac{1}{2}$  to 3 seers per rupee. In Sind it was cheaper by from  $\frac{3}{4}$  to  $2\frac{1}{2}$  seers per rupee everywhere except Karachi where it was dearer by one seer per rupee.

*Bajri*.—Except at Dhulia (West Khandesh), Nasik, Ahmednagar, Sholapur, Thana and Ratnagiri where it was cheaper by from  $\frac{1}{4}$  to  $1\frac{1}{4}$  seers per rupee *bajri* was dearer at almost all the other stations of the Presidency by from  $\frac{1}{2}$  to  $2\frac{1}{2}$  seers per rupee. In Sind, it was the same as last year at Hyderabad and Mirpurkhas (Thar and Parkar) but was cheaper by from  $\frac{1}{4}$  to  $2\frac{1}{4}$  seers per rupee at the other stations of the Province.

*Rice*.—With the exception of Kaira and Nasik where it was cheaper by  $1\frac{1}{4}$  and  $1\frac{1}{4}$  seers per rupee respectively and at Dharwar and Kolaba at each of which it was cheaper by about  $\frac{1}{2}$  seer per rupee, the rate of rice showed but small variations at the other stations of the Presidency. In Sind, this article was cheaper by from  $\frac{1}{2}$  to 3 seers per rupee except at Karachi where its price was stationary.

*Wheat*.—Except in the Karnatak where it was dearer by  $1\frac{1}{4}$  to  $2\frac{1}{2}$  seers per rupee, wheat was cheaper by from  $\frac{1}{2}$  to  $1\frac{1}{4}$  seers per rupee at almost all the other stations of the Presidency. In Sind, except at Sukkur where it ruled higher by  $\frac{1}{2}$  seer per rupee, it was cheaper by from  $\frac{1}{2}$  to 1 seer per rupee at the other stations.

*Gram*.—Except at Ahmedabad and Alibag (Kolaba) where it was steady in price and at Hyderabad and Jacobabad (Upper Sind Frontier) where it was higher by  $\frac{1}{2}$  and  $3\frac{1}{4}$  seers per rupee respectively, gram was cheaper throughout the Presidency and Sind by from  $\frac{1}{2}$  to  $2\frac{1}{2}$  seers per rupee.

*Gul or raw sugar*.—This was nearly stationary at Ahmedabad, Kaira, Ratnagiri and Mirpurkhas (Thar and Parkar). At all the other stations in the Presidency and in Sind it ruled easier by from  $\frac{1}{4}$  to 2 seers per rupee.

*Tobacco*.—Except at Kaira where it was cheaper by  $\frac{2}{3}$  seers per rupee and Ahmednagar where it was dearer by the same amount, tobacco showed but slight variations (ranging between nothing and  $\frac{1}{2}$  seer per rupee) in its price at the other stations of the Presidency. In Sind tobacco was cheaper by  $1\frac{1}{4}$  seers per rupee at Sukkur and dearer by 1 and  $1\frac{1}{2}$  seers per rupee at Hyderabad and Larkana respectively. Elsewhere its price was almost stationary.

*Cotton*.—Under the incentive afforded by the high prices fetched by the crop in the previous season the area under cotton was extended wherever possible and the total area sown with the crop in the Presidency including Sind, Kathiawar and other Native States stood at 6,788 thousand acres, thus showing a rise of 971 thousand acres or 16.7 per cent. over the last year. The season, however, was marred by the absence or deficiency of late rains and the output fell from 1,328 thousand bales to 1,211 thousand bales, or by 8.8



per cent. Of this total outturn of 1,211 thousand bales, 391 thousand bales or 32.3 per cent. represented the yield of the long-stapled Broach, Dharwar and Kumpta varieties while the remaining 820 thousand bales or 67.7 per cent. belonged to short-stapled varieties of Khandesh, Gujarat and Sind. As compared with the previous year the outturn of the long-stapled cotton rose by 9.2 per cent. but that of the short stapled varieties fell by 15.5 per cent. The keen demand for Indian Cotton in the foreign market continued and the prices were much tighter than the very high prices secured in the previous year and the cultivators must no doubt have benefited even better than they did last year. The following table compares the prices of the year with those of the previous year:—

Variety.	Price per bale of 400 lbs.		Percentage increase.		
	Average of five years ending 1922.	Average of the seven months ending 31st July		Compared with the average.	Compared with the price in 1923.
		1923.	1924.		
Broach	264	281	308	16.7	9.6
Khandesh	185	221	280	51.4	26.7
Dharwar	254	284	316	20.5	11.8

*Fodder.*—Dry grass was dearer at Ahmedabad, Surat, Satara and Belgaum and in the North Deccan and Sind. At the other places too it was not materially cheaper. *Jowar kadbi* was dearer in East Khandesh, Satara, in South Konkan and the whole of Gujarat and Sind. In other places it was either constant or showed a very slight fall.

#### VII. AGRICULTURAL STOCK.

27. Information under this head is collected quinquennially. The result of the last enumeration has been published in the Season and Crop Report for the year 1919-20.

#### VIII & IX. CONDITION OF THE AGRICULTURAL POPULATION.

28. The season under review was not favourable. While the *kharij* crops were much below the normal (except in the Konkan and on the edge of the Western Ghats where they were generally satisfactory) the *rabi* crops were disappointing nearly everywhere. The result was that scarcity prevailed in most parts of the East Deccan and Karnatak and in North Gujarat and remissions and suspensions on a liberal scale were found necessary in many places to ameliorate the distress in these areas. There was also an acute fodder-famine in these places and in the Sind Desert, and considerable

quantities of grass had to be imported to save the cattle. The agriculturists in the non-cotton areas thus had a poor return for their labours. In many districts owing to severe scarcity of fodder the people were put to great straits in maintaining their milch and plough cattle.

29. Wages continued high but the prices (except for cotton) were generally stationary. In consequence, while the classes labouring for cash wages were fairly well off the other classes of the agricultural population suffered. The cultivator of sugarcane especially were very hard hit during the year as the low prices of *gul* coupled with low yield and the increased cost of cultivation gave a severe blow to the cane industry.

30. The areas of economic advance were confined to the cotton tracts for, while the prices secured by this article were, with the solitary exception of 1918, the highest on record the yield also was better than what one would have expected from the adverse seasonal conditions, and the high value thus obtained undoubtedly made amends in many cases for the loss in other crops.

## APPENDIX A.

*Total area, area cultivated and uncultivated.*

Details.	Presidency Proper.			Sind.		
	1922-23.	1923-24.	Increase (+) or Decrease (-) per cent.	1922-23.	1923-24.	Increase (+) or decrease (-) per cent.
<i>A.—Cultivated area.</i>						
	Areas in acres			(000) omitted.		
Gross area cropped ...	27,743	27,511	- 0.8	4,352	4,411	+ 1.4
Area cropped more than once.	989	600	- 39.3	427	398	- 6.8
Net area cropped ...	26,754	26,911	+ 0.6	3,925	4,013	+ 2.2
Current fallows ...	6,661	6,507	- 2.3	5,409	5,353	- 1.0
Assessed ...	33,292	33,292	.....	8,892	8,807	- 0.9
Unassessed ...	133	126	- 5.3	502	559	+ 11.4
<b>Total Cultivated Area ...</b>	<b>33,415</b>	<b>33,418</b>	<b>.....</b>	<b>9,394</b>	<b>9,366</b>	<b>+ 0.3</b>
<i>B.—Uncultivated area.</i>						
Available for cultivation (culturable waste)	968	943	- 2.6	6,103	6,100	.....
Not available for cultivation. Forest	8,559	8,553	- 0.1	729	739	+ 1.4
Others	5,771	5,800	+ 0.5	13,983	13,951	- 0.2
<b>Total Uncultivated Area ...</b>	<b>15,298</b>	<b>15,296</b>	<b>.....</b>	<b>20,815</b>	<b>20,790</b>	<b>- 0.1</b>
<b>Grand Total ...</b>	<b>48,713</b>	<b>48,714</b>	<b>.....</b>	<b>30,149</b>	<b>30,156</b>	<b>.....</b>

## APPENDIX

## CROPPED

Crops.	Presidency		
	Normal.*	1922-23.	1923-24.
1	2	3	4
<i>I.—Food Crops.</i>			
			Area in thousands
<i>(a) Cereals and Pulses—</i>			
Jowari	7,902	8,237	7,447
Bajri	4,239	4,018	4,350
Rice	1,911	1,886	1,611
Wheat	1,627	1,526	1,181
Gram	605	586	422
Others	2,677	3,305	3,331
<b>Total Cereals and Pulses</b>	<b>18,861</b>	<b>19,558</b>	<b>18,492</b>
<i>(b) Sugarcane</i>	66	60	69
<i>(c) Other food crops †</i>	548	511	473
<b>Total food crops</b>	<b>19,475</b>	<b>20,129</b>	<b>19,034</b>
<i>II.—Non-food Crops.</i>			
<i>(a) Tobacco</i>	100	95	99
<i>(b) Oil seeds</i>	882	977	966
<i>(c) Cotton</i>	3,860	3,709	4,547
<i>(d) Other non-food crops ‡</i>	2,602	2,882	2,864
<b>Total non-food crops</b>	<b>7,444</b>	<b>7,613</b>	<b>8,476</b>
<b>Total Crops</b>	<b>26,919</b>	<b>27,742</b>	<b>27,510</b>

\* Average of the five years 1916-17 to 1922-23 excluding the two abnormal years 1918-19 and 1921-22.

† These include fruits and vegetables and miscellaneous food crops.

‡ These include condiments and spices, dyes, drugs and Narcotics (excluding tobacco which

## B.

## AREA.

Proper.		Sind.				
Percentage by which area in col. 4 exceeds (+) or falls short of (-) that in		Normal.*	1922-23.	1923-24.	Percentage by which area in col. 9 exceeds (+) or falls short of (-) that in	
Col. 2.	Col. 3.				Col. 7.	Col. 8.
5	6	7	8	9	10	11
Per cent. of acres (i.e., 000 omitted).	Per cent. of acres (i.e., 000 omitted).				Per cent.	Per cent.
-5.7	-9.6	598	483	455	-23.9	-5.8
+2.6	+8.3	1,029	985	1,013	-1.6	+9.4
-4.2	-2.9	1,152	1,173	1,190	+3.3	+1.4
-30.5	-25.9	556	502	483	-23.1	-13.7
-30.2	+28.0	161	302	302	+25.5	...
+28.5	+0.2	297	329	331	+12.6	+0.6
-1.9	-5.4	3,733	3,615	3,624	-4.5	+0.2
+4.5	+15.0	4	3	4	...	+33.3
-13.6	-7.4	43	51	50	+4.2	-2.0
-2.2	-5.4	3,845	3,669	3,678	-4.3	+0.2
-1.0	+4.2	8	8	5	-37.5	-37.5
+9.5	-1.1	357	294	243	-31.9	-17.3
+17.8	+22.7	244	268	342	+40.2	+27.6
+10.1	+1.1	130	113	143	+10.0	+26.6
+13.9	+11.3	739	683	738	-0.8	+7.8
+2.2	-0.8	4,584	4,352	4,411	-3.8	+1.4

1920-21.

has been separately noted), fodder, and miscellaneous non-food crops.

## APPENDIX C.—

Percentages of the Gross Cropped Area, in each

No.	Districts	Food				
		Cereals and				
		Rice.	Wheat.	Barley.	Jowdri.	Bajri.
1	2	3	4	5	6	7
<b>A.—PRESIDENCY PROPER.</b>						
<i>I.—Gujarāt.</i>						
1	Ahmedabad	1	5	1	24	11
2	Saira	3	1	...	7	21
3	Panch Mahāls	11	2	...	2	7
4	Broach	1	2	...	24	1
5	Surat	13	1	...	12	1
		Average ... {		1923-24	5	2
				1922-23	7	7
<i>II.—Deccan.</i>						
6	West Khāndesh	4	9	...	9	23
7	East Khāndesh	...	1	...	18	16
8	Nasik	3	8	...	4	47
9	Ahmednagar	1	5	...	34	23
10	Poona	4	2	...	40	26
11	Sholapur	...	1	...	66	8
12	Satara	2	2	...	32	14
		Average ... {		1923-24	2	4
				1922-23	2	4
<i>III.—Karnatak.</i>						
13	Belgaum	6	4	...	31	8
14	B. Japur	...	6	...	45	11
15	Chārwar	5	10	...	25	...
		Average ... {		1923-24	3	7
				1922-23	4	10
<i>IV.—Konkan.</i>						
16	Bombay Suburban	47	...	...	...	...
17	Thāna	54	...	...	...	...
18	Kolhāpi	69	...	...	...	...
19	B. Nagiri	40	...	...	...	...
20	Kānara	64	...	...	...	...
		Average ... {		1923-24	51	...
				1922-23	51	...
		Average of Presidency Proper.		1923-24	7	4
				1922-23	7	5
<b>B.—SIND.</b>						
21	Karachi	56	3	2	9	3
22	Hyderabad	41	5	...	1	24
23	Thar Parkar	7	5	...	1	65
24	Nawāsbāh	...	9	...	20	29
25	Lārkāna	47	10	...	10	...
26	Sukkur	14	30	...	25	4
27	Upper Sind Frontier	19	13	...	18	14
		Average of Sind.		1923-24	27	10
				1922-23	27	12
		Average of the Presidency.		1923-24	10	5
				1922-23	9	6

DISTRIBUTION OF CROPS.

District of the Bombay Presidency and Sind.

Rajp.	pulses.					Non-food crops.				Total.
	Maize.	Gram.	Other cereals & pulses.	Total cereals & pulses.	Other food-crops.	Cotton.	Oil-seeds.	Other non-food crops.	Food crops.	Non-food crops.
8	9	10	11	12	13	14	15	16	17	18
...	...	...	4	46	2	41	3	8	48	52
7	...	...	18	57	5	15	3	20	62	34
3	26	6	14	71	1	8	9	11	72	28
...	...	...	7	95	1	53	2	9	86	64
1	...	...	5	33	4	22	1	40	37	63
2	4	1	8	47	2	29	4	18	49	51
2	4	2	10	56	3	23	3	16	58	42
1	1	2	11	60	1	23	5	1	61	39
...	...	...	13	46	1	45	7	1	47	53
5	...	3	12	32	1	4	8	7	63	17
1	...	3	6	53	2	6	2	7	85	15
2	...	2	5	83	3	...	3	11	86	14
...	1	2	4	81	1	3	3	9	85	15
2	1	2	9	64	3	1	6	26	67	33
2	...	2	8	73	2	12	4	9	75	25
2	...	...	8	73	2	12	4	9	75	25
2	1	1	14	67	2	17	2	12	69	31
...	...	1	6	60	1	25	2	3	70	30
1	...	1	15	57	2	32	2	7	59	41
1	...	1	11	65	1	26	2	6	86	34
1	...	2	9	73	1	17	2	7	74	26
...	...	...	...	47	6	...	3	44	53	47
9	...	...	6	68	1	...	1	30	69	31
10	...	...	9	88	2	...	1	9	90	10
17	...	...	21	78	3	...	7	12	81	19
1	...	...	2	67	4	...	5	24	71	29
11	...	...	12	74	3	...	3	18	77	23
11	...	...	12	74	3	...	4	19	77	23
2	1	1	9	67	2	17	4	10	69	31
2	1	2	9	71	2	13	3	11	73	27
...	...	...	6	79	3	...	7	11	82	18
...	...	...	1	72	2	12	8	6	74	26
...	...	...	1	79	...	17	1	5	79	21
...	...	2	6	67	1	22	5	5	64	32
...	...	3	19	89	1	...	9	1	90	10
...	...	11	8	92	3	...	4	1	95	5
...	...	19	9	92	1	...	7	...	93	7
...	...	5	7	82	1	8	6	3	88	17
...	...	5	7	83	1	6	7	3	94	14
2	1	2	9	70	2	15	4	9	72	28
2	2	2	10	73	2	12	4	0	75	25

## APPENDIX D.

## I. IRRIGATED AREA.

*Area in acres (000 omitted.)*

Details.	Presidency Proper.			Sind.		
	1922-23.	1923-24.	Increase (+) or decrease (-) per cent.	1922-23.	1923-24.	Increase (+) or decrease (-) per cent.
<i>A—Area Irrigated.</i>						
Irrigated from Government canals.	215	219	+1.9	2,990	2,897	-3.1
Do. private canals.	47	53	+12.8	10	10	.....
Do. wells	531	539	+1.5	36	48	+33.3
Do. tanks	96	87	-9.4	...	1	.....
Do. other sources	43	40	-7.0	116	114	-1.7
Total A-Area Irrigated ...	932	938	+0.6	3,152	3,070	-2.6
<i>B—Crops Irrigated.</i>						
Rice	150	129	+14.0	1,172	1,190	+1.5
Wheat	175	155	-11.4	392	297	-23.2
Barley	14	13	-7.1	13	12	-7.7
Jowari	209	199	-4.8	434	391	-9.9
Bajri	79	83	+5.1	510	477	-6.5
Maize	29	31	+6.9	3	3	.....
Other cereals and pulses	89	111	+24.7	221	261	+18.1
Sugarcane	60	69	+15.0	4	4	.....
Other food crops	126	116	-7.9	66	55	-16.7
Cotton	6	16	+166.7	267	342	+28.1
Other non-food crops	128	152	+18.7	246	225	-8.5
Total B-Crops Irrigated ...	1,065	1,074	+0.8	3,319	3,257	-1.9



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TABLE I—RAINFALL

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TABLE I—  
Average fall of rain from 1st June 1923 to 31st May 1924 at each of

No.	District Headquarter Station.	Kharif rains (1st June 1923 to 30th September 1923).				Rabi rains (1st October 1923 to 28th February 1924).			
		Average.		1923.		Average.		1923-24.	
		Fall.	Rainy days.	Fall.	Rainy days.	Fall.	Rainy days.	Fall.	Rainy days.
	<i>Deccan.</i>	Ins.		Ins.		Ins.		Ins.	
1	Dhulia (West Khandesh) ...	19.30	30	20.59	25	2.82	4	0.28	...
2	Jalgaon (East Khandesh) ...	25.26	40	31.45	48	2.19	4	0.93	1
3	Nasik ...	25.26	41	25.14	37	3.56	6	0.35	2
4	Ahmednagar ...	17.79	28	15.93	22	4.46	7	0.77	2
5	Poona ...	21.30	36	12.82	23	5.49	7	0.19	1
6	Sholapur ...	21.12	30	19.71	28	4.75	7	0.69	1
7	Satara ...	32.07	53	23.73	59	5.19	9	1.78	3
8	*Hilly Deccan Tracts ...	63.70	70	60.49	66	4.29	7	0.50	1
	<i>Karnatak.</i>								
9	Belgaum ...	38.90	61	45.11	66	6.96	11	0.42	2
10	Bijapur ...	15.09	25	9.35	17	5.86	9	0.06	...
11	Dharwar ...	20.08	44	22.17	49	7.68	12	0.56	3
12	*Hilly Karnatak Tracts ...	58.97	66	81.94	73	6.89	11	0.70	2
	<i>Konkan.</i>								
13	Karwar (Kanara) ...	106.73	89	126.52	86	7.49	10	...	...
14	Ratnagiri ...	90.58	89	92.78	78	4.68	7	...	...
15	Alibag (Kolaba) ...	81.18	76	90.43	76	3.15	4	...	...
16	Thana ...	92.81	86	96.15	81	3.74	5	0.06	...
	<i>Gujarat.</i>								
17	Surat ...	37.25	43	26.79	33	2.22	3	...	...
18	Broach ...	37.38	40	10.65	29	1.97	2	...	...
19	Kaira ...	31.33	36	12.93	26	1.06	2	0.07	...
20	Godhra (Panch Mahals) ...	36.88	41	21.19	33	1.31	3	0.02	...
21	Ahmedabad ...	27.65	33	11.21	24	0.86	2	0.11	...
	<i>Sind.</i>								
22	Karachi ...	5.78	5	3.64	3	1.24	3	0.61	1
23	Hyderabad ...	6.21	7	4.95	4	0.62	1	...	...
24	Mirpurkhas (Thar and Parkar) ...	3.97	7	2.68	5	0.32	1	...	...
25	Nawabshah ...	5.74	6	0.19	...	0.22	1	0.04	...
26	Larkana ...	3.51	4	1.04	3	0.37	1	0.19	1
27	Sukkur ...	1.81	3	2.17	3	0.30	1	0.31	1
28	Jacobabad (Upper Sind Frontier) ...	2.58	4	3.64	3	0.82	2	0.27	1

\* The figures for the Hilly Tracts of Deccan and Karnatak

## RAINFALL.

*the representative stations of the Districts of the Bombay Presidency.*

Hot weather rains (1st March 1924 to 31st May 1924).				Total.			
Average.		1924.		Average.		1923-24.	
Fall.	Rainy days.	Fall.	Rainy days.	Fall.	Rainy days.	Fall.	Rainy days.
Ins.		Ins.		Ins.		Ins.	
0.49	1	0.02	...	22.54	35	20.89	25
0.61	1	0.54	1	29.06	45	32.97	50
1.13	1	0.10	1	39.98	48	25.69	40
1.25	3	0.86	2	23.50	38	17.66	26
2.07	4	1.17	2	28.86	47	14.18	32
1.68	3	1.01	4	27.65	40	21.61	33
2.49	5	2.11	6	39.75	67	27.67	68
1.48	3	0.48	1	69.44	60	61.47	48
4.69	9	3.34	7	50.55	81	48.67	75
2.33	5	0.73	1	23.28	39	10.13	18
5.12	10	2.42	6	32.88	66	25.15	69
3.88	7	4.97	6	69.74	84	87.61	81
4.09	4	0.66	1	118.31	103	127.18	87
1.45	2	0.04	...	96.69	92	92.82	78
0.96	1	...	...	85.29	81	90.43	76
1.04	1	...	...	97.69	92	96.21	81
0.30	...	...	...	39.77	46	26.79	33
0.34	1	...	...	30.69	43	10.65	29
0.46	1	0.57	1	32.85	39	13.57	27
0.59	1	0.01	...	38.78	45	21.22	33
0.49	1	0.70	2	29.00	36	12.02	26
0.60	1	...	...	7.62	9	4.25	4
0.42	1	0.80	2	7.25	9	5.75	6
0.47	1	0.08	...	4.76	9	2.71	5
0.46	...	0.17	1	6.42	7	0.40	1
0.56	1	0.06	...	4.44	6	1.28	4
0.45	1	0.10	...	2.66	5	2.58	4
0.60	2	0.18	...	4.00	8	4.09	4

are averages for six and two stations respectively.

TABLE

Total area and area cultivated and uncultivated in each District

No.	District.	Area by village papers. (Total area of the district.)	Deduct area for which no returns exist.	Net area for which statistics are available.	CULTIVATED		
					Gross area cropped.		
					Reported.	Estimated.	Total.
1	2	3	4	5	6	7	8
<b>A—BOMBAY PRESIDENCY PROPER.</b>							
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<i>Gujarat.</i>							
1	Ahmedabad	2,451,784	181,177	2,320,607	1,248,359	75,950	1,324,309
2	Kaira	1,029,159	84,700	944,459	737,033	65,258	802,291
3	Panch Mahals	1,028,706	175,833	852,873	458,989	121,573	580,562
4	Broach	938,963	23,012	915,951	597,362	20,010	617,372
5	Surat	1,058,277	24,835	1,033,442	761,152	23,292	784,444
	<b>Gujarat Total</b>	<b>6,506,889</b>	<b>499,557</b>	<b>6,067,332</b>	<b>3,802,835</b>	<b>306,063</b>	<b>4,108,918</b>
<i>Deccan.</i>							
6	West Khandesh	3,481,182	970,564	2,510,618	1,417,864	12,351	1,430,215
7	East Khandesh	2,908,679	.....	2,908,679	2,001,410	.....	2,001,410
8	Nasik	3,771,013	15,858	3,755,155	2,032,510	10,327	2,042,837
9	Ahmednagar	4,242,106	30,710	4,211,396	2,646,025	20,206	2,666,231
10	Poona	3,427,445	49,904	3,378,541	2,066,490	25,516	2,092,006
11	Sholapur	2,916,104	.....	2,916,104	2,176,753	.....	2,176,753
12	Satara	3,141,355	123,858	3,017,497	2,004,427	74,585	2,079,012
	<b>Deccan Total</b>	<b>23,887,884</b>	<b>1,189,894</b>	<b>22,697,990</b>	<b>14,345,479</b>	<b>142,995</b>	<b>14,488,474</b>
<i>Karnatak.</i>							
13	Belgaum	2,952,667	141,066	2,811,601	1,734,459	54,813	1,788,672
14	Bijapur	3,652,918	11,964	3,640,954	2,330,902	8,212	2,339,114
15	Dharwar	2,946,989	72,402	2,874,587	2,099,229	54,287	2,153,516
	<b>Karnatak Total</b>	<b>9,552,574</b>	<b>225,432</b>	<b>9,327,142</b>	<b>6,664,590</b>	<b>116,712</b>	<b>6,781,302</b>
<i>Konkan.</i>							
16	Thana	2,191,588	50,196	2,141,392	569,883	12,211	582,093
17	Bombay Suburban	98,115	15,324	82,791	24,300	8,526	32,826
18	Kolaba	1,367,400	65,151	1,302,249	366,764	24,094	390,858
19	Ratnagiri	2,563,730	1,694,439	669,291	196,749	674,613	871,362
20	Kanara	2,525,835	.....	2,525,835	254,968	.....	254,968
	<b>Konkan Total</b>	<b>8,766,668</b>	<b>2,025,112</b>	<b>6,741,556</b>	<b>1,412,653</b>	<b>719,444</b>	<b>2,132,097</b>
	<b>Total Presidency Proper.</b>	<b>48,714,015</b>	<b>3,880,015</b>	<b>44,834,000</b>	<b>26,225,657</b>	<b>1,285,234</b>	<b>27,510,791</b>
<i>B—Sind.</i>							
21	Karachi	7,599,815	.....	7,599,815	433,113	.....	433,113
22	Hyderabad	2,833,963	.....	2,833,963	630,449	.....	630,449
23	Thar Parkar	8,727,079	.....	8,727,079	954,140	.....	954,140
24	Nawabshah	2,495,892	.....	2,495,892	484,465	.....	484,465
25	Larkana	3,240,681	140,630	3,100,051	895,047	1,050	896,097
26	Sukkur	3,593,299	.....	3,593,299	453,599	.....	453,599
27	Upper Sind Frontier.	1,735,240	134,906	1,600,332	559,243	.....	559,243
	<b>Sind Total</b>	<b>30,155,969</b>	<b>265,536</b>	<b>29,890,431</b>	<b>4,410,055</b>	<b>1,050</b>	<b>4,411,105</b>
	<b>Grand Total</b>	<b>78,869,984</b>	<b>4,145,553</b>	<b>74,724,431</b>	<b>30,635,613</b>	<b>1,286,284</b>	<b>31,921,896</b>

## II.—AREA.

of the Bombay Presidency (including Sind) in 1923-24.

Deduct area cropped more than once.			Net cropped area.		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
9	10	11	12	13	14
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
9,468	121	9,589	1,235,697	75,829	1,311,526
8,237	302	8,539	726,796	64,936	791,732
39,043	7,277	46,320	419,546	114,296	533,842
138	.....	138	597,164	20,010	617,174
26,921	703	27,624	734,931	22,589	757,520
83,101	8,423	91,524	3,719,734	297,660	4,017,394
22,799	31	22,830	1,395,065	12,330	1,407,395
9,213	.....	9,213	1,992,197	.....	1,992,197
54,685	743	55,428	1,977,625	9,594	1,987,219
72,330	191	72,521	2,573,695	20,015	2,593,710
106,373	189	107,062	1,959,612	25,327	1,984,939
35,863	.....	35,863	2,140,599	.....	2,140,599
79,196	5,096	84,292	1,925,231	69,489	1,994,720
380,964	6,250	387,214	13,964,515	136,745	14,101,260
32,333	226	32,559	1,712,126	53,967	1,766,093
4,353	.....	4,353	2,896,549	8,213	2,904,762
10,753	111	10,864	2,088,476	54,176	2,142,652
37,439	337	37,776	6,627,151	116,375	6,743,526
4,906	46	4,952	564,974	12,165	577,139
251	.....	251	24,049	8,596	32,645
10,622	275	11,097	356,941	23,819	379,760
10,578	37,767	48,345	186,171	626,846	813,017
18,982	.....	18,982	235,976	.....	235,976
45,542	38,088	83,630	1,367,111	661,356	2,028,467
547,046	53,098	600,144	25,678,511	1,232,196	26,910,707
24,207	.....	24,207	408,305	.....	408,305
6,228	.....	6,228	624,221	.....	624,221
4,771	.....	4,771	949,269	.....	949,269
15,104	.....	15,104	469,361	.....	469,361
229,547	.....	229,547	565,500	1,060	666,507
37,964	.....	37,964	415,635	.....	415,635
79,543	.....	79,543	479,700	.....	479,700
397,964	.....	397,964	4,012,091	1,050	4,013,141
945,010	63,098	998,108	29,660,602	1,233,196	30,893,798

TABLE

No.	District.	CULTIVATED					
		Add current fallows.			Total cultivated area.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	15	16	17	18	19	20
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>A.—BOMBAY PRESIDENCY PROPER.</b>							
<i>Gujarat.</i>							
1	Ahmedabad	494,445	48,150	542,595	1,733,342	124,279	1,857,621
2	Kaira	53,300	4,482	57,782	752,096	69,418	821,514
3	Panch Mahals	69,403	33,321	102,724	489,349	147,517	636,866
4	Broach	46,327	885	47,212	643,491	20,895	664,386
5	Surat	30,780	265	31,045	755,711	22,854	778,565
	<b>Gujarat Total</b>	<b>684,255</b>	<b>87,303</b>	<b>771,558</b>	<b>4,403,989</b>	<b>384,963</b>	<b>4,788,952</b>
<i>Deccan.</i>							
6	West Khandesh	185,873	783	186,656	1,580,933	13,103	1,594,041
7	East Khandesh	73,760	.....	73,760	2,065,957	.....	2,065,957
8	Nasik	497,243	2,592	499,835	2,475,068	12,186	2,487,254
9	Ahmednagar	512,945	4,821	517,766	3,186,640	24,836	3,211,476
10	Poona	562,085	21,542	583,627	2,521,697	47,169	2,568,896
11	Sholapur	384,654	.....	384,654	2,525,544	.....	2,525,544
12	Satara	324,035	17,441	341,476	2,249,266	86,630	2,336,196
	<b>Deccan Total</b>	<b>2,640,595</b>	<b>47,479</b>	<b>2,688,074</b>	<b>16,605,110</b>	<b>184,224</b>	<b>16,789,334</b>
<i>Karnatak.</i>							
13	Belgaum	402,962	31,639	434,601	2,115,038	85,626	2,200,714
14	Bijapur	395,825	3,214	399,039	3,222,374	11,426	3,233,800
15	Dharwar	265,123	4,781	269,904	2,353,599	58,957	2,412,556
	<b>Karnatak Total</b>	<b>1,063,910</b>	<b>39,634</b>	<b>1,103,544</b>	<b>7,691,051</b>	<b>1,56,009</b>	<b>7,847,070</b>
<i>Konkan.</i>							
16	Thana	376,183	24,967	401,150	941,157	37,132	978,289
7	Bombay Suburban	23,532	6,025	29,557	47,581	14,651	62,132
18	Kolaba	392,830	23,704	416,534	745,741	47,523	793,254
19	Ratnagiri	236,573	754,250	990,823	422,744	1,391,096	1,813,840
21	Kanara	106,094	.....	106,094	342,070	.....	342,070
	<b>Konkan Total</b>	<b>1,135,182</b>	<b>808,946</b>	<b>1,944,128</b>	<b>2,502,293</b>	<b>1,490,302</b>	<b>3,992,595</b>
	<b>Total Presidency Proper.</b>	<b>5,523,943</b>	<b>963,362</b>	<b>6,507,304</b>	<b>31,202,453</b>	<b>2,215,498</b>	<b>33,417,951</b>
<b>B.—Sind</b>							
21	Karachi	422,915	.....	422,915	831,223	.....	831,220
23	Hyderabad	733,048	.....	733,048	1,357,269	.....	1,357,269
23	Thar & Parkar	1,441,480	.....	1,441,480	2,399,949	.....	2,399,849
24	Nawabshah	782,499	.....	782,499	1,251,560	.....	1,251,860
25	Larkana	665,757	139,580	805,337	1,331,287	140,630	1,471,917
26	Sukkur	674,987	.....	674,987	1,030,622	.....	1,030,622
27	Upper Sind Frontier.	479,217	13,385	492,602	958,917	13,385	972,302
	<b>Sind Total</b>	<b>5,199,933</b>	<b>152,965</b>	<b>5,352,898</b>	<b>9,212,024</b>	<b>154,015</b>	<b>9,366,039</b>
	<b>Grand Total</b>	<b>10,723,875</b>	<b>1,136,327</b>	<b>11,860,202</b>	<b>40,414,477</b>	<b>2,369,513</b>	<b>42,783,990</b>

II—AREA—continued.

AREA.

Details of cultivated area.					
Assessed.			Unassessed.		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
21	22	23	24	25	26
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1,716,527	124,266	1,840,793	16,815	13	16,828
780,821	69,418	850,239	1,275	.....	1,275
490,141	147,517	636,658	.....	.....	908
540,784	30,895	661,679	2,707	.....	2,707
752,319	22,854	775,173	3,392	.....	3,392
4,379,592	384,950	4,764,542	24,397	13	24,410
1,562,877	13,101	1,575,978	18,061	2	18,063
2,065,152	.....	2,065,152	799	.....	799
2,454,773	12,186	2,476,959	10,295	.....	10,295
3,178,617	24,835	3,203,452	8,023	1	8,024
2,495,602	47,169	2,542,771	26,095	.....	26,095
2,518,045	.....	2,518,045	7,499	.....	7,499
2,246,229	86,930	2,333,159	3,037	.....	3,037
16,531,301	184,221	16,715,522	73,609	3	73,612
2,110,513	85,626	2,196,139	4,575	.....	4,575
3,221,852	11,426	3,233,278	522	.....	522
2,353,567	58,957	2,412,524	32	.....	32
7,685,932	156,009	7,841,941	5,129	.....	5,129
920,641	37,132	957,773	20,516	.....	20,516
47,542	14,551	62,094	38	.....	38
747,228	47,523	794,751	1,513	.....	1,513
432,744	1,691,096	1,813,840	.....	.....	.....
341,152	.....	341,152	918	.....	918
2,479,308	1,490,302	3,969,610	22,985	.....	22,985
31,076,133	2,315,482	33,291,615	126,320	16	126,336
621,309	.....	621,309	209,911	.....	209,911
1,340,920	.....	1,340,920	16,349	.....	16,349
2,318,046	.....	2,318,046	72,803	.....	72,803
1,221,614	.....	1,221,614	30,216	.....	30,216
1,232,908	140,630	1,373,538	98,379	.....	98,379
1,046,325	.....	1,046,325	44,297	.....	44,297
885,137	.....	885,137	73,780	13,385	87,165
8,668,262	140,630	8,808,919	645,735	13,385	659,120
30,742,422	2,356,112	32,098,534	672,055	13,401	685,456

TABLE

No.	District.	UNCULTIVATED					
		Culturable waste unoccupied and unassessed.			Not available.		
		1			2		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	3	4	5	6		
		Acres.	Acres.	Acres.	Acres.	Acres.	
<b>A—BOMBAY PRESIDENCY PROPER.</b>							
<i>Gujarat.</i>							
1	Ahmedabad	102,191	312	102,503	12,017	12,017	
2	Kaira	23,227	185	23,412	.....	.....	
3	Panch Mahals	72,591	996	73,587	202,064	210,175	
4	Broach	24,628	.....	24,628	.....	.....	
5	Surat	58,941	18	58,959	44,798	44,798	
	<b>Gujarat Total</b>	<b>281,578</b>	<b>1,513</b>	<b>283,091</b>	<b>258,379</b>	<b>269,054</b>	
<i>Deccan.</i>							
6	West Khandesh	150,012	608	150,615	504,676	955,945	
7	East Khandesh	59,588	.....	59,588	415,596	415,596	
8	Nasik	68,327	.....	68,327	812,639	812,639	
9	Ahmednagar	44,239	15	44,254	531,248	531,248	
10	Poona	14,188	4	14,192	414,143	414,157	
11	Sholapur	16,444	.....	16,444	111,454	111,454	
12	Satara	24,471	5,191	29,662	448,434	448,963	
	<b>Deccan Total</b>	<b>377,269</b>	<b>5,753</b>	<b>383,022</b>	<b>3,298,190</b>	<b>4,195,946</b>	
<i>Karnatak.</i>							
13	Belgaum	59,141	856	59,997	447,015	447,015	
14	Bijapur	45,946	300	46,246	176,594	176,594	
15	Dharwar	53,355	634	53,989	242,574	242,574	
	<b>Karnatak Total</b>	<b>157,442</b>	<b>1,790</b>	<b>159,232</b>	<b>866,489</b>	<b>866,489</b>	
<i>Konkan.</i>							
16	Thana	41,271	430	41,701	799,648	800,804	
17	Bombay Suburban	5,579	12	5,591	3,894	3,894	
18	Kolaba	19,160	.....	19,160	329,882	332,384	
19	Rainagiri	6,492	3,407	9,899	9,067	13,127	
20	Kanara	41,933	.....	41,933	2,071,140	2,071,140	
	<b>Konkan Total</b>	<b>114,435</b>	<b>3,649</b>	<b>119,284</b>	<b>3,213,631</b>	<b>3,221,349</b>	
	<b>Total Presidency Proper.</b>	<b>930,724</b>	<b>12,905</b>	<b>943,629</b>	<b>7,577,163</b>	<b>8,552,832</b>	
<b>B.—Sind.</b>							
21	Karachi	1,254,520	.....	1,254,520	170,574	170,574	
22	Hyderabad	959,361	.....	959,361	70,856	70,856	
23	Thar & Parkar	1,800,761	.....	1,800,761	43,410	43,410	
24	Nuwabsbah	433,973	.....	433,973	89,457	89,457	
25	Larkana	929,526	.....	929,526	59,832	59,832	
26	Sukkur	457,308	.....	457,308	264,283	264,283	
27	Upper Sind Frontier.	265,281	.....	265,281	40,308	40,308	
	<b>Sind Total</b>	<b>6,100,730</b>	<b>.....</b>	<b>6,100,730</b>	<b>738,720</b>	<b>738,720</b>	
	<b>Grand Total</b>	<b>7,031,454</b>	<b>12,905</b>	<b>7,044,359</b>	<b>8,315,903</b>	<b>9,291,552</b>	



II—AREA—concluded.

AREA.					
For cultivation.			Total uncultivated area.		
3 Others.					
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
33	34	35	36	37	38
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
473,057	6,586	479,643	587,265	6,898	594,163
139,136	15,097	154,233	162,363	15,282	177,645
88,969	17,143	106,012	363,524	28,316	391,840
247,832	2,117	249,949	272,460	2,117	274,577
173,992	1,963	175,955	277,731	1,981	279,712
1,122,886	43,906	1,166,792	1,663,349	54,594	1,717,943
274,902	913	275,815	929,680	957,461	1,887,141
967,538	.....	967,538	842,722	.....	842,722
399,121	2,404	401,525	1,380,067	3,672	1,383,739
449,269	5,859	455,128	1,024,756	5,874	1,030,630
428,513	1,717	430,230	856,844	1,735	858,579
262,662	.....	262,662	390,560	.....	390,560
296,326	31,268	327,594	798,231	36,828	835,059
2,477,421	42,161	2,519,582	6,093,880	1,006,670	7,099,550
191,357	54,584	245,941	696,513	55,440	751,953
195,725	256	195,981	418,560	556	419,116
225,059	12,811	237,870	520,988	13,445	534,433
612,136	67,653	679,789	1,636,061	69,443	1,705,504
359,314	11,480	370,794	1,200,233	13,066	1,213,299
25,737	761	26,498	35,210	773	35,983
224,486	15,126	239,612	573,508	17,628	591,136
230,988	495,876	726,864	246,547	593,343	749,890
70,692	.....	70,692	2,153,765	.....	2,153,765
911,197	523,243	1,434,440	4,239,263	534,810	4,774,073
5,123,640	675,963	5,799,603	13,631,547	1,664,517	15,296,064
5,283,501	.....	5,283,501	6,708,595	.....	6,708,595
446,477	.....	446,477	1,476,694	.....	1,476,694
4,492,059	.....	4,492,059	6,335,230	.....	6,335,230
731,602	.....	731,602	1,244,032	.....	1,244,032
779,406	.....	779,406	1,768,764	.....	1,768,764
1,781,086	.....	1,781,086	2,502,677	.....	2,502,677
345,826	111,523	457,349	641,415	111,523	752,938
13,838,957	111,523	13,950,480	20,678,407	111,523	20,789,930
18,962,596	787,486	19,750,082	34,309,954	1,776,040	36,085,994

TABLE III—  
Area under different crops in each District

Serial No.	District.	Cereals					
		1. Rice.			2. Wheat.		
		Reported.	Estimated.	Total.*	Reported.	Estimated.	Total.
2	3	4	5	6	7	8	
A.—PRESIDENCY PROPER.		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<i>I.—Gujarat.</i>							
1	Ahmedabad	12,695	65	12,760	64,919	2,352	67,271
2	Kaira	23,657	1,162	24,819	6,552	227	6,779
3	Panch Mahals	54,562	9,113	63,675	7,653	1,629	9,282
4	Broach	8,369	65	8,434	8,624	386	8,990
5	Surat	97,217	1,772	98,989	9,367	22	9,389
	Total, Gujarat	196,799	12,113	207,912	97,115	4,596	101,711
<i>II.—Deccan.</i>							
6	West Khandesh	10,888	830	50,719	120,576	2,706	123,292
7	East Khandesh	471	.....	471	28,247	...	28,247
8	Nasik	61,002	790	61,792	159,089	880	160,924
9	Ahmednagar	16,744	7	16,751	138,293	1,504	139,997
10	Poona	89,549	3,261	83,909	48,978	560	49,468
11	Sholapur	3,824	.....	3,824	26,528	...	26,528
12	Satara	11,042	3,107	47,149	37,667	1,883	39,650
	Total, Deccan	236,310	7,935	261,305	538,407	7,279	565,686
<i>III.—Karnatak</i>							
13	Belgaum	195,598	6,527	112,125	78,512	624	79,136
14	Bijapur	2,418	...	2,418	166,194	317	166,511
15	Dharwar	115,130	1,519	116,579	208,905	8,445	217,350
	Total, Karnatak	223,146	8,076	231,222	453,611	9,386	462,907
<i>IV.—Konkan.</i>							
16	Thana	305,000	6,867	311,867	159	...	159
17	Bombay Suburban	11,575	3,933	15,508	...	...	...
18	Kolaba	218,968	19,620	268,528	...	...	...
19	Ratnagiri	77,123	270,687	348,110	...	...	...
20	Kanara	163,952	...	163,952	...	...	...
	Total, Konkan	866,558	391,107	1,107,965	159	...	159
	Total, Presidency proper	1,182,094	329,321	1,811,415	1,109,292	21,261	1,130,553
<i>B.—SIND.</i>							
21	Karachi	243,538	...	243,538	11,819	...	11,819
22	Hyderabad	257,103	...	257,103	19,314	...	29,314
23	Thar - Parkar	66,747	...	66,747	14,837	...	44,835
24	Nawalshah	35,294	...	35,294	44,469	...	44,469
25	Larkana	416,116	350	416,766	91,504	...	91,504
26	Sukkar	63,832	...	63,832	137,069	...	137,069
27	Upper Sind Frontier	107,160	...	107,160	73,572	...	73,572
	Total, Sind	1,199,910	350	1,199,350	432,602	...	432,602
	Grand Total	2,672,094	339,671	3,001,765	1,541,894	21,261	1,563,155

\* Of this area Belgaum had 430 acres, Ratnagiri 14,456 acres

† Of this area the following districts cultivated Jowari as a *rali* crop:—

Acres.	Acres.	Acres.
Ahmedabad	Broach	Nasik
11,057	112,617	49,706
Kaira	Surat	Ahmednagar
661	12,153	917,273
Panch Mahals	West Khandesh	Poona
6,562	53,297	728,593

CROPS.  
of the Bombay Presidency (including Sind) in 1923-24.

and Pulses.

3. Barley.			4. Cholam or Jowar (millet).			5. Cumbu or Bajri (millet).		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total †	Reported.	Estimated.	Total.
9	10	11	12	13	14	15	16	17
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
4,689	1,138	5,827	303,169	13,790	321,899	129,598	7,354	137,252
913	88	1,001	55,493	3,418	58,911	144,511	18,492	163,003
1,065	639	2,294	12,371	1,817	14,188	39,372	8,685	41,737
...	...	...	142,080	4,843	146,923	8,364	286	8,650
...	...	...	31,463	5,073	36,536	5,923	3	5,926
7,247	1,853	9,100	698,116	33,941	732,057	321,668	34,799	356,467
...	...	...	131,743	1,782	133,525	331,393	772	332,162
...	...	...	321,716	...	321,716	309,083	...	309,083
...	...	...	85,498	323	85,821	955,030	1,622	956,651
321	6	327	908,210	9,063	917,273	876,826	3,039	879,865
699	...	699	894,567	7,251	901,818	583,817	3,006	586,823
1,655	...	1,655	1,377,405	...	1,377,405	167,195	...	167,195
2,674	137	2,811	644,809	21,357	666,166	240,834	10,761	301,195
5,349	163	5,512	4,407,947	8,776	4,416,723	3,515,784	19,200	3,534,984
1,830	181	2,011	529,010	11,327	540,337	144,778	4,369	149,147
2,316	3	2,319	1,278,771	3,923	1,282,694	298,821	813	299,634
42	...	42	326,847	16,441	343,288	7,022	2,463	9,485
4,188	184	4,372	2,314,624	32,191	2,346,815	430,621	7,633	438,254
...	...	...	456	1	457	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	100	...	100	...	...	...
...	...	...	643	1	644	...	...	...
16,784	2,200	18,984	7,341,337	103,009	7,444,346	4,258,073	61,634	4,319,707
7,928	...	7,928	40,563	...	40,563	11,871	...	11,871
2,074	...	2,074	7,331	...	7,331	186,174	...	186,174
203	...	203	9,948	...	9,948	623,151	...	623,151
1,647	...	1,647	97,323	...	97,323	116,111	...	116,111
2,368	...	2,368	89,159	200	90,359	1,076	...	1,076
465	...	465	112,756	...	112,756	17,226	...	17,226
76	...	76	97,493	...	97,493	76,691	...	76,691
14,761	...	14,761	454,573	200	454,773	1,012,970	...	1,012,970
31,545	2,200	33,745	7,795,910	10,647	7,806,557	5,300,973	61,634	5,362,607

and Kanara 10,389 acres under late rice.

	Acres.		Acres.
Sholapur	1,477,405	Bijapur	946,650
Satara	396,602	Dharwar	119,666
Belgaum	229,529	Thana	457

TABLE III—CROPS—

Serial No. 1	District. 2	Cereals and					
		6. Bajri or Marua.			7. Maize.		
		Reported. 18	Estimated 19	Total. 20	Reported. 21	Estimated 22	Total. 23
	<b>PRESIDENCY PROPER.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>
	<i>I.—Gujarat.</i>						
1	Ahmedabad	1,144	3	1,147	4,545	101	4,646
2	Kaira	54,420	6,007	60,427	924	53	977
3	Panch Mahals	16,432	3,401	19,833	103,036	44,110	147,146
4	Broach	167	...	167	42	...	42
5	Surat	10,401	316	10,717	13	9	21
	<b>Total Gujarat</b>	<b>82,564</b>	<b>9,727</b>	<b>92,291</b>	<b>108,559</b>	<b>44,273</b>	<b>152,832</b>
	<i>II.—Deccan.</i>						
6	West Khândesh	15,461	124	15,585	7,128	66	7,194
7	East Khândesh	...	...	...	727	...	727
8	Nasik	104,888	1,347	106,235	3,760	59	3,819
9	Ahmednagar	21,866	...	20,865	1,261	1	1,262
10	Poona	38,437	3,683	42,120	1,781	1	1,782
11	Sholapur	87	...	87	10,991	...	10,991
12	Sâtâra	36,698	3,294	39,992	6,766	725	9,491
	<b>Total Deccan</b>	<b>211,586</b>	<b>8,648</b>	<b>220,234</b>	<b>33,517</b>	<b>852</b>	<b>34,369</b>
	<i>III.—Karnatak.</i>						
13	Belgâum	24,376	5,273	29,649	15,904	424	16,328
14	Bijâpur	261	...	261	1,802	...	1,962
15	Dhârwar	23,839	534	24,373	15	36	49
	<b>Total Karnatak</b>	<b>53,476</b>	<b>5,807</b>	<b>59,283</b>	<b>17,719</b>	<b>460</b>	<b>18,179</b>
	<i>IV.—Konkan.</i>						
16	Thâna	43,496	1,102	44,598	19	...	19
17	Bombay Suburban District	51	...	51	...	...	...
18	Koliba	36,611	1,606	38,217	...	...	...
19	Ratnâgiri	33,940	113,199	147,089	...	...	...
20	Kanara	2,111	...	2,111	21	...	21
	<b>Total Konkan</b>	<b>116,099</b>	<b>115,907</b>	<b>231,996</b>	<b>40</b>	<b>...</b>	<b>40</b>
	<b>Total, Presidency proper</b>	<b>463,725</b>	<b>139,989</b>	<b>603,714</b>	<b>159,835</b>	<b>45,585</b>	<b>205,420</b>
	<b>SIND.</b>						
21	Karâchi	381	...	381	1,601	...	1,601
22	Hyderabad	2	...	2	140	...	140
23	Thar-Pârkar	...	...	...	659	...	659
24	Nawâbehâh	...	...	...	83	...	83
25	Larkana	...	...	...	...	...	...
26	Sukkur	27	...	27	5	...	5
27	Upper Sind Frontier	...	...	...	29	...	29
	<b>Total, Sind</b>	<b>410</b>	<b>...</b>	<b>410</b>	<b>2,517</b>	<b>...</b>	<b>2,517</b>
	<b>Grand Total</b>	<b>464,135</b>	<b>139,989</b>	<b>604,124</b>	<b>162,352</b>	<b>45,585</b>	<b>207,937</b>

continued.

pulses—concluded.

8. Gram.			9. Other food-grains, including pulses.			Total cereals and Pulses.		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
24	25	26	27	28	29	30	31	32
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1,181	645	1,826	49,677	4,282	52,959	570,840	34,720	605,560
1,659	64	1,723	123,708	14,039	137,747	411,437	43,488	454,925
26,615	5,408	32,023	64,441	16,224	80,665	320,597	91,017	411,614
219	33	252	39,521	1,731	40,252	206,528	7,327	213,855
1,539	40	1,579	37,910	1,516	39,425	346,532	8,749	355,281
<b>31,616</b>	<b>6,185</b>	<b>37,801</b>	<b>313,267</b>	<b>37,794</b>	<b>351,061</b>	<b>1,755,932</b>	<b>186,311</b>	<b>1,941,243</b>
31,465	805	32,270	153,305	1,090	154,395	843,956	8,175	552,131
5,831	...	5,831	258,978	...	258,978	31,636	...	925,050
68,903	119	69,022	224,446	2,046	226,492	1,658,604	7,842	1,666,446
67,363	666	68,029	163,156	1,438	164,594	2,199,241	15,324	2,214,565
39,293	536	39,829	106,117	2,563	108,680	1,736,848	20,851	1,757,699
39,836	...	39,836	77,894	...	77,894	1,844,515	...	1,844,515
44,793	2,097	46,890	173,567	9,323	182,890	1,282,719	52,704	1,335,423
<b>297,984</b>	<b>4,328</b>	<b>302,312</b>	<b>1,163,749</b>	<b>16,461</b>	<b>1,180,210</b>	<b>10,450,033</b>	<b>104,866</b>	<b>10,554,899</b>
19,245	1,642	20,887	246,851	7,426	254,277	1,166,104	38,263	1,204,367
33,617	225	33,842	156,950	550	157,500	1,940,290	5,831	1,946,121
24,956	953	25,909	294,054	9,178	303,232	1,206,738	39,694	1,246,432
<b>77,878</b>	<b>2,825</b>	<b>80,703</b>	<b>697,856</b>	<b>17,154</b>	<b>715,010</b>	<b>4,313,122</b>	<b>83,718</b>	<b>4,396,840</b>
934	234	1,168	34,103	1,346	35,449	384,157	9,550	393,707
...	...	...	...	...	...	11,634	3,933	15,567
292	5	297	35,419	992	36,411	324,220	22,123	346,343
13	54	67	39,339	149,384	179,633	156,820	524,334	674,654
238	...	238	5,348	...	5,348	171,960	...	171,960
<b>1,492</b>	<b>293</b>	<b>1,785</b>	<b>114,107</b>	<b>147,732</b>	<b>261,839</b>	<b>1,039,391</b>	<b>569,940</b>	<b>1,609,331</b>
<b>408,360</b>	<b>13,826</b>	<b>422,186</b>	<b>2,385,978</b>	<b>214,140</b>	<b>2,600,118</b>	<b>17,558,478</b>	<b>833,366</b>	<b>18,402,343</b>
397	...	397	26,238	...	26,238	344,226	...	344,226
284	...	284	5,925	...	5,925	46,347	...	46,347
483	...	483	3,342	...	3,342	749,368	...	749,368
11,461	...	11,461	23,144	...	23,144	324,342	...	324,342
30,685	...	30,685	171,709	...	171,709	103,515	550	804,068
51,089	...	51,089	34,462	...	34,462	418,911	...	418,911
109,107	...	109,107	48,331	...	48,331	511,479	...	511,479
<b>202,456</b>	<b>...</b>	<b>202,456</b>	<b>313,142</b>	<b>...</b>	<b>313,142</b>	<b>3,623,361</b>	<b>550</b>	<b>3,623,911</b>
<b>610,816</b>	<b>13,826</b>	<b>624,642</b>	<b>2,612,120</b>	<b>214,140</b>	<b>2,826,260</b>	<b>21,181,639</b>	<b>831,415</b>	<b>22,113,054</b>

TABLE III—CROPS

Serial No.	District.	Oil-seeds.					
		10. Linseed.			11. Sesamum ( <i>Til</i> or <i>Jinjil</i> ).		
		Reported.	Esti- mated.	Total.	Reported.	Esti- mated.	Total.
2	33	34	35	36	37	38	
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>PRESIDENCY PROPER.</b>							
<i>I.—Gujarat.</i>							
1	Ahmedabad	15	...	15	18,141	385	18,526
2	Baira	2	...	2	9,214	636	9,850
3	Panch Mahals	40	3	43	22,754	3,981	26,735
4	Broach	1	...	1	9,724	110	9,834
5	Surat	...	...	...	1,487	10	1,497
	Total	61	3	67	61,320	5,122	66,442
<i>II.—Deccan.</i>							
6	West Khândesh	6,128	173	6,298	24,976	361	25,337
7	East Khândesh	521	...	521	16,846	...	16,846
8	Nasik	16,119	230	16,349	14,072	...	14,072
9	Ahmednagar	14,373	267	14,640	15,680	107	15,787
10	Poona	980	20	1,000	23,604	1,064	27,555
11	Sholapur	12,081	...	12,081	4,340	...	4,340
12	Satara	2,984	120	3,104	250	10	3,280
	Total	54,085	810	54,895	101,306	2,430	104,235
<i>III.—Karnatak.</i>							
13	Belgaum	2,721	2	2,723	2,641	25	2,666
14	Bijapur	41,262	84	41,346	12,304	23	12,417
16	Dharwar	10,082	218	10,299	5,713	231	5,944
	Total	57,065	304	57,369	20,748	279	21,027
<i>IV.—Konkan.</i>							
16	Thana	...	...	...	1,268	31	1,319
17	Bombay Suburban	...	...	...	4	...	4
18	Kolaha	...	...	...	2,208	49	2,256
19	Ratnagiri	...	...	...	1,487	4,339	5,826
20	Kanara	6	...	6	113	...	113
	Total	6	...	6	5,160	4,468	9,568
	Total, Presidency proper	111,300	1,117	112,317	188,174	12,308	201,232
<b>SIND.</b>							
21	Karachi	...	...	...	3,190	...	3,190
22	Hyderabad	...	...	...	2,116	...	2,116
23	Thar—Parker	...	...	...	5,831	...	5,831
24	Nawabshah	...	...	...	8,473	...	8,473
25	Larkana	...	...	...	2,496	...	2,496
26	Sukkur	...	...	...	2,412	...	2,412
27	Upper Sind Frontier	...	...	...	4,448	...	4,448
	Total, Sind	...	...	...	30,000	...	30,000
	Grand Total	111,300	1,117	112,317	218,073	12,308	231,581

continued.

continued.

12. Rape and Mustard.			13. Groundnut.			14. Coconut.		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
39	40	41	42	43	44	45	46	47
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
6,746	9	6,755	9,128	.....	9,128	.....	.....	.....
180	15	195	715	25	740	.....	.....	.....
471	18	489	15,507	2,507	18,014	.....	.....	.....
31	.....	31	163	.....	163	.....	.....	.....
179	.....	179	283	31	314	34	.....	34
7,007	42	7,049	25,790	2,583	28,373	34	.....	34
2,306	53	2,359	19,023	33	19,056	.....	.....	.....
79	.....	79	106,046	.....	106,046	.....	.....	.....
84	.....	84	5,887	17	6,014	.....	.....	.....
8	.....	8	4,682	55	4,737	.....	.....	.....
13	.....	13	14,369	820	14,579	2	.....	2
.....	.....	.....	37,933	.....	37,933	.....	.....	.....
.....	.....	.....	105,631	5,422	111,053	43	.....	43
3,240	58	3,298	296,633	6,047	302,680	41	.....	41
.....	.....	.....	18,553	167	18,720	2	.....	2
.....	.....	.....	766	1	767	7	.....	7
143	.....	143	8,441	187	8,628	352	.....	352
143	.....	143	27,710	355	28,115	381	.....	381
6	.....	6	4	.....	4	306	.....	296
.....	.....	.....	.....	.....	.....	807	.....	807
.....	.....	.....	.....	.....	.....	1,187	.....	1,187
.....	.....	.....	34	102	136	8,977	26,220	33,197
.....	.....	.....	108	.....	108	11,648	.....	11,648
6	.....	6	146	102	248	20,595	26,220	47,115
11,002	100	11,102	350,335	9,067	359,402	21,334	26,220	47,554
25,679	.....	25,679	.....	.....	.....	34	.....	34
42,917	.....	42,917	.....	.....	.....	.....	.....	.....
808	.....	808	.....	.....	.....	.....	.....	.....
13,355	.....	13,355	.....	.....	.....	.....	.....	.....
71,800	500	71,800	.....	.....	.....	8,101	.....	3,101
14,503	.....	14,503	2	.....	2	.....	.....	.....
38,205	.....	38,205	.....	.....	.....	.....	.....	.....
207,445	500	207,945	2	.....	2	3,135	.....	3,135
218,417	600	219,017	350,337	9,067	359,404	21,334	26,220	50,554

TABLE III—CROPS

Serial No.	District.	Oil-seeds					
		15. Castor Seed.			16. Other oil-seeds.		
		Reported.	Esti- mated.	Total.	Reported.	Esti- mated.	Total.
1	2	48	49	50	51	52	53
	<b>A.—PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>I.—Gujarat.</i>						
1	Ahmedabad	8,004	561	8,565	976	8	824
2	Kaira	13,486	1,305	14,791	.....	.....	.....
3	Panch Mahals	1,481	400	1,880	4,400	1,316	5,716
4	Broach	1,072	62	1,134	184	8	192
5	Surat	7,004	260	7,264	220	3	223
	<b>Total</b>	<b>31,049</b>	<b>2,597</b>	<b>33,646</b>	<b>5,720</b>	<b>1,335</b>	<b>7,055</b>
	<i>II.—Deccan.</i>						
6	West Khândesh	18,165	235	18,400	10,674	91	10,765
7	East Khândesh	595	.....	595	.....	.....	.....
8	Nasik	.....	.....	.....	33,498	1,624	35,120
9	Ahmednagar	.....	.....	.....	11,496	55	11,551
10	Poona	38	.....	38	4,237	.....	4,275
11	Sholapur	1,854	.....	1,854	3,603	.....	3,603
12	Satara	158	5	163	8,730	382	9,112
	<b>Total</b>	<b>20,810</b>	<b>240</b>	<b>21,050</b>	<b>122,345</b>	<b>2,152</b>	<b>124,397</b>
	<i>III.—Karnatak.</i>						
13	Belgaum	1,102	60	1,222	4,391	1,611	6,002
14	Bijapur	768	8	715	4,437	13	4,470
15	Dharwar	3,053	83	3,141	4,228	254	4,522
	<b>Total</b>	<b>4,923</b>	<b>151</b>	<b>5,078</b>	<b>13,146</b>	<b>1,878</b>	<b>15,024</b>
	<i>IV.—Konkan.</i>						
16	Thana	210	10	220	4,769	217	4,986
17	Bombay Suburban	.....	.....	.....	16	.....	16
18	Kolaba	48	.....	48	573	28	601
19	Ratnagiri	.....	.....	.....	4,715	17,550	22,265
20	Kanara	39	.....	39	244	.....	244
	<b>Total</b>	<b>297</b>	<b>10</b>	<b>307</b>	<b>10,317</b>	<b>17,795</b>	<b>28,112</b>
	<b>Total, Presidency proper</b>	<b>57,060</b>	<b>3,001</b>	<b>60,031</b>	<b>151,428</b>	<b>23,160</b>	<b>174,588</b>
	<b>B.—SIND.</b>						
21	Karachi	130	.....	130	2	.....	2
22	Hyderabad	.....	.....	.....	6	.....	6
23	Thar Parkar	113	.....	103	979	.....	973
24	Nawabshah	.....	.....	.....	652	.....	652
25	Larkana	.....	.....	.....	3	.....	3
26	Sukkur	.....	.....	.....	9	.....	9
27	Upper Sind Frontier	.....	.....	.....	1	.....	1
	<b>Total, Sind</b>	<b>233</b>	<b>.....</b>	<b>253</b>	<b>1,646</b>	<b>.....</b>	<b>1,646</b>
	<b>Grand Total</b>	<b>57,313</b>	<b>3,001</b>	<b>60,314</b>	<b>153,074</b>	<b>23,160</b>	<b>176,234</b>



—continued.

—concluded.			Condiments and Spices.			Sugar.		
Total oil-seeds.			17. Condiments and Spices.			18. Sugarcane.		
Reported.	Esti- mated.	Total.	Reported.	Esti- mated.	Total.	Rep. nted.	Esti- mated.	Total.
54	55	56	57	58	59	60	61	62
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
42,959	963	43,923	1,733	10	1,733	645	10	661
23,509	1,581	25,090	7,315	207	7,522	70	7	84
14,659	8,234	22,893	1,412	299	1,711	83	5	88
11,175	189	11,364	346	.....	346	29	.....	29
9,307	304	9,611	1,394	140	1,534	2,663	63	2,726
131,590	11,662	143,252	12,190	656	12,846	3,499	91	3,590
81,269	951	82,220	6,948	124	7,072	1,143	.....	1,143
124,126	.....	124,126	16,967	.....	16,967	753	.....	783
143,424	1,871	145,295	7,590	38	7,628	3,255	32	3,287
46,241	484	46,725	4,444	71	4,515	13,629	3	13,633
46,223	2,501	47,724	12,889	45	12,934	12,668	.....	12,668
60,779	.....	60,779	8,585	.....	8,585	1,065	.....	1,065
117,807	5,939	123,746	24,647	1,723	26,370	9,335	1,084	10,369
698,860	11,746	710,606	82,000	2,905	84,905	41,830	1,119	42,949
29,470	1,865	31,335	21,086	217	21,303	12,857	301	13,158
82,595	127	82,722	3,292	9	3,301	884	7	891
32,064	978	33,042	49,205	703	49,908	1,963	50	2,013
124,127	2,970	127,097	73,633	823	74,456	15,704	358	16,062
6,574	253	6,827	2,141	56	2,197	393	.....	393
827	.....	827	33	.....	33	.....	.....	.....
3,995	76	4,071	365	7	372	18	13	31
13,214	748,261	761,475	831	3,501	4,332	452	2,052	2,504
12,158	.....	12,158	4,569	.....	4,569	3,239	.....	3,239
36,767	48,595	85,362	7,379	3,534	11,413	4,043	2,065	6,113
591,353	74,973	666,326	175,652	7,123	182,775	65,090	3,633	68,723
29,035	.....	29,035	614	.....	614	1,403	.....	1,403
46,119	.....	46,119	363	.....	363	916	.....	916
7,516	.....	7,516	304	.....	304	1,363	.....	1,363
23,080	.....	23,080	26	.....	26	161	.....	161
76,909	500	77,409	1,531	.....	1,531	125	.....	125
16,956	.....	16,956	1,050	.....	1,050	342	.....	342
42,654	.....	42,654	224	.....	224	13	.....	13
242,560	500	243,060	1,147	.....	1,147	4,336	.....	4,326
1,193,913	75,473	1,269,386	179,790	7,123	186,913	69,416	3,633	73,049

TABLE III—CROPS

Serial No. 1	District. 2	Sugar—					
		19. Other engars.			Total sugars.		
		Reported. 63	Esti- mated. 64	Total. 65	Reported. 66	Esti- mated. 67	Total. 68
<b>A.—PRESIDENCY PROPER.</b>		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<i>I.—Gujarat.</i>							
1	Ahmedabad	11	.....	11	658	16	672
2	Kaira	.....	.....	.....	79	7	86
3	Panch Mahals	.....	.....	.....	83	5	88
4	Broach	111	.....	111	140	.....	140
5	Surat	386	1	387	3,049	64	3,113
	Total	508	1	509	4,007	92	4,099
<i>II.—Deccan.</i>							
6	West Khandesh	27	.....	27	1,170	.....	1,170
7	East Khandesh	.....	.....	.....	783	.....	783
8	Nasik	.....	.....	.....	3,253	32	3,287
9	Ahmednagar	6	.....	6	13,626	.....	13,629
10	Poona	50	.....	50	12,718	9	12,718
11	Sholapur	.....	.....	.....	1,065	.....	1,065
12	Satara	4	.....	4	1,309	1,084	10,383
	Total	87	.....	87	41,926	1,119	43,045
<i>III.—Karnatak.</i>							
13	Belgaum	20	.....	20	12,877	301	13,178
14	Bijapur	13	.....	13	607	7	604
15	Dharwad.	61	.....	61	2,024	50	2,074
	Total	94	.....	94	15,793	358	16,156
<i>IV.—Konkan.</i>							
16	Thana	2	.....	2	371	.....	371
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	12	.....	12	30	13	43
19	Ratnagiri	.....	.....	.....	432	2,052	2,504
20	Kanara	.....	.....	.....	3,209	.....	3,209
	Total	14	.....	14	4,062	2,065	6,127
	Total, Presidency proper	703	1	704	65,793	3,631	69,427
<b>B.—SIND.</b>							
21	Karachi	131	.....	131	1,534	.....	1,534
22	Hyderabad	23	.....	23	936	.....	936
23	Thar Parkar	2	.....	2	1,365	.....	1,365
24	Nawabshah	.....	.....	.....	161	.....	161
25	Larkana	316	.....	316	447	.....	447
26	Sukkar	2,554	.....	2,554	2,896	.....	2,896
27	Upper Sind Frontier	9	.....	9	22	.....	22
	Total, Sind	3,037	.....	3,037	7,363	.....	7,363
	Grand Total	3,740	1	3,741	73,156	3,731	76,790

continued.

continued.			Fibres.					
20. Cotton.			21. Jute.			22. Others.		
Reported.	Esti- mated.	Total.	Reported.	Estimated.	Total.	Re- ported.	Esti- mated.	Total.
69	70	71	72	73	74	75	76	77
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
510,908	34,780	545,688	.....	.....	.....	1,613	34	1,647
109,016	5,331	114,347	.....	.....	.....	4,033	357	4,420
83,836	5,271	89,107	.....	.....	.....	8,407	1,475	9,970
318,742	9,623	328,365	.....	.....	.....	86	.....	86
103,469	5,272	108,741	.....	.....	.....	2,330	68	2,398
1,136,571	60,433	1,197,004	.....	.....	.....	16,589	1,927	18,516
449,138	2,922	452,060	.....	.....	.....	15,608	154	15,766
885,426	.....	885,426	.....	.....	.....	7,755	.....	7,755
79,851	.....	79,851	.....	.....	.....	4,266	24	4,290
144,475	2,380	146,855	.....	.....	.....	12,091	135	12,226
1,639	.....	1,639	.....	.....	.....	3,057	92	3,149
67,725	.....	67,725	.....	.....	.....	8,860	.....	8,860
17,680	167	17,847	.....	.....	.....	5,483	260	5,743
1,045,831	5,469	1,051,300	.....	.....	.....	57,110	669	57,779
291,577	7,612	299,189	.....	.....	.....	10,558	104	10,727
716,048	1,964	718,002	.....	.....	.....	6,987	16	7,003
671,733	9,302	681,035	.....	.....	.....	14,803	1,372	16,175
1,679,358	18,929	1,698,286	.....	.....	.....	32,340	1,556	33,905
.....	.....	.....	.....	.....	.....	1,182	98	1,280
.....	.....	.....	.....	.....	.....	24	.....	24
.....	.....	.....	.....	.....	.....	150	7	157
3	9	12	.....	.....	.....	2,141	6,432	8,573
.....	.....	.....	.....	.....	.....	111	.....	111
3	9	12	.....	.....	.....	3,928	6,537	10,165
4,461,708	84,839	4,546,605	.....	.....	.....	109,676	10,689	120,365
822	.....	822	.....	.....	.....	53	.....	53
72,449	.....	72,449	.....	.....	.....	219	.....	219
163,102	.....	163,102	.....	.....	.....	74	.....	74
104,986	.....	104,986	.....	.....	.....	113	.....	113
451	.....	451	.....	.....	.....	40	.....	40
952	.....	952	.....	.....	.....	.....	.....	.....
221	.....	221	.....	.....	.....	5	.....	5
342,355	.....	342,355	.....	.....	.....	503	.....	503
4,801,152	84,839	4,885,991	.....	.....	.....	110,179	10,689	120,868

TABLE III—CROPS

Serial No.	District.	Fibres— <i>concluded</i> .			Dyee.		
		Total Fibres.			23. Indigo.		
		Reported. 78	Estimated. 79	Total. 80	Reported. 81	Estimated. 82	Total. 83
	<b>PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>I.—Gujarat.</i>						
1	Ahmedabad	612,521	34,764	547,285	.....	.....	.....
2	Kaira	113,679	5,688	119,367	.....	.....	.....
3	Panch Mahals	42,343	6,744	49,077	.....	.....	.....
4	Broach	318,828	9,829	328,657	.....	.....	.....
5	Surat	165,750	5,335	171,134	.....	.....	.....
	<b>Total</b>	<b>1,153,180</b>	<b>62,360</b>	<b>1,215,520</b>	.....	.....	.....
	<i>II.—Deccan.</i>						
6	West Khândesh	464,746	3,050	467,826	16	.....	16
7	East Khândesh	893,181	.....	893,181	4	.....	4
8	Nâsik	84,117	24	84,141	.....	.....	.....
9	Ahmednagar	159,666	2,515	159,081	.....	.....	.....
10	Poona	4,986	92	4,788	.....	.....	.....
11	Sholapur	76,575	.....	76,575	.....	.....	.....
12	Sâtara	23,063	427	23,490	.....	.....	.....
	<b>Total</b>	<b>1,702,944</b>	<b>6,188</b>	<b>1,709,062</b>	<b>20</b>	.....	<b>20</b>
	<i>III.—Karnâtak.</i>						
13	Belgaum	302,136	7,780	309,916	.....	.....	.....
14	Bijâpur	723,035	1,970	725,005	.....	.....	.....
15	Dharwâr	685,636	10,734	697,270	.....	.....	.....
	<b>Total</b>	<b>1,711,707</b>	<b>20,484</b>	<b>1,732,191</b>	.....	.....	.....
	<i>IV.—Konkan.</i>						
16	Thâna	1,152	98	1,250	.....	.....	.....
17	Bombay Suburban	24	.....	24	.....	.....	.....
18	Kolaba	170	7	177	.....	.....	.....
19	Râtnâgiri	2,144	6,441	8,585	.....	.....	.....
20	Kânara	111	.....	111	.....	.....	.....
	<b>Total</b>	<b>3,631</b>	<b>6,546</b>	<b>10,177</b>	.....	.....	.....
	<b>Total, Presidency proper</b>	<b>4,571,442</b>	<b>65,538</b>	<b>4,666,970</b>	<b>20</b>	.....	<b>20</b>
	<b>SIND.</b>						
21	Karâchi	835	.....	835	.....	.....	.....
22	Hydrabad	72,858	.....	72,858	.....	.....	.....
23	Thar Parkar	163,476	.....	163,476	.....	.....	.....
24	Nawâbshâh	104,189	.....	104,189	1,750	.....	1,750
25	Lârkhânâ	491	.....	491	66	.....	66
26	Sukkur	952	.....	952	296	.....	296
27	Upper Sind Frontier	228	.....	228	.....	.....	.....
	<b>Total, Sind</b>	<b>342,859</b>	.....	<b>342,899</b>	<b>2,111</b>	.....	<b>2,111</b>
	<b>Grand Total</b>	<b>4,914,331</b>	<b>95,528</b>	<b>5,009,850</b>	<b>2,131</b>	.....	<b>2,131</b>



TABLE III—CROPS

1 Serial No.	District. 2	Drugs and					
		26. Coffee.			27. Tea.		
		Re- ported. 93	Esti- mated. 94	Total. 95	Re- ported. 96	Esti- mated. 97	Total. 98
	<b>PRESIDENCY PROPER.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>
	<i>I.—Gujarat.</i>						
1	Ahmedabad	...	...	...	...	...	...
2	Kaira	...	...	...	...	...	...
3	Panch Mahals	...	...	...	...	...	...
4	Broach	...	...	...	...	...	...
5	Surat	...	...	...	...	...	...
	<b>Total</b>	...	...	...	...	...	...
	<i>II.—Deccan.</i>						
6	West Khândesh	...	...	...	...	...	...
7	East Khândesh	...	...	...	...	...	...
8	Nâsik	...	...	...	...	...	...
9	Ahmednagar	...	...	...	...	...	...
10	Poona	...	...	...	...	...	...
11	Sholâpur	...	...	...	...	...	...
12	Sâtara	...	3	...	3	20	...
	<b>Total</b>	...	3	...	3	20	...
	<i>III.—Karnâtk.</i>						
13	Belgaum	...	...	...	...	...	...
14	Bijâpur	...	...	...	...	...	...
15	Dhârwar	...	...	...	...	...	...
	<b>Total</b>	...	...	...	...	...	...
	<i>IV.—Konkan.</i>						
16	Thânn	...	...	...	...	...	...
17	Bombay Suburban	...	...	...	...	...	...
18	Kolâba	...	...	...	...	...	...
19	Ratnâgiri	...	...	...	...	...	...
20	Kânara	...	35	...	35	...	...
	<b>Total</b>	...	35	...	35	...	...
	<b>Total, Presidency proper</b>	...	38	...	38	20	...
	<b>SIND.</b>						
21	Karâchi	...	...	...	...	...	...
22	Hyderabad	...	...	...	...	...	...
23	Thar Pârkar	...	...	...	...	...	...
24	Nawâbshâh	...	...	...	...	...	...
25	Larkâna	...	...	...	...	...	...
26	Sukkur	...	...	...	...	...	...
27	Upper Sind Frontier	...	...	...	...	...	...
	<b>Total, Sind</b>	...	...	...	...	...	...
	<b>Grand Total</b>	...	38	...	38	20	...

—continued.

Narcotics—continued.

28. Tobacco.			29. Cinchona.			30. Indian Hemp.			31. Other drugs and narcotics.		
Re-ported. 99	Esti- mated. 100	Total. 101	Re-ported. 102	Esti- mated. 103	Total. 104	Re-ported. 105	Esti- mated. 106	Total. 107	Re-ported. 108	Esti- mated. 109	Total. 110
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1,574	23	1,598	...	...	...	...	...	...	...	...	...
32,511	1,279	33,790	...	...	...	...	...	...	...	...	...
1,005	146	1,153	...	...	...	...	...	...	...	...	...
1,924	44	1,968	...	...	...	...	...	...	1	...	1
574	18	592	...	...	...	...	...	...	...	...	...
37,588	1,511	39,099	...	...	...	...	...	...	1	...	1
371	2	273	...	...	...	...	...	...	32	...	32
1,542	...	1,542	...	...	...	...	...	...	151	...	151
545	...	545	...	...	...	...	...	...	308	...	308
2,794	38	2,832	...	...	...	325	...	325	134	...	134
944	...	944	...	...	...	...	...	...	294	...	294
2,314	...	2,314	...	...	...	...	...	...	172	...	172
10,790	447	11,237	...	...	...	...	...	...	823	30	853
19,200	482	19,682	...	...	...	325	...	325	1,914	30	1,944
38,116	538	38,654	...	...	...	...	...	...	568	16	584
1,455	...	1,455	...	...	...	...	...	...	92	...	92
572	...	572	...	...	...	...	...	...	1,030	11	1,700
40,143	538	40,681	...	...	...	...	...	...	2,349	27	2,376
...	...	...	...	...	...	...	...	...	600	...	600
...	...	...	...	...	...	...	...	...	376	...	475
...	...	...	...	...	...	...	...	...	1,254	3,813	5,067
...	...	...	...	...	...	...	...	...	17,923	...	17,923
...	...	...	...	...	...	...	...	...	20,252	3,813	24,065
90,931	2,531	93,462	...	...	...	325	...	325	24,516	3,870	28,386
41	...	41	...	...	...	...	...	...	...	...	...
2,043	...	2,043	...	...	...	...	...	...	...	...	...
75	...	75	...	...	...	...	...	...	...	...	...
1,174	...	1,174	...	...	...	...	...	...	...	...	...
968	...	968	...	...	...	61	...	61	...	...	...
1,100	...	1,100	...	...	...	...	...	...	61	...	61
35	...	35	...	...	...	...	...	...	...	...	...
5,406	...	5,406	...	...	...	61	...	61	64	...	64
201,427	2,331	203,758	...	...	...	386	...	386	24,580	3,870	28,450

TABLE III—CROPS

Serial No.	District.	Drugs and Narcotics— <i>consid.</i>			32. Podder crops.		
		Total drugs and narcotics.			Reported.	Esti- mated.	Total.
		Reported.	Esti- mated.	Total.			
1	2	111	112	113	114	115	116
	<b>PRESIDENCY PROPER.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>
	<i>I.—Gujarat.</i>						
1	Ahmedabad	1,574	22	1,596	80,413	3,818	94,331
2	Kaira	32,511	1,279	33,790	113,102	9,703	122,805
3	Panch Mahals	1,005	148	1,153	44,905	14,101	59,006
4	Broach	1,928	44	1,972	52,181	2,470	54,651
5	Surat	574	18	592	3,9499	8,137	517,636
	<b>Total</b>	<b>37,589</b>	<b>1,511</b>	<b>39,100</b>	<b>610,100</b>	<b>36,329</b>	<b>646,429</b>
	<i>II.—Deccan.</i>						
6	West Khândesh	303	2	305	1,720	.....	1,720
7	East Khândesh	1,696	.....	1,696	4,074	.....	4,074
8	Nasik	863	.....	863	119,564	353	119,917
9	Ahmednagar	3,253	33	3,286	48,361	964	49,325
10	Poona	2,338	.....	2,338	127,969	599	128,568
11	Sholapur	3,486	.....	3,486	52,406	.....	52,406
12	Satara	11,636	477	12,113	453,383	9,401	462,784
	<b>Total</b>	<b>21,462</b>	<b>512</b>	<b>21,974</b>	<b>634,496</b>	<b>11,317</b>	<b>645,813</b>
	<i>III.—Marâttak.</i>						
13	Belgaum	38,684	554	39,238	116,380	3,055	119,435
14	Bijapur	1,547	.....	1,547	4,453	.....	4,453
15	Dharwar	2,281	11	2,292	61,092	133	61,225
	<b>Total</b>	<b>42,492</b>	<b>565</b>	<b>43,057</b>	<b>181,925</b>	<b>3,188</b>	<b>185,113</b>
	<i>IV.—Konkan.</i>						
16	Thana	600	.....	600	167,946	2,148	170,094
17	Bombay Suburban	.....	.....	.....	10,876	4,187	14,263
18	Kolaba	475	.....	475	31,236	1,631	32,867
19	Ratnagiri	1,254	3,813	5,067	22,557	68,697	91,254
20	Kanara	17,958	.....	17,958	35,229	.....	35,228
	<b>Total</b>	<b>30,287</b>	<b>3,813</b>	<b>34,100</b>	<b>267,043</b>	<b>76,663</b>	<b>343,706</b>
	<b>Total, Presidency proper</b>	<b>121,836</b>	<b>6,401</b>	<b>128,237</b>	<b>1,293,554</b>	<b>129,497</b>	<b>2,023,051</b>
	<b>SIND.</b>						
21	Kardahi	41	.....	41	47,396	.....	47,396
22	Hyderabad	2,042	.....	2,042	423	.....	423
23	Thar Parkar	76	.....	76	22,975	.....	22,975
24	Nawabshah	1,174	.....	1,174	13,162	.....	13,162
25	Larkana	1,029	.....	1,029	1,597	.....	1,597
26	Sukkur	1,224	.....	1,224	992	.....	992
27	Upper Sind Frontier	35	.....	35	491	.....	491
	<b>Total, Sind</b>	<b>5,621</b>	<b>.....</b>	<b>5,621</b>	<b>87,026</b>	<b>.....</b>	<b>87,026</b>
	<b>Grand Total</b>	<b>127,461</b>	<b>6,401</b>	<b>133,862</b>	<b>1,980,580</b>	<b>129,497</b>	<b>2,110,077</b>



-continued.

33. Fruits and Vegetables including root crops.			34. Miscellaneous Crops.		
			A. Food crops.		
Reported. 117	Estimated. 118	Total. 119	Reported. 120	Estimated. 121	Total. 122
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
27,363	1,315	28,678	40	211	251
34,575	2,819	37,394	209	30	239
3,879	1,025	5,004	1	.....	1
6,126	160	6,286	2	.....	2
25,018	536	25,554	1	.....	1
97,061	5,855	102,916	253	241	494
17,072	19	17,091	558	.....	558
31,080	.....	31,080	39	.....	39
27,521	265	28,086	64	4	68
45,805	106	45,911	246	2	248
43,303	173	43,481	2,432	21	2,453
18,942	.....	18,942	76	.....	76
49,870	2,106	51,976	578	7	585
233,898	2,674	236,572	3,893	34	4,027
23,588	1,815	25,403	14	.....	14
24,052	27	24,079	9	.....	9
26,302	780	27,082	.....	.....	.....
78,948	2,622	81,570	23	.....	23
6,777	131	6,908	.....	.....	.....
1,547	406	1,953	.....	.....	.....
9,314	237	9,551	.....	.....	.....
5,649	16,217	21,866	.....	.....	.....
7,603	.....	7,603	.....	.....	.....
30,780	17,601	48,381	.....	.....	.....
440,892	28,752	469,644	4,389	275	4,664
9,366	.....	9,366	1	.....	1
9,914	.....	9,914	18	.....	18
1,904	.....	1,904	7	.....	7
2,163	.....	2,163	.....	.....	.....
7,897	.....	7,897	25	.....	25
11,254	.....	11,254	23	.....	23
4,110	.....	4,110	.....	.....	.....
46,483	.....	46,483	69	.....	69
497,175	28,752	525,927	4,388	276	4,664

TABLE III—CROPS

1 Serial No.	2 District.	34. Miscellaneous Crops— <i>concl'd.</i>			35. Grand Total of all crops (i.e. Gross area cropped).		
		B. Non-Food crops.			Reported. 126	Esti- mated. 127	Total, 128
		Reported. 123	Esti- mated. 124	Total. 125			
	<b>PRESIDENCY PROPER.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>
	<b>I.—Gujarat.</b>						
1	Ahmedabad	199	1	200	1,243,359	75,950	1,324,309
2	Kaira	263	1	264	737,033	65,278	802,311
3	Panch Mahals	15	.....	15	458,989	121,573	580,562
4	Broach	53	.....	53	697,302	20,010	617,312
5	Surat	79	9	88	761,162	23,292	784,454
	<b>Total</b>	<b>609</b>	<b>11</b>	<b>620</b>	<b>3,802,835</b>	<b>306,063</b>	<b>4,108,918</b>
	<b>II.—Deccan.</b>						
6	West Khandesh	85	.....	85	1,417,864	12,361	1,430,215
7	East Khandesh	5	.....	5	2,001,410	.....	2,001,410
8	Nasik	44	.....	44	2,032,510	10,337	2,042,847
9	Ahmednagar	36	.....	36	2,616,025	20,206	2,636,231
10	Poona	2,210	10	2,220	2,066,490	25,516	2,092,006
11	Sholapur	38	.....	38	2,176,753	.....	2,176,753
12	Satara	6	.....	6	2,004,427	74,585	2,079,012
	<b>Total</b>	<b>2,424</b>	<b>10</b>	<b>2,434</b>	<b>14,345,479</b>	<b>142,995</b>	<b>14,488,474</b>
	<b>III.—Karnatak.</b>						
13	Belgaum	8	.....	8	1,734,459	54,313	1,788,672
14	Bijapur	33	.....	33	2,391,402	8,212	2,399,614
15	Dharwar	7	.....	7	2,099,229	54,267	2,153,516
	<b>Total</b>	<b>48</b>	<b>.....</b>	<b>48</b>	<b>6,664,500</b>	<b>116,712</b>	<b>6,781,302</b>
	<b>IV.—Konkan.</b>						
16	Thana	136	.....	136	560,593	12,211	572,803
17	Bombay Suburban	159	.....	159	24,300	8,526	32,826
18	Kolaba	18	.....	18	366,764	24,094	390,858
19	Ratnagiri	229	687	916	186,749	674,613	871,362
20	Kanara	2,259	.....	2,259	254,953	.....	254,953
	<b>Total</b>	<b>2,800</b>	<b>687</b>	<b>3,487</b>	<b>1,412,653</b>	<b>719,444</b>	<b>2,132,097</b>
	<b>Total, Presidency proper</b>	<b>5,881</b>	<b>798</b>	<b>6,689</b>	<b>26,225,557</b>	<b>1,285,234</b>	<b>27,510,791</b>
	<b>SIND.</b>						
21	Karachi	4	.....	4	433,112	.....	433,112
22	Hyderabad	29,607	.....	29,607	630,449	.....	630,449
23	Thar Parkar	2,149	.....	2,149	954,140	.....	954,140
24	Nawalshah	9,363	.....	9,363	484,466	.....	484,466
25	Larkana	1,225	.....	1,225	893,047	1,050	894,097
26	Sukkur	815	.....	815	453,599	.....	453,599
27	Upper Sind Frontier	.....	.....	.....	559,243	.....	559,243
	<b>Total, Sind</b>	<b>43,163</b>	<b>.....</b>	<b>43,163</b>	<b>4,410,055</b>	<b>1,050</b>	<b>4,411,105</b>
	<b>Grand Total</b>	<b>40,044</b>	<b>798</b>	<b>40,752</b>	<b>30,635,612</b>	<b>1,286,284</b>	<b>31,921,896</b>

—concluded.

36.—Area cropped more than once.			37.—Net area cropped.		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
129	130	131	132	133	134
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
9,462	121	9,583	1,238,997	75,829	1,314,726
8,237	323	8,560	728,796	84,938	793,732
99,043	7,277	46,320	419,846	114,296	534,142
138	.....	138	597,164	20,010	617,174
26,221	708	26,929	734,931	22,589	757,520
83,101	8,423	91,524	3,719,734	297,660	4,017,394
22,799	31	22,830	1,395,963	12,929	1,407,385
9,213	.....	9,213	1,992,197	.....	1,992,197
54,985	743	55,428	1,977,925	9,594	1,987,419
72,380	191	72,571	2,573,695	20,015	2,593,710
106,878	189	107,067	1,959,612	25,327	1,984,939
35,863	.....	35,863	2,140,890	.....	2,140,890
79,196	5,096	84,292	1,925,231	69,489	1,994,720
380,964	6,250	387,314	13,964,515	136,745	14,101,260
22,393	226	22,559	1,712,126	53,987	1,766,163
4,353	.....	4,353	2,826,549	8,212	2,834,761
10,753	111	10,864	2,089,476	54,176	2,142,652
37,961	337	38,298	6,626,629	116,375	6,743,004
4,908	46	4,954	564,974	12,165	577,139
551	.....	551	24,049	8,526	32,575
10,923	275	11,098	355,941	23,819	379,760
10,578	37,787	48,365	186,171	696,846	883,017
13,952	.....	13,952	235,975	.....	235,975
45,542	36,088	69,630	1,367,111	681,856	2,048,467
547,046	53,098	600,144	25,878,511	1,282,136	26,910,647
24,907	.....	24,907	408,305	.....	408,305
6,228	.....	6,228	624,221	.....	624,221
4,771	.....	4,771	949,369	.....	949,369
15,104	.....	15,104	469,361	.....	469,361
229,647	.....	229,647	665,500	1,050	666,550
37,964	.....	37,964	415,635	.....	415,635
479,543	.....	479,543	479,700	.....	479,700
397,964	.....	397,964	4,012,081	1,050	4,013,141
945,910	53,098	998,108	29,680,892	1,233,186	30,923,789

TABLE IV.—  
Area under different sources of irrigation and crops

No.	District.	Area irri					
		1.—Government Canals.			2.—Private Canals.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	3	4	5	6	7	8
	<b>A.—PRESIDENCY PROPER.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>
	<i>Gujarát.</i>						
1	Ahmedabad ...	8	.....	8	305	.....	305
2	Kaira ...	2	.....	2	.....	.....	.....
3	Panch Maháls ...	992	20	1,012	.....	.....	.....
4	Broach ...	.....	.....	.....	.....	.....	.....
5	Surat ...	.....	.....	.....	.....	.....	.....
	<b>Total, Gujarát ...</b>	<b>1,002</b>	<b>20</b>	<b>1,022</b>	<b>305</b>	<b>.....</b>	<b>305</b>
	<i>Deccan.</i>						
6	West Khándesh ...	11,120	220	11,340	827	.....	827
7	East Khándesh ...	2,978	.....	2,978	46	.....	46
8	Násik ...	32,667	.....	32,667	4,905	.....	4,905
9	Ahmednagar ...	70,146	.....	70,146	1,334	.....	1,334
10	Poona ...	62,124	.....	62,124	5,007	.....	5,007
11	Sholapur ...	11,226	.....	11,226	60	.....	60
12	Sátara ...	11,107	2,805	13,912	23,546	2,906	26,452
	<b>Total, Deccan ...</b>	<b>201,368</b>	<b>3,035</b>	<b>204,403</b>	<b>36,325</b>	<b>2,906</b>	<b>39,231</b>
	<i>Karnátak.</i>						
13	Belgaum ...	7,442	.....	7,442	3,041	20	3,061
14	Bijapur ...	126	.....	126	117	.....	117
15	Dharwár ...	6,279	.....	6,279	3	.....	3
	<b>Total, Karnátak ...</b>	<b>13,847</b>	<b>.....</b>	<b>13,847</b>	<b>3,161</b>	<b>20</b>	<b>3,181</b>
	<i>Konkan.</i>						
16	Thána ...	.....	.....	.....	.....	.....	.....
17	Bombay Suburban ...	.....	.....	.....	.....	.....	.....
18	Kolaba ...	.....	.....	.....	.....	.....	.....
19	Ratnágiri ...	.....	.....	.....	1,558	4,974	6,532
20	Kánara ...	.....	.....	.....	3,276	.....	3,276
	<b>Total, Konkan ...</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>4,834</b>	<b>4,974</b>	<b>9,808</b>
	<b>Total, A ...</b>	<b>216,317</b>	<b>3,065</b>	<b>219,372</b>	<b>44,725</b>	<b>7,900</b>	<b>52,626</b>
	<b>B.—SIND.</b>						
21	Karachi ...	263,671	.....	263,671	.....	.....	.....
22	Hyderabad ...	613,112	.....	613,112	.....	.....	.....
23	Uhar Parkar ...	356,921	.....	356,921	.....	.....	.....
24	Nawásháh ...	424,063	.....	424,063	.....	.....	.....
25	Larkana ...	532,123	550	532,673	.....	.....	.....
26	Sukkar ...	238,495	.....	238,495	10,536	.....	10,536
27	Upper Sind Frontier ...	437,611	.....	437,611	.....	.....	.....
	<b>Total, B ...</b>	<b>2,596,226</b>	<b>560</b>	<b>2,596,776</b>	<b>10,536</b>	<b>.....</b>	<b>10,536</b>
	<b>Grand Total ...</b>	<b>3,112,443</b>	<b>3,665</b>	<b>3,116,048</b>	<b>55,261</b>	<b>7,900</b>	<b>63,161</b>

IRRIGATION.  
 irrigated in the Bombay Presidency (including Sind) in 1923-24.

gated from								
3.—Tanks.			4.—Wells.			5.—Other sources of irrigation.		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
9	10	11	12	13	14	15	16	17
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
61	.....	61	47,650	4,768	52,418	2,055	.....	2,055
1	.....	1	28,783	998	29,781	747	143	890
.....	.....	.....	3,850	771	4,621	135	5	140
.....	.....	.....	611	.....	611	.....	.....	.....
1,431	.....	1,431	5,576	318	5,893	25	.....	25
1,493	.....	1,493	86,542	6,523	93,065	2,963	148	3,110
.....	.....	.....	14,977	396	15,373	324	.....	324
21	.....	21	21,183	.....	21,183	779	.....	779
757	.....	757	25,844	259	26,103	285	.....	285
.....	.....	.....	10,477	504	10,981	.....	.....	.....
3,906	.....	3,906	57,930	57	57,987	262	.....	262
48	.....	48	46,258	.....	46,258	96,258	.....	96,258
14	.....	14	61,261	2,003	63,264	6,770	214	6,984
5,256	.....	5,256	310,923	3,213	313,136	8,410	214	8,624
15,921	1	15,922	52,915	1,766	54,681	3,046	165	3,211
147	.....	147	24,747	25	24,772	.....	.....	.....
19,936	1,300	20,236	2,202	21	2,223	7,731	26	7,757
65,001	1,291	66,292	59,864	1,812	61,676	10,777	221	11,098
477	.....	477	5,722	.....	5,722	92	.....	92
3	.....	3	210	.....	210	.....	.....	.....
.....	.....	.....	679	.....	679	234	.....	234
772	2,316	3,088	1,876	17,658	19,534	2,472	7,416	9,888
10,467	.....	10,467	1,244	.....	1,244	6,703	.....	6,703
11,719	2,316	14,035	13,731	17,629	31,360	8,501	7,416	15,917
83,472	3,607	87,079	510,080	29,506	539,586	31,850	7,899	39,749
.....	.....	.....	7,200	.....	7,200	50,930	.....	50,930
752	.....	752	285	.....	285	10,172	.....	10,172
.....	.....	.....	115	.....	115	.....	.....	.....
.....	.....	.....	10,512	.....	10,512	450	.....	450
.....	.....	.....	3,804	.....	3,804	5,807	.....	5,807
.....	.....	.....	24,665	.....	24,665	5,945	.....	5,945
.....	.....	.....	1,065	.....	1,065	41,024	.....	41,024
752	.....	752	47,513	.....	47,513	114,029	.....	114,029
84,224	3,607	87,831	557,873	29,506	587,379	145,678	7,899	153,677

TABLE IV—

No.	District.	Area irrigated from—concluded.			Crops irri		
		Total area irrigated from all sources of irrigation.			1.—Rice.		
		Reported.	Estimated.	Total.	Reported.	Estimat-d.	Total.
1	2	18	19	20	21	22	23
	<b>A.—PRESIDENCY PROPER.</b>	Aeres.	Aeres.	Aeres.	Aeres.	Aeres.	Aeres.
	<i>Gujarat.</i>						
1	Ahmedabad ...	50,109	4,766	54,875	1,818	2	1,220
2	Kaira ...	29,543	1,141	30,684	60	...	60
3	Panch Mahals ...	4,940	796	5,736	37	.....	37
4	Broach ...	641	...	641	2	.....	2
5	Surat ...	7,031	315	7,346	1,355	.....	1,355
	<b>Total, Gujarat ...</b>	<b>92,314</b>	<b>7,021</b>	<b>99,335</b>	<b>2,472</b>	<b>2</b>	<b>2,651</b>
	<i>Deccan.</i>						
6	West Khândesh ...	27,248	625	27,873	1,232	.....	1,232
7	East Khândesh ...	25,007	.....	25,007	125	.....	125
8	Nasik ...	67,419	253	67,672	1,399	.....	1,399
9	Ahmednagar ...	141,557	504	142,061	305	1	305
10	Poona ...	129,299	57	129,356	2,793	.....	2,792
11	Sholapur ...	104,072	.....	104,072	775	.....	775
12	Satara ...	102,691	7,328	110,019	10,159	1,464	11,623
	<b>Total, Deccan ...</b>	<b>601,282</b>	<b>9,368</b>	<b>610,650</b>	<b>16,787</b>	<b>1,465</b>	<b>16,252</b>
	<i>Karnatak.</i>						
13	Belgaum ...	62,365	1,989	64,354	17,347	55	17,402
14	Bijapur ...	25,137	25	25,162	325	.....	325
15	Dhârwâr ...	65,151	1,337	66,488	58,980	688	59,668
	<b>Total, Karnatak ...</b>	<b>152,653</b>	<b>3,344</b>	<b>156,097</b>	<b>74,662</b>	<b>713</b>	<b>75,105</b>
	<i>Konkan.</i>						
16	Thâns ...	6,291	.....	6,291	.....	.....	.....
17	Bombay Suburban ...	213	.....	213	.....	.....	.....
18	Kolâba ...	913	.....	913	.....	.....	.....
19	Ratnâgiri ...	10,778	32,334	43,112	3,656	10,968	14,624
20	Kâvara ...	21,690	.....	21,690	18,253	.....	18,253
	<b>Total, Konkan ...</b>	<b>39,885</b>	<b>32,334</b>	<b>72,219</b>	<b>21,889</b>	<b>10,968</b>	<b>32,857</b>
	<b>Total, A ...</b>	<b>886,124</b>	<b>52,067</b>	<b>938,191</b>	<b>115,996</b>	<b>13,179</b>	<b>129,168</b>
	<b>B.—SIND.</b>						
21	Karâchi ...	322,087	.....	322,087	243,538	.....	243,538
22	Hyderabad ...	624,221	.....	624,221	257,103	.....	257,103
23	Thar Parkar ...	398,036	.....	398,036	16,747	.....	16,747
24	Nawâbshah ...	435,018	.....	435,018	35,204	.....	35,204
25	Larkana ...	541,614	550	542,164	416,416	350	416,766
26	Sukkur ...	240,641	.....	240,641	63,832	.....	63,832
27	Upper Sind Frontier ...	479,700	.....	479,700	107,160	.....	107,160
	<b>Total, B ...</b>	<b>3,069,355</b>	<b>550</b>	<b>3,069,905</b>	<b>1,190,000</b>	<b>350</b>	<b>1,190,350</b>
	<b>Grand Total ...</b>	<b>3,955,479</b>	<b>52,617</b>	<b>4,008,096</b>	<b>1,305,996</b>	<b>13,528</b>	<b>1,319,518</b>



TABLE IV—

No.	District.	Crops irri-					
		5.—Bajri.			6.—Maize.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	33	34	35	36	37	38
A.—PRESIDENCY PROPER.		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<i>Gujarat.</i>							
1	Ahmedabad	43	620	563	671	20	691
2	Kaira	20	.....	20	5	.....	5
3	Panch Mahals	.....	.....	.....	25	7	32
4	Brosch	.....	.....	.....	.....	.....	.....
5	Surat	.....	.....	.....	.....	.....	.....
Total, Gujarat		63	620	563	701	27	728
<i>Deccan.</i>							
6	West Khandesh	622	.....	622	576	.....	576
7	East Khandesh	.....	.....	.....	99	.....	99
8	Nasik	7,996	.....	7,996	1,841	.....	1,841
9	Ahmednagar	24,998	.....	24,998	1,056	1	1,057
10	Poona	31,613	.....	31,613	1,751	1	1,752
11	Sholapur	5,762	.....	5,762	9,100	.....	9,100
12	Satara	9,917	593	10,510	3,271	222	3,493
Total, Deccan		87,915	893	88,808	17,617	224	17,841
<i>Karnatak.</i>							
13	Belgaum	134	.....	134	10,990	84	11,074
14	Bijapur	50	.....	50	863	.....	863
15	Dharwar	.....	.....	.....	2	36	38
Total, Karnatak		184	.....	184	11,855	120	11,965
<i>Konkan.</i>							
16	Thana	.....	.....	.....	.....	.....	.....
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	.....	.....	.....	.....	.....	.....
19	Ratnagiri	.....	.....	.....	.....	.....	.....
20	Kanara	.....	.....	.....	.....	.....	.....
Total, Konkan		.....	.....	.....	.....	.....	.....
Total, A		81,175	1,413	82,588	30,243	371	30,614
<b>B.—SIND.</b>							
21	Karachi	10,824	.....	10,824	1,601	.....	1,601
22	Hyderabad	165,943	.....	165,943	140	.....	140
23	Thar Parkar	88,996	.....	88,996	659	.....	659
24	Newshaban	116,014	.....	116,014	83	.....	83
25	Larkana	1,598	.....	1,598	.....	.....	.....
26	Sukkur	17,226	.....	17,226	8	.....	8
27	Upper Sind Frontier	76,676	.....	76,676	39	.....	39
Total, B		477,217	.....	477,217	2,525	.....	2,525
Grand Total		558,392	1,413	559,805	32,771	371	33,142



IRRIGATION--continued.

gated--contd.

7.—Other cereals and pulses.			8.—Sugar-cane.			9.—Other food crops.		
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
39	40	41	42	43	44	45	46	47
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
368	5	368	644	16	660	3,020	512	3,541
456	15	471	79	7	86	.....	.....	.....
516	.....	518	83	5	88	373	108	776
.....	.....	.....	29	.....	29	282	.....	282
.....	.....	.....	2,663	63	2,726	1,972	227	2,199
1,337	20	1,357	3,498	91	3,589	5,861	937	6,798
2,414	20	2,434	1,143	.....	1,143	4,784	87	4,871
951	.....	981	783	.....	783	8,185	.....	8,185
19,636	41	19,677	5,139	27	5,166	15,959	101	16,060
18,862	31	18,893	13,565	3	13,568	10,494	49	10,543
14,869	13	14,883	12,003	.....	12,003	22,553	4	22,557
10,498	.....	10,498	1,065	.....	1,065	15,912	.....	15,912
7,445	469	7,914	9,485	859	10,344	12,435	904	13,339
74,705	566	75,271	43,783	890	44,672	10,182	1,145	91,327
6,168	305	6,473	12,857	301	13,158	6,482	156	6,638
4,206	10	4,273	884	7	891	5,329	6	5,335
2,966	53	3,029	1,863	30	2,013	.....	.....	.....
13,402	873	14,280	16,708	358	17,066	11,835	161	11,996
.....	.....	.....	369	.....	369	4,686	.....	4,686
.....	.....	.....	.....	.....	.....	186	.....	186
.....	.....	.....	16	.....	16	1,100	.....	1,100
4,849	14,547	19,396	463	1,404	1,872	.....	.....	.....
460	.....	460	2,469	.....	2,469	414	.....	414
5,309	14,547	19,856	3,322	1,404	4,726	6,386	.....	6,386
94,723	16,041	110,764	66,311	2,742	69,053	114,234	2,243	116,477
27,758	.....	27,758	1,463	.....	1,463	10,779	.....	10,779
6,340	.....	6,340	916	.....	916	11,474	.....	11,474
2,588	.....	2,588	1,363	.....	1,363	2,177	.....	2,177
14,761	.....	14,761	161	.....	161	2,473	.....	2,473
31,158	200	31,358	128	.....	128	8,595	.....	8,595
20,852	.....	20,852	342	.....	342	15,611	.....	15,611
17,069	.....	17,069	13	.....	13	4,161	.....	4,161
261,396	200	261,596	4,326	.....	4,326	55,250	.....	55,250
350,149	16,211	371,360	70,637	2,742	73,379	169,514	2,243	171,757

TABLE IV—

No.	District.	Crops irri-					
		10.—Cotton.			Other non-food crops.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	48	49	50	51	52	53
	<b>A.—PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarat.</i>						
1	Ahmedabad	4,629	1,147	5,776	16,135	333	16,468
2	Kaira	611	7	618	24,177	501	24,978
3	Panch Mahals	.....	.....	.....	119	10	129
4	Broach	.....	.....	.....	331	.....	331
6	Surat	.....	.....	.....	1,039	27	1,066
	<b>Total, Gujarat</b>	<b>5,240</b>	<b>1,154</b>	<b>6,394</b>	<b>41,801</b>	<b>1,171</b>	<b>42,972</b>
	<i>Deccan.</i>						
6	West Khandesh	124	.....	124	6,745	63	6,808
7	East Khandesh	.....	.....	.....	8,177	.....	8,177
8	Nasik	1,003	.....	1,003	14,911	76	14,987
9	Ahmednagar	1,334	17	1,651	12,728	109	12,837
10	Poona	41	.....	41	12,998	10	13,008
11	Sholapur	4,877	.....	4,877	12,549	.....	12,549
12	Satara	6	.....	6	15,405	952	16,357
	<b>Total, Deccan</b>	<b>7,085</b>	<b>17</b>	<b>7,102</b>	<b>83,513</b>	<b>1,210</b>	<b>84,723</b>
	<i>Karnatak.</i>						
13	Belgaum	859	.....	859	6,986	1,052	10,032
14	Bijapur	1,824	.....	1,824	4,378	.....	4,378
15	Dharwar	.....	.....	.....	1,123	.....	1,123
	<b>Total, Karnatak</b>	<b>2,683</b>	<b>.....</b>	<b>2,683</b>	<b>14,481</b>	<b>1,052</b>	<b>15,533</b>
	<i>Konkan.</i>						
16	Thana	.....	.....	.....	1,250	.....	1,250
17	Bombay Suburban	.....	.....	.....	27	.....	27
18	Kolaba	.....	.....	.....	85	.....	85
19	Ratnagiri	.....	.....	.....	1,562	5,586	7,448
20	Kanara	.....	.....	.....	119	.....	119
	<b>Total, Konkan</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>3,373</b>	<b>5,586</b>	<b>6,959</b>
	<b>Total, A</b>	<b>16,008</b>	<b>1,171</b>	<b>16,179</b>	<b>143,168</b>	<b>9,019</b>	<b>152,187</b>
	<b>B.—SIND.</b>						
21	Karachi	825	.....	825	26,616	.....	26,616
22	Hyderabad	72,440	.....	72,440	77,376	.....	77,376
23	Thar Parkar	163,327	.....	163,327	11,728	.....	11,728
24	Nawabshah	104,086	.....	104,086	43,243	.....	43,243
25	Larkana	451	.....	451	15,381	.....	15,381
26	Sukkur	400	.....	400	7,794	.....	7,794
27	Upper Sind Frontier	223	.....	223	42,933	.....	42,933
	<b>Total, B</b>	<b>341,752</b>	<b>.....</b>	<b>341,752</b>	<b>225,261</b>	<b>.....</b>	<b>225,261</b>
	<b>Grand Total</b>	<b>356,760</b>	<b>1,171</b>	<b>357,931</b>	<b>368,429</b>	<b>9,019</b>	<b>377,448</b>

IRRIGATION—concluded.

gated—concl.			Deduct area of crops irrigated more than once.			No.		
Total crops irrigated.								
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.	Reported.	Es	
54	55	56	57	58	59	60	61	62
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
51,048	4,766	55,814	939	.....	939	50,109	4,766	54,875
30,380	1,143	31,523	837	..... 2	839	29,543	1,141	30,684
4,988	796	5,784	8	.....	8	4,980	796	5,776
654	.....	654	13	.....	13	641	.....	641
7,066	318	7,384	35	.....	35	7,031	318	7,349
94,136	7,023	101,159	1,632	..... 2	1,634	92,304	7,021	99,325
32,374	626	33,000	5,126	.....	5,126	27,248	626	27,874
26,231	.....	26,231	1,224	.....	1,224	25,007	.....	25,007
92,234	263	92,497	24,816	..... 10	24,826	67,416	253	67,671
159,828	586	160,412	18,269	..... 82	18,351	141,557	504	142,061
166,506	69	166,575	37,217	..... 12	37,229	129,289	57	129,346
131,054	.....	131,054	22,082	.....	22,082	108,072	.....	108,072
117,365	8,414	125,779	14,674	..... 486	15,160	102,691	7,928	110,619
725,590	9,058	735,548	124,306	..... 590	124,896	601,292	9,358	610,650
68,542	2,134	70,676	6,177	..... 152	6,329	62,365	1,982	64,347
27,113	25	27,138	1,976	.....	1,976	25,137	25	25,162
69,352	1,337	66,689	201	.....	201	65,161	1,337	66,498
161,007	3,496	164,503	8,354	..... 152	8,506	152,653	3,344	155,997
6,335	.....	6,335	44	.....	44	6,291	.....	6,291
213	.....	213	.....	.....	.....	213	.....	213
1,201	.....	1,201	288	.....	288	913	.....	913
10,633	32,505	43,138	57	..... 171	326	10,778	32,334	43,112
21,695	.....	21,695	5	.....	5	21,690	.....	21,690
40,279	32,505	72,784	394	..... 171	565	39,885	32,334	72,219
1,021,012	52,982	1,073,994	134,886	..... 915	135,801	886,124	52,067	938,191
346,557	.....	346,557	24,470	.....	24,470	322,087	.....	322,087
630,449	.....	630,449	6,228	.....	6,228	624,221	.....	624,221
390,615	.....	390,615	4,579	.....	4,579	386,036	.....	386,036
450,061	.....	450,061	15,005	.....	15,005	435,056	.....	435,056
580,919	550	581,469	39,305	.....	39,305	541,614	553	542,164
299,233	.....	299,233	18,592	.....	18,592	280,641	.....	280,641
559,243	.....	559,243	79,543	.....	79,543	479,700	.....	479,700
3,257,077	550	3,257,627	187,722	.....	187,722	3,069,355	550	3,069,905
4,273,089	53,532	4,326,621	322,610	..... 915	323,525	3,955,479	52,617	4,008,096

TABLE V—

*Estimated Outturn of principal Kharif  
a normal crop) in the Bombay*

No.	District.	Kharif.					
		Jowari.	Bajri.	Rice.	Kodra.	Ragi.	Vari.
1	Ahmedabad ...	42	42	28	48	42	42
2	Kaira ...	67	58	17	40	50	25
3	Panch Mahals ...	73	63	32	78	83	92
4	Broach ...	36	73	19	34	49	...
5	Surat ...	73	74	82	71	82	82
6	West Khandesh ...	75	75	75	75	67	75
7	East Khandesh ...	...	83	53	...	...	67
8	Nasik ...	58	75	83	...	83	83
9	Ahmednagar ...	...	53	100	42	67	50
10	Poona ...	43	60	58	50	50	50
11	Sholapur ...	...	25	48	67	67	67
12	Satara ...	42	43	63	67	67	67
13	Belgaum ...	50	42	77	...	43	56
14	Bijapur ...	50	33	50	50	33	33
15	Dharwar ...	58	50	50	...	42	50
16	Thana ...	83	...	92	...	83	83
17	Bombay Suburban ...	...	...	100	...	100	100
18	Kolaba ...	...	...	100	100	92	92
19	Ratnagiri ...	...	...	83	58	83	75
20	Kanara ...	...	...	83	...	58	...
21	Karachi ...	51	73	83	...	67	75
22	Hyderabad ...	67	76	75	...	50	50
23	Thar-Parkar ...	56	38	67	...	...	67
24	Nawabshah ...	83	75	75	...	...	...
25	Larkana ...	56	60	58	...	...	23
26	Sukkur ...	58	58	58	...	58	67
27	Upper Sind Frontier ...	58	50	67	...	...	...

## OUTTURN PER CENT.

and Rabi crops in parts of 100 (100 denoting  
Presidency during the year 1923-24.

Year.	Kharif.				Rabi.							Perennial sugar- cane.
	Uddi.	Aug.	Cotton.		Jowari.	Wheat.	Gram.	Tobacco.	Linseed.	Rape and Mustard.		
			Early.	Late.								
25	39	42	...	42	...	48	8	42	...	28	75	
29	25	83	...	48	...	44	83	62	25	25	28	
46	67	78	...	69	...	67	66	68	67	48	28	
38	26	38	...	48	43	26	22	60	...	...	76	
61	86	66	...	33	77	59	66	86	...	...	68	
75	76	68	75	...	83	75	75	88	67	75	92	
67	67	75	83	...	83	69	68	75	58	...	83	
50	53	74	71	...	...	68	63	58	65	83	75	
42	46	60	67	...	61	52	61	75	58	...	83	
35	46	42	53	...	...	83	48	68	42	...	117	
50	53	67	50	...	38	62	51	68	42	...	67	
33	50	67	67	...	50	47	53	75	67	...	53	
42	45	50	...	58	25	38	42	58	25	...	75	
26	33	83	...	50	33	25	33	50	83	...	67	
33	40	42	...	75	50	42	50	50	50	...	58	
67	83	83	...	...	...	83	88	...	...	67	100	
...	...	...	...	...	...	...	...	...	...	...	...	
92	88	32	...	...	...	...	86	...	...	...	88	
85	58	67	...	...	...	...	78	...	...	...	88	
63	75	67	...	...	...	...	67	...	...	...	75	
...	67	58	...	50	...	75	63	42	...	53	88	
...	60	...	...	50	...	56	88	69	...	58	75	
67	50	50	...	75	...	50	50	67	...	50	67	
67	...	67	...	75	...	71	23	75	...	67	67	
...	50	50	...	50	...	58	68	50	...	50	58	
...	67	58	...	60	...	67	53	75	...	67	75	
...	58	58	...	50	...	58	58	67	...	53	58	

TABLE VI—AREA  
Area under food-grain crops (cereals and pulses),  
Sind) and its estimated outturn

1	Serial Number.	District.	Cereals					
			Rice.					
			1923-24.		1922-23.		1921-22.	
			Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
2	3	4	5	6	7	8		
		<b>Gujarat.</b>						
1	Ahmedabad ...	12,760	2,311	27,318	3,897	65,925	33,738	
2	Kaira ...	24,169	2,384	64,396	30,165	74,409	35,809	
3	Panch Mahals ...	63,641	10,504	68,870	30,799	77,056	36,120	
4	Broach ...	8,374	642	13,809	4,862	17,906	4,797	
5	Surat ...	93,989	56,354	101,684	66,247	100,300	61,689	
	<b>Total, Gujarat ...</b>	<b>207,923</b>	<b>72,395</b>	<b>276,077</b>	<b>140,970</b>	<b>335,596</b>	<b>170,153</b>	
	<b>Deccan.</b>							
6	West Khandesh ...	50,718	18,488	48,990	19,727	45,084	16,563	
7	East Khandesh ...	471	188	588	213	660	265	
8	Nasik ...	61,792	24,939	62,502	25,036	66,646	26,776	
9	Ahmednagar ...	16,761	7,752	15,869	7,395	16,836	3,931	
10	Poona ...	83,600	24,256	85,905	39,250	83,879	38,172	
11	Sholapur ...	3,824	718	4,178	813	6,198	1,785	
12	Satara ...	47,149	14,716	47,794	20,266	50,103	17,598	
	<b>Total, Deccan ...</b>	<b>264,305</b>	<b>91,057</b>	<b>265,826</b>	<b>112,870</b>	<b>270,066</b>	<b>105,090</b>	
	<b>Karnatak.</b>							
13	Belgaum ...	119,126	43,575	110,748	36,701	111,012	63,111	
14	Bijapur ...	2,418	451	2,159	410	6,489	1,589	
15	Dharwar ...	116,679	29,180	130,427	28,076	130,038	33,090	
	<b>Total, Karnatak ...</b>	<b>238,223</b>	<b>73,206</b>	<b>243,334</b>	<b>65,187</b>	<b>247,539</b>	<b>97,784</b>	
	<b>Konkan.</b>							
16	Thana ...	311,887	158,149	308,901	165,481	315,385	169,063	
17	Bombay Suburban ...	15,508	8,308	16,018	8,581	16,068	9,325	
18	Kolaba ...	268,528	143,854	268,646	158,316	267,010	144,719	
19	Ratnagiri ...	348,110	132,091	344,231	150,150	341,277	155,345	
20	Kanara ...	163,953	79,705	162,509	63,283	160,637	82,394	
	<b>Total, Konkan ...</b>	<b>1,107,965</b>	<b>517,107</b>	<b>1,100,305</b>	<b>665,512</b>	<b>1,101,677</b>	<b>580,846</b>	
	<b>Total, Bombay Presidency ...</b>	<b>1,831,415</b>	<b>753,765</b>	<b>1,885,602</b>	<b>884,639</b>	<b>1,955,718</b>	<b>923,873</b>	
	<b>B.—SIND.</b>							
21	Karachi ...	243,538	119,051	238,542	125,007	230,432	111,016	
22	Hyderabad ...	257,103	92,296	252,433	114,158	238,669	108,535	
23	Thar Parkar ...	66,747	34,853	71,834	28,221	51,964	15,311	
24	Nawabshah ...	35,804	12,965	40,830	28,530	30,271	16,933	
25	Larkana ...	416,766	179,730	399,956	223,725	363,540	164,730	
26	Sukkur ...	62,823	16,439	67,526	22,120	35,607	11,682	
27	Upper Sind Frontier ...	107,180	46,261	106,653	47,666	73,747	36,213	
	<b>Total, Sind ...</b>	<b>1,190,350</b>	<b>501,855</b>	<b>1,174,786</b>	<b>589,457</b>	<b>1,044,430</b>	<b>464,470</b>	
	<b>Grand Total ...</b>	<b>3,021,765</b>	<b>1,255,620</b>	<b>3,058,388</b>	<b>1,474,096</b>	<b>3,000,148</b>	<b>1,388,343</b>	

## AND OUTTURN.

*in each district of the Bombay Presidency (including during 1923-24 and preceding two years.*

als.

Wheat.					
1923-24.		1922-23. *		1921-22.	
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
9	10	11	12	13	14
67,271	12,430	196,724	30,927	243,780	56,867
6,779	1,603	11,411	2,811	16,881	4,510
9,282	2,811	17,782	6,290	23,223	7,644
8,990	623	59,337	11,854	52,973	11,823
9,369	1,405	20,427	5,062	18,072	3,601
101,711	18,671	305,681	56,934	354,929	84,345
123,282	29,673	125,144	31,227	134,461	33,176
28,247	7,009	32,312	10,012	40,892	12,524
153,924	28,894	137,465	23,903	112,737	18,133
139,597	23,295	107,652	25,024	107,660	18,253
49,458	9,079	56,641	10,760	60,470	6,805
26,526	5,749	27,428	5,735	25,442	7,753
39,650	8,372	48,769	15,779	42,598	13,190
565,686	112,074	535,431	123,843	613,660	109,364
79,136	6,802	128,516	15,490	111,082	23,400
166,511	7,560	276,758	33,076	176,071	15,719
217,350	20,275	279,509	36,399	344,919	44,964
462,997	34,627	685,083	85,965	632,072	84,085
159	29	149	33	85	15
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
159	29	149	33	85	15
1,130,553	165,401	1,526,344	206,775	1,500,946	278,309
11,819	4,293	14,562	6,206	14,399	2,946
20,314	1,516	36,392	5,810	25,464	4,651
44,835	7,970	70,159	35,536	36,136	16,439
44,469	12,060	51,302	23,172	46,395	16,727
01,504	21,197	106,401	20,413	113,864	23,992
137,069	31,376	116,350	25,584	123,102	33,551
73,592	17,504	104,906	32,906	73,965	27,534
432,602	96,016	502,082	149,689	432,276	125,840
1,563,155	261,417	2,028,426	416,464	1,933,222	404,149

TABLE VI—AREA AND

Serial Number.	District.	Cereals-					
		Barley.					
		1923-24.		1922-23.		1921-22.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	15	16	17	18	19	20
<b>Gujarat.</b>							
1	Ahmedabad	5,807	2,216	6,155	2,583	6,625	2,346
2	Kaira	999	482	636	246	1,203	547
3	Panch Mahals	2,294	644	7,733	2,417	5,013	1,475
4	Broach	.....	.....	.....	.....	.....	.....
5	Surat	.....	.....	.....	.....	.....	.....
	<b>Total, Gujarat</b>	<b>4,100</b>	<b>3,342</b>	<b>14,524</b>	<b>5,246</b>	<b>12,841</b>	<b>4,368</b>
<b>Deccan.</b>							
6	West Khandesh	.....	.....	.....	.....	.....	.....
7	East Khandesh	.....	.....	.....	.....	.....	.....
8	Nasik	.....	.....	.....	.....	.....	.....
9	Ahmednagar	327	80	247	54	237	46
10	Poona	699	117	756	172	487	121
11	Sholapur	1,655	355	2,157	415	1,800	295
12	Satara	2,331	637	3,682	1,261	2,914	929
	<b>Total, Deccan</b>	<b>5,512</b>	<b>1,169</b>	<b>6,841</b>	<b>1,902</b>	<b>5,438</b>	<b>1,391</b>
<b>Karnatak.</b>							
13	Belgaum	2,011	525	2,086	870	2,276	1,089
14	Bijapur	2,319	652	2,610	775	3,128	1,215
16	Dharwar	48	.....	41	5	36	.....
	<b>Total, Karnatak</b>	<b>4,378</b>	<b>1,177</b>	<b>4,737</b>	<b>1,650</b>	<b>5,438</b>	<b>2,304</b>
<b>Konkan.</b>							
16	Thana	.....	.....	.....	.....	.....	.....
17	Hombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	.....	.....	.....	.....	.....	.....
19	Ratnagiri	.....	.....	.....	.....	.....	.....
20	Kanara	.....	.....	.....	.....	.....	.....
	<b>Total, Konkan</b>	.....	.....	.....	.....	.....	.....
	<b>Total, Bombay Presidency</b>	<b>18,664</b>	<b>5,708</b>	<b>26,102</b>	<b>8,798</b>	<b>23,717</b>	<b>8,013</b>
<b>B.--SIND.</b>							
21	Karachi	7,928	3,326	6,366	2,433	9,016	3,631
22	Hyderabad	2,074	444	2,507	508	2,841	659
23	Thar Parkar	303	45	1,306	563	334	111
24	Nawabshah	1,647	134	2,216	475	2,788	563
25	Larkana	2,368	392	3,062	666	3,964	846
26	Sukkur	465	100	571	69	564	39
27	Upper Sind Frontier	76	16	116	23	96	33
	<b>Total, Sind</b>	<b>14,761</b>	<b>4,457</b>	<b>16,267</b>	<b>5,150</b>	<b>19,635</b>	<b>5,882</b>
	<b>Grand Total</b>	<b>33,745</b>	<b>10,165</b>	<b>42,369</b>	<b>13,948</b>	<b>43,302</b>	<b>13,895</b>



OUTTURN—*continued.**continued.*

Jowar.					
1923-24.		1922-23.		1921-22.	
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
21	22	23	24	25	26
321,494	64,908	317,300	127,729	333,288	107,026
58,911	18,475	45,782	15,558	48,842	12,776
14,756	5,769	12,931	6,298	13,390	4,151
146,923	23,164	105,007	27,236	165,759	65,074
89,536	22,399	93,144	27,861	113,538	29,401
632,057	134,708	574,064	204,182	676,807	218,468
136,525	34,352	145,594	30,073	146,885	37,211
321,716	86,190	329,716	97,744	367,149	21,182
86,921	12,194	157,839	18,498	74,869	11,699
917,273	143,841	1,093,237	177,316	903,054	86,693
841,818	96,735	955,942	175,597	806,632	89,896
1,477,405	233,831	1,500,102	261,058	1,480,767	234,188
666,165	109,830	897,717	186,232	584,756	157,224
4,447,723	716,963	4,780,147	936,518	4,368,125	738,093
540,637	76,532	658,581	157,403	704,674	227,601
1,282,694	118,159	1,660,368	145,365	1,629,414	268,922
543,268	91,894	662,724	95,563	662,263	133,044
2,366,819	287,585	2,882,173	398,331	2,996,350	624,667
457	76	499	79	504	119
...	...	.....	.....	.....	.....
...	...	.....	.....	.....	.....
193	11	32	2	396	35
647	87	531	81	902	147
7,447,246	1,139,843	8,236,915	1,539,112	8,041,184	1,581,275
40,563	5,473	27,488	8,011	45,649	18,192
7,331	1,118	8,680	6,663	9,351	4,487
9,948	1,558	25,053	7,702	24,626	6,419
97,323	39,839	109,853	35,861	88,648	21,753
89,359	17,705	81,039	23,497	188,873	45,746
112,766	19,880	142,062	47,565	120,636	35,534
97,493	18,397	85,076	21,991	96,065	23,377
454,773	104,090	483,251	162,190	573,848	155,908
7,902,019	1,843,423	8,723,166	1,691,302	8,615,032	1,737,183

TABLE VI—AREA AND

Serial Number.	District.	Cereals-					
		Bajri.					
		1923-24.		1922-23.		1921-22.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	3	4	5	6	7	
	<i>Gujarat.</i>						
1	Ahmedabad ...	137,253	21,504	166,371	34,963	171,732	26,883
2	Kaira ...	163,003	41,190	159,310	41,961	204,042	44,160
3	Panch Mahals ...	41,737	9,539	42,246	9,072	45,142	11,084
4	Broach ...	8,850	2,026	10,813	2,953	15,320	2,790
5	Surat ...	5,635	1,117	6,039	1,505	6,771	1,253
	<b>Total, Gujarat ...</b>	<b>356,467</b>	<b>75,376</b>	<b>364,679</b>	<b>90,584</b>	<b>442,007</b>	<b>86,140</b>
	<i>Deccan.</i>						
6	West Khandesh ...	332,162	55,542	325,371	54,486	369,833	68,685
7	East Khandesh ...	309,083	43,741	320,666	40,799	350,760	71,638
8	Nasik ...	956,661	116,311	795,133	65,024	972,324	118,461
9	Ahmednagar ...	879,865	73,900	803,064	53,146	1,045,399	56,405
10	Poona ...	688,823	55,604	554,440	45,488	584,313	47,104
11	Sholapur ...	167,195	6,536	168,326	8,697	261,898	15,849
12	Satara ...	301,195	21,378	405,604	44,438	436,351	54,165
	<b>Total, Deccan ...</b>	<b>3,534,934</b>	<b>373,112</b>	<b>3,372,604</b>	<b>312,078</b>	<b>4,030,383</b>	<b>431,247</b>
	<i>Karnatak.</i>						
13	Belgaum ...	149,147	11,127	120,247	12,506	144,968	20,910
14	Bijapur ...	299,634	14,312	133,530	6,379	389,506	27,846
15	Dharwar ...	9,475	952	7,029	1,569	8,574	2,231
	<b>Total, Karnatak ...</b>	<b>458,256</b>	<b>26,391</b>	<b>260,806</b>	<b>20,454</b>	<b>543,048</b>	<b>50,987</b>
	<i>Konkan.</i>						
16	Thana ...	.....	.....	.....	.....	.....	.....
17	Bombay Suburban ...	.....	.....	.....	.....	.....	.....
18	Kolaba ...	.....	.....	.....	.....	.....	.....
19	Ratnagiri ...	.....	.....	.....	.....	.....	.....
20	Kanara ...	.....	.....	.....	.....	.....	.....
	<b>Total, Konkan ...</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>
	<b>Total, Bombay Presidency ...</b>	<b>4,349,707</b>	<b>474,879</b>	<b>4,018,089</b>	<b>423,116</b>	<b>5,005,739</b>	<b>568,374</b>
	<i>B.—SIND.</i>						
21	Karachi ...	11,871	3,086	12,412	1,773	16,162	2,332
22	Hyderabad ...	166,174	52,523	154,440	57,915	169,229	33,981
23	Tnar Parkar ...	633,151	49,471	519,607	76,637	640,086	63,303
24	Nawabshah ...	115,111	32,082	121,842	26,087	149,762	30,001
25	Larkana ...	1,676	265	2,065	385	4,710	882
26	Sukkur ...	17,326	2,743	25,570	8,219	29,083	8,300
27	Upper Sind Frontier ...	76,691	11,298	89,696	19,230	99,323	23,344
	<b>Total, Sind ...</b>	<b>1,012,900</b>	<b>144,473</b>	<b>925,631</b>	<b>190,256</b>	<b>1,107,354</b>	<b>187,743</b>
	<b>Grand Total ...</b>	<b>5,362,607</b>	<b>619,352</b>	<b>4,943,720</b>	<b>613,372</b>	<b>6,113,092</b>	<b>756,117</b>

OUTTURN—*continued.**continued.*

Regi.					
1922-24.		1922-23.		1921-22.	
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
33	34	35	36	37	38
1,147	306	1,473	473	2,769	1,480
60,427	19,470	65,798	38,778	48,197	23,755
19,823	10,995	19,801	12,552	16,810	8,876
167	47	257	115	263	145
10,717	4,689	11,444	5,318	11,843	4,510
92,291	35,507	96,773	57,231	79,862	38,567
15,589	4,175	11,794	3,554	10,894	3,228
102,415	32,370	120,233	34,208	113,123	33,1
20,865	5,573	24,187	9,711	24,936	8,766
42,120	8,500	34,586	10,422	28,606	6,581
87	4	51	13	14	14,649
39,163	10,497	39,426	10,577	46,493	3
220,234	61,119	230,317	68,485	234,126	73,177
29,649	4,997	32,934	7,779	37,250	14,363
251	55	200	27	143	19
29,373	6,556	41,968	4,312	43,394	5,076
59,283	11,588	76,132	12,024	80,787	19,458
44,589	12,779	46,672	14,711	48,024	15,136
51	18	53	16	74	24
138,117	12,471	38,671	13,311	39,407	14,064
147,089	37,846	142,731	36,552	141,501	44,080
2,111	806	2,333	1,118	3,576	1,420
231,906	63,920	230,470	66,208	232,962	74,674
603,714	172,134	634,683	203,946	627,777	205,376
381	186	531	190	455	142
2	...	...	...	...	...
...	...	4	2	2	1
...	...	...	...	1	...
...	...	1	...	...	...
27	5	51	12	19	4
...	...	...	...	1	...
410	141	587	204	478	147
604,124	172,275	635,269	204,152	628,255	206,023

TABLE VI—AREA AND

Serial Number.	District.	Cereals—					
		Maize.					
		1923-24.		1922-23.		1921-22.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	3	4	5	6	7	8
<i>Gujarat.</i>							
1	Ahmedabad ...	4,646	1,887	4,957	1,631	4,855	1,670
2	Kaira ...	977	192	948	375	1,302	419
3	Panch Mahals ...	147,146	71,666	149,770	72,963	138,726	36,860
4	Broach ...	42	11	25	10	80	28
5	Surat ...	21	7	41	21	26	14
	<b>Total, Gujarat ...</b>	<b>162,832</b>	<b>73,743</b>	<b>155,741</b>	<b>75,000</b>	<b>144,989</b>	<b>38,991</b>
<i>Deccan.</i>							
6	West Khandesh ...	7,194	2,280	7,818	2,257	10,449	2,668
7	East Khandesh ...	727	176	1,192	446	1,645	654
8	Nasik ...	3,819	1,530	3,553	806	3,789	737
9	Ahmednagar ...	1,265	595	1,245	679	2,167	932
10	Poona ...	1,732	786	1,946	865	2,232	1,114
11	Sholapur ...	10,091	4,644	9,521	5,141	12,414	4,986
12	Satara ...	9,491	2,717	9,735	3,210	11,063	3,806
	<b>Total, Deccan ...</b>	<b>34,369</b>	<b>12,728</b>	<b>35,010</b>	<b>13,404</b>	<b>43,759</b>	<b>14,447</b>
<i>Karnatak.</i>							
13	Belgaum ...	16,328	6,189	16,160	7,309	15,248	9,264
14	Bijapur ...	1,802	507	1,840	592	2,399	1,339
15	Dharwar ...	49	.....	70	18	45	.....
	<b>Total, Karnatak ...</b>	<b>18,179</b>	<b>6,696</b>	<b>18,070</b>	<b>7,919</b>	<b>20,692</b>	<b>10,623</b>
<i>Konkan.</i>							
16	Thana ...	19	3	20	4	6	1
17	Bombay Suburban ...	.....	.....	.....	.....	.....	.....
18	Kolaba ...	.....	.....	.....	.....	1	.....
19	Ratnagiri ...	.....	.....	.....	.....	.....	.....
20	Kanara ...	21	3	73	24	99	30
	<b>Total, Konkan ...</b>	<b>40</b>	<b>6</b>	<b>93</b>	<b>28</b>	<b>106</b>	<b>31</b>
	<b>Total, Bombay Presidency ...</b>	<b>205,430</b>	<b>93,173</b>	<b>208,914</b>	<b>96,351</b>	<b>209,546</b>	<b>64,052</b>
<i>B.—SIND.</i>							
21	Karachi ...	1,801	584	1,640	697	1,294	466
22	Hyderabad ...	140	28	161	71	153	56
23	Thar Parkar ...	659	294	1,233	560	1,201	402
24	Nawabshah ...	83	32	132	51	155	45
25	Larkana ...	.....	.....	.....	.....	.....	.....
26	Sukkur ...	5	1	.....	.....	2	1
27	Upper Sind Frontier ...	29	11	94	6	22	6
	<b>Total, Sind ...</b>	<b>2,517</b>	<b>950</b>	<b>3,190</b>	<b>1,275</b>	<b>2,827</b>	<b>978</b>
	<b>Grand Total ...</b>	<b>207,937</b>	<b>94,123</b>	<b>212,104</b>	<b>97,626</b>	<b>212,373</b>	<b>65,070</b>

OUTTURN—continued.

continued.

Kodra.					
1923-24.		1922-23.		1921-22.	
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
45	46	47	48	49	50
3,447	864	4,812	945	3,749	1,473
98,193	19,623	106,060	49,810	76,523	27,226
25,028	9,999	24,405	12,311	25,122	9,511
5,508	883	6,985	3,009	9,014	2,750
11,177	3,958	13,578	6,165	15,694	7,650
131,358	36,317	155,340	72,240	130,112	48,610
11,857	3,573	14,130	4,255	16,218	4,924
.....	.....	.....	.....	23	8
52	7	59	.....	36	3
759	136	618	147	633	131
23	6	13	2	50	15
30	7	41	10	48	10
12,730	3,729	14,851	4,414	17,007	5,094
.....	.....	.....	.....	177	47
137	25	246	15	143	17
52	.....	397	80	52	.....
189	25	643	95	402	64
.....	.....	5,718	1,499	5,823	1,524
.....	.....	5,775	2,062	5,823	1,903
5,430	1,939	63,084	17,064	60,416	21,577
60,538	10,647	.....	.....	.....	.....
65,968	12,586	74,577	20,645	72,062	25,004
210,235	51,657	245,911	97,394	219,583	78,772
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	685	248
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	685	248
210,235	51,657	245,911	97,394	220,268	79,020

TABLE VI—AREA AND

		Cereals—					
Serial Number.	District.	Other Cereals.					
		1923-24.		1922-23.		1921-22.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	51	52	53	54	55	56
<i>Gujarat.</i>							
1	Ahmedabad	25,098	6,782	30,839	9,349	32,400	13,035
2	Kaira	8,426	1,734	11,034	4,130	8,621	2,912
3	Panch Mahals	31,676	15,566	32,926	18,962	30,914	13,359
4	Broach	51	10	101	28	136	44
5	Surat	1,152	494	1,442	727	2,127	656
<b>Total, Gujarat</b>		<b>66,403</b>	<b>24,976</b>	<b>76,342</b>	<b>33,196</b>	<b>74,498</b>	<b>30,206</b>
<i>Deccan.</i>							
6	West Khandesh	26,977	7,868	27,099	7,277	35,573	9,036
7	East Khandesh	1,329	316	1,381	329	1,864	610
8	Nasik	22,075	6,623	26,188	7,775	44,476	10,033
9	Ahmednagar	30,529	5,814	35,521	9,924	30,901	4,613
10	Poona	30,668	5,722	20,591	7,531	35,652	7,913
11	Sholapur	10,453	4,019	3,892	907	6,813	1,784
12	Satara	48,185	10,246	54,865	15,270	59,521	14,763
<b>Total, Deccan</b>		<b>170,225</b>	<b>40,607</b>	<b>178,537</b>	<b>49,013</b>	<b>214,600</b>	<b>48,772</b>
<i>Karnatak.</i>							
13	Belgaum	90,028	19,858	100,003	25,265	114,038	36,594
14	Bijapur	22,984	4,618	18,249	2,598	27,444	5,369
15	Bharwar	119,803	22,562	102,712	21,093	109,342	18,366
<b>Total, Karnatak</b>		<b>232,815</b>	<b>47,038</b>	<b>220,964</b>	<b>48,966</b>	<b>250,824</b>	<b>60,319</b>
<i>Konkan.</i>							
16	Thana	18,445	5,642	13,375	5,921	13,323	5,399
17	Bombay Suburban	7	3	7	2	10	3
18	Kolaba	25,084	11,673	25,141	12,794	26,083	13,199
19	Matnagiri	70,387	21,210	64,412	18,912	65,235	21,933
20	Kanara	34	15	44	24	86	48
<b>Total, Konkan</b>		<b>113,907</b>	<b>38,543</b>	<b>102,979</b>	<b>37,653</b>	<b>104,736</b>	<b>40,582</b>
<b>Total, Bombay Presidency</b>		<b>590,350</b>	<b>151,164</b>	<b>578,822</b>	<b>168,818</b>	<b>644,858</b>	<b>179,879</b>
<i>B.—SIND.</i>							
21	Karachi	34	13	65	23	83	28
22	Hyderabad	66	13	59	25	25	9
23	Thar Parkar	862	384	852	304	3	1
24	Nawabshah	496	148	2,000	696	2,211	657
25	Larkana	603	105	658	141	647	143
26	Sukkur	1,469	84	1,891	406	4,159	790
27	Upper Sind Frontier	4,041	946	3,346	896	4,967	1,655
<b>Total, Sind</b>		<b>7,571</b>	<b>1,693</b>	<b>8,671</b>	<b>2,391</b>	<b>12,095</b>	<b>3,283</b>
<b>Grand Total</b>		<b>597,921</b>	<b>152,857</b>	<b>587,693</b>	<b>171,209</b>	<b>656,953</b>	<b>183,162</b>

OUTTURN—*continued.**concluded.*

## Total. Cereals.

1923-24.		1922-23.		1921-22.	
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
57	58	59	60	61	62
579,927	113,188	755,749	317,497		
409,679	105,153	465,375	193,834	865,123	244,478
355,425	137,976	375,464	171,664	480,320	150,134
178,905	27,405	196,334	50,097	375,386	129,110
226,606	90,313	247,799	112,491	262,451	87,452
				267,371	108,674
1,750,142	474,035	3,041,731	735,583	2,250,661	719,849
704,299	156,051	705,930	152,856	770,997	175,746
661,573	137,610	685,555	139,543	762,061	207,212
1,392,507	222,660	1,302,973	174,650	1,367,957	221,615
2,706,524	290,860	2,081,061	294,130	2,132,030	176,587
1,639,724	200,935	1,720,424	290,232	1,605,528	205,905
1,697,273	255,862	1,715,668	282,784	1,793,396	265,961
1,153,858	178,400	1,207,653	209,072	1,233,535	274,149
9,253,758	1,412,378	9,419,564	1,622,327	9,667,504	1,527,175
1,019,261	169,605	1,169,575	264,323	1,244,655	396,351
1,785,760	146,309	2,096,460	189,237	2,435,035	317,030
1,036,111	172,419	1,124,957	187,021	1,298,662	236,760
3,451,132	468,333	4,390,992	640,581	4,778,352	940,141
375,535	171,078	375,334	157,729	383,349	191,070
15,566	8,329	15,033	8,599	15,152	9,532
337,109	169,937	338,238	186,953	339,225	178,885
626,074	201,794	614,456	222,638	606,829	242,885
166,308	80,540	164,396	64,451	164,994	83,927
1,520,592	682,378	1,509,104	690,460	1,512,550	701,299
16,367,624	3,007,224	17,361,381	3,688,951	18,229,067	3,888,463
317,735	135,963	296,656	145,142	317,490	138,753
462,204	148,038	454,972	185,545	455,932	157,428
745,405	87,785	690,058	149,615	755,036	122,235
295,333	97,270	328,197	114,802	319,132	86,679
602,276	219,394	595,182	265,817	675,586	256,339
332,550	70,693	353,800	103,975	312,192	90,211
359,062	94,539	393,820	182,716	348,206	112,854
3,115,865	853,665	3,112,665	1,090,612	3,193,578	944,199
19,493,509	3,860,889	20,474,046	4,777,563	21,422,645	4,832,962

TABLE VI—AREA AND

Serial Number.	District.	Pul					
		Tur.					
		1923-24.		1922-23.		1921-22.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	3	4	5	6	7	
<b>Gujarat.</b>							
1	Ahmedabad ...	1,247	77	3,299	551	1,672	139
2	Kaira ...	21,705	1,560	27,548	7,455	21,896	5,063
3	Panch Mahals ...	7,909	895	9,551	2,431	6,741	1,428
4	Broach ...	9,858	1,011	11,780	2,761	12,591	2,245
5	Surat ...	13,166	2,250	13,778	3,592	15,663	3,370
	<b>Total, Gujarat ...</b>	<b>52,805</b>	<b>5,783</b>	<b>66,056</b>	<b>16,790</b>	<b>58,563</b>	<b>12,248</b>
<b>Deccan.</b>							
6	West Khandesh ...	18,830	6,053	19,261	6,691	19,718	6,337
7	East Khandesh ...	35,056	10,927	34,323	9,807	31,371	14,566
8	Nasik ...	16,909	3,622	24,459	5,241	18,833	6,380
9	Ahmednagar ...	35,159	6,290	26,579	4,753	28,861	9,101
10	Poona ...	14,551	1,504	13,223	2,410	14,972	1,566
11	Sholapur ...	42,506	9,107	36,343	6,510	38,060	6,569
12	Satara ...	39,225	7,022	43,733	17,562	49,635	19,936
	<b>Total, Deccan ...</b>	<b>202,576</b>	<b>43,625</b>	<b>197,921</b>	<b>52,974</b>	<b>201,370</b>	<b>57,745</b>
<b>Karnatak.</b>							
13	Belgaum ...	48,663	8,695	48,560	15,617	45,249	12,958
14	Bijapur ...	47,398	6,136	33,300	2,405	65,680	14,074
15	Dharwar ...	50,725	9,058	40,634	10,598	48,127	12,891
	<b>Total, Karnatak ...</b>	<b>146,786</b>	<b>22,889</b>	<b>122,564</b>	<b>28,620</b>	<b>159,056</b>	<b>39,923</b>
<b>Konkan.</b>							
16	Thana ...	4,476	494	5,066	697	4,803	660
17	Bombay Suburban ...	.....	.....	.....	.....	.....	.....
18	Kolaba ...	1,429	240	1,401	213	1,295	197
19	Ratnagiri ...	1,168	156	772	107	1,444	239
20	Kanara ...	35	4	46	5	.....	.....
	<b>Total, Konkan ...</b>	<b>7,110</b>	<b>894</b>	<b>7,285</b>	<b>1,022</b>	<b>7,542</b>	<b>1,095</b>
	<b>Total, Bombay Presidency ...</b>	<b>409,280</b>	<b>73,201</b>	<b>393,826</b>	<b>99,706</b>	<b>426,531</b>	<b>111,011</b>
<b>B.—SIND.</b>							
21	Karachi ...	.....	.....	.....	.....	.....	.....
22	Hyderabad ...	.....	.....	.....	.....	.....	.....
23	Thar Parkar ...	.....	.....	.....	.....	.....	.....
24	Nawabshah ...	225	64	142	30	73	16
25	Larkana ...	4	1	13	1	3	1
26	Sukkur ...	.....	.....	.....	.....	.....	.....
27	Upper Sind Frontier ...	.....	.....	.....	.....	.....	.....
	<b>Total, Sind ...</b>	<b>229</b>	<b>65</b>	<b>155</b>	<b>31</b>	<b>76</b>	<b>17</b>
	<b>Grand Total ...</b>	<b>409,509</b>	<b>73,266</b>	<b>393,981</b>	<b>99,737</b>	<b>426,537</b>	<b>111,028</b>



## OUTTURN—continued.

808.

Gram.					
1923-24.		1922-23.		1921-22.	
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
69	70	71	72	73	74
1,829	48	17,349	2,068	25,617	5,218
1,923	142	6,747	1,218	15,273	3,139
32,218	5,702	67,530	16,552	58,516	14,476
252	18	1,986	374	2,641	441
1,579	232	2,335	487	2,131	357
37,801	6,142	95,847	21,649	104,383	23,631
32,270	5,804	33,545	6,048	34,294	6,528
5,831	1,096	9,397	1,850	8,577	1,669
69,323	11,973	78,146	10,410	62,526	8,044
67,929	10,129	64,109	10,065	34,146	3,767
39,529	5,535	59,810	9,899	38,450	4,423
39,836	3,881	38,179	4,282	26,438	2,986
46,890	3,899	71,613	13,373	56,989	9,397
301,907	42,247	354,804	56,947	265,730	36,809
20,887	1,712	41,308	5,838	31,726	4,844
23,872	1,708	51,143	3,881	36,984	4,181
25,944	2,895	41,335	4,602	47,650	6,211
80,703	6,316	133,686	14,321	116,360	15,286
1,168	174	910	163	842	123
297	42	285	40	243	33
72	10	100	12	72	11
236	34	411	59	326	47
1,775	260	1,706	274	1,482	214
422,136	54,965	586,043	92,191	487,955	75,890
397	35	365	33	731	103
294	37	249	41	387	65
483	54	572	85	349	39
11,401	2,148	17,618	2,517	16,819	2,402
30,605	3,269	25,678	2,805	22,703	1,772
51,099	7,574	48,571	7,247	39,709	5,191
108,107	22,201	108,890	33,688	94,016	23,540
902,456	35,348	201,943	46,506	174,714	38,112
624,642	90,313	787,986	138,697	662,669	114,002

TABLE VI—AREA AND

Serial Number.	District.	Pulses--					
		Other Pulses.					
		1923-24.		1922-23.		1921-22.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	75	76	77	78	79	80
<b>Gujarat.</b>							
1	Ahmedabad	23,167	2,511	37,054	4,565	33,185	4,641
2	Kaira	21,418	1,337	24,357	4,077	23,217	2,735
3	Panch Mahals	15,162	2,543	19,979	3,790	17,839	3,417
4	Broach	24,533	2,428	46,184	12,103	48,543	9,515
5	Surat	14,910	3,128	18,814	4,258	18,490	3,778
	<b>Total, Gujarat</b>	<b>100,495</b>	<b>12,047</b>	<b>146,388</b>	<b>28,793</b>	<b>141,274</b>	<b>24,386</b>
<b>Deccan.</b>							
6	West Khandesh	96,732	19,748	87,042	17,851	59,894	13,564
7	East Khandesh	222,550	33,085	217,215	33,940	252,761	62,145
8	Nasik	187,508	29,892	157,435	22,364	141,600	22,135
9	Ahmednagar	105,163	11,363	94,139	15,878	89,317	6,968
10	Poona	62,395	6,350	62,546	9,085	51,149	4,604
11	Sholapur	24,900	2,252	24,003	2,108	31,145	3,048
12	Satara	95,450	9,897	101,659	18,906	114,544	18,785
	<b>Total, Deccan</b>	<b>794,683</b>	<b>112,997</b>	<b>744,039</b>	<b>123,132</b>	<b>740,419</b>	<b>131,249</b>
<b>Karnatak.</b>							
13	Belgaum	115,586	11,623	89,223	15,813	71,613	12,030
14	Bijapur	79,081	5,972	51,498	4,184	69,690	7,628
15	Dharwar	133,552	13,420	114,158	13,758	122,194	15,929
	<b>Total, Karnatak</b>	<b>328,219</b>	<b>31,020</b>	<b>248,879</b>	<b>33,756</b>	<b>263,497</b>	<b>35,787</b>
<b>Konkan.</b>							
16	Thana	12,526	1,863	13,318	2,127	13,391	2,372
17	Bombay Suburban	1	.....	5	1	1	.....
18	Kolaba	4,508	829	4,705	905	4,787	838
19	Ratnagiri	47,540	5,172	64,076	6,032	52,250	9,033
20	Kanara	5,279	720	5,493	807	6,177	916
	<b>Total, Konkan</b>	<b>69,854</b>	<b>8,584</b>	<b>77,597</b>	<b>9,872</b>	<b>76,606</b>	<b>13,159</b>
	<b>Total, Bombay Presidency</b>	<b>1,298,256</b>	<b>164,548</b>	<b>1,216,908</b>	<b>195,553</b>	<b>1,221,796</b>	<b>204,531</b>
<b>B.—SIND.</b>							
21	Karachi	26,204	2,437	24,417	3,290	20,102	2,545
22	Hyderabad	5,859	991	6,559	1,217	523	110
23	Thar Parkar	2,255	156	4,425	543	5,346	482
24	Nawabshah	22,644	4,479	10,501	1,756	12,587	1,826
25	Larkana	171,097	24,824	173,385	25,475	141,001	22,155
26	Sukkar	32,992	5,208	37,081	7,103	31,350	5,705
27	Upper Sind Frontier	44,200	6,169	43,959	5,946	38,699	5,979
	<b>Total, Sind</b>	<b>305,341</b>	<b>44,264</b>	<b>300,328</b>	<b>45,270</b>	<b>249,608</b>	<b>38,902</b>
	<b>Grand Total</b>	<b>1,598,597</b>	<b>208,812</b>	<b>1,517,231</b>	<b>240,823</b>	<b>1,471,404</b>	<b>243,383</b>

OUTTURN—continued.

concluded.

Total, Pulses.					
1923-24.		1922-23.		1921-22.	
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
81	82	83	84	85	86
26,243	2,795	57,702	8,104	60,674	9,997
45,046	3,089	58,752	12,750	60,391	10,936
56,189	9,140	97,060	22,603	83,096	19,322
34,948	3,457	69,850	15,238	63,775	12,605
28,675	5,610	34,927	6,337	38,254	7,505
191,101	23,982	308,291	67,232	304,220	60,265
147,832	31,605	139,848	30,590	113,906	26,424
263,477	44,138	260,935	45,597	292,709	75,360
273,739	45,197	260,040	38,015	223,208	35,559
308,241	24,382	184,827	33,716	152,324	13,836
117,075	13,389	135,579	21,394	104,471	10,593
107,242	15,240	95,525	12,900	97,663	12,898
181,565	20,818	217,010	49,841	223,178	48,118
1,289,171	198,769	1,206,764	232,058	1,207,519	225,808
185,136	22,036	173,111	37,268	148,588	29,832
160,351	12,816	135,941	10,470	172,354	26,089
210,221	25,373	196,077	29,259	217,971	35,031
555,708	60,225	506,129	76,997	538,913	99,946
18,172	2,531	19,294	2,987	19,036	3,165
1	.....	5	1	1	.....
6,234	1,111	6,391	1,158	6,324	1,068
48,750	5,338	54,948	6,151	63,766	9,282
5,552	758	5,950	871	6,503	963
78,739	9,738	86,568	11,168	86,630	14,468
2,124,719	292,714	2,196,772	387,450	2,136,282	391,482
26,591	2,472	24,792	3,263	20,833	2,648
6,143	1,023	6,508	1,254	910	175
2,963	254	5,140	638	6,768	637
34,049	6,623	23,132	4,274	29,409	4,229
201,792	28,113	199,063	25,370	163,704	23,927
84,091	12,792	85,652	14,350	71,059	10,896
152,397	28,370	152,849	39,634	132,715	34,519
506,026	79,677	502,426	91,807	424,398	76,931
2,632,745	372,391	2,699,198	479,257	2,560,680	468,413

TABLE VI.—AREA AND OUTTURN—concluded.

Serial Number.	District.	Total, Cereals and Pulses.					
		1923-24.		1922-23.		1921-22.	
		Area in acres,	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	87	88	89	90	91	92
<b>A.—PRESIDENCY PROPER.</b>							
<i>Gujarat.</i>							
1	Ahmedabad ...	605,570	115,924	813,451	225,601	925,797	254,475
2	Kaira ...	454,925	108,192	524,127	196,584	540,711	161,070
3	Panch Mahals ...	411,614	147,116	473,524	194,467	458,452	148,432
4	Broach ...	213,853	30,862	256,184	65,335	326,236	99,967
5	Surat ...	255,281	95,923	282,726	120,828	303,665	116,179
	<b>Total, Gujarat ...</b>	<b>1,941,243</b>	<b>498,017</b>	<b>2,350,012</b>	<b>802,315</b>	<b>2,554,981</b>	<b>780,113</b>
<i>Deccan.</i>							
6	West Khandesh ...	852,131	187,556	845,778	183,446	884,803	202,170
7	East Khandesh ...	925,050	191,748	946,790	185,140	1,054,770	285,592
8	Nasik ...	1,666,346	268,037	1,563,013	212,655	1,611,225	257,174
9	Ahmednagar ...	2,214,765	289,242	2,265,888	317,906	2,284,354	190,423
10	Poona ...	1,756,799	214,224	1,856,003	311,626	1,709,999	216,498
11	Sholapur ...	1,604,515	271,102	1,814,193	295,684	1,893,059	273,854
12	Satara ...	1,335,423	199,218	1,424,663	347,913	1,456,713	322,267
	<b>Total, Deccan ...</b>	<b>10,554,929</b>	<b>1,611,347</b>	<b>10,716,328</b>	<b>1,864,380</b>	<b>10,895,023</b>	<b>1,752,976</b>
<i>Karnatak.</i>							
13	Belgaum ...	1,204,397	191,641	1,342,636	301,591	1,393,243	416,183
14	Bijapur ...	1,946,111	159,125	2,232,491	199,707	2,407,369	543,113
15	Dharwar ...	1,246,332	197,792	1,321,034	216,280	1,516,633	271,791
	<b>Total, Karnatak ...</b>	<b>4,396,840</b>	<b>548,558</b>	<b>4,896,121</b>	<b>717,578</b>	<b>5,317,265</b>	<b>1,031,087</b>
<i>Konkan.</i>							
16	Thana ...	393,707	174,309	394,628	190,716	402,385	194,225
17	Bombay Suburban ...	16,567	8,329	16,068	8,600	16,153	9,532
18	Kolaba ...	343,343	171,048	344,624	188,141	345,650	174,953
19	Ratnagiri ...	674,854	207,132	669,405	223,849	662,595	252,167
20	Kanara ...	171,860	81,298	170,946	85,322	171,497	84,890
	<b>Total, Konkan ...</b>	<b>1,599,331</b>	<b>642,016</b>	<b>1,596,692</b>	<b>701,628</b>	<b>1,598,180</b>	<b>715,767</b>
	<b>Total, Bombay Presidency ...</b>	<b>18,492,343</b>	<b>3,299,938</b>	<b>19,556,153</b>	<b>4,076,401</b>	<b>20,365,349</b>	<b>4,279,945</b>
<b>B.—SIND.</b>							
21	Karachi ...	344,326	138,434	321,418	148,405	338,323	141,401
22	Hyderabad ...	468,347	149,066	461,780	186,803	466,842	157,603
23	Thar Parkar ...	749,303	88,069	695,198	150,273	760,804	122,772
24	Nawabshah ...	329,383	103,888	356,329	119,076	348,541	90,903
25	Larkana ...	604,063	247,507	794,245	297,187	899,292	260,266
26	Sukkur ...	416,941	83,475	499,452	118,325	563,251	101,107
27	Upper Sind Frontier ...	511,479	122,903	546,669	162,350	480,923	147,373
	<b>Total, Sind ...</b>	<b>3,623,911</b>	<b>933,342</b>	<b>3,615,091</b>	<b>1,182,419</b>	<b>3,617,976</b>	<b>1,021,430</b>
	<b>Grand Total ...</b>	<b>22,116,254</b>	<b>4,233,280</b>	<b>23,173,244</b>	<b>5,258,820</b>	<b>23,983,325</b>	<b>6,301,375</b>

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TABLE VII—PRICES.

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TABLE VII—  
Prices (prevailing at harvest time) of Staple Articles  
each district of the Bombay Presi

No.	District.	Rate per rupee in				
		Jowari.	Bajri.	Wheat.	Rice.	Nachni.
<i>Gujarat.</i>		Sers.	Sers.	Sers.	Sers.	Sers.
1	Ahmedabad ... ..	10-50	7-00	6-50	4-50	...
2	Kaira ... ..	.....	7-55	5-75	5-15	13-00
3	Panch Mahals ... ..	12-63*	7-50	8-31	5-00	...
4	Broach ... ..	9-00	7-31	6-50	5-00	...
5	Surat ... ..	7-44	6-51	6-00	3-69	...
	Average ... ..	9-89	7-24	6-21	4-66	13-00
<i>Deccan.</i>						
6	West Khandesh (Dhulia) ... ..	10-35	8-56	6-56	5-06	...
7	East Khandesh (Jalgaon) ... ..	10-33	8-00	6-31	4-25	...
8	Nasik ... ..	.....	9-19	6-13	5-25	12-13
9	Ahmednagar ... ..	10-83	8-44	6-25	4-69	...
10	Poona ... ..	9-19	7-88	6-31	4-19	...
11	Sholapur ... ..	9-06	8-61	6-81	5-31	...
12	Satara ... ..	7-81	7-38	4-44	3-63	...
	Average ... ..	9-60	8-32	6-12	4-66	12-13
<i>Karnatak.</i>						
13	Belgaum ... ..	7-35	6-36	4-56	6-25	8-31
14	Bijapur ... ..	8-38	9-19	5-06	5-06	...
15	Dharwar ... ..	8-44	7-25	4-75	4-75	...
	Average ... ..	8-07	7-61	4-79	5-02	8-31
<i>Konkan.</i>						
16	Thana ... ..	.....	7-68	5-19	5-50	...
17	Kolaba (Alibag) ... ..	.....	.....	4-63	5-81	...
18	Ratnagiri ... ..	.....	6-75	4-81	6-05	7-63
19	Kanara (Karwar) ... ..	6-06	.....	4-81	6-00	8-94
	Average ... ..	6-47	7-31	4-86	5-54	8-23
<i>Sind.</i>						
20	Karachi ... ..	10-75	10-44	8-44	5-94	...
21	Hyderabad ... ..	12-25	9-94	8-00	6-56	...
22	Thar & Parkar (Mirpurkhas) ... ..	.....	9-61	8-06	6-38	...
23	Nawabshah ... ..	13-00	11-31	8-00	4-63	...
24	Larkana ... ..	12-69	11-44	8-50	7-00	...
25	Sukkur ... ..	12-94	11-38	8-19	3-75	...
26	Upper Sind Frontier (Jacobabad) ... ..	12-94	12-56	9-50	4-06	...
	Average ... ..	12-43	10-98	8-38	5-47	...

\* For Maize.

## PRICES.

and of Fodder at the Head-quarter Station of  
dency (including Sind) during 1923-1924.

sers of 80 Tolas.					Price per Indian Maund of 3,200 Tolas.	
Gram.	Turdal‡.	Gul.	Tobacco.	Cotton cleaned.	Dry Grass.	Jowari Karbi.
Sers.	Sers.	Sers.	Sers.	Sers.	Rs. a. p.	Rs. a. p.
7-00	6-00	3-00	1-00	0-69	2 4 0	2 9 0
8-88	5-25	4-06	1-81	...	.....	1 7 2
10-50	5-38	4-44	1-50	1-13	0 13 10	.....
6-50	5-50	2-75	2-50	0-69	2 0 0	2 6 5
9-25	5-19	3-63	1-13	0-50	2 6 5	1 13 8
8-43	5-46	3-58	1-59	0-75	1 14 1	2 1 1
9-88	6-00	3-88	1-88	0-75	2 6 5	.....
10-38	5-13	3-44	2-00	0-69	1 8 7	2 12 9
10-25	5-13	4-38	1-25	...	1 8 0	.....
9-04	5-00	4-44	1-75	...	.....	0 15 2
9-81	4-50	5-00	1-44	...	1 10 3	1 10 3
9-63	5-75	4-00	1-19	...	.....	1 3 7
7-03	5-44	3-81	1-69	...	1 10 8	2 10 7
9-65	5-28	4-14	1-69	0-72	1 12 0	1 14 8
8-85	4-56	4-00	1-00	...	1 10 8	.....
8-31	6-25	3-94	1-00	...	.....	1 8 5
8-13	6-06	3-94	1-00	0-69	0 15 6	0 10 7
8-27	5-29	3-96	1-00	0-69	1 5 1	1 1 6
6-88	5-44	3-38	2-00	...	.....	.....
7-19	4-63	3-38	1-38	...	.....	.....
7-44	4-81	2-81	1-38	...	0 15 5	1 14 2†
7-44	5-19	2-63	0-69	...	.....	1 11 0†
7-24	4-89	3-05	1-21	...	0 15 5	1 12 7
11-63	5-56	3-75	1-50	1-00	2 11 3	.....
6-94	6-25	4-00	2-60	0-63	1 2 8	1 5 9*
5-19	5-13	4-00	1-25	0-69	1 14 11	.....
10-50	3-38	4-50	1-00	...	0 12 0	0 12 10
11-50	4-60	5-19	3-75	0-69	.....	1 2 3
11-31	6-00	5-63	6-00	0-75	.....	0 14 2
7-88	5-50	5-06	.....	1-13	.....	0 7 6
9-28	5-19	4-59	2-67	0-82	1 10 2	0 14 11

\* For Bajri straw. † For Rice straw. ‡ For Mug dal in the case of Sind.

*Annual Reports.*

Season and Crop Report for the  
year 1923-24.

GOVERNMENT OF BOMBAY.

REVENUE DEPARTMENT.

Resolution No. P.—119.

Bombay Castle, 12th December 1924.

Letter from the Director of Agriculture No. P.—11 dated 13th  
October 1924—Submitting the Season and Crop Report of the  
Bombay Presidency for the year 1923-24.

RESOLUTION.—Recorded.

By order of the Government of Bombay  
(Transferred Departments),

H. K. KIRPALANI,  
Deputy Secretary to Government.

To

The Commissioner in Sind,  
The Commissioners of Divisions,  
All Collectors including the Deputy Commissioner, Upper  
Sind Frontier,  
The Director of Agriculture,  
The Settlement Commissioner and Director of Land Records,  
The Chief Conservator of Forests, Bombay Presidency,  
The Conservators of Forests, Northern, Central, Southern  
and Sind Circles,  
The Finance Department,  
The Public Works Department,  
The Government of India,  
The High Commissioner for India in the United Kingdom.



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No. P.—11 of 1925.

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From

Dr. H. H. MANN, D.Sc.,  
DIRECTOR OF AGRICULTURE,  
BOMBAY PRESIDENCY, POONA ;

To

THE SECRETARY TO GOVERNMENT,  
REVENUE DEPARTMENT, BOMBAY.

Poona, 7th October 1925.

Sir,

I have the honour to submit herewith the Annual Season and Crop Report of the Bombay Presidency for the year ending 31st July 1925.

I have the honour to be,  
Sir,  
Your most obedient servant,

H. H. MANN,  
Director of Agriculture.

## SEASON AND CROP REPORT OF THE BOMBAY PRESIDENCY FOR 1924-25.

### I. CHARACTER OF THE SEASON.

1. **General.**—The agricultural season of 1924-25 may, on the whole, be termed to be a satisfactory one, at least over a large part of the Bombay Presidency including Sind, for the great anxiety caused in the early part was more than allayed by the splendid rains that fell in the middle and latter periods. Putting the seasonal history in a connected story it can be said that whereas the rains expected in June, July and even in the first half of August were so defective as very seriously to hamper the *kharif* sowings and the transplantation of rice throughout the Presidency extra good falls at the end of August and in September considerably relieved the situation, improving the crops which had been sown, in many cases saving them from absolute destruction, and also enabling rice seedlings to be transplanted. These rains also were an excellent preparation for the *rabi* sowings which were carried out on a very large scale during September. The rain in the last week of that month, however, which in some parts extended into the early portion of October, unfortunately proved excessive in many places in Gujarat, in Khandesh and Ahmednagar in the Deccan, and in North Kanara in the Konkan, checking the progress of the *rabi* sowings and damaging cotton, *bajri* and other crops to a varying extent. But there came a most beneficial break in the last week of October which gave time and opportunity for the reaping of the early crops and the completion of the sowing of the later ones. In fact, the outlook in November was so bright in most parts of the Presidency that it was felt that *rabi* crops would more than make up the loss caused by the failure of the *kharif* and the season would prove to be an abnormally good one. But there came a very severe frost in the third week of January which most unfortunately was both severe in its intensity and widespread in its extent with the result that the outturn of crops was reduced in many areas and the high hopes once entertained were not realised to the full.

Taking the situation of the season all round however, it may be said that with all its drawbacks, such as the deficiency of the early rains over a large part of the Presidency, the severe cold wave in the last week of January and the absence of inadequacy of winter rains in parts of the east Deccan and Karnatak, the season was satisfactory at least over a large part of the Bombay Presidency.

Details regarding the season in its various aspects are contained in the following section.

2. Statement No. I (pages 30-31) compares the rainfall of the year with the average fall of rain at each representative station in the Presidency and in Sind. The average rainfall figures for each station are, as during the last year, those supplied by the Indian Meteorological

Department, based on the rainfall statistics available up to and including 1920.

The *kharif* rains were slightly above the average at Surat in Gujarat, but were generally below it at all the other stations in that division. In the Deccan, they somewhat exceeded the usual amount at Dhulia (West Khandesh), Nasik and Ahmednagar but were under it everywhere else. In the Karnatak, except at Bijapur where they were considerably short of the normal, they were generally above the average at the other stations. In the Konkan, they were just about the average at Karwar (Kanara) and slightly above it at Ratnagiri but were much below the usual amount at Thana and Alibag (Kolaba). In Sind the distribution of the *kharif* rains was very uneven, for, while Hyderabad, Mirpurkhas (Thar Parkar) and Nawabshah received double their usual share, Karachi, Larkana and Jacobabad (Upper Sind Frontier) had only half of the usual amount while Sukkur had to be satisfied with less than half an inch against an average of nearly two inches.

The *rabi* rains were slightly above the average at Godhra (Panch Mahals) in Gujarat and approached the normal at Sholapur in the Deccan. They were also about double the usual quantity at Dhulia (West Khandesh) and Jalgaon (East Khandesh) in the Deccan. But everywhere else in the Presidency and Sind they were considerably below the usual amount. It must however here be noted that it is customary to call the rains received between 1st October to 28th February as *rabi* rains and the above remarks apply to the rains received during this period. But as a matter of fact most of the useful late or *rabi* rains, during the season under review, were received in September and though according to practice these September rains have been included under *kharif* rains, it will not do to overlook their utility in considering the *rabi* season.

The hot weather rains present no features of special importance.

3. The following remarks will show in detail the nature of the season in each division of the Presidency:—

**Konkan.**—Regular monsoon commenced in all parts of the Konkan Division by about the end of June and the rain was seasonable for the sowing of rice seed. The rains in July were adequate and enabled completion of the *kharif* sowings and the commencement of rice transplantation. In August the rains were far below requirements in the two northern districts of Thana and Kolaba, with the result that the transplantation of rice was retarded here. In Ratnagiri and Kanara, however, the rains of the month were satisfactory and all went well. In September, the rains, though not really abundant, were certainly well-distributed and they improved the situation everywhere, though in parts of the north of Thana the rice crop was still in need of further rain while in sections of the Kanara District the rains proved rather excessive. The rains in October further helped the crops nearly everywhere though they proved inadequate to improve materially the condition of the crops in the north of Thana. As a result of the season described above, rice and *nagli*, the staple crops of the division, were fully normal nearly everywhere except

in the north of the Thana district and the flood affected areas of the Kanara district where their outturn was reduced from twenty to forty per cent. As regards crop diseases, "Koleroga" appeared as usual on the betelnut in Kanara and hairy caterpillar on *nagli* and *vari* was reported from parts of the Ratnagiri district.

**Gujarat.**—The monsoon started about the middle of June. The rainfall in this month being neither copious nor well-distributed *kharif* sowings had to be restricted to places of sufficient moisture. In July, the rains were satisfactory and *kharif* sowings were completed generally though in the rice tracts of the Surat district more rain was required for transplantation of rice. In August, the rains were generally sufficient in the south and the crops in the Surat and Broach districts consequently proceeded well but in the northern districts of Ahmedabad, Kaira and the Panch Mahals the rainfall proved inadequate and crops including rice required further rain to help them on. This they got in September. The rainfall in this month, however, exceeded the requirements in many places slightly damaging the crops and interfering with *rabi* sowings and a break in rains was needed. This desired spell of dry weather occurred in October and gave relief to the overwatered crops and enabled the harvesting of *kharif* crops and the sowing of *rabi* crops to be pushed on. There was but little rain in November and December nor was any required as the crops were progressing well on the strength of the previous moisture. The position appeared to be quite satisfactory at this period (December) and it was thought that the crops would return a fully normal yield. A severe frost which occurred in the third week of January, however, changed the aspect altogether and affected more or less all the crops, with the result that they were reduced in yield to a varying extent. As regards crop diseases, woolly mites and boll-worm affected cotton in September and October while stemborer appeared on *jowar* in places but the damage from any of these was not exceptionally serious anywhere.

**Deccan.**—Except on the fringe of the Western Ghats where it was up to the requirements of the crops, the rainfall in the Deccan from the commencement of June till about the middle of August was very defective. This deficiency of the *kharif* rains gave cause for great anxiety and by the middle of August it appeared that there would be a famine of some intensity especially among livestock as there had been a poor fodder crop in the preceding *rabi* season. Splendid rains were, however, received in the third week of August which seemed to be the turning point in the fortunes of the season. These rains continued well into September with the result that the *kharif* crops which were not yet hopelessly gone were saved, the Khandesh cotton crop which was suffering from want of moisture was considerably improved while *rabi* sowings on a very extensive scale were made possible. The rains in October were not very well distributed, for whereas they proved excessive in many parts of Khandesh where they damaged the cotton and other crops, they fell short of requirements in other areas. As however the September rains had left ample moisture in the soil, these areas did not suffer to any considerable extent. There was practically little rain either in November or December and as a

result though the crops in Khandesh and in the West Deccan progressed well those in the East Deccan began to show signs of distress. The severe frost in January further affected the crops nearly everywhere and as a result the yield of the crops fell short of expectations in many places though owing to the larger area under *rabi* crops a plentiful supply of fodder was assured. As regards crop diseases, a rather serious attack of smut on *jowar* was reported from the Deccan Canal areas. Except for this however the crops were generally free from any serious crop pest.

**Karnatak.**—In this division there were a few fairly good ante-monsoon showers which facilitated preparatory tillage. Monsoon opened as usual in June but though it gave good rain in the *Mallad* tract to undertake *kharif* sowings, it failed to extend into the interior where, in consequence, the sowings had to be confined to wet places. Rain in July also proved disappointing except in the West and the situation was anxious. In August, excellent showers were received which considerably improved the situation though there were still places in the east of Bijapur and north-east Dharwar where further rain was still needed. The rain in September was all that could be desired being both abundant and well-spread. It helped all the *kharif* crops and gave also an impetus to the *rabi* sowings. The rainfall in October was much below the usual quantity but the crops progressed well as they had ample moisture left by the September rains to fall back upon. The insufficiency or absence of rains in November and December coupled with the north-east winds that prevailed between December and March however told rather seriously upon the crops in the eastern portion of the division with the result that the crops were much reduced in yield, though owing to the extension of area under *rabi jowar* a plentiful supply of fodder was assured and what was lost in *jowar* grain was partly made up by the increased supply of *jowari kadbi*. In the *Mallad* the season was, on the whole, excellent. As regards crop diseases, a serious attack of red-leaf blight was reported on cotton from parts of the Bijapur district and was responsible for a considerable reduction in yield of the crop, while the most serious attack in recent years of rust on wheat in the dry tracts reduced its outturn considerably. For the irrigated crops such as sugarcane, tobacco and other garden crops the season under review was excellent.

**Sind.**—The *kharif* rains were generally above the average in south Sind, but below it elsewhere while the *rabi* rains were practically absent. The river was late in its rising for about a month thus delaying the *kharif* sowings for that time. From 1st July onwards, however, the levels began to improve reaching a point unparalleled in the available history of the river. This high level was maintained for a number of days with the result that widespread floods were caused in low-lying areas. The floods subsided with the fall of the river but the submerged areas were not dry till late in the *rabi* season. Owing to the late inundation there was some delay in the sowing of the *kharif* crops but when once sown the crops did well. The *jowar* and *bajri* crops gave a normal yield. Cotton progressed exceedingly well in the beginning and promised a full yield. Had it not been for the serious attack of frost in January, it

would certainly have been a bumper crop but as it was, the crop was injured and its yield fell short of expectations. As a result of late sowing there was much sterility in the rice crop in many places and the crop was also washed away in low-lying lands. With all this, however, the crop on the whole did fairly well. As regards *rabi* crops, the sowing of wheat except on high lands was considerably delayed due to the fact that the flooded areas did not come into ploughing condition in time. There was nevertheless a very considerable rise in the *bosi* area and were it not for the serious damage caused to the crop by repeated spells of frost the year would have been one of very high wheat harvest. Oilseeds too, though they presented a vigorous growth in the beginning, suffered in the end by these spells of frost and failed to return a normal yield when harvested. As regards crop diseases, except for *jowar*-borer and cotton boll-worm, these were not conspicuous in the year under report.

## II. AREA CULTIVATED AND UNCULTIVATED.

(Statement No. II, pages 32 to 37.)

4. **No. of Villages.**—The total number of villages (22,914½) in the Presidency proper rose by one, due to the formation of one new village in the Bombay suburban district. One village each in the Nasik and Satara districts of the Deccan and two villages in the Kolaba district of the Konkan were surveyed and transferred from the class of 'unavailable' to 'available' statistics.

In Sind, the total number of villages increased by four. One new *deh* was formed in the Karachi district while three new *dehs* were formed in each of the two districts of Nawabshah and Sukkur partly as a result of throwing up of new *Kacha* lands by the river and partly due to survey operations. Against this there was a decrease of three *dehs* in the Larkana district due to survey measurements.

5. **Total Area.**—The total area receded by about thirteen thousand acres in the Presidency. The difference was mainly perceptible in the Belgaum and Kaira districts. In the former the area decreased by about twenty thousand acres while in the latter it advanced by about eight thousand acres. The changes in both the cases were due to correction of mistake in previous records.

6. **Reporting Area.**—The total area for which statistics are regularly collected and reported in the Presidency rose by ninety-one thousand acres the districts mostly contributing to the increase being Kaira (+74,000 acres) in Gujarat, and Kolaba (+7,000 acres) and Ratnagiri (+8,000 acres) in the Konkan. The difference in the case of all the three districts is due to the fact that some villages which were wrongly classed as 'non-reporting' statistics last year were transferred to the correct class of 'reporting statistics'.

7. **Non-reporting Area.**—Under the non-reporting area, Belgaum showed a decline of twenty thousand acres which, as noticed under 'total area' above, was due to correction of mistakes detected in survey records. There was also a decrease in the districts of Kolaba and



Ratnagiri in the Konkan but this decrease corresponded generally with the increase under the reporting area in these districts.

8. In Sind, the total area, the area for which statistics are reported and the non-reporting area remained almost stationary.

9. Estimates for the probable cropping in the areas for which statistics were not forthcoming were, as usual, received from all the districts except Ratnagiri for which they had to be added in the Director's office.

**Cultivated, i.e., occupied area.**

10. Appendix A (page 23) shows the cultivated and uncultivated areas as compared with those in the previous year.

**Gross cropped Area.**—In the Presidency proper, the gross area cropped rose by 627,000 acres; the districts that mainly contributed to the increase being the whole of Gujarat (+ 293,000 acres) most of the Deccan (+ 118,000 acres) and the whole of the Karnatak (+ 203,000 acres) due to the abundance of the rains received in the later part of August and in September. Against this there was a decline in Poona (—27,000 acres) in the Deccan due to the inadequacy of the early rains.

**Twice cropped Area.**—The area cropped more than once advanced by 46,000 acres the districts which were mainly responsible for the increase being the whole of Gujarat (+ 78,000 acres), the whole of the Karnatak (+ 19,000 acres) and the district of Satara (+ 19,000 acres) in the Deccan, due to the excellent rains in the middle of the season. Almost the whole of the Deccan (—68,000 acres), on the other hand, showed a set back owing to the short duration of the rainy period as a result of which no time was found for the raising of two crops.

**Net cropped Area.**—The net area cropped rose by 581,000 acres and the increase was shared by all the districts except Ahmednagar (—10,000 acres) which showed a set back on account of the insufficiency of the earlier rains.

**Fallows.**—In consequence of the extension under the net cropped area (+ 581,000 acres) as noted above, the area under fallows receded by nearly the same extent (—544,000 acres).

In Sind, the gross cropped area, the area cropped more than once and the net cropped area, all rose by 453, 41, and 412 thousand acres respectively owing to the plentiful, though late, inundation of the year.

**Assessed and unassessed Areas.**—Both the assessed and unassessed areas rose very slightly in the Presidency, the former by 12,000 acres and the latter by 24,000 acres but in Sind the assessed area receded by about 102,000 acres while the unassessed area rose by 243,000 acres.

**Uncultivated, i. e., unoccupied area.**

11. Variations under this head correspond generally with those under the occupied area which have been noticed above.

In the Presidency, about 69,000 acres of forest lands were given out for temporary cultivation mainly in West Khandesh (22,000 acres),

Poona (18,000 acres), Sholapur (16,000 acres), Thana (8,000 acres), Ahmednagar (3,000 acres) and Nasik (2,000 acres) and about 61,000 acres of culturable waste mainly in Ahmedabad (23,000 acres), Surat (4,000 acres), Broach (3,000 acres), Poona (6,000 acres), Nasik (5,000 acres), Ahmednagar and Satara (2,000 acres each), Belgaum (6,000 acres) and Thana (9,000 acres) were similarly dealt with.

In Sind, the area under culturable waste fell by 134,000 acres, the decrease being shared by all the districts. The area under 'forest' and the 'miscellaneous unoccupied area' were however very nearly the same as last year.

### III. CROPPED AREA OF THE YEAR.

(Statement No. III, pages 38 to 59.)

12. **Cropped Area.**—The main features of the season and of the harvest of the year have been described elsewhere in the report. Appendix B (pages 24-25) shows the effect of the season under report on the area sown as compared with the average and with the preceding year's area under the principal crops.

In the Presidency proper, the area under food crops 53,000 acres advanced by 0·3 per cent. over the area of the last year though it still fell short of the normal by 388,000 acres or 2·0 per cent. *Jowar* (mostly *rabi*), wheat and gram showed a considerable increase as a result of the excellent September rains which stimulated cultivation of these crops nearly everywhere. Against this, however, *bajri*, the minor cereals and pulses (chiefly the *Kharif* ones) and sugarcane showed a considerable set back, the first two (*i.e.*, *bajri* and the minor grains) as a result of the insufficiency of the early rains and the last (sugarcane) due to the slump in the prices of *gul* and the deficiency of water supply early in the season. Among non-food crops, there was an extension under all the principal crops, *viz.*, tobacco, oilseeds and cotton which were cultivated on a larger scale in anticipation of high prices. The net result was an increase of 627,000 acres in the total cropped area over that of the preceding year.

In Sind, with the exception of rice which slightly declined in area owing to the late inundation of the year, and the minor food and non-food crops the area under which received a check as a result of the devotion of larger areas to the other more paying crops, there was an all round increase to a varying extent under all the food and non-food crops in consequence of the plentiful inundation of the year.

13. **Kharif and Rabi seasons.**—The following table compares as useful the *kharif* and *rabi* seasons of the year in the Presidency proper with those of the preceding two years. It will be seen that the *kharif* season, so far as judged from the areas under the *kharif* cereals and pulses, was worse both than the preceding year as well as the year 1922-23. The *rabi* season, however, was decidedly better than the previous year though it was still somewhat less favourable than the year 1922-23. There was a net rise of 103,000 acres in the total area under cereals and pulses as compared with the last year, but a net decline of 964,000 acres as compared with the year 1922-23.

Vari	Area in thousands of acres (i.e. 000 omitted).								
	1922-23.			1923-24.			1924-25.		
	Cereals.	Pulses.	Total cereals and pulses.	Cereals.	Pulses.	Total cereals and pulses.	Cereals.	Pulses.	Total cereals and pulses.
Kharif	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Rabi	7,717	1,496	11,110	9,991	1,653	11,644	8,890	1,385	10,255
	7,717	701	8,418	6,376	471	6,847	7,687	652	8,339
Total	17,361	2,197	19,558	16,367	2,124	18,491	16,577	2,017	18,594

14. Principal Crops.—The detailed remarks below explain variations under the principal crops :—

**Jowar and Bajri.**—The following table compares the extent of the cultivation of these staple grains in the different tracts. Owing to the splendid rains received in the latter half of August and in September throughout the Presidency the area under *jowar* (especially *rabi*) increased by 1,186,000 acres, the districts mainly contributing to the increase being the whole of the Deccan (+ 1,083,000 acres) and the Karnatak (+ 174,000 acres). Against this there was a decline almost throughout the Gujarat division (– 71,000 acres) owing to the decline in the area under *kharif jowar* due to inadequacy of the early rains. The area under *bajri* which is almost exclusively a *kharif* crop, showed as may be expected, a considerable set back in its area (– 1,273,000 acres) the decrease being shared by almost all the districts in the presidency and especially by the three principal *bajri* growing districts, viz., Nasik (– 311,000 acres), Ahmednagar (– 528,000 acres) and Poona (– 216,000 acres).

In Sind, the area under both the staple crops (viz., *jowar* and *bajri*) increased, that under the former by 107,000 acres and under the latter by 16,000 acres the increase being shared by all the districts.

Division.	Area in thousands of acres (i.e. 000 omitted.)					
	Jowar.			Bajri.		
	Normal.*	1923-24.	1924-25.	Normal.*	1923-24.	1924-25.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Gujarat	610	632	561	426	366	368
Deccan	4,595	4,448	5,531	3,419	3,535	2,405
Karnatak	2,697	2,367	2,541	394	458	303
Total Presidency	7,902	7,447	8,633	4,239	4,349	3,076
Sind	598	455	562	1,029	1,013	1,029
Grand Total	8,500	7,902	9,195	5,268	5,362	4,105

\* Average of the five years 1916-17 to 1922-23 excluding the two abnormal years 1918-19 and 1920-21.

**Wheat.**—In the Presidency proper, the area under this cereal considerably advanced (+ 288,000 acres) as a result of the copious rains of September which encouraged larger cultivation of the crop in many districts. The districts which mainly contributed to the increase were the whole of Gujarat (+ 90,000 acres) and the whole of the Deccan (+ 273,000 acres). Against this, however, there was a general decline (—75,000 acres) in all the districts of the Karnatak where the area under the crop receded owing to the larger devotion of areas to the *jowar* crop which, in view of the prevailing scarcity of fodder in that division, was given preference on account of the fodder it supplies.

In Sind, the increase in area under the crop (+ 108,000 acres) was general being shared by all the districts, and was due to the good inundation of the year.

**Rice.**—This shows an increase of 76,000 acres in the Presidency proper out of which Gujarat contributed 48,000 acres owing to the suitability of the June rains, Karnatak 22,000 acres where the good ante-monsoon showers encouraged larger cultivation, and the Konkan 6,000 acres as a result of the favourable early rains in many parts. The area under the crop was almost stationary in the Deccan.

In Sind, the area under the crop receded by about 15,000 acres owing to the late inundation of the year.

**Other Cereals and Pulses.**—Among these, the area under *ragi* (*nachani*) in the Presidency proper extended by 31,000 acres as a result of the favourable early rains received on and near the *Ghats* where the crop is principally grown. Gram also showed an increase in area (+ 79,000 acres) owing to the plentiful September rains which encouraged larger cultivation of the crop, and the increase was shared by almost all the districts of the Presidency where the crop is grown. The variations in the other cereals and pulses such as barley, maize, etc., are too small to justify any special remarks.

In Sind, the area under gram advanced by 38,000 acres as a result of the favourable conditions prevailing, while the area under the other cereals and pulses such as barley, maize, etc., was either stationary or showed but very slight variations.

**Oilseeds.**—As a result of the good rains in the middle of the season in the Presidency and the favourable rise of the river in Sind the area under oilseeds rose by 15,000 acres in the Presidency proper and by 144,000 acres in Sind.

Increase or decrease in thousands of acres as compared with the last year.		
Name of Oilseed.	Presidency.	Sind.
Linseed ..	+ 20	..
Sesame ..	- 13	+ 4
Rape and Mustard ..	+ 6	+ 143
Groundnut ..	- 15	..
Castor ..	- 7	+ 1
Cocoanut ..	- 10	- 3
Others ..	+ 30	- 1

The table in the margin shows the variations under the principal oilseeds as compared with the previous year.

**Linseed, Rape and Mustard.**—The area under linseed advanced by 20,000 acres and under rape

and mustard by 6,000 acres in the Presidency proper due to the plentiful September rains.

In Sind, linseed is hardly cultivated to an extent to justify any special remark, the cultivation hardly exceeding a few hundred acres but under rape and mustard, the principal oilseeds of the Province, an increase of 143,000 acres in area was noticed during the year under review, the increase being shared by all the districts without an exception as a result of the excellent behaviour of the river.

**Sesame.**—Sesame which is principally a *kharif* crop showed a set back in area of 13,000 acres in the Presidency proper as a result of the inadequacy of the early rains, but the area under the crop advanced slightly (+ 4,000 acres) in Sind owing to the favourable inundation there.

**Groundnut.**—Groundnut, though it attracted new areas in the Panch Mahals (+ 12,000 acres) and in Khandesh (+ 15,000 acres) where the crop is getting more popular every year, lost more in area in the other districts of the Deccan (—43,000 acres) than what it gained in Khandesh and the Panch Mahals—the net result being a reduction in area of 15,000 acres in the Presidency proper as a whole. This decrease was, of course, the result of the indifferent early rains of the season.

**Castorseed.**—The area under castorseed advanced slightly in South Gujarat as a result of the comparatively favourable rains there but receded in North Gujarat and the Deccan due to their insufficiency, while in the Karnatak the area was the same as last year in all the districts.

**Cotton.**—In the Presidency proper on account of the stimulus of high prices fetched by the crop during recent years and also as a result of the favourable rains in the latter half of August and in September, the area under cotton advanced further from 4,547,000 acres during last year to 4,917,000 acres during the year under report or by 8·1 per cent. over the last year and 27·4 per cent. over the normal. To the total increase of 370,000 acres in the Presidency, Gujarat contributed 73,000 acres, Deccan 43,000 acres, and Karnatak 253,000 acres.

In Sind, the area under cotton advanced from 342,000 acres in the previous year to 400,000 acres during the year under review, thus showing a net increase of 58,000 acres for the Province or a rise of 17·0 per cent. and 63·9 per cent. as compared with the last year and the normal respectively. The increase in Sind was general and was due to the favourable inundation and stimulus of high prices.

**Sugarcane.**—In the Presidency proper, the area under sugarcane receded by 10,000 acres and the decrease was noticeable in all the Sugarcane tracts. There were several causes that brought about this decrease. In the first place, the *rabi* rains of the last year (1923-24) being defective, there was shortage of water in the irrigation sources, chiefly in wells. To add to this, the early rains during the season under review were very defective with the result that much insufficiency of water was felt at the time of the planting of the crop. The slump in the prices of *gul* in the commencement of the season had also an adverse effect on the raising of the crop.

**Other Crops.**—Among other crops in the Presidency proper, the area under tobacco rose by 17,000 acres due to the stimulus of high prices, the districts which contributed to this increase being Kaira (+13,000 acres) and Belgaum (+2,000 acres). The fall under fruits and vegetables of 39,000 acres was almost general and due to deficiency of water supply earlier in the season. Under fodder however there was an increase of 55,000 acres, the demand for fodder and the high rates commanded in the market inducing larger cultivation almost everywhere.

In Sind, the area under tobacco and under fruits and vegetables was almost stationary but that under fodder receded by about 20,000 acres especially in Karachi, due to the late inundation of the season.

15. Appendix C (pages 26-27) shows as usual the distribution in each district of the Presidency and of Sind, of the principal food and non-food crops in percentages of the gross area cropped.

#### IV. IRRIGATED AREA.

(Statement No. IV, pages 60 to 69.)

16. **Variations in Irrigated Area and Crops.**—Appendix D (page 28) shows variations under the several heads of irrigation and crops irrigated as compared with similar details of the previous year.

17. **Area irrigated.**—In the Presidency proper, the irrigated area advanced from 938,000 acres in the previous year to 994,000 acres or by 6·0 per cent. during the year under report. The increase was mainly noticeable in the districts of Nasik (+16,000 acres), Ahmednagar (+4,000 acres), Poona (+55,000 acres) and Dharwar (+29,000 acres) where as a result of the deficiency of the rains at the commencement and end of the season, irrigation had to be resorted to, to a greater extent. Against this increase there was a set back in the whole of Gujarat (—28,000 acres), in Khandesh (—6,000 acres) and in the Konkan (—4,000 acres) where owing to the favourable nature of the rains, there was not the same necessity of having recourse to irrigation.

In Sind, the area irrigated rose appreciably, the area increasing from 3,070,000 acres during the previous year to 3,286,000 acres or by 7·0 per cent. during the year under review. The increase was shared by all the districts without an exception and was due to the plentiful inundation of the year.

#### 18. Sources of Irrigation (Presidency)—

**Government Canals.**—As regards the area irrigated from the different sources of irrigation the area under Government canals in the Presidency proper rose by 35,000 acres, the districts chiefly contributing to the increase being Ahmedabad (+5,000 acres), Kaira (+2,000 acres), Nasik (+7,000 acres) and Poona (+24,000 acres).

**Private Canals.**—Irrigation from private canals extended by 17,000 acres, the increase being shared almost exclusively by the Deccan districts (+17,000 acres) where as a result of the short duration of the rains, irrigation was necessary to help the crops.

**Wells.**—For the same reason as private canals, irrigation from wells extended in the districts of Nasik (+6,000 acres), Ahmednagar (+6,000 acres), Poona (+22,000 acres), and Dharwar (+3,000 acres) but decreased in Gujarat (—44,000 acres), Khandesh (—4,000 acres), Satara (—6,000 acres), Belgaum (—2,000 acres) and the Konkan (—4,000 acres) as a result of the comparatively favourable rainfall in these districts.

**Tanks.**—The increase of 37,000 acres in the area irrigated by tanks was almost exclusively to be found in Ahmedabad (+9,000 acres) and Dharwar (+28,000 acres).

**Other Sources.**—Under other sources the only district showing any large variation was Satara where the area receded by 6,000 acres.

#### Sources of Irrigation (Sind)—

**Government Canals.**—In Sind, which is mainly dependant for its cultivation on irrigation, the area irrigated by Government Canals rose by 183,000 acres as a result of the good inundation of the year and the increase was shared by all the districts.

**Private Canals and Tanks.**—The area irrigated by private canals and tanks was as usual small and also showed little variation as compared with the last year except in the district of Sukkur which showed an increase of 14,000 acres under the former (*i.e.*, private canals).

**Wells.**—Irrigation by wells advanced slightly in Karachi (+3,000 acres) but this rise was more than counterbalanced by a fall in the three northern districts, Nawabshah, Larkana and Sukkur, which three together showed a set back of 8,000 acres, the net result being a decline of 5,000 acres for the Province as a whole.

**Other Sources.**—Irrigation from other sources rose by 24,000 acres and the increase was shared by all the districts except Sukkur which showed a decrease of 5,000 acres.

19. The ratio of irrigated area to net cropped area was 3·6 per cent. in the Presidency and 74·3 per cent. in Sind.

#### 20. Crops Irrigated—

**Rice.**—As regards the crops grown under irrigation in the Presidency, the area under rice rose by 47,000 acres the increase having taken place almost exclusively in Ahmedabad (+15,000 acres) and Dharwar (+29,000 acres) where the crop had to be helped with irrigation as much as possible due to the inadequacy of the early rains.

**Wheat.**—Irrigated wheat declined in area in Gujarat (—13,000 acres) and Khandesh (—6,000 acres) where owing to the excellent rains in the middle of the season the crop required little artificial help. But in the Deccan (except Khandesh) the decline was made up by a rise of almost exactly the same area, as here owing to the deficient late rains the crop had to be irrigated as far as possible.

**Jowar.**—For the same reason as wheat, irrigated *jowar* showed an extension in area of 30,000 acres in the Deccan. In the other districts however, the area under the crop was either the same as last year or showed only slight deviation.

**Bajri.**—Irrigated *bajri* declined by 19,000 acres in area, the decline having occurred exclusively in the Deccan due to preference being given to *jowar* for its fodder.

**Cotton.**—The area under irrigated cotton rose by 4,000 acres under the stimulus of high prices but that under sugarcane fell by 11,000 acres, the decrease being noticeable in all the sugarcane areas owing to the slump in the prices of *gul* in the commencement of the season.

**Other Crops.**—The area under barley, maize, and the miscellaneous non-food crops fell by one, four and eighteen thousand acres respectively, but that under the miscellaneous cereals and pulses and the miscellaneous food crops rose respectively by seven and five thousand acres.

In Sind, the area under the principal irrigated *kharif* crops such as rice, *jowar* and *bajri* fell by 15, 64 and 64 thousand acres respectively, due to the late inundation of the year but that under wheat and cotton rose considerably, the former by 35,000 acres due to the excellent inundation later in the season and under the latter (cotton) by 56,000 acres due both to the good inundation and the incentive of high prices. Under other crops the area under barley, maize and sugarcane was almost stationary, while the miscellaneous cereals and pulses and also both the miscellaneous food and non-food crops showed an advance in area due to the favourable inundation of the year.

## V. OUTTURN OF CROPS.

(Statements V and V-A, pages 70 to 86.)

21. **Yield of principal crops.**—Statement V (pages 70—71) shows the estimated yield of the principal *kharif* and *rabi* crops in parts of 100 which is taken as normal. It is prepared from the district estimates which are returned in annas taking twelve annas to represent a normal crop. The figures are therefore approximate only.

22. The character of the season has already been described above.

23. **Outturn of *kharif* crops in the Presidency in parts of the normal—**  
**Jowar.**—In the Presidency proper except in Ahmedabad, Poona, Satara and Bijapur where the outturn of *kharif jowar* was only about half the normal, the yield of the crop varied from two-thirds to about five-sixths of the normal in the other districts.

**Bajri.**—The yield of *bajri* which came to only one-fourth the normal in Sholapur and was about half the normal in the Panch Mahals, Poona and Bijapur, ranged between two-thirds and five-sixths of the normal in the other districts.



**Rice.**—Rice returned nearly a full normal yield throughout the Konkan except in parts of the Thana district where it suffered somewhat due to deficiency of rains and in parts of the Kanara district where it was spoiled by excessive rains in July. In the whole of Gujarat, in Khandesh, Ahmednagar, and Satara, in the Deccan, and in Belgaum and Dharwar in the Karnatak, also it yielded between eighty per cent. and a full normal. In the remaining districts of Nasik, Poona, Sholapur and Bijapur however its outturn came only to about one-half the normal.

**Cotton.**—The yield of cotton came between three-fourths and nearly a full normal in Gujarat, the North Deccan including Ahmednagar and in Belgaum and Dharwar in the Karnatak. In the South and east Deccan (Poona, Sholapur and Satara) and in Bijapur in the Karnatak however the outturn ranged only between one-third and one-half the normal.

**Sesame.**—The yield of Sesame varied from three-fourths to five-sixths of the normal in the whole of Gujarat and the Konkan and in Dharwar in the Karnatak. In the North Deccan including Ahmednagar, Satara and in Belgaum the outturn of the crop was about two-thirds of the normal while in Sholapur and Bijapur it came only to one-third of the normal and in Poona to a little over half the normal.

**24. Outturn of kharif crops in Sind in parts of the normal—**  
**Jowar.**—In Sind, *kharif jowar* returned only about half the normal in Thar Parkar and Larkana, but in the other districts the yield was higher—ranging from two-thirds to five-sixths of the normal.

**Bajri.**—*Bajri* yielded only half the normal in Larkana but in all the other districts, the yield varied between two-thirds and five-sixths of the normal.

**Rice.**—As regards rice, it returned a full yield in the Upper Sind Frontier district. In the other districts the outturn ranged from two-thirds to three-fourths of the normal except in Larkana where it came to a little less than sixty per cent. of the normal.

**Cotton.**—As a result of the severe frost in the end of January the yield of cotton came to only half the normal in Hyderabad, Thar Parkar, and Larkana and a little over half in Karachi. In the remaining districts of Nawabshah, Sukkur and Upper Sind Frontier however, the yield was much better—being two-thirds of the normal.

**25. Outturn of rabi crops in the Presidency in parts of the normal—**  
**Jowar.**—As regards, *rabi* crops, the yield of *jowar* varied between eighty per cent. and a full normal in the whole of Gujarat, in Khandesh, and in Dharwar, while in Sholapur and Belgaum it was about three-fourths of the normal. In the remaining districts, however, it was only about half the normal.

**Wheat.**—Wheat yielded about five-sixths of the normal in Khandesh, while in the other Deccan districts the yield was about three-fourths of the normal except in Poona where it was only a little over one-half. In the Karnatak, the crop was almost a failure in Bijapur as a result of the deficiency of late rains, the dry winds that prevailed later in the season,

a very serious attack of rust, and the severe frost in the end of January with the result that in this district the yield came to only one-fourth of the normal. For the same reasons the out-turn of the crop in the other two districts of the Division, *viz.*, Belgaum and Dharwar was not satisfactory though it was better than in Bijapur coming to one-half the normal. In Gujarat, the crop returned one-half the normal in Kaira and two-thirds of the normal in the Panch Mahals but in the other districts the yield ranged between eighty per cent. and a full normal.

**Gram.**—The yield of gram ranged between seventy and eighty per cent. of the normal in North Gujarat and was a little over half the normal in Poona and Sholapur but everywhere else the yield of the crop corresponded generally with that of wheat.

**Tobacco.**—Except in Bijapur and Nasik where the yield of tobacco came to one-third and one-half the normal respectively, the yield of the crop ranged between two-thirds and a full normal in all the Districts of the Presidency.

**Linseed, Rapeseed and Mustard.**—Linseed, and Rape and Mustard seeds yielded between seventy and eighty per cent. of the normal in the whole of Gujarat, in North Deccan including Ahmednagar and in Dharwar in the Karnatak but in all the other districts the out-turn came only to about one-half the normal.

#### 26. Outturn of Rabi Crops in Sind in parts of the normal—

**Wheat, Gram and Tobacco.**—In Sind, the outturn of wheat and gram ranged between one-half and three-fourths of the normal while that of tobacco between one-half and two-thirds of the normal.

**Rapeseed and Mustard.**—Rapeseed and Mustard returned three-fourths of the normal in Karachi and two-thirds of it in Hyderabad. In the other districts the yield of the crops varied from one-third to one-half the normal.

#### 27. Outturn of Sugarcane in the Presidency and Sind—

**In the Presidency.**—Except in Sholapur and Bijapur where the yield of sugarcane came to two-thirds of the normal, the outturn of the crop ranged between three-fourths and a full normal everywhere.

**In Sind,** sugarcane yielded three-fourths of the normal in Karachi and Hyderabad and two-thirds of the normal in Upper Sind Frontier. Everywhere else the out-turn of sugarcane bordered on sixty per cent. of the normal.

28. **Outturn in tons of food-grain crops.**—Statement V-A (pages 72 to 86) compares the acreage under food-grain crops (cereals and pulses) in the various divisions of the Presidency and their approximate outturn in tons during the year under report with similar statistics for the two preceding years.

The following table sums up the result :—

Division.	Area in thousands of acres.			Out-turn in thousands of tons.		
	1922-23.	1923-24.	1924-25.	1922-23.	1923-24.	1924-25.
Gujarat .. ..	2,350	1,941	2,092	803	498	734
Deccan .. ..	10,716	10,555	10,627	1,854	1,611	2,010
Karnatak .. ..	4,896	4,397	4,282	717	549	974
Konkan .. ..	1,596	1,599	1,593	702	642	671
Total Presidency proper ..	19,558	18,492	18,594	4,076	3,300	4,389
Sind .. ..	3,615	3,624	3,899	1,182	933	1,042
Grand total ..	23,173	22,116	22,493	5,258	4,233	5,431

It will be noticed that while the area under food grains in the Presidency rose by only 0·5 per cent. the out-turn rose by as much as 33·0 per cent. over the previous year thus reflecting the comparatively satisfactory character of the season under review. In Sind, too, both the area and yield rose appreciably over the last year, the former by 7·6 per cent. and the latter by 11·7 per cent.

#### VI. PRICES, TRADE AND STOCK.

29. **Prices of principal articles.**—Statement VI (pages 87 to 89) shows in detail the prices of the principal staples and of fodder ruling at harvest time at each district head-quarter station in the Presidency and in Sind. The detailed remarks below explain the variations in prices of the principal articles.

**Jowar.**—In the Presidency proper *jowar* was dearer by  $\frac{1}{4}$ th of a seer at Godhra (Panch Mahals) and by about  $\frac{4}{5}$ ths of a seer at Surat but at Ahmedabad and Broach it was dearer by  $1\frac{1}{2}$  and  $1\frac{1}{2}$  seer per rupee respectively. In the Deccan *jowar* ruled higher by about half a seer per rupee at Dhulia (West Khandesh) and Sholapur, but at the other stations it was dearer from about  $1\frac{1}{2}$  to 3 seers per rupee. In the Karnatak it was dearer by about half a seer per rupee in all the districts.

In Sind except at Karachi where it ruled higher by a little over one seer per rupee, it was dearer by from  $2\frac{1}{2}$  and  $3\frac{1}{2}$  seers per rupee at all the district head-quarter stations in the Province.

**Bajri.**—Except at Godhra (Panch Mahals), Broach, Belgaum, Dharwar and Ratnagiri where it was almost stationary in price and at Ahmedabad, Surat, Jalgaon (East Khandesh), Poona and Satara where it was dearer by less than one seer per rupee, bajri ruled higher by from one to two seers per rupee at all the other stations of the Presidency.

In Sind, *bajri* was dearer by half a seer per rupee at Mirpurkhas (Thar

Parkar) but at the other stations it was dearer by from  $1\frac{1}{2}$  to  $2\frac{1}{2}$  seers per rupee.

**Wheat.**—The price of wheat was stationary at Dharwar and nearly so at Karwar (in Kanara) and rose by about  $\frac{1}{2}$  to  $\frac{2}{3}$  seers per rupee at Surat, Nasik, Belgaum, Bijapur and Ratnagiri. At the other stations, however, it was dearer by 1 to  $1\frac{1}{2}$  seers per rupee.

In Sind the price of the article rose by from about 2 to  $3\frac{1}{2}$  seers per rupee.

**Rice.**—Except at Kaira, Satara, Kolaba and Ratnagiri where the price of rice rose by a little over one seer per rupee, the price of the article was either stationary or showed an immaterial rise.

In Sind, the price of rice was almost the same as last year at Nawabshah, Sukkur, and Jacobabad (Upper Sind Frontier) but it rose by about a seer per rupee at the other stations except at Hyderabad where it rose by  $1\frac{1}{2}$  seers per rupee.

**Gram.**—Gram was almost steady in price at Ahmedabad, Godhra (Panch Mahals) and Broach in Gujarat, at Sholapur and Satara in the Deccan and at all the stations in the Konkan, while it showed a small rise (of less than half a seer per rupee) at Nasik, Bijapur and Dharwar. At all the other stations, however, it rose in price by from 1 to  $2\frac{1}{2}$  seers per rupee.

In Sind, the price of the article was nearly the same as last year at Hyderabad, Mirpurkhas (Thar Parkar) and Nawabshah and rose by  $1\frac{1}{2}$  seers per rupee at Jacobabad (Upper Sind Frontier). At the other stations, however, the rise in price was considerable ranging from  $2\frac{1}{2}$  to 3 seers per rupee.

**Turdal.**—Except at Ahmedabad and Surat where it rose by about a seer per rupee and at Ahmednagar where it was cheaper by the same amount, the price of *turdal* was stationary at all other stations in Gujarat and the Deccan and also in the Konkan, while in the Karnatak the article was cheaper by about a seer per rupee at all the stations.

In Sind where *mug-dal* is used in place of *turdal* the price of the article (*mug-dal*) was either stationary or showed but slight variations.

**Gul or raw sugar.**—The price of *gul* was nearly stationary at Ahmedabad and Broach in Gujarat, at Dharwar in the Karnatak, and at all the stations in the Konkan except Alibag (Kolaba) where it was dearer by  $\frac{1}{2}$  seer per rupee. At the other stations in Gujarat, in Khandesh and at Belgaum and Bijapur in the Karnatak, the price rose by from  $\frac{1}{3}$ rd to  $\frac{2}{3}$ rd seers per rupee while at the remaining stations of the Presidency the price rose by from about one seer to two seers per rupee.

In Sind, the article was nearly steady in price at Karachi, Hyderabad and Mirpurkhas (Thar Parkar) but at the other stations it rose in price by from 1 to  $1\frac{1}{2}$  seers per rupee.

**Tobacco.**—This was nearly stationary throughout the Presidency, the highest rise or fall never exceeding  $\frac{1}{3}$ rd of a seer per rupee at any station in the Presidency.

In Sind, the price of the article was nearly the same as last year at Karachi, Nawabshah and Jacobabad (Upper Sind Frontier) but at the other stations it rose by from  $\frac{1}{2}$  to  $\frac{2}{3}$  seer per rupee.

**Cotton.**—Under the incentive afforded by the high prices fetched by the crop during recent years and also as a result of the plentiful rains received in the middle of the season, the area under cotton was extended wherever possible and the total area sown with the crop in the Presidency including Sind, Kathiawar and other Native States stood at 7,713,000 acres, thus showing a rise of 925,000 acres or 13·6 per cent. over the last year. The out-turn also rose from 1,211 thousand bales in the previous year to 1,589 thousand bales or by 31·1 per cent. Of this total out-turn of 1,589 thousand bales, 507 thousand bales or 31·9 per cent. represented the yield of the long stapled Broach, Dharwar and Kumpta varieties while the remaining 1,082 thousand bales or 68·1 per cent. belonged to short-stapled varieties of Khandesh, Gujarat and Sind. As compared with the previous year the out-turn of the long stapled cotton rose by 29·7 per cent. The demand for Indian cotton in the foreign market was not as keen as during the previous year with the result that the prices for all varieties fell considerably as compared with the last year though they were still about the average of the preceding five years for the Broach and Dharwar varieties and considerably higher than this average for the Khandesh variety. The following table compares the prices of the year under report with those of the previous year and the average of the preceding five years :—

Variety.	Price per Bale of 400 lbs.			Per cent. increase + or decrease (-)	
	Average of five years end- ing 1923.	Average of the seven months ending 31st July		Compared with the average.	Compared with the price in 1924.
		1924.	1925.		
	Rs.	Rs.	Rs.	Per cent.	Per cent.
Broach .. .. .	245	308	245	..	-20·4
Khandesh .. .. .	173	280	235	+35·8	-19·7
Dharwar .. .. .	238	316	233	-2·1	-26·0

**Fodder.**—Dry grass was somewhat cheaper at Ahmedabad, Satara and Belgaum and dearer at Dhulia and Poona, especially at the former place. Everywhere else in the Presidency it was either stationary or showed only slight variations.

In Sind, except at Mirpurkhas (Thar Parkar) where it was appreciably cheaper, dry grass remained steady in price at all the other stations.

**Jowar kadbi.**—This was appreciably cheaper at Ahmedabad and Kaira in Gujarat, at Jalgaon (East Khandesh) and Satara in the Deccan and at Karwar (Kanara) in the Konkan while it was much dearer at Sholapur. Everywhere else in the Presidency it was either stationary or showed only a slight difference in the market rate.

In Sind except at Nawabshah where it was appreciably cheaper, the price of the article remained constant at the other stations of the Province.

## VII. AGRICULTURAL STOCK.

**30. Census of Agricultural Stock.**—The quinquennial census of agricultural stock was held this year and the result of it is given at length in statement VII (pages 90 to 104).

Appendix E (page 29) summarises the total strength under each main head during the year as compared with the last two censuses held in 1915-16 and 1919-20.

**31. Variations in total number of cattle.**—The total number of cattle is now returned at 84·80 *lakhs*. This is 3·6 per cent. in advance of the figure of 1919-20 though it is still short of the figure of 1915-16 by 7·9 per cent.

In Sind, the total number increased by 507,000 or 27·9 per cent. and 146,000 or 6·7 per cent. as compared with 1919-20 and 1915-16 respectively.

**32. Variations under principal heads.**—The following remarks explain the variations under the several heads.

**Plough cattle.**—The number of these has declined by 0·2 per cent. in the Presidency but has advanced by 9·8 per cent. in Sind, as compared with 1919-20. As a result of the favourable nature of the seasons experienced during recent years in Gujarat, Konkan and Khandesh plough cattle show an increase in their number in these areas with the single exception of Kanara in the Konkan where the number has been slightly reduced due to "cattle diseases, floods and dearth of provisions". In the Deccan and Karnatak, however, the position is not very satisfactory. In the former (Deccan) except in Khandesh which has been noticed above, the number of plough cattle is almost constant in Poona and Nasik but in the districts of Satara, Ahmednagar and Sholapur which are frequently liable to scarcity it has declined by 6·4, 6·8 and 15·2 per cent. respectively since 1919-20. In the Karnatak, the position is even worse, for here while plough cattle have decreased in Dharwar and Belgaum by nearly six and nine per cent. respectively, in the Bijapur district—one of the most famine-stricken districts in the Presidency—the decline has amounted to as much as 21·6 per cent. since the last census.

In Sind, with the solitary exception of Hyderabad which shows a setback in number by about fourteen per cent., chiefly due to exportation, there has been an appreciable increase in all the districts owing to the comparatively favourable seasons experienced in the Province recently.

**Milch cattle.**—Excepting Sholapur in the Deccan and all the districts of the Karnatak (*viz.*, Belgaum, Bijapur and Dharwar) where they show a decrease in number as a result of seasons of scarcity and the consequent fodder famines experienced in these districts during recent years, milch cattle have advanced in number throughout the Presidency and Sind. The tendency of the people to rear milch cattle on a larger scale on account of the high prices commanded by milk and its by-products in the market everywhere and the absence of severe fodder famines (except in the Karnatak and east Deccan) during the last three or four years seem to be the two principal causes for a general increase under

this head. The net result has been that while since 1919-20 their number has increased by 3·4 per cent. in the Presidency it has advanced by as much as 28·0 per cent. in Sind.

**Breeding bulls.**—As compared with 1919-20 these show an advance of 1,000 in number or 3·3 per cent. in the Presidency and of 13,000 in number or 162·5 per cent. in Sind, the number now recorded being the highest on record. This clearly shows that the cultivators have now realised the importance of good breeding and are giving more attention to the matter than at any time previously. It is also possible that much of this enthusiasm on the part of cultivators is due to the encouragement given to the breeding of good bulls.

**Young stock.**—The increase in number over 1919-20 under this head is 9·8 per cent. in the Presidency and 43·0 per cent. in Sind. Except in Sholapur in the Deccan and the three Karnatak districts where the number decreased in sympathy with the reduction in the number of milch cattle there, young stock has shown an increase everywhere in the Presidency and Sind. With an increase in “milch cattle” and “breeding bulls” an increase under this head is but natural. The absence of any fodder famine (except in the Karnatak and east Deccan) during the last three or four years and the fact that after the famines of 1918-19 and 1920-21 the cultivators have rightly realised the importance of taking good care of their young stock also go a long way in accounting for the increase.

**Horses and ponies.**—In the Presidency proper, as compared with the previous cattle census of 1919-20 these show a decrease of about 5,000 head or 3·8 per cent. chiefly due to the advance of the better means of transport, such as motorcars and motor lorries. In Sind however where local conditions such as rough roads and sandy tracts do not permit of the above latest means of transport (motors) these animals still hold their own and are carefully reared as is evinced from an increase in their number from 72,000 in 1919-20 to 78,000 during the year under report.

**Sheep and goats.**—These together show in the Presidency an increase of 15 lakhs or 51·9 per cent. as compared with 1919-20 but when compared with 1915-16 the rise is much less, being 3·53 lakhs or 8·7 per cent. In Sind however they show an advance of over five lakhs or thirty per cent. both as compared with 1919-20 and 1915-16. Various reasons are assigned for this increase the chief of which are—

- (a) grazing facilities and absence of fodder famines during the last four years as a result of the comparatively favourable seasons experienced over a greater portion both in the Presidency and Sind ;
- (b) the increasing tendency of the cultivators to rear sheep and goats, as their rearing is both inexpensive and profitable, their feeding charges being very small while at the same time the milk, wool, manure and mutton obtained from them brings in a handsome return. ;
- (c) the increased demand for wool as a result of the “*khaddar*” or home-spun cloth movement. This movement having given a stimulus to the hand-loom industry and to the manufacture of country blankets (*kambli* or *ghongdi*) both for wearing as blankets and for use as coating,

felt for caps, etc., a large amount of wool is always in demand and to supply it a large number of sheep are nowadays kept, as besides wool they give milk, mutton and manure at a comparatively low cost of feeding ;

(d) immigration from outside the Presidency for grazing and folding purposes at the time of the census. As a result of this, sheep and goats which did not really belong to the Presidency were enumerated and included in the figures of the present census ;

(e) a large emigration from the Presidency owing to fodder famine at the time of the *last census*. As a result of this, sheep and goats which really belonged to the Presidency could not be enumerated as they were absent then and the net result was that the number returned in 1919-20 was considerably less than the real figure.

From the last two causes mentioned above it would appear that the very large increase now reported under sheep and goats is partly apparent but even if this apparent increase is left out of account there is still reason to believe that these animals are getting more popular and are showing a substantial advance in number.

**Ploughs and carts.**—These increased everywhere in the Presidency proper and in Sind, as a result of the increased use of carts as against more primitive means of transport.

#### VIII AND IX. CONDITION OF THE AGRICULTURAL POPULATION.

33. The agricultural season of 1924-25 was, on the whole, so far as the actual produce of the land was concerned, decidedly better than its predecessor. No doubt, owing to the inadequacy of the early rains in the Presidency and the late inundation in Sind, the outturn of *kharif* crops was below normal, except perhaps in most of the Konkan and along the edge of the Western Ghats where it approached the standard. But the *rabi* rains were very good as a result of which a larger area was placed under these (*rabi*) crops and though they suffered in places from the severe frost in January (and from absence of late rains in addition in the East Karnatak where consequently their yield was poor) they returned a good yield, on the whole, in most parts of the Presidency. The net result was that there was a general sufficiency of food and fodder in a large part of the Presidency.

34. Prices for articles produced by the people for their own use remained steady or slightly advanced but the rates of wages rose considerably while scarcity of labour was felt in many areas. The net result was that for the classes labouring for cash wages it was a very good year for while the prices of food-grains were somewhat high the wages of the labourers were still good as compared with past years. Similarly for the self-dependent small farmer with an economic holding, chiefly cultivating his own land himself and employing the minimum of labour, the year has been a favourable one for the generally good yields of his crops and the high prices fetched by the produce have given him a good return for his labour and enabled him to live in a state of reasonable ease and



comfort. But the larger man chiefly cultivating by employed labour has been very hard hit indeed for the higher wages he has been forced to pay have more than robbed him of his profits accruing from good yields and high prices.

The price of *gul* was higher than last year and the yield was also better with the result that the cultivators of this crop did well though owing to the high rates of labour and its scarcity, the position has not been as satisfactory as it would otherwise have been. Owing to shorter demand from abroad the price of cotton was much below last year, yet it must have been generally remunerative.

35. The late rains over much of the Presidency secured abundance of fodder while in Sind the very favourable, though somewhat late, inundation placed the cultivators in an advantageous position.

36. The only areas of economic decline during the year were perhaps a large part of the Karnatak. Here in the eastern portion the three principal crops, cotton, wheat and *rabi jowar* suffered badly from one cause or another. Cotton suffered badly from the dry north-east winds which prevailed later in the season, wheat from a serious attack of rust and *rabi jowar* from want of moisture. Prices of cotton were also low. As a result therefore of the low yields of crops and low prices of cotton, the condition of the cultivator was far from satisfactory. In the *Mallad* or western portion the season was exceptionally good but here a serious wave of rinderpest carried away a large number of cattle and what the cultivator gained in his crops he lost in his cattle.

Except in the Karnatak, however, the season under review was generally favourable and its favourable character was reflected in a generally prosperous condition of the people.

## APPENDIX A.

## CULTIVATED AND UNCULTIVATED AREA.

Area in thousands of Acres (*i.e.* 000 omitted).

Details. 1	Presidency Proper.			Sind.		
	1923-24. 2	1924-25. 3	Increase (+) or decrease (-) per cent. 4	1923-24. 5	1924-25. 6	Increase (+) or decrease (-) per cent. 7
<i>A.—Cultivated area</i>						
Gross cropped area ...	27,511	28,138	+ 2.3	4,411	4,854	+10.3
Area cropped more than once.	600	646	+ 7.6	398	439	+10.2
Net area cropped ...	26,911	27,492	+ 2.2	4,013	4,415	+10.3
Current fallows ...	6,507	5,962	- 8.4	5,353	5,072	- 5.2
Assessed ...	33,292	33,304	.....	8,607	8,695	- 1.3
Unassessed ...	126	150	+16.0	559	803	+43.5
<b>Total Cultivated Area ...</b>	<b>33,418</b>	<b>33,454</b>	<b>+ 0.1</b>	<b>9,366</b>	<b>9,497</b>	<b>+ 1.4</b>
<i>B.—Uncultivated area.</i>						
Available for cultivation (culturable waste).	943	913	- 3.2	6,100	5,987	- 3.2
Not available for cultivation. Forest ...	8,553	8,535	- 0.2	739	734	- 0.7
Others ...	5,800	5,798	.....	13,951	13,960	.....
<b>Total Uncultivated Area...</b>	<b>15,296</b>	<b>15,246</b>	<b>- 0.3</b>	<b>20,790</b>	<b>20,681</b>	<b>- 0.5</b>
<b>Total Area ...</b>	<b>48,714</b>	<b>48,700</b>	<b>.....</b>	<b>30,156</b>	<b>30,158</b>	<b>.....</b>

## APPENDIX

## CROPPED

Area in thousands of Acres

Crops.	Presidency Proper.				
	Normal.*	1923-24.	1924-25.	Percentage by which area in col. 4 exceeds (+) or falls short of (-) that in	
	2	3	4	Col. 2.	Col. 5.
1				5	6
				Per cent.	Per cent.
<i>I.—Food Crops.</i>					
(a) Cereals and Pulses—					
Jowari ...	7,902	7,447	8,635	+9.3	+16.0
Bajri ...	4,239	4,350	3,076	-27.4	-29.3
Paddy ...	1,911	1,811	1,887	-1.2	+4.2
Wheat ...	1,627	1,131	1,418	-12.8	+25.3
Grain ...	605	492	501	-17.2	+18.7
Other cereals and pulses.	2,577	3,331	3,077	+19.4	-7.6
<b>Total Cereals and Pulses ...</b>	<b>18,861</b>	<b>18,492</b>	<b>18,594</b>	<b>-1.4</b>	<b>+0.8</b>
(b) Sugarcane ...	66	69	59	-10.6	-14.5
(c) Other food crops†	648	473	434	-20.8	-8.2
<b>Total food crops ...</b>	<b>19,475</b>	<b>19,034</b>	<b>19,087</b>	<b>-2.0</b>	<b>+0.3</b>
<i>II.—Non-food Crops.</i>					
(a) Tobacco ...	100	99	116	+16.0	+17.3
(b) Oil seeds ...	882	966	981	+11.2	+1.5
(c) Cotton ...	3,660	4,547	4,917	+27.4	+8.1
(d) Other non-food crops‡	2,602	2,864	3,037	+16.7	+6.0
<b>Total non-food crops ...</b>	<b>7,444</b>	<b>8,476</b>	<b>9,061</b>	<b>+21.6</b>	<b>+6.8</b>
<b>Total Crops</b>	<b>26,919</b>	<b>27,510</b>	<b>28,138</b>	<b>+4.5</b>	<b>+2.9</b>

\* Average of the five years 1916-17 to 1922-23 excluding the two abnormal years 1918-19 and 1923-24.

† These include fruits and vegetables and miscellaneous food crops.

‡ These include condiments and spices, dyes, drugs and Narcotics (excluding tobacco which

## B.

## AREA.

(i.e., 000 omitted).

Normal.*	Sind.		Percentage by which area in col. 9 exceeds (+) or falls short of (-) that in		Crops.
	1923-24.	1924-25.	Col. 7.	Col. 8.	
	7	8	9	10	
			Per cent.	Per cent.	<i>I.—Food Crops.</i>
598	455	562	-6.0	+23.5	(a) Cereals and Pulses—
1,029	1,013	1,029	...	+1.6	Jowari.
1,153	1,190	1,175	+2.0	-1.3	Bajri.
566	433	541	-2.7	+24.9	Paddy.
161	203	240	+49.1	+18.8	Wheat.
297	331	352	+18.5	+6.3	Gram.
					Other cereals and pulses.
3,733	3,624	3,899	+2.8	+7.6	Total Cereals and Pulses.
4	4	4	...	...	(b) Sugarcane.
48	50	49	+9.1	-2.0	(c) Other food crops.†
3,845	3,678	3,962	+2.8	+7.4	Total food crops.
					<i>II.—Non-food Crops.</i>
8	5	7	-12.5	+40.0	(a) Tobacco.
357	243	387	+8.4	+59.3	(b) Oil seeds.
244	242	400	+63.9	+17.0	(c) Cotton.
190	143	118	-9.2	-17.5	(d) Other non-food crops.‡
739	733	912	+23.4	+24.4	Total non-food crops.
4,584	4,411	4,864	+6.1	+10.3	Total Crops.

1920-21.

has been separately noted), fodder, and miscellaneous non-food crops.

## APPENDIX C—

Percentage of the Gross cropped Area in each

No.	Districts.	Food									
		Cereals and pul									
		Rice.	Wheat	Barley.	Jowari.	Bajri.	Ragi.	Maize.	Gram.	Other cereals & pulses.	
1	2	3	4	5	6	7	8	9	10	11	
A.—BOMBAY PRESIDENCY PROPER.											
I.—Gujarat.											
1	Ahmedabad ...	2	7	1	22	10	...	...	...	1	5
2	Kaira ...	7	1	...	6	19	6	...	...	1	16
3	Panch Mahals ...	10	3	1	2	6	3	22	...	10	12
4	Broach ...	1	7	...	16	1	...	...	...	...	9
5	Surat ...	12	2	...	8	1	1	...	...	...	5
	Average ... { 1924-25	6	4	...	13	8	2	3	2	2	9
	1923-24	5	2	...	16	9	2	4	1	1	8
II.—Deccan.											
6	West Khandesh ...	4	10	...	11	25	1	...	...	1	10
7	East Khandesh ...	1	1	...	16	15	...	...	...	...	13
8	Nasik ...	3	17	...	11	31	5	...	...	5	9
9	Ahmednagar ...	1	7	...	56	13	1	...	...	2	2
10	Poona ...	4	3	...	50	16	2	...	...	2	4
11	Sholapur ...	1	1	...	72	5	...	...	...	2	2
12	Satara ...	2	2	...	35	12	2	1	3	3	9
	Average ... { 1924-25	2	6	...	38	16	2	...	2	2	7
	1923-24	2	4	...	31	24	2	...	2	2	8
III.—Karnatak.											
13	Belgaum ...	6	4	...	32	6	2	1	1	1	12
14	Bijapur ...	4	4	...	48	6	...	...	...	1	4
15	Dharwar ...	6	8	...	24	...	2	...	...	1	12
	Average ... { 1924-25	4	5	...	37	4	1	...	1	1	9
	1923-24	3	7	...	35	7	1	...	1	1	11
IV.—Konkan.											
16	Thana ...	53	...	...	...	...	8	...	...	...	6
17	Bombay Suburban ...	45	...	...	...	...	...	...	...	...	...
18	Kolaba ...	69	...	...	...	...	9	...	...	...	9
19	Ratnagiri ...	39	...	...	...	...	17	...	...	...	19
20	Kanara ...	65	...	...	...	...	1	...	...	...	2
	Average ... { 1924-25	52	...	...	...	...	11	...	...	...	11
	1923-24	51	...	...	...	...	11	...	...	...	12
	Average of the Bombay Presi- dency proper. { 1924-25	7	5	...	31	11	2	1	2	2	8
	1923-24	7	4	...	27	16	2	1	1	1	9
B.—SIND.											
21	Karachi ...	55	5	2	10	3	...	1	...	...	7
22	Hyderabad ...	39	7	...	2	23	...	...	...	...	1
23	Thar Parkar ...	8	4	...	1	63	...	...	...	...	1
24	Navabshah ...	6	8	...	19	22	...	...	...	2	5
25	Larkann ...	40	19	...	13	...	...	...	...	4	17
26	Sukkur ...	12	32	...	25	3	...	...	...	12	6
27	Upper Sind Frontier ...	16	14	...	18	14	...	...	...	19	8
	Average ... { 1924-25	24	11	...	12	21	...	...	5	5	7
	1923-24	27	10	...	10	23	...	...	5	5	7
	Average of the Presidency in- cluding Sind. { 1924-25	9	6	...	28	12	2	1	2	2	8
	1923-24	10	5	...	25	16	2	1	2	2	9

## DISTRIBUTION OF CROPS.

District of the Bombay Presidency and Sind.

crops.			Non-food crops.				Total.			Districts.	No.
Total cereals & pulses.	Other food crops.	Total food crops.	Cotton.	Oil-seeds.	Other non-food crops.	Total non-food crops.	Food crops.	Non-food crops.	Food and non-food crops.		
<b>A.—BOMBAY PRESIDENCY PROPER.</b>											
<b>I.—Gujarat.</b>											
48	2	50	38	4	8	50	50	50	100	Ahmedabad	1
56	4	60	16	3	21	40	60	40	100	Kaira	2
69	1	70	8	11	11	30	70	30	100	Panch Mahals	3
34	2	36	5½	2	10	64	36	64	100	Broach	4
29	6	35	25	1	39	65	35	65	100	Surat	5
47	3	50	29	4	17	50	50	50	100	Average	{ 1924-25. 1923-24.
47	2	49	29	4	18	51	49	51	100		
<b>II.—Deccan.</b>											
62	1	63	32	4	1	37	63	37	100	West Khandesh	6
44	2	46	46	7	1	54	46	54	100	East Khandesh	7
81	2	83	4	7	6	17	83	17	100	Nasik	8
83	1	84	5	2	9	16	84	16	100	Ahmednagar	9
83	3	86	...	3	11	14	86	14	100	Poona	10
82	1	83	3	2	12	17	83	17	100	Sholapur	11
66	3	69	1	6	24	31	69	31	100	Satara	12
73	2	75	12	4	9	25	75	25	100	Average	{ 1924-25. 1923-24.
73	2	75	12	4	9	25	75	25	100		
<b>III.—Karnatak.</b>											
64	4	68	19	2	11	32	68	32	100	Belgaum	13
63	1	64	31	2	3	36	64	36	100	Bijapur	14
58	4	57	33	2	8	43	57	43	100	Dharwar	15
61	3	64	28	1	7	36	64	36	100	Average	{ 1924-25. 1923-24.
65	1	66	26	2	6	34	66	34	100		
<b>IV.—Konkan.</b>											
67	2	69	...	1	30	31	69	31	100	Thana	16
45	7	52	...	2	46	48	52	48	100	Bombay Suburban	17
67	3	90	...	1	9	10	90	10	100	Kolaba	18
75	3	78	...	7	16	23	78	23	100	Ratnagiri	19
66	6	74	...	5	21	26	74	26	100	Kanara	20
74	3	77	...	4	19	23	77	23	100	Average	{ 1924-25. 1923-24.
74	3	77	...	5	18	23	77	23	100		
67	3	70	17	3	10	30	70	30	100	Average of the Bombay Presi-	{ 1924-25. 1923-24.
67	2	69	17	4	10	31	69	31	100	dency proper.	
<b>B.—SIND.</b>											
83	3	86	...	9	6	14	86	14	100	Karachi	21
72	2	74	12	10	4	26	74	26	100	Hyderabad	22
77	...	77	19	1	3	23	77	23	100	Thar Parkar	23
82	1	63	24	9	4	37	63	37	100	Nawabshah	24
86	1	87	...	12	1	13	87	13	100	Larkana	25
90	3	93	...	6	1	7	93	7	100	Sukkur	26
89	1	90	...	10	...	10	90	10	100	Upper Sind Frontier	27
80	1	81	8	8	3	19	81	19	100	Average	{ 1924-25. 1923-24.
82	1	83	8	6	3	17	83	17	100		
68	2	70	16	4	10	30	70	30	100	Average of the Presidency in-	{ 1924-25. 1923-24.
70	2	72	15	4	9	28	72	28	100	cluding Sind.	

## APPENDIX D.

## IRRIGATED AREA.

Area in thousands of acres (i.e., 000 omitted.)

Details.	Presidency Proper.			Sind.		
	1923-24.	1924-25.	Increase (+) or decrease (-) per cent.	1923-24.	1924-25.	Increase (+) or decrease (-) per cent.
1	2	3	4	5	6	7
<i>A—Area Irrigated.</i>						
Irrigated from Government canals.	219	254	+16.0	2,897	3,060	+6.3
Do. private canals.	53	70	+32.1	10	25	+150.0
Do. wells	539	514	-4.6	48	43	-10.4
Do. tanks	87	124	+42.5	1	...	.....
Do. other sources	40	32	-20.0	114	138	+21.1
Total A-Area Irrigated	938	994	+6.0	3,070	3,296	+7.0
<i>B—Crops Irrigated.</i>						
Rice	129	176	+36.4	1,190	1,175	-1.2
Wheat	155	156	-0.6	297	339	+11.8
Barley	13	12	-7.7	12	11	-8.3
Jowari	199	226	+13.6	391	327	-16.4
Bayri	83	64	-22.9	477	413	-13.4
Maize	31	27	-12.9	3	3	.....
Other cereals and pulses	111	118	+6.3	261	533	+104.2
Sugarcane	60	58	-15.9	4	4	.....
Other food crops	116	121	+4.3	55	60	+9.1
Cotton	16	20	+25.0	342	398	+16.4
Other non-food crops	152	134	-11.8	225	296	+31.5
Total B-Crops Irrigated	1,074	1,112	+3.5	3,257	3,552	+9.1

## APPENDIX E.

## AGRICULTURAL STOCK.

(Number in thousands.)

Details of Agricultural Stock.	Presidency Proper.					Sind.				
	1915-16.	1919-20.	1924-25.	Increase (+) or decrease (-) per cent.		1915-16.	1919-20.	1924-25.	Increase (+) or decrease (-) per cent.	
				Over 1915-16.	Over 1919-20.				Over 1915-16.	Over 1919-20.
1	2	3	4	5	6	7	8	9	10	11
Plough cattle ...	3,318	3,127	3,120	-6.0	-0.2	602	530	582	-3.3	+9.8
Breeding bulls ...	24	30	31	+22.2	+3.3	8	8	21	+162.5	+162.5
Cattle for other purposes ...	119	180	121	+1.7	-6.9	16	14	44	+193.3	+214.3
Milch cattle ...	3,002	2,625	2,714	-9.6	+3.4	999	876	1,121	+13.3	+28.0
Young stock ...	3,743	2,272	2,494	-9.1	+9.8	565	390	557	-1.5	+43.0
<b>Total cattle ...</b>	<b>9,206</b>	<b>8,184</b>	<b>8,480</b>	<b>-7.9</b>	<b>+3.6</b>	<b>2,179</b>	<b>1,818</b>	<b>2,325</b>	<b>+6.7</b>	<b>+27.9</b>
Horses and ponies ...	130	132	127	-2.3	-3.8	81	72	78	-3.7	+8.9
Sheep ...	1,699	1,437	1,768	+4.1	+23.0	514	564	624	+21.4	+10.6
Goats ...	2,338	1,453	2,622	+12.1	+80.5	1,101	1,028	1,511	+37.2	+47.0
Ploughs ...	1,121	1,093	1,170	+4.4	+7.4	278	264	300	+7.9	+13.6
Carts ...	618	625	682	+7.1	+5.8	56	57	78	+39.3	+37.0



TABLE I—  
Rainfall from 1st June 1924 to 31st May 1925 as  
Districts of the

No.	District Headquarter Station.	Kharif rains (1st June 1924 to 30th September 1924).				Rabi rains (1st October 1924 to 28th February 1925).			
		Average.		1924.		Average.		1924-25.	
		Rain-fall. 3	Rainy days. 4	Rain-fall. 5	Rainy days. 6	Rain-fall. 7	Rainy days. 8	Rain-fall. 9	Rainy days. 10
	<i>Gujarat.</i>	Ins.	No.	Ins.	No.	Ins.	No.	Ins.	No.
1	Ahmedabad	27.65	33	22.00	28	0.86	2	0.13	...
2	Kaira	31.33	36	28.37	30	1.06	2	0.14	...
3	Godhra (Panch Mahals)	36.88	41	31.05	44	1.31	3	1.49	3
4	Broach	37.38	40	22.14	36	1.97	2	0.77	2
5	Surat	37.25	43	42.99	49	2.22	3	0.80	2
	<i>Deccan.</i>								
6	Dhulia (West Khandesh)	19.30	30	22.85	33	2.82	4	4.40	6
	Jalgaon (East Khandesh)	26.26	40	19.66	39	2.19	4	4.29	6
8	Nasik	25.26	41	28.65	39	3.56	6	0.28	2
9	Ahmednagar	17.79	28	19.37	28	4.46	7	1.23	2
10	Poona	21.30	36	19.49	30	5.49	7	0.43	3
11	Sholapur	21.12	30	20.62	23	4.75	7	4.41	6
12	Satara	32.07	53	30.00	40	5.19	9	1.00	5
13	*Hilly Deccan Tracts	63.70	70	60.34	69	4.29	7	1.16	3
	<i>Karnatak.</i>								
14	Belgaum	38.90	61	39.76	55	6.96	11	3.96	6
15	Bijapur	15.09	25	11.79	14	5.86	9	2.57	6
16	Dharwar	20.08	44	28.27	43	7.63	12	1.89	6
17	*Hilly Karnatak Tracts	58.97	66	71.18	70	6.89	11	2.93	5
	<i>Konkan.</i>								
18	Thana	93.61	86	78.36	91	3.74	5	...	...
19	Alibag (Kolaba)	81.18	76	71.64	71	3.15	4	0.06	...
20	Ratnagiri	90.68	83	96.64	78	4.66	7	2.48	5
21	Karwar (Kanara)	106.73	89	106.53	86	7.49	10	1.79	4
	<i>Sind.</i>								
22	Karachi	5.78	5	1.90	4	1.24	3	0.75	1
23	Hyderabad	6.21	7	11.24	8	0.62	1	...	...
24	Mirpurkhas (Thar Parkar)	3.97	7	8.56	12	0.32	1	...	...
25	Nawabshah	5.74	6	9.65	6	0.22	1	...	...
26	Larkana	3.61	4	1.75	2	0.37	1	...	...
27	Sukkur	1.81	3	0.47	2	0.30	1	...	...
28	Jacobabad (Upper Sind Frontier).	3.58	4	1.50	3	0.62	2	0.26	2

\* The figures for the Hilly Tracts of the Deccan and Karnatak

## RAINFALL.

compared with the average at each of the representative stations of the Bombay Presidency, including Sind.

Hot weather rains (1st March 1925 to 31st May 1925).				Total.				District Headquarter Station.	No.
Average.		1925.		Average.		1924-25.			
Rain-fall. 11	Rainy days. 13	Rain-fall. 13	Rainy days. 14	Rain-fall. 15	Rainy days. 16	Rain-fall. 17	Rainy days. 18		
Ins.	No.	Ins.	No.	Ins.	No.	Ins.	No.		
<i>Gujarat.</i>									
0.49	1	0.22	1	29.00	36	22.35	29	Ahmedabad	1
0.46	1	0.06	...	32.85	39	23.56	30	Kaira	2
0.59	1	0.31	1	33.78	45	32.86	48	Godhra (Panch Mahals)	3
0.34	1	0.50	2	36.69	43	23.41	40	Broach	4
0.30	...	2.24	2	39.77	46	46.03	53	Surat	5
<i>Deccan.</i>									
0.42	1	1.76	3	22.54	35	29.01	42	Dhulia (West Khandesh)	6
0.61	1	0.95	2	23.06	45	24.90	47	Jalgaon (East Khandesh)	7
1.13	1	1.75	5	29.98	48	30.68	46	Nasik	8
1.25	3	0.48	2	23.50	38	21.08	32	Ahmednagar	9
2.07	4	0.77	2	28.86	47	20.69	35	Poona	10
1.68	3	2.99	7	27.65	40	28.02	36	Sholapur	11
2.49	5	0.93	3	39.75	67	31.93	48	Satara	12
1.48	3	4.51	6	69.44	80	66.01	78	*Hilly Deccan Tracts	13
<i>Karnatak.</i>									
4.69	9	9.04	18	60.55	81	62.76	79	Belgaum	14
2.33	5	2.95	5	23.28	39	17.31	25	Bijapur	15
5.12	10	7.88	14	32.88	66	38.04	62	Dharwar	16
3.88	7	4.99	10	69.74	84	79.10	85	*Hilly Karnatak Tracts	17
<i>Konkan.</i>									
1.04	1	5.15	5	97.59	92	83.51	96	Thana	18
0.96	1	3.65	4	85.29	81	75.34	75	Alibag (Kolaba)	19
1.45	2	4.49	6	96.69	92	103.61	89	Ratnagiri	20
4.09	4	4.54	3	118.31	103	112.86	103	Karwar (Kanara)	21
<i>Sind.</i>									
0.60	1	...	...	7.62	9	2.65	5	Karachi	22
0.42	1	0.05	...	7.25	9	11.29	8	Hyderabad	23
0.47	1	1.12	1	4.76	9	9.68	13	Mirpurkhas (Thar Parkar)	24
0.45	...	0.02	...	6.42	7	9.67	6	Nawabshah	25
0.56	1	0.06	...	4.44	6	1.81	2	Larkana	26
0.45	1	...	...	2.66	5	0.47	2	Sukkur	27
0.60	2	0.57	2	4.00	8	2.33	7	Jacobabad (Upper Sind Frontier).	28

are averages for six and two stations respectively.

Total area and area cultivated and uncultivated in each District

No.	District.	Area by village papers. (Total area of the district.)	Deduct area for which no returns exist.	Net area for which statistics are available.	CULTIVATED		
					Gross area cropped.		
					Reported.	Estimated.	Total.
1	2	3	4	5	6	7	8
<b>A—BOMBAY PRESIDENCY PROPER.</b>							
<i>Gujarat.</i>							
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
1	Ahmedabad	2,451,909	131,177	2,320,731	1,964,312	98,126	1,457,438
2	Kaira	1,036,864	19,272	1,017,592	822,626	15,798	838,424
3	Panch Mahals	1,028,632	175,804	852,828	620,347	142,249	662,596
4	Broach	938,966	23,012	915,954	614,979	90,250	635,229
5	Surat	1,038,272	25,244	1,013,028	786,254	23,607	809,861
	<b>Gujarat Total</b>	<b>6,514,702</b>	<b>374,509</b>	<b>6,140,193</b>	<b>4,108,518</b>	<b>295,030</b>	<b>4,403,548</b>
<i>Deccan.</i>							
6	West Khandesh	3,481,131	966,316	2,514,815	1,459,241	12,696	1,471,939
7	East Khandesh	2,908,696	.....	2,908,696	2,012,315	.....	2,012,315
8	Nasik	3,771,539	15,294	3,756,245	2,076,027	9,848	2,085,875
9	Ahmednagar	4,342,109	33,410	4,308,699	2,651,208	21,833	2,653,041
10	Poona	3,427,447	48,903	3,378,544	2,039,997	25,504	2,065,501
11	Sholapur	2,916,140	.....	2,916,140	2,179,092	.....	2,179,092
12	Satara	3,140,830	122,872	3,017,958	2,034,221	76,176	2,110,397
	<b>Deccan Total</b>	<b>23,887,942</b>	<b>1,186,695</b>	<b>22,701,247</b>	<b>14,462,104</b>	<b>146,069</b>	<b>14,608,163</b>
<i>Karnatak.</i>							
13	Belgaum	2,932,440	120,807	2,811,633	1,809,937	45,302	1,855,239
14	Bijapur	3,652,988	11,384	3,641,604	2,883,486	8,316	2,891,802
15	Dharwar	2,946,991	72,401	2,874,590	2,184,383	52,308	2,236,691
	<b>Karnatak Total</b>	<b>9,532,419</b>	<b>205,192</b>	<b>9,327,227</b>	<b>6,877,806</b>	<b>105,926</b>	<b>6,983,732</b>
<i>Konkan.</i>							
16	Thana	2,191,588	50,196	2,141,392	571,692	12,181	583,873
17	Bombay Suburban	98,923	15,324	83,599	24,404	8,649	33,053
18	Kolaba	1,385,419	55,714	1,329,705	369,575	23,509	393,084
19	satnagiri	2,563,834	1,886,381	677,453	300,597	671,791	872,388
20	Kanara	2,525,549	.....	2,525,549	260,013	.....	260,013
	<b>Konkan Total</b>	<b>8,765,613</b>	<b>2,007,618</b>	<b>6,757,995</b>	<b>1,426,381</b>	<b>716,130</b>	<b>2,142,411</b>
	<b>Total Bombay Presidency Proper.</b>	<b>49,700,676</b>	<b>3,774,014</b>	<b>44,926,662</b>	<b>26,874,709</b>	<b>1,269,145</b>	<b>28,137,854</b>
<b>B—Sind.</b>							
21	Karachi	7,540,434	.....	7,540,434	441,483	.....	441,483
22	Hyderabad	2,833,877	.....	2,833,877	671,831	.....	671,831
23	Thar Parkar	8,727,060	.....	8,727,060	967,156	.....	967,156
24	Nawabshah	2,495,336	.....	2,495,336	553,787	.....	553,787
25	Larkana	3,241,456	140,629	3,100,827	1,040,832	3,000	1,043,832
26	Sukkur	3,594,617	.....	3,594,617	568,657	.....	568,657
27	Upper Sind Frontier.	1,735,417	124,908	1,610,509	614,329	2,874	617,203
	<b>Sind Total</b>	<b>30,158,197</b>	<b>265,537</b>	<b>29,892,660</b>	<b>4,658,055</b>	<b>6,874</b>	<b>4,664,929</b>
	<b>Grand Total</b>	<b>78,668,873</b>	<b>4,039,551</b>	<b>74,629,322</b>	<b>31,732,764</b>	<b>1,276,019</b>	<b>33,002,783</b>

## II—AREA.

of the Bombay Presidency (including Sind) in 1924-25.

AREA.						District.	No.
Deduct area cropped more than once.			Net cropped area.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
9	10	11	12	13	14	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	A—BOMBAY PRESIDENCY PROPER.	
						<i>Gujarat.</i>	
7,006	287	7,293	1,357,307	92,639	1,450,146	Ahmedabad	1
10,805	86	10,891	811,631	15,762	827,393	Kaira	2
80,202	90,583	100,725	440,145	131,726	571,871	Panch Mahals	3
469	.....	469	614,510	20,250	634,760	Brosch	4
50,329	589	50,918	735,925	28,018	763,943	Surat	5
148,810	21,435	170,245	3,959,708	273,595	4,233,303	Total Gujarat.	
						<i>Deccan.</i>	
22,707	7	22,714	1,436,534	12,691	1,449,225	West Khandesh	6
8,098	.....	8,098	2,004,220	.....	2,004,220	East Khandesh	7
47,897	42	47,939	2,028,130	9,906	2,037,936	Nasik	8
41,353	133	41,486	2,619,645	21,700	2,641,345	Ahmednagar	9
89,196	497	89,693	1,350,801	25,007	1,375,808	Poona	10
25,220	.....	25,220	2,153,873	.....	2,153,872	Sholapur	11
98,182	5,451	103,633	1,936,039	70,725	2,006,764	Satara	12
339,663	6,130	338,793	14,129,441	139,929	14,269,370	Total Deccan.	
						<i>Karnatak.</i>	
31,907	103	32,010	1,778,030	45,199	1,823,229	Belgaum	13
5,192	.....	5,192	2,876,294	8,316	2,884,610	Bijapur	14
20,188	112	20,300	2,164,195	52,186	2,216,381	Dharwar	15
57,287	215	57,602	6,820,519	105,711	6,926,230	Total Karnatak.	
						<i>Konkan.</i>	
5,655	25	5,710	566,007	12,156	578,163	Thana	16
236	.....	236	24,169	8,549	32,717	Bombay Suburban	17
11,440	359	11,799	388,185	23,150	381,285	Kolaba	18
10,877	32,631	43,508	199,720	639,160	828,880	Ratnagiri	19
18,489	.....	18,489	241,524	.....	241,524	Kanara	20
46,727	33,015	79,742	1,379,554	683,115	2,062,669	Total Konka	
585,487	60,795	646,282	26,289,223	1,202,350	27,491,572	Total Bombay Presidency Proper.	
						<i>B.—Sind.</i>	
33,449	.....	33,449	408,034	.....	408,034	Karachi	21
8,688	.....	8,688	663,143	.....	663,143	Hyderabad	22
2,878	.....	2,878	964,278	.....	964,278	Thar Parker	23
22,31	.....	22,221	531,536	.....	531,536	Nawabsha	24
235,608	.....	235,608	805,224	8,000	808,224	Larkana	25
54,281	.....	54,281	514,376	.....	514,376	Sukar	26
81,639	.....	81,639	532,690	2,874	535,564	Upper Sind Frontier.	27
438,774	.....	438,774	4,419,281	5,874	4,425,155	Total Sind.	
1,024,361	60,795	1,085,066	30,708,503	1,308,324	31,916,727	Grand Total.	

TABLE

No.	District.	CULTIVATED					
		Add current fallows			Total cultivated area.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	15	16	17	18	19	20
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>A—BOMBAY PRESIDENCY PROPER.</b>							
<i>Gujarat.</i>							
1	Abmedabad	394,353	31,153	425,511	1,751,860	123,997	1,875,657
2	Kaira	29,250	1,424	30,674	841,081	17,186	858,267
3	Panch Mahals	51,291	25,763	77,059	491,436	147,494	638,930
4	Broach	30,844	644	31,488	645,354	20,894	666,248
5	Surat	20,328	334	20,662	756,253	23,352	779,605
	<b>Gujarat Total</b>	<b>526,076</b>	<b>59,328</b>	<b>585,404</b>	<b>4,455,784</b>	<b>332,923</b>	<b>4,818,707</b>
<i>Deccan.</i>							
6	West Khandesh	166,158	413	166,571	1,602,692	13,104	1,615,796
7	East Khandesh	62,573	.....	62,573	2,066,798	.....	2,066,798
8	Nasik	446,235	1,816	448,111	2,474,435	11,622	2,486,047
9	Ahmednagar	551,928	5,165	557,093	3,181,773	26,565	3,208,638
10	Poona	558,373	22,161	580,534	2,509,174	47,168	2,556,342
11	Sholapur	360,943	.....	360,943	2,534,515	.....	2,534,515
12	Satara	313,751	15,863	329,614	2,249,820	86,568	2,336,418
	<b>Deccan Total</b>	<b>2,490,056</b>	<b>45,418</b>	<b>2,535,474</b>	<b>16,619,497</b>	<b>185,347</b>	<b>16,804,844</b>
<i>Karnatak.</i>							
13	Belgaum	336,969	23,051	360,020	2,116,999	66,950	2,183,249
14	Bijapur	343,436	3,111	346,547	3,221,730	11,427	3,233,157
15	Dharwar	191,635	5,594	197,229	2,355,630	57,790	2,413,620
	<b>Karnatak Total</b>	<b>874,040</b>	<b>31,756</b>	<b>905,796</b>	<b>7,694,559</b>	<b>137,467</b>	<b>7,832,026</b>
<i>Konkan.</i>							
16	Thana	375,379	24,967	400,346	941,334	87,133	978,609
17	Bombay Suburban	22,452	5,903	28,354	46,620	14,551	61,171
18	Kolaba	391,855	25,413	417,268	749,900	48,563	798,553
19	Ratnagiri	237,268	748,122	985,390	426,948	1,357,282	1,814,270
20	Kanara	104,641	.....	104,641	346,165	.....	346,165
	<b>Konkan Total</b>	<b>1,131,595</b>	<b>804,404</b>	<b>1,935,999</b>	<b>2,511,149</b>	<b>1,497,519</b>	<b>3,998,668</b>
	<b>Total Bombay Presidency Proper.</b>	<b>5,021,767</b>	<b>940,906</b>	<b>5,962,673</b>	<b>31,310,989</b>	<b>2,143,256</b>	<b>33,454,245</b>
<b>B.—Sind.</b>							
21	Karachi	430,483	.....	430,483	838,517	.....	838,517
22	Hyderabad	713,475	.....	713,475	1,376,618	.....	1,376,618
23	Thar & Parkar	1,446,206	.....	1,446,206	2,410,484	.....	2,410,484
24	Nawabshah	737,171	.....	737,171	1,268,707	.....	1,268,707
25	Larkana	568,580	137,639	706,209	1,373,804	140,620	1,514,433
26	Sukkur	591,066	.....	591,066	1,106,462	.....	1,106,462
27	Upper Sind Frontier.	436,678	16,511	447,189	969,368	13,385	982,753
	<b>Sind Total</b>	<b>4,923,679</b>	<b>148,140</b>	<b>5,071,819</b>	<b>9,342,960</b>	<b>154,014</b>	<b>9,496,974</b>
	<b>Grand Total</b>	<b>9,945,446</b>	<b>1,089,046</b>	<b>11,034,492</b>	<b>40,663,949</b>	<b>2,297,270</b>	<b>42,961,219</b>

## II—AREA—contd.

ABRA.						District.	No.
Details of cultivated area.							
Assessed.			Unassessed.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
21	22	23	24	25	26	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
1,728,745	123,997	1,852,742	22,915	.....	22,915	<b>A—BOMBAY PRESIDENCY PROPER.</b>	
638,966	17,154	656,140	2,095	32	2,127	<i>Gujarat.</i>	
491,142	147,494	638,636	394	.....	394	Ahmedabad	1
542,559	20,894	563,453	2,795	.....	2,795	Kaira	2
752,338	23,353	775,690	3,915	.....	3,915	Panch Mahals	3
						Broach	4
						Surat	5
4,453,770	332,891	4,786,661	32,014	52	32,046	<b>Total Gujarat.</b>	
						<i>Deccan.</i>	
1,572,995	13,101	1,586,096	30,597	3	30,600	West Khandesh	6
2,065,611	.....	2,065,611	1,127	.....	1,127	East Khandesh	7
3,466,997	11,622	3,478,619	7,428	.....	7,428	Nasik	8
3,176,410	26,863	3,203,273	5,363	2	5,365	Ahmednagar	9
2,484,392	47,168	2,531,560	24,782	.....	24,782	Poona	10
2,518,302	.....	2,518,302	16,513	.....	16,513	Sholapur	11
2,247,242	86,463	2,333,710	2,578	120	2,698	Satara	12
11,531,049	185,222	11,716,271	82,448	125	82,573	<b>Total Deccan.</b>	
						<i>Karnatak.</i>	
2,111,431	69,250	2,179,681	5,568	.....	5,568	Belgaum	13
3,221,676	11,427	3,233,103	55	.....	55	Bijapur	14
2,355,787	57,790	2,413,577	43	.....	43	Dharwar	15
7,688,393	137,467	7,825,860	5,666	.....	5,666	<b>Total Karnatak.</b>	
						<i>Konkan.</i>	
920,499	37,123	957,622	20,827	.....	20,827	Thana	16
46,582	14,551	61,133	38	.....	38	Bombay Suburban	17
742,297	48,563	790,860	1,693	.....	1,693	Kolaba	18
426,988	1,827,232	1,814,270	.....	.....	.....	Ratnagiri	19
345,184	.....	345,184	931	.....	931	Kanara	20
2,487,550	1,487,519	3,975,069	23,599	.....	23,599	<b>Total Konkan.</b>	
31,161,962	2,143,099	33,304,361	149,727	167	149,864	<b>Total Bombay Presidency Proper.</b>	
						<i>B.—Sind.</i>	
624,625	.....	624,625	213,892	.....	213,892	Karachi	21
1,365,086	.....	1,365,086	11,532	.....	11,532	Hyderabad	22
2,328,241	.....	2,328,241	82,243	.....	82,243	Thar Parkor	23
1,235,822	.....	1,235,822	32,855	.....	32,855	Nawabsha	24
1,247,865	140,629	1,388,494	125,839	.....	125,839	Larkana	25
866,413	.....	866,413	239,049	.....	239,049	Sukkur	26
886,716	.....	886,716	82,652	13,385	96,037	Upper Sind Frontier	27
8,554,868	140,629	8,695,497	788,092	13,385	801,477	<b>Total Sind.</b>	
33,716,130	2,283,728	35,999,858	937,819	13,542	951,361	<b>Grand Total.</b>	

TABLE

No.	District.	UNCULTIVATED					
		Culturable waste unoccupied and unassessed.			Not available.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	27	28	29	30	31	32
	<b>A.—BOMBAY PRESIDENCY PROPER.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>	<b>Acres.</b>
	<i>Gujarat.</i>						
1	Ahmedabad	99,256	1,409	100,675	12,017	.....	12,017
2	Kaira	19,474	.....	19,474	.....	.....	415,561
3	Panch Mahals	70,381	993	71,374	202,065	10,175	312,240
4	Broach	22,884	.....	22,884	.....	.....	531,797
5	Surat	57,863	168	58,031	44,868	.....	44,868
	<b>Gujarat Total</b>	<b>269,858</b>	<b>2,570</b>	<b>272,428</b>	<b>256,950</b>	<b>10,175</b>	<b>269,125</b>
	<i>Deccan.</i>						
6	West Khandesh	140,567	603	141,170	501,220	951,597	1,452,617
7	East Khandesh	59,088	.....	59,088	415,561	.....	415,561
8	Nasik	69,925	.....	69,925	613,005	1,268	814,273
9	Ahmednagar	45,371	15	45,386	531,797	.....	531,797
10	Poona	8,412	4	8,416	415,058	14	416,072
11	Sholapur	16,590	.....	16,590	102,101	.....	102,101
12	Satara	23,038	4,799	27,837	445,092	415	445,507
	<b>Deccan Total</b>	<b>364,011</b>	<b>5,421</b>	<b>369,432</b>	<b>3,229,534</b>	<b>953,294</b>	<b>4,183,126</b>
	<i>Karnatak.</i>						
13	Belgaum	53,224	856	54,080	448,449	.....	448,449
14	Bijapur	46,053	300	46,353	176,764	.....	176,764
15	Dharwar	51,858	634	52,492	241,806	.....	241,806
	<b>Karnatak Total</b>	<b>151,135</b>	<b>1,790</b>	<b>152,925</b>	<b>867,019</b>	<b>.....</b>	<b>867,019</b>
	<i>Konkan.</i>						
16	Thana	41,377	430	41,707	801,716	1,156	802,872
17	Bombay Suburban	6,102	12	6,114	3,895	.....	3,895
18	Kolaba	19,817	104	19,921	328,726	187	328,913
19	Ratnagiri	6,517	3,295	9,812	8,917	3,365	12,782
20	Kanara	41,065	.....	41,065	2,067,511	.....	2,067,511
	<b>Konkan Total</b>	<b>114,778</b>	<b>3,841</b>	<b>118,619</b>	<b>3,210,765</b>	<b>5,208</b>	<b>3,215,973</b>
	<b>Total Bombay Presidency Proper.</b>	<b>899,792</b>	<b>13,622</b>	<b>913,414</b>	<b>7,566,568</b>	<b>968,677</b>	<b>8,536,245</b>
	<i>B.—Sind.</i>						
21	Karachi	1,229,870	.....	1,229,870	170,889	.....	170,889
22	Hyderabad	956,318	.....	956,318	70,666	.....	70,666
23	Thar & Parkar	1,781,816	.....	1,781,816	43,007	.....	43,007
24	Nawabshah	423,094	.....	423,094	80,457	.....	80,457
25	Larkana	876,894	.....	876,894	57,170	.....	57,170
26	Sukkur	445,269	.....	445,269	262,851	.....	262,851
27	Upper Sind Frontier	253,950	.....	253,950	39,803	.....	39,803
	<b>Sind Total</b>	<b>5,967,211</b>	<b>.....</b>	<b>5,967,211</b>	<b>734,043</b>	<b>.....</b>	<b>734,043</b>
	<b>Grand Total</b>	<b>6,867,003</b>	<b>13,622</b>	<b>6,880,625</b>	<b>8,300,611</b>	<b>968,677</b>	<b>9,269,286</b>

## II—AREA—concl'd.

AREA.						District.	No.
For cultivation.			Total uncultivated area.				
Others.			Reported.	Estimated.	Total.		
Reported.	Estimated.	Total.					
33	34	35	36	37	38	9	
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
<b>A—BOMBAY PRESIDENCY PROPER.</b>							
<i>Gujarat.</i>							
457,788	5,771	463,559	569,071	7,180	576,251	Ahmedabad ...	
157,037	2,066	159,103	176,511	2,086	178,597	Kaira ...	
89,006	17,149	106,149	361,452	28,310	389,762	Panch Mahals ...	
247,716	2,118	249,834	270,600	2,118	272,718	Broach ...	
174,044	1,724	175,768	276,775	1,892	278,667	Surat ...	
1,125,591	28,841	1,154,432	1,654,409	41,586	1,695,995	Total Gujarat.	
<i>Deccan.</i>							
270,486	912	271,398	912,273	953,112	1,865,385	West Khandesh ...	
367,249	.....	367,249	841,898	.....	841,898	East Khandesh ...	
398,890	2,404	401,294	1,281,830	3,672	1,285,492	Nasik ...	
448,758	6,530	455,288	1,026,926	6,545	1,033,471	Ahmednagar ...	
442,900	1,717	444,617	869,370	1,735	871,105	Poona ...	
262,634	.....	262,634	381,325	.....	381,325	Sholapur ...	
296,988	31,070	328,058	763,138	36,284	804,422	Satara ...	
2,487,905	43,633	2,530,538	6,061,750	1,001,348	7,063,098	Total Deccan.	
<i>Karnatak.</i>							
192,961	51,701	244,662	694,634	52,557	747,191	Belgaum ...	
196,457	257	196,714	419,274	537	419,811	Bijapur ...	
225,096	13,977	239,073	518,760	14,611	533,371	Dharwar ...	
614,514	65,925	680,449	1,632,668	67,725	1,700,393	Total Karnatak.	
<i>Konkan.</i>							
357,013	11,487	368,500	1,300,006	13,073	1,313,079	Thana ...	
26,952	761	27,713	36,979	773	37,752	Bombay Suburban ...	
231,172	6,860	238,032	579,715	7,151	586,866	Kolaba ...	
235,028	491,942	726,970	2,04,462	499,102	749,564	Ratnagiri ...	
71,108	.....	71,108	2,179,684	.....	2,179,684	Kanara ...	
921,303	511,050	1,432,353	4,246,846	520,099	4,766,945	Total Konkan.	
5,149,313	649,459	5,797,772	13,615,673	1,630,758	15,246,431	Total Bombay Presidency Proper.	
<i>B.—Sind.</i>							
5,301,158	.....	5,301,158	6,701,917	.....	6,701,917	Karachi ...	
430,075	.....	430,075	1,457,259	.....	1,457,259	Hyderabad ...	
4,491,753	.....	4,491,753	6,316,576	.....	6,316,576	Thar Parker ...	
714,078	.....	714,078	1,226,629	.....	1,226,629	Nawabsha ...	
792,959	.....	792,959	1,727,023	.....	1,727,023	Larkana ...	
1,781,035	.....	1,781,035	2,489,155	.....	2,489,155	Sukkur ...	
337,388	111,523	448,911	631,141	111,523	742,664	Upper Sind Frontier.	
18,848,446	111,523	18,959,969	20,549,700	111,623	20,661,323	Total Sind.	
18,997,759	759,963	19,757,741	34,165,373	1,742,281	35,907,654	Grand Total.	



TABLE III—  
Area under different crops in each District

Serial No.	District.	Cereals					
		1. Rice.*			2. Wheat.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	3	4	5	6	7	8
A.—PRESIDENCY PROPER.		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<i>I.—Gujarat.</i>							
1	Ahmedabad	26,691	1,015	27,706	97,379	8,342	105,721
2	Kaira	55,703	711	56,414	6,397	40	6,397
3	Panch Mahals	56,360	9,481	65,841	17,123	3,995	21,108
4	Broach	10,230	91	10,321	43,369	556	43,945
5	Surat	93,344	2,056	95,400	13,800	22	13,822
	Total, Gujarat	243,328	13,358	256,686	178,087	12,946	191,033
<i>II.—Deccan.</i>							
6	West Khandesh	50,821	589	51,410	145,470	2,965	148,435
7	East Khandesh	256	.....	256	28,019	...	28,019
8	Nasik	59,639	637	60,276	350,050	830	350,880
9	Ahmednagar	15,111	2	15,113	182,899	958	183,857
10	Poona	63,186	3,589	66,775	55,975	572	56,547
11	Sholapur	2,464	.....	2,464	29,364	...	29,364
12	Satara	43,626	2,896	46,522	40,117	1,935	42,052
	Total, Deccan	255,153	8,063	263,216	831,885	7,360	839,145
<i>III.—Karnatak.</i>							
13	Belgaum	108,522	6,558	115,080	74,532	1,121	75,653
14	Bijapur	2,341	...	2,341	129,585	384	129,969
15	Dharwar	134,159	1,556	135,715	173,660	6,277	181,837
	Total, Karnatak	245,022	8,114	253,136	377,677	9,782	387,459
<i>IV.—Konkan.</i>							
16	Thana	302,531	6,587	309,118	78	...	78
17	Rombay Suburban	11,079	3,637	14,716	...	...	...
18	Kolaba	251,394	18,638	270,032	...	...	...
19	Ratnagiri	73,032	274,086	347,118	...	...	...
20	Kanara	167,896	...	167,896	...	...	...
	Total, Konkan	810,922	3,93,258	1,114,180	78	...	78
	Total, Presidency proper	1,551,425	392,791	1,944,216	1,387,727	29,988	1,417,715
<i>B.—SIND.</i>							
21	Karachi	242,425	...	242,425	20,575	...	20,575
22	Hyderabad	260,043	...	260,043	50,059	...	50,059
23	Thar Parkar	54,826	...	54,826	34,891	...	34,891
24	Nawabshah	32,507	...	32,507	43,390	...	43,390
25	Larkana	422,210	500	422,710	122,449	300	122,749
26	Sukkur	65,982	...	65,982	180,052	...	180,052
27	Upper Sind Frontier	96,568	...	96,568	88,409	844	89,253
	Total, Sind	1,174,861	500	1,175,361	539,625	1,144	540,769
	Grand Total	2,726,286	333,291	3,059,577	1,927,352	31,132	1,958,484

\* Of this area Belgaum had 436 acres, Ratnagiri 12,576 acres

† Of this area the following districts cultivated Jowari as a rabi crop as shown below :—

	Acres.		Acres.		Acres.
Ahmedabad	2,402	Broach	98,167	Nasik	177,717
Kaira	702	Surat	2,250	Ahmednagar	1,490,758
Panch Mahals	9,852	West Khandesh	69,328	Poona	955,354

CROPS.  
of the Bombay Presidency (including Sind) in 1924-25.

3. Barley.			4. Jowar.†			District.	Serial No.
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
9	10	11	12	13	14	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
3,687	105	3,792	288,606	25,369	324,064	A.—PRESIDENCY PROPER.	
199	4	203	50,230	970	51,200	I.—Gujarat.	
3,101	2,661	5,762	11,489	2,531	14,020	Ahmedabad	1
...	...	...	99,332	4,400	103,732	Kaira	2
...	...	...	64,142	4,249	68,391	Panch Mahals	3
6,967	2,770	9,737	623,788	37,609	661,397	Broach	4
						Surat	5
						Total, Gujarat.	
						II.—Deccan.	
			155,520	1,294	156,814	West Khandesh	6
			905,267	.....	905,267	East Khandesh	7
			238,750	1,247	240,027	Nasik	8
139	3	142	1,479,224	12,534	1,491,758	Ahmednagar	9
537	...	537	1,021,674	8,645	1,030,319	Poona	10
1,472	...	1,472	1,578,195	...	1,578,195	Sholapur	11
2,570	174	2,744	707,511	22,182	729,693	Satara	12
4,318	177	4,495	5,486,371	45,902	5,532,273	Total, Deccan.	
						III.—Karnatak.	
2,340	92	2,432	585,511	7,715	593,226	Belgaum	13
2,679	4	2,683	1,306,033	4,859	1,400,892	Bijapur	14
32	...	32	531,553	16,634	548,187	Dharwar	15
4,950	96	5,046	2,513,087	28,189	2,541,276	Total, Karnatak.	
						IV.—Konkan.	
			462	.....	462	Thana	16
			.....	.....	.....	Bombay Suburban	17
			.....	.....	.....	Kolaba	18
			.....	.....	.....	Ratnagiri	19
			335	.....	335	Kanara	20
			797	.....	797	Total, Konkan.	
16,764	3,043	19,807	8,523,043	111,699	8,634,742	Total, Presidency Proper.	
						B.—SIND.	
9,707	...	9,707	46,400	.....	46,400	Karachi	21
1,625	...	1,625	10,023	.....	10,023	Hyderabad	22
131	...	131	13,460	.....	13,460	Thar Parkar	23
1,144	...	1,144	103,931	.....	103,931	Nawabshah	24
3,002	...	3,002	131,288	1,440	132,728	Larkana	25
399	...	399	141,876	.....	141,876	Sukkur	26
147	...	147	111,817	2,030	113,847	Upper Sind Frontier	27
16,160	...	16,160	569,693	3,430	573,123	Total, Sind.	
32,924	3,043	35,967	9,092,036	115,129	9,207,165	Grand Total.	

and Kanara 10,206 acres under late rice.

	Acres.		Acres.
Sholapur	1,578,195	Bijapur	1,118,105
Satara	45,067	Dharwar	81,581
Belgaum	969,806	Thana	462

TABLE III—CROPS

Serial No.	District.	Cereals and					
		5. Bajri.			6. Ragi (Nashâi).		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	15	16	17	18	19	20
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>PRESIDENCY PROPER.</b>							
<i>I.—Gujarat.</i>							
1	Ahmedabad	140,818	8,837	149,655	2,088	73	2,161
2	Naira	15,851	4,039	19,890	46,959	1,124	48,083
3	Panch Mahals	30,881	8,171	39,052	16,457	4,149	20,606
4	Broach	10,217	286	10,503	175	...	175
5	Surat	5,339	2	5,341	10,075	371	10,446
	<b>Total, Gujarat</b>	<b>246,236</b>	<b>21,884</b>	<b>268,120</b>	<b>75,744</b>	<b>5,717</b>	<b>81,461</b>
<i>II.—Deccan.</i>							
6	West Khândesh	365,137	679	365,816	10,933	120	11,053
7	East Khândesh	290,395	...	290,395	...	...	...
8	Nashik	643,441	587	644,028	109,791	1,856	111,647
9	Ahmednagar	350,718	1,238	351,956	21,678	...	21,678
10	Poona	371,050	1,760	372,810	43,334	3,069	46,403
11	Sholapur	104,457	...	104,457	253	...	253
12	Sâtira	254,313	8,675	262,988	36,847	3,435	40,282
	<b>Total, Deccan</b>	<b>2,390,820</b>	<b>13,839</b>	<b>2,404,659</b>	<b>222,731</b>	<b>6,260</b>	<b>231,011</b>
<i>III.—Karnatak.</i>							
13	Belgâum	117,750	1,635	119,385	27,309	4,952	32,261
14	Bijâpur	175,152	239	175,391	88	...	88
15	Dhârwar	6,305	2,429	8,734	39,616	545	40,081
	<b>Total, Karnatak</b>	<b>299,207</b>	<b>4,303</b>	<b>303,510</b>	<b>66,913</b>	<b>5,497</b>	<b>72,410</b>
<i>IV.—Konkan.</i>							
16	Thâna	.....	.....	.....	42,432	1,307	43,739
17	Bombay Suburban	.....	.....	.....	51	...	51
18	Kolha	.....	.....	.....	36,348	977	37,325
19	Ratnâgiri	.....	.....	.....	34,071	132,213	166,284
20	Kânara	.....	.....	.....	2,139	...	2,139
	<b>Total, Konkan</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>115,039</b>	<b>134,497</b>	<b>249,536</b>
	<b>Total, Presidency proper</b>	<b>3,036,263</b>	<b>40,026</b>	<b>3,076,289</b>	<b>450,429</b>	<b>158,991</b>	<b>609,420</b>
<b>SIND</b>							
21	Karâchi	14,906	.....	14,906	337	...	337
22	Hyderabad	154,127	.....	154,127	5	...	5
23	Thar-Parkar	630,239	.....	630,239	4	...	4
24	Nawâshâh	121,378	.....	121,378	...	...	...
25	Larkânâ	1,406	.....	1,406	...	...	...
26	Sukkur	20,652	.....	20,652	5	...	5
27	Upper Sind Frontier	83,731	.....	83,731	...	...	...
	<b>Total, Sind</b>	<b>1,028,729</b>	<b>.....</b>	<b>1,028,729</b>	<b>841</b>	<b>...</b>	<b>841</b>
	<b>Grand Total</b>	<b>4,064,992</b>	<b>40,026</b>	<b>4,105,018</b>	<b>480,770</b>	<b>158,991</b>	<b>634,761</b>

—contd.

pulses—continued.						District.	Serial No.
7. Maize.			8. Gram.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
21	22	23	24	25	26	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
4,229	128	4,357	9,585	555	10,141	A.—PRESIDENCY PROPER.	
983	16	999	5,068	66	5,134	I.—Gujarat.	
102,070	43,125	145,195	53,397	12,484	65,881	Ahmedabad	1
112	...	112	1,421	143	1,564	Kaira	2
10	24	34	1,677	96	1,773	Panch Mahals	3
						Broach	4
						Surat	5
107,404	43,293	150,697	71,149	13,316	84,465	Total, Gujarat.	
						II.—Deccan.	
4,487	98	4,585	21,689	493	22,182	West Khandesh	6
414	...	414	4,991	...	4,991	East Khandesh	7
2,946	79	3,025	100,944	532	101,476	Nasik	8
1,088	3	1,091	66,525	726	67,251	Ahmednagar	9
1,485	2	1,487	49,444	695	50,139	Poona	10
8,672	...	8,672	32,388	...	32,388	Solapur	11
9,523	270	10,193	53,078	2,393	55,471	Satara	12
29,411	846	30,257	329,059	4,829	333,888	Total, Deccan.	
						III.—Karnatak.	
14,309	278	14,587	23,460	1,769	25,229	Belgaum	13
1,238	...	1,238	31,608	128	31,736	Bijapur	14
51	44	95	23,720	960	24,680	Dharwar	15
15,478	322	15,800	78,788	2,867	81,645	Total, Karnatak.	
						IV.—Konkan.	
17	...	17	907	5	912	Thana	16
...	...	...	...	...	...	Bombay Suburban	17
1	...	1	291	6	297	Kolaba	18
...	...	...	9	27	36	Ratnagiri	19
74	...	74	315	...	315	Kanara	20
92	...	92	1,522	38	1,560	Total, Konkan.	
151,385	44,461	195,846	489,518	21,040	501,558	Total, Presidency proper.	
						B.—SIND.	
1,832	...	1,832	1,033	...	1,033	Karachi	21
269	...	269	309	...	309	Hyderabad	22
444	...	444	657	...	657	Thar Parkar	23
79	...	79	13,344	...	13,344	Nawabshah	24
...	...	...	37,028	...	37,028	Larkana	25
1	...	1	71,063	...	71,063	Sukkar	26
10	...	10	116,437	...	116,437	Upper Sind Frontier	27
2,625	...	2,625	239,921	...	239,921	Total, Sind.	
154,010	44,461	198,471	730,439	21,040	741,479	Grand Total.	

TABLE III—CROPS

Serial No.	District.	Cereals and Pulses—concluded.					
		9. Other food-grains, including pulses.			10. Total Cereals and Pulses.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	27	28	29	30	31	32
	<b>PRESIDENCY PROPER.</b>						
	<b>I.—Gujarat.</b>						
1	Ahmedabad ...	70,174	3,504	73,678	653,377	47,928	701,305
2	Kaira ...	139,115	2,856	141,771	483,515	10,227	473,742
3	Panch Mahals ...	60,310	17,112	77,422	351,667	103,733	455,400
4	Broach ...	55,636	2,198	57,834	220,412	7,684	228,098
5	Surat ...	39,190	1,350	37,510	225,147	6,169	231,316
	<b>Total, Gujarat ...</b>	<b>361,395</b>	<b>20,850</b>	<b>388,245</b>	<b>1,914,118</b>	<b>177,741</b>	<b>2,091,859</b>
	<b>II.—Deccan.</b>						
6	West Khândesh ...	142,939	993	143,936	697,036	7,518	904,554
7	East Khândesh ...	264,253	.....	264,253	902,786	.....	902,786
8	Nasik ...	181,129	1,773	182,902	1,688,610	7,341	1,695,951
9	Ahmednagar ...	79,317	891	80,208	2,196,626	16,355	2,211,981
10	Poona ...	81,974	2,956	87,930	1,711,938	21,258	1,733,196
11	Sholapur ...	45,085	.....	45,085	1,807,355	.....	1,802,365
12	Bâtara ...	176,034	9,591	185,625	1,323,718	52,921	1,376,639
	<b>Total, Deccan ...</b>	<b>973,821</b>	<b>16,197</b>	<b>990,018</b>	<b>10,522,069</b>	<b>105,993</b>	<b>10,627,463</b>
	<b>III.—Karnatak.</b>						
13	Belgaum ...	223,386	6,986	230,332	1,176,927	31,106	1,208,033
14	Bijapur ...	116,967	323	117,290	1,855,681	6,917	1,861,598
15	Dhârwar ...	269,646	8,999	278,645	1,173,522	38,441	1,211,963
	<b>Total, Karnatak ...</b>	<b>609,999</b>	<b>16,305</b>	<b>621,304</b>	<b>4,206,130</b>	<b>76,464</b>	<b>4,281,594</b>
	<b>IV.—Konkan.</b>						
16	Thâna ...	34,651	1,345	35,996	381,078	9,541	390,622
17	Bombay Suburban ...	0	.....	0	11,139	3,637	11,775
18	Kolâba ...	34,892	772	35,664	322,916	20,393	343,379
19	Ratnâgiri ...	37,519	112,537	150,078	149,631	516,693	668,524
20	Kânara ...	5,350	.....	5,350	176,109	.....	176,109
	<b>Total, Konkan ...</b>	<b>112,421</b>	<b>114,674</b>	<b>227,095</b>	<b>1,040,873</b>	<b>552,467</b>	<b>1,593,340</b>
	<b>Total, Presidency proper.</b>	<b>2,052,636</b>	<b>174,026</b>	<b>2,226,662</b>	<b>17,683,190</b>	<b>911,065</b>	<b>18,594,255</b>
	<b>SIND</b>						
21	Karachi ...	29,598	.....	29,598	366,903	.....	396,503
22	Hyderabad ...	6,746	.....	6,746	465,196	.....	471,942
23	Thur Pârkar ...	3,968	.....	3,968	738,420	.....	742,388
24	Nawâshah ...	26,535	.....	26,535	342,313	.....	368,848
25	Lârkhna ...	181,470	.....	181,470	468,941	2,200	650,611
26	Sukkur ...	36,913	.....	36,913	517,243	.....	554,156
27	Upper Sind Frontier...	47,154	.....	47,154	544,723	2,374	547,527
	<b>Total, Sind ...</b>	<b>332,394</b>	<b>.....</b>	<b>332,394</b>	<b>3,693,639</b>	<b>5,074</b>	<b>3,698,713</b>
	<b>Grand Total ...</b>	<b>3,385,020</b>	<b>174,026</b>	<b>3,559,046</b>	<b>21,676,629</b>	<b>916,139</b>	<b>22,492,668</b>

—contd.

Oil-seeds.						District.	Serial No.
11. Linseed.			12. Sesame (Td).				
Reported. 33	Esti- mated. 34	Total. 35	Reported. 36	Esti- mated. 37	Total. 38		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
22	...	22	26,791	673	27,464	Ahmedabad	1
12	...	12	13,110	184	13,294	Kaira	2
279	12	291	29,841	4,468	33,829	Panch Mahals	3
...	...	...	11,587	88	11,668	Broach	4
2	...	2	1,384	19	1,403	Surat	5
316	12	327	82,193	5,450	87,643	Total, Gujarat.	
4,231	93	4,324	15,451	390	15,761	West Khandesh	6
1,151	...	1,151	11,299	...	11,299	East Khandesh	7
36,274	124	36,398	6,368	...	6,368	Nasik	8
16,931	145	17,076	10,194	136	10,330	Ahmednagar	9
1,179	22	1,201	17,235	521	17,746	Poona	10
12,425	...	12,425	3,094	...	3,094	Sholapur	11
3,290	111	3,401	249	8	257	Satara	12
75,481	495	75,976	61,570	926	62,365	Total, Deccan.	
3,363	6	3,369	3,779	789	4,578	Belgaum	13
43,344	91	43,435	8,447	9	8,456	Bijapur	14
9,776	211	9,986	9,526	341	9,867	Dharwar	15
55,863	308	55,990	31,752	1,149	32,601	Total, Karnatak.	
...	...	...	1,350	51	1,351	Thana	16
...	...	...	4	...	4	Bombay Suburban	17
...	...	...	2,015	24	2,039	Kolaba	18
...	...	...	2,449	7,847	9,796	Ratnagiri	19
8	...	8	48	...	47	Kanara	20
8	...	8	5,766	7,493	13,163	Total, Konkan.	
131,186	515	132,001	171,681	14,906	186,577	Total Presidency proper.	
...	...	...	5,423	...	5,423	Karachi	21
...	...	...	3,768	...	3,768	Hyderabad	22
...	...	...	5,366	...	5,366	Thar Parkar	23
247	...	247	7,043	...	7,043	Nawabshah	24
...	...	...	2,351	...	2,351	Larkana	25
...	...	...	3,524	...	3,524	Sukkur	26
1	...	1	5,418	...	5,418	Upper Sind Frontier	27
249	...	249	33,763	...	33,763	Total, Sind.	
131,434	515	132,349	205,394	14,906	220,300	Grand Total.	

TABLE III—CROPS

Serial No.	District.	Oil-seeds					
		13. Rape and Mustard.			14. Groundnut.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	39	40	41	42	43	44
	<b>A.—PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<b>I.—Gujarat.</b>						
1	Ahmedabad	12,496	7	12,503	8,669	25	8,694
2	Kaira	246	.....	246	1,404	57	1,461
3	Panch Mahals	999	125	1,124	25,504	3,593	29,096
4	Broach	172	10	182	.....	115	115
5	Surat	197	.....	197	191	11	202
	<b>Total, Gujarat</b>	<b>14,109</b>	<b>142</b>	<b>14,251</b>	<b>35,783</b>	<b>3,695</b>	<b>39,478</b>
	<b>II.—Deccan.</b>						
6	West Khândesh	1,026	16	1,042	22,946	98	23,044
7	East Khândesh	40	.....	40	117,146	.....	117,146
8	Nâsik	1,527	.....	1,527	7,859	2	7,861
9	Ahmednagar	12	.....	12	2,775	15	2,787
10	Poona	9	.....	9	13,244	312	13,556
11	Sholâpur	.....	.....	.....	7,863	.....	7,863
12	Sâtârâ	.....	.....	.....	97,437	5,652	103,089
	<b>Total, Deccan</b>	<b>2,614</b>	<b>16</b>	<b>2,630</b>	<b>269,270</b>	<b>6,079</b>	<b>275,349</b>
	<b>III.—Karnâtk.</b>						
13	Belgaum	.....	.....	.....	17,327	65	17,392
14	Bijâpur	.....	.....	.....	224	.....	224
15	Dhârwar	140	2	142	11,466	51	11,517
	<b>Total, Karnâtk</b>	<b>140</b>	<b>2</b>	<b>142</b>	<b>29,017</b>	<b>116</b>	<b>29,133</b>
	<b>IV.—Konkan.</b>						
16	Thâna	3	.....	3	3	.....	3
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolâba	.....	.....	.....	5	.....	5
19	Ratnâgiri	.....	.....	.....	124	248	372
20	Kânara	3	.....	3	78	.....	78
	<b>Total, Konkan</b>	<b>6</b>	<b>.....</b>	<b>6</b>	<b>210</b>	<b>248</b>	<b>356</b>
	<b>Total, Presidency proper</b>	<b>16,869</b>	<b>160</b>	<b>17,029</b>	<b>334,270</b>	<b>10,194</b>	<b>344,464</b>
	<b>SIIND.</b>						
21	Kârachi	34,634	.....	34,634	.....	.....	.....
22	Hyderabad	59,612	.....	59,612	.....	.....	.....
23	Thar Pârkar	1,145	.....	1,145	.....	.....	.....
24	Nawâshâh	42,425	.....	42,425	.....	.....	.....
25	Lârkhânâ	125,880	800	126,680	.....	.....	.....
26	Sukkur	59,655	.....	59,655	.....	.....	.....
27	Upper Sind Frontier	59,564	.....	59,564	.....	.....	.....
	<b>Total, Sind</b>	<b>350,115</b>	<b>800</b>	<b>350,915</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>
	<b>Grand Total</b>	<b>366,984</b>	<b>960</b>	<b>367,944</b>	<b>334,270</b>	<b>10,194</b>	<b>344,464</b>

—contd.

continued.

15. Coconut.			16. Castor Seed.			District.	Serial No.
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
45	46	47	48	49	50	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
						<b>A.—PRESIDENCY PROPER.</b>	
						<b>I.—Gujarat.</b>	
			7,399	600	7,999	Ahmedabad	1
			10,362	221	10,583	Kaira	2
			2,710	613	3,323	Panch Mahals	3
			1,529	63	1,592	Broach	4
37		37	9,579	256	9,834	Surat	5
37		37	31,579	1,639	33,218	Total, Gujarat.	
						<b>II.—Deccan.</b>	
			13,375	127	13,502	West Khandesh	6
			491		491	East Khandesh	7
						Nasik	8
						Ahmednagar	9
1		1	24		24	Poona	10
			1,740		1,740	Sholapur	11
33		33	161	10	161	Satara	12
34		34	16,787	137	16,924	Total, Deccan.	
						<b>III.—Karnatak.</b>	
2		2	1,225	8	1,233	Belgaum	13
6		6	866	1	867	Bijapur	14
531		531	8,667	65	8,732	Dharwar	15
539		539	5,758	64	5,822	Total, Karnatak.	
						<b>IV.—Konkan.</b>	
320		320	242	10	252	Thana	16
766	90	856				Bombay Suburban	17
1,114		1,114	8		8	Kolaba	18
7,769	15,638	23,307				Ratnagiri	19
11,768		11,768	19		19	Kanara	20
21,737	15,628	37,365	269	10	279	Total, Konkan	
22,317	15,628	37,945	53,393	1,593	54,986	Total, Presidency proper.	
						<b>SIND.</b>	
31		31	79		79	Karachi	21
						Hyderabad	22
			1,185		1,185	Thar Parkar	23
						Nawabshah	24
						Larkana	25
						Bukkur	26
						Upper Sind Frontier	27
31		31	1,264		1,264	Total, Sind.	
22,378	15,628	38,006	54,657	1,593	56,250	Grand Total.	



TABLE III—CROPS

Serial No.	District.	Oil-seeds—concluded.					
		17. Other oil-seeds.			18. Total oil-seeds.		
		Reported.	Esti- mated.	Total.	Reported.	Esti- mated.	Total.
1	2	51	52	53	54	55	56
<b>A.—PRESIDENCY PROPER.</b>		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>I.—Gujarat.</b>							
1	Ahmedabad	289	9	298	55,565	1,314	56,879
2	Kaira	.....	.....	.....	25,134	462	25,596
3	Panch Mahala	3,044	1,347	4,391	61,877	10,077	71,954
4	Broach	242	4	246	13,625	163	13,788
5	Surat	239	.....	239	11,629	315	11,944
	<b>Total, Gujarat</b>	<b>3,814</b>	<b>1,360</b>	<b>5,174</b>	<b>187,890</b>	<b>12,331</b>	<b>180,161</b>
<b>II.—Deccan.</b>							
6	West Khândesh	9,762	165	9,927	64,799	829	65,620
7	East Khândesh	.....	.....	.....	130,127	.....	130,127
8	Násik	89,279	1,397	90,676	141,307	1,523	142,830
9	Ahmednagar	12,569	33	12,602	42,501	329	42,830
10	Poona	13,124	624	13,748	44,806	1,479	46,225
11	Sholapur	22,530	.....	22,530	17,648	.....	47,648
12	Sátara	8,886	466	9,352	110,046	6,247	116,293
	<b>Total, Deccan</b>	<b>156,170</b>	<b>2,635</b>	<b>158,805</b>	<b>581,226</b>	<b>10,407</b>	<b>591,633</b>
<b>III.—Karnatak.</b>							
13	Belgaum	4,423	863	5,286	31,124	1,749	31,873
14	Bijapur	4,235	24	4,259	50,023	125	50,147
15	Dhárwar	4,860	236	5,146	39,955	949	40,904
	<b>Total, Karnatak</b>	<b>13,523</b>	<b>1,179</b>	<b>14,701</b>	<b>126,101</b>	<b>2,823</b>	<b>128,924</b>
<b>IV.—Konkan.</b>							
16	Thána	5,149	216	5,365	6,967	257	7,224
17	Bombay Suburban	15	.....	15	775	90	875
18	Kolaba	890	30	920	4,032	54	4,086
19	Ratnágiri	3,548	18,537	22,065	13,890	41,870	55,590
20	Kánara	274	.....	274	12,198	.....	12,198
	<b>Total, Konkan</b>	<b>9,876</b>	<b>18,783</b>	<b>28,659</b>	<b>37,872</b>	<b>42,071</b>	<b>79,943</b>
	<b>Total, Presidency proper</b>	<b>183,383</b>	<b>24,006</b>	<b>207,389</b>	<b>913,029</b>	<b>67,632</b>	<b>986,661</b>
<b>B.—SIND.</b>							
21	Karachi	17	.....	17	40,364	.....	40,364
22	Hyderabad	2	.....	2	63,372	.....	63,372
23	Thar Parkar	724	.....	724	8,420	.....	8,420
24	Nawáshah	2	.....	2	50,617	.....	50,617
25	Lárkána	4	.....	4	123,235	800	129,035
26	Sukkur	8	.....	8	30,187	.....	30,187
27	UpperSind Frontier	.....	.....	.....	64,983	.....	64,983
	<b>Total, Sind</b>	<b>757</b>	<b>.....</b>	<b>757</b>	<b>396,198</b>	<b>800</b>	<b>396,998</b>
	<b>Grand Total</b>	<b>184,140</b>	<b>24,606</b>	<b>208,746</b>	<b>1,309,227</b>	<b>68,432</b>	<b>1,367,659</b>

—contd.

Condiments and Spices.			Sugar.			District.	Serial No.
19. Condiments and Spices.			20. Sugarcane.				
Reported.	Esti- mated.	Total.	Reported.	Esti- mated.	Total.	2	1
57	58	59	60	61	62		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	PRESIDENCY PROPER.	
						<b>I.—Gujarat.</b>	
1,407	26	1,433	192	8	200	Ahmedabad	1
1,692	19	1,711	9	.....	9	Kaira	2
1,282	434	1,716	43	4	47	Panch Mahals	3
351	.....	351	32	.....	32	Broach	4
1,291	125	1,416	2,005	34	2,039	Surat	5
6,023	604	6,627	2,281	46	2,327	Total, Gujarat.	
						<b>III.—Deccan.</b>	
5,121	83	5,204	959	.....	959	West Khandesh	6
9,315	.....	9,315	561	.....	561	East Khandesh	7
7,823	53	7,875	2,934	4	2,938	Nasik	8
5,290	97	5,387	13,118	352	13,470	Ahmednagar	9
11,360	41	11,391	10,642	.....	10,642	Poona	10
8,443	.....	8,443	825	.....	825	Sholapur	11
28,759	1,384	27,143	6,678	890	7,608	Satara	12
73,080	1,658	74,718	35,717	1,290	37,003	Total, Deccan.	
						<b>III.—Karnatak.</b>	
21,373	175	21,548	11,503	229	11,732	Belgaum	13
2,916	5	2,921	461	4	465	Bijapur	14
50,600	706	51,306	1,826	32	1,858	Dharwar	15
74,889	886	75,775	13,790	265	14,055	Total, Karnatak.	
						<b>IV.—Konkan.</b>	
2,012	25	2,037	351	.....	351	Thane	16
13	.....	13	.....	.....	.....	Bombay (Municipal)	17
333	7	340	25	10	35	Kolaba	18
613	2,529	3,172	544	1,632	2,176	Ratnagiri	19
4,463	.....	4,463	2,903	.....	2,903	Kanara	20
7,670	2,551	10,231	3,823	1,642	5,465	Total, Konkan.	
161,642	5,709	167,361	55,811	3,229	59,840	Total, Presidency proper.	
						<b>SIND.</b>	
617	.....	617	1,350	.....	1,350	Karachi	21
546	.....	546	888	.....	888	Hyderabad	22
197	.....	197	900	.....	900	Thar Parkar	23
18	.....	18	74	.....	74	Nawabshah	24
1,402	.....	1,402	136	.....	136	Larkana	25
1,311	.....	1,311	351	.....	351	Sukkur	26
330	.....	330	18	.....	18	Upper Sind Frontier	27
4,623	.....	4,623	3,688	.....	3,688	Total, Sind.	
166,265	5,709	171,974	60,500	3,229	63,538	Grand Total.	

TABLE III—CROPS

		Sugar—concluded.					
Serial No. 1	District. 2	21. Others.			22. Total sugars.		
		Reported. 63	Esti- mated. 64	Total. 65	Reported. 66	Esti- mated. 67	Total. 68
	<b>PRESIDENCY PROPER.</b>						
	<i>I.—Gujarat.</i>						
1	Ahmedabad	15	.....	15	207	8	215
2	Kaira	.....	.....	.....	9	.....	9
3	Panch Mahals	.....	.....	.....	43	4	47
4	Broach	113	.....	113	145	.....	145
5	Surat	379	.....	379	2,384	34	2,418
	<b>Total, Gujarat</b>	<b>507</b>	<b>.....</b>	<b>507</b>	<b>2,788</b>	<b>46</b>	<b>2,834</b>
	<i>II.—Deccan.</i>						
6	West Khandesh	30	.....	30	959	.....	989
7	East Khandesh	.....	.....	.....	561	.....	561
8	Nasik	.....	.....	.....	2,937	4	2,941
9	Ahmednagar	1	.....	1	13,119	352	13,471
10	Poona	90	.....	90	10,722	.....	10,722
11	Sholapur	.....	.....	.....	825	.....	825
12	Satara	2	.....	2	6,690	930	7,610
	<b>Total, Deccan</b>	<b>113</b>	<b>.....</b>	<b>113</b>	<b>35,290</b>	<b>1,286</b>	<b>37,116</b>
	<i>III.—Karnatak.</i>						
13	Belgaum	22	.....	22	11,525	329	11,754
14	Bijapur	2	.....	2	463	4	467
15	Dharwar	61	.....	61	1,387	32	1,919
	<b>Total, Karnatak</b>	<b>85</b>	<b>.....</b>	<b>85</b>	<b>13,375</b>	<b>265</b>	<b>14,140</b>
	<i>IV.—Konkan.</i>						
16	Thana	.....	.....	.....	351	.....	351
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	12	.....	12	37	10	47
19	Ratnagiri	.....	.....	.....	544	1,632	2,176
20	Kanara	.....	.....	.....	2,903	.....	2,903
	<b>Total, Konkan</b>	<b>12</b>	<b>.....</b>	<b>12</b>	<b>3,835</b>	<b>1,642</b>	<b>5,477</b>
	<b>Total, Presidency proper</b>	<b>717</b>	<b>.....</b>	<b>717</b>	<b>55,328</b>	<b>3,239</b>	<b>59,567</b>
	<b>SIND.</b>						
21	Karachi	193	.....	193	1,543	.....	1,543
22	Hyderabad	21	.....	21	909	.....	909
23	Thar Parkar	5	.....	5	905	.....	905
24	Nawabshah	.....	.....	.....	74	.....	74
25	Larkana	.....	.....	.....	129	.....	129
26	Sukkur	2,279	.....	2,279	2,610	.....	2,610
27	Upper Sind Frontier	7	.....	7	23	.....	23
	<b>Total, Sind</b>	<b>2,505</b>	<b>.....</b>	<b>2,505</b>	<b>6,193</b>	<b>.....</b>	<b>6,193</b>
	<b>Grand Total</b>	<b>3,222</b>	<b>.....</b>	<b>3,222</b>	<b>62,521</b>	<b>3,239</b>	<b>65,760</b>

—contd.

Fibres.						District.	Serial No.
23. Cotton.			24. Jute.				
Reported. 69	Esti- mated. 70	Total. 71	Reported. 72	Estimated. 73	Total. 74		
Acrea.	Acrea.	Acrea.	Acrea.	Acrea.	Acrea.	2	1
						<b>A.—PRESIDENCY PROPER.</b>	
						<i>I.—Gujarat.</i>	
516,429	40,460	555,879	.....	.....	.....	Ahmedabad	1
134,771	1,569	136,340	.....	.....	.....	Kaira	2
46,357	5,790	52,147	.....	.....	.....	Panch Mahals	3
316,796	9,774	326,570	.....	.....	.....	Broach	4
193,693	5,734	199,427	.....	.....	.....	Surat	5
1,208,046	63,307	1,270,253	.....	.....	.....	Total Gujarat.	
						<i>II.—Deccan.</i>	
464,693	4,129	468,822	.....	.....	.....	West Khândesh	6
924,170	.....	924,170	.....	.....	.....	East Khândesh	7
75,115	.....	75,115	.....	.....	.....	Nâsik	8
140,822	2,283	143,105	.....	.....	.....	Ahmednagar	9
2,296	43	2,339	.....	.....	.....	Poona	10
61,500	.....	61,500	.....	.....	.....	Sholapur	11
16,926	191	17,117	.....	.....	.....	Sâtara	12
1,688,618	6,651	1,695,269	.....	.....	.....	Total Deccan.	
						<i>III.—Karnatak.</i>	
332,736	6,737	339,473	.....	.....	.....	Belgaum	13
864,712	1,956	866,668	.....	.....	.....	Bijâpur	14
736,354	8,988	745,342	.....	.....	.....	Dhârwar	15
1,933,832	17,681	1,951,513	.....	.....	.....	Total Karnatak.	
						<i>IV.—Konkan.</i>	
.....	.....	.....	.....	.....	.....	Thâna	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolâga	18
.....	.....	.....	.....	.....	.....	Batnâgtri	19
.....	.....	.....	.....	.....	.....	Karâra	20
1	3	4	.....	.....	.....	Total Konkan.	
4,829,597	87,642	4,917,239	.....	.....	.....	Total, Presidency proper.	
						<b>SIND.</b>	
1,035	.....	1,035	.....	.....	.....	Karâchi	21
81,944	.....	81,944	.....	.....	.....	Hyderabad	22
181,803	.....	181,803	.....	.....	.....	Thar Pârkar	23
131,810	.....	131,810	.....	.....	.....	Nawâshah	24
946	.....	946	.....	.....	.....	Lârkanâ	25
1,665	.....	1,665	.....	.....	.....	Sukkur	26
363	.....	363	.....	.....	.....	Upper Sind Frontier	27
399,566	.....	399,566	.....	.....	.....	Total, Sind.	
5,229,163	87,642	5,316,805	.....	.....	.....	Grand Total.	

TABLE III—CROPS

1 Serial No.	District.	Fibres—concluded.					
		25. Other Fibres.			26. Total Fibres.		
		Re- ported. 75	Esti- mated. 76	Total. 77	Reported. 78	E-ti- mated. 79	Total. 80
	<b>PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>I.—Gujarat.</i>						
1	Ahmedabad	2,833	29	2,862	518,262	40,479	558,741
2	Kaira	4,797	67	4,864	139,568	1,628	141,194
3	Panch Mahals	8,236	1,345	9,581	64,593	7,139	61,731
4	Broach	275	...	275	317,071	9,774	326,845
5	Surat	2,954	58	3,012	196,547	5,792	202,339
	<b>Total Gujarat</b>	<b>19,095</b>	<b>1,502</b>	<b>20,597</b>	<b>1,226,041</b>	<b>64,609</b>	<b>1,290,650</b>
	<i>II.—Deccan.</i>						
6	West Khândesh	9,469	117	9,586	474,363	4,246	478,609
7	East Khândesh	7,802	...	7,802	931,972	...	931,972
8	Nasik	4,153	26	4,181	79,273	26	79,299
9	Ahmednagar	6,069	81	6,150	146,991	2,369	149,260
10	Poona	2,647	101	2,748	4,913	144	5,067
11	Sholapur	24,284	...	24,284	88,890	...	83,890
12	Satara	4,993	215	5,208	21,918	426	22,345
	<b>Total Deccan</b>	<b>59,432</b>	<b>560</b>	<b>59,992</b>	<b>1,743,250</b>	<b>7,211</b>	<b>1,750,461</b>
	<i>III.—Karnatak.</i>						
13	Belgaum	11,473	308	11,781	314,209	7,045	321,254
14	Bijapur	5,564	6	5,570	870,276	1,962	872,238
15	Dharwar	53,198	987	54,185	789,580	9,975	799,555
	<b>Total Karnatak</b>	<b>70,235</b>	<b>1,301</b>	<b>71,536</b>	<b>2,004,065</b>	<b>18,982</b>	<b>2,023,047</b>
	<i>IV.—Konkan.</i>						
16	Thana	1,342	97	1,439	1,342	97	1,439
17	Bombay Suburban	.....	...	.....	...	...	.....
18	Kolaba	181	7	188	181	7	188
19	Ratnagiri	2,003	6,009	8,012	2,004	6,012	8,016
20	Ranara	106	...	106	106	...	106
	<b>Total Konkan</b>	<b>3,632</b>	<b>6,113</b>	<b>9,745</b>	<b>3,632</b>	<b>6,116</b>	<b>9,748</b>
	<b>Total, Presidency proper</b>	<b>152,322</b>	<b>9,476</b>	<b>161,798</b>	<b>4,981,069</b>	<b>97,118</b>	<b>5,078,107</b>
	<b>SIND.</b>						
21	Karachi	117	...	117	1,152	...	1,152
22	Hyderabad	248	...	248	82,192	...	82,192
23	Thar Parkar	56	...	56	181,859	...	181,859
24	Nawabshah	101	...	101	181,911	...	181,911
25	Larkana	42	...	42	988	...	988
26	Sukkur	5	...	5	1,670	...	1,670
27	Upper Sind Frontier	8	...	8	371	...	371
	<b>Total, Sind</b>	<b>577</b>	<b>...</b>	<b>577</b>	<b>400,143</b>	<b>.....</b>	<b>400,143</b>
	<b>Grand Total</b>	<b>152,899</b>	<b>9,476</b>	<b>162,445</b>	<b>5,382,132</b>	<b>97,118</b>	<b>5,479,250</b>

—contd.

Dyes.						District.	No.
27. Indigo.			24. Other dyes.				
Re-ported. 61	Esti-mated. 62	Total. 63	Re-ported. 64	Esti-mated. 65	Total. 66		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	2	1
						<b>PRESIDENCY PROPER.</b>	
						<b>I.—Gujarat.</b>	
.....	.....	.....	361	.....	361	Ahmedabad	1
.....	.....	.....	307	.....	307	Kaira	2
.....	.....	.....	.....	.....	.....	Panch Mahals	3
.....	.....	.....	.....	.....	.....	Broach	4
.....	.....	.....	.....	.....	.....	Surat	5
.....	.....	.....	666	.....	666	Total Gujarat.	
						<b>II.—Deccan.</b>	
1	.....	1	6	.....	6	West Khandesh	6
9	.....	9	1,420	.....	1,420	East Khandesh	7
.....	.....	.....	15,681	102	15,133	Nasik	8
.....	.....	.....	181,714	1,192	182,906	Ahmednagar	9
.....	.....	.....	102,274	897	103,171	Poona	10
.....	.....	.....	129,774	.....	129,774	Sholapur	11
.....	.....	.....	37,998	808	38,771	Satara	12
10	.....	10	468,187	2,994	471,181	Total Deccan.	
						<b>III.—Karnatak.</b>	
.....	.....	.....	21,422	344	21,766	Belgaum	13
.....	.....	.....	70,526	255	70,788	Bijapur	14
.....	.....	.....	28,130	1,287	29,417	Dharwar	15
.....	.....	.....	120,080	1,886	121,966	Total Karnatak.	
						<b>IV.—Konkan.</b>	
.....	.....	.....	.....	.....	.....	Thane	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Ratnagiri	19
.....	.....	.....	2	.....	2	Kanara	20
.....	.....	.....	2	.....	2	Total Konkan.	
10	.....	10	588,987	4,880	593,817	Total, Presidency proper.	
						<b>SIND.</b>	
.....	.....	.....	.....	.....	.....	Karachi	21
.....	.....	.....	5	.....	5	Hyderabad	22
.....	.....	.....	6,533	.....	6,533	Thar Parkar	23
1,024	.....	1,024	2	.....	2	Nawabshah	24
25	.....	25	398	.....	398	Larkana	25
105	.....	105	289	.....	289	Sukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
1,154	.....	1,154	7,171	.....	7,171	Total, Sind	
1,164	.....	1,164	696,108	4,680	600,988	Grand Total.	

TABLE III—CROPS

1 Serial No.	2 District.	Dyes—concluded.			Drugs		
		28. Total dyes.			30. Opium.		
		Re-ported. 87	Esti-mated. 88	Total. 89	Re-ported. 90	Esti-mated. 91	Total. 92
	<b>PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>I.—Gujarat.</i>						
1	Ahmedabad	361	...	361	.....	...	...
2	Kaira	307	...	307	.....	...	...
3	Panch Mahals	...	...	...	.....	...	...
4	Brosach	...	...	...	.....	...	...
5	Surat	...	...	...	.....	...	...
	<b>Total Gujarat</b>	<b>668</b>	<b>...</b>	<b>668</b>	<b>.....</b>	<b>...</b>	<b>...</b>
	<i>II.—Deccan.</i>						
6	West Khândesh	7	.....	7	.....	...	...
7	East Khândesh	1,429	.....	1,429	.....	...	...
8	Nâsik	15,031	102	15,133	.....	...	...
9	Ahmednagar	181,714	1,192	182,906	.....	...	...
10	Poona	103,274	897	104,171	.....	...	...
11	Sholâpur	129,774	...	129,774	.....	...	...
12	Sâtâra	87,968	803	88,771	.....	...	...
	<b>Total Deccan</b>	<b>468,197</b>	<b>2,994</b>	<b>471,191</b>	<b>.....</b>	<b>...</b>	<b>...</b>
	<i>III.—Karnâtak.</i>						
13	Belgaum	21,422	344	21,766	.....	...	...
14	Bijapur	70,523	265	70,788	.....	...	...
15	Dharwâr	28,130	1,267	29,417	.....	...	...
	<b>Total Karnatak</b>	<b>120,080</b>	<b>1,876</b>	<b>121,966</b>	<b>.....</b>	<b>...</b>	<b>...</b>
	<i>IV.—Konkan</i>						
16	Thâna	...	...	...	.....	...	...
17	Rombay Suburban	...	...	...	.....	...	...
18	Kolâva	...	...	...	.....	...	...
19	Ratnâgiri	...	...	...	.....	...	...
20	Kânara	2	...	2	.....	...	...
	<b>Total Konkan</b>	<b>2</b>	<b>...</b>	<b>2</b>	<b>.....</b>	<b>...</b>	<b>...</b>
	<b>Total, Presidency proper</b>	<b>588,947</b>	<b>4,880</b>	<b>593,827</b>	<b>.....</b>	<b>...</b>	<b>...</b>
	<b>SIND.</b>						
21	Korâchi	...	...	.....	.....	...	...
22	Hyderabad	5	...	5	.....	...	...
23	Thar Pârkar	6,533	...	6,533	.....	...	...
24	Nawalshâh	1,026	...	1,026	.....	...	...
25	Larkânâ	423	...	423	.....	...	...
26	Sukkur	336	...	336	.....	...	...
27	Upper Sind Frontier	...	...	.....	.....	...	...
	<b>Total, Sind</b>	<b>8,325</b>	<b>...</b>	<b>8,325</b>	<b>.....</b>	<b>...</b>	<b>...</b>
	<b>Grand Total</b>	<b>597,272</b>	<b>4,880</b>	<b>602,152</b>	<b>.....</b>	<b>...</b>	<b>...</b>

-contd.

and Narcotics.						District.	No.
31. Coffee.			32. Tea.				
Re-ported.	Esti-mated.	Total.	Re-ported.	Esti-mated.	Total.		
93	94	95	95	97	98	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	PRESIDENCY PROPER.	
						<i>I.—Gujarat.</i>	
...	...	...	...	...	...	Ahmedabad	1
...	...	...	...	...	...	Kaira	2
...	...	...	...	...	...	Panch Mahale	3
...	...	...	...	...	...	Broach	4
...	...	...	1	...	1	Surat	5
...	...	...	1	...	1	Total Gujarat.	
						<i>II.—Deccan.</i>	
...	...	...	...	...	...	West Khandesh	6
...	...	...	...	...	...	East Khandesh	7
...	...	...	...	...	...	Nasik	8
...	...	...	...	...	...	Ahmednagar	9
...	...	...	...	...	...	Poona	10
...	...	...	...	...	...	Sholapur	11
1	...	1	20	...	20	Satara	12
1	...	1	20	...	20	Total Deccan.	
						<i>III.—Karnatak.</i>	
...	...	...	...	...	...	Belgaum	13
...	...	...	...	...	...	Bijapur	14
...	...	...	...	...	...	Dharwar	15
...	...	...	...	...	...	Total Karnatak.	
						<i>IV.—Konkan.</i>	
...	...	...	...	...	...	Thana	16
...	...	...	...	...	...	Bombay Suburban	17
...	...	...	...	...	...	Kolaba	18
...	...	...	...	...	...	Laturgiri	19
6	...	6	...	...	...	Kanara	20
6	...	6	...	...	...	Total Konkan.	
7	...	7	21	...	21	Total, Presidency proper.	
						<i>SIND.</i>	
...	...	...	...	...	...	Karachi	21
...	...	...	...	...	...	Hyderabad	22
...	...	...	...	...	...	Thar Parkar	23
...	...	...	...	...	...	Nawalshah	24
...	...	...	...	...	...	Larkana	25
...	...	...	...	...	...	Sukkur	26
...	...	...	...	...	...	Upper Sind Frontier	27
...	...	...	...	...	...	Total, Sind.	
7	...	7	21	...	21	Grand Total.	



TABLE III—CROPS

Serial No.	District.	Drugs and					
		33. Tobacco.			34. Cinchona.		
		Re-ported. 89	Esti-mated. 100	Total. 101	Re-ported. 102	Esti-mated. 103	Total. 104
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<b>PRESIDENCY PROPER.</b>						
	<b>I.—Gujarat.</b>						
1	Ahmedabad ...	2,212	18	2,230	...	...	...
2	Kaira ...	46,951	353	47,304	...	...	...
3	Panch Mahals ...	1,109	294	1,403	...	...	...
4	Broach ...	2,196	43	2,239	...	...	...
5	Surat ...	591	30	621	...	...	...
	<b>Total Gujarat ...</b>	<b>53,059</b>	<b>738</b>	<b>53,797</b>	...	...	...
	<b>II.—Deccan.</b>						
6	West Khandesh ...	166	1	167	...	...	...
7	East Khandesh ...	689	...	689	...	...	...
8	Nasik ...	936	...	936	...	...	...
9	Ahmednagar ...	1,754	22	1,776	...	...	...
10	Poona ...	711	1	712	...	...	...
11	Sholapur ...	1,817	...	1,817	...	...	...
12	Satara ...	10,703	446	11,149	...	...	...
	<b>Total Deccan ...</b>	<b>16,776</b>	<b>470</b>	<b>17,246</b>	...	...	...
	<b>III.—Karnatak.</b>						
13	Belgaum ...	41,906	480	42,448	...	...	...
14	Bijapur ...	1,399	1	1,399	...	...	...
15	Dharwar ...	773	...	773	...	...	...
	<b>Total Karnatak ...</b>	<b>44,130</b>	<b>481</b>	<b>44,611</b>	...	...	...
	<b>IV.—Konkan.</b>						
16	Thana ...	...	...	...	...	...	...
17	Bombay Suburban ...	...	...	...	...	...	...
18	Kolaba ...	...	...	...	...	...	...
19	Ratnagiri ...	...	...	...	...	...	...
20	Kanara ...	...	...	...	...	...	...
	<b>Total Konkan ...</b>	...	...	...	...	...	...
	<b>Total, Presidency proper ...</b>	<b>113,965</b>	<b>1,689</b>	<b>115,654</b>	...	...	...
	<b>SIND.</b>						
21	Karachi ...	33	...	33	...	...	...
22	Hyderabad ...	2,274	...	2,274	...	...	...
23	Thar Parkar ...	79	...	79	...	...	...
24	Nawabshah ...	1,013	...	1,013	...	...	...
25	Larkana ...	1,243	...	1,243	...	...	...
26	Sukkur ...	2,041	...	2,041	...	...	...
27	Upper Sind Frontier ...	22	...	22	...	...	...
	<b>Total, Sind ...</b>	<b>6,745</b>	...	<b>6,745</b>	...	...	...
	<b>Grand Total ...</b>	<b>1 0,710</b>	<b>1,689</b>	<b>122,399</b>	...	...	...

—concl'd.

Narcotics—continued.

35. Indian Hemp.			36. Other drugs and narcotics.			District.	Serial No.
Re-ported. 105	Esti-mated. 106	Total. 107	Re-ported. 108	Esti-mated. 109	Total. 110		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
						<b>PRESIDENCY PROPER.</b>	
						<b>I.—Gujarat.</b>	
...	...	...	...	...	...	Ahmedabad	1
...	...	...	...	...	...	Kaira	2
...	...	...	...	...	...	Panch Mahals	3
...	...	...	3	...	3	Broach	4
...	...	...	1	...	1	Surat	5
...	...	...	4	...	4	Total Gujarat.	
						<b>II.—Deccan.</b>	
...	...	...	17	...	17	West Khandesh	6
...	...	...	207	...	207	East Khandesh	7
...	...	...	284	...	284	Nasik	8
25	...	258	164	...	164	Ahmednagar	9
...	...	...	552	1	553	Poona	10
...	...	...	183	...	183	Sholapur	11
...	...	...	797	34	831	Satara	12
258	...	258	2,204	35	2,239	Total Deccan.	
						<b>III.—Karnatak.</b>	
...	...	...	454	9	463	Belgaum	13
...	...	...	125	...	128	Bijapur	14
...	...	...	1,655	13	1,668	Dharwar	15
...	...	...	2,237	22	2,259	Total Karnatak.	
						<b>IV.—Konkan.</b>	
...	...	...	565	...	565	Thana	16
...	...	...	...	...	...	Bombay Suburban	17
...	...	...	483	...	486	Kolaba	18
...	...	...	1,416	5,446	7,264	Ratnagiri	19
...	...	...	17,838	...	17,838	Kanara	20
...	...	...	20,705	5,449	26,153	Total Konkan.	
258	...	258	25,150	5,595	30,745	Total, Presidency proper	
						<b>SEND.</b>	
...	...	...	...	...	...	Karachi	21
...	...	...	...	...	...	Hyderabad	22
...	...	...	...	...	...	Thar Parkar	23
...	...	...	...	...	...	Nawabshah	24
80	...	80	...	...	...	Larkana	25
...	...	...	21	...	21	Sukkur	26
...	...	...	...	...	...	Upper Sind Frontier	27
80	...	80	21	...	21	Total, Sind.	
338	...	338	25,171	5,505	30,676	Grand Total.	

TABLE III—CROPS

No.	District.	Drugs and Narcotics— <i>concd.</i>			Fodder crops.		
		37. Total drugs and narcotics.			38. Fodder crops.		
		Reported.	Esti- mated.	Total.	Reported.	Esti- mated.	Total.
1	2	111	112	113	114	115	116
<b>PRESIDENCY PROPER.</b>							
<i>I.—Gujarat.</i>							
		Acre.	Acre.	Acre.	Acre.	Acre.	Acre.
1	Ahmedabad	2,212	18	2,230	108,870	2,936	111,806
2	Kaira	46,951	353	47,304	114,475	2,428	116,903
3	Panch Mahals	1,100	294	1,403	46,417	19,641	66,058
4	Broach	2,189	43	2,242	54,650	2,415	57,065
5	Surat	593	30	623	305,758	8,178	313,936
	Total Gujarat	53,064	738	53,802	630,200	35,597	665,797
<i>II.—Deccan.</i>							
6	West Khandesh	183	1	184	2,006	.....	2,006
7	East Khandesh	896	.....	896	3,777	.....	3,777
8	Nasik	1,220	.....	1,220	116,396	729	116,125
9	Ahmednagar	2,176	22	2,198	50,078	1,036	51,114
10	Poona	1,263	2	1,265	114,566	1,386	115,962
11	Sholapur	2,000	.....	2,000	85,319	.....	85,319
12	Satara	11,521	450	12,001	459,624	11,101	461,725
	Total Deccan	19,259	505	19,764	821,766	14,282	836,028
<i>III.—Karnatak.</i>							
13	Belgaum	42,422	490	42,911	130,820	3,056	133,876
14	Bijapur	1,517	1	1,518	6,351	.....	6,351
15	Dharwar	2,428	13	2,441	71,936	170	72,106
	Total Karnatak	46,367	503	46,870	209,107	3,226	212,333
<i>IV.—Konkan.</i>							
16	Thana	565	.....	565	171,316	2,148	173,463
17	Bombay Suburban	.....	.....	.....	10,860	4,515	15,175
18	Kolaba	486	.....	486	31,443	2,731	34,174
19	Ratnagiri	1,816	5,548	7,264	26,483	79,330	105,552
20	Kanara	17,844	.....	17,844	36,548	.....	36,548
	Total Konkan	20,711	5,548	26,169	276,429	68,783	365,212
	Total Presidency proper	139,401	7,194	146,595	1,937,502	141,868	2,079,370
<b>SIND.</b>							
21	Karachi	33	.....	33	20,462	.....	20,462
22	Hyderabad	2,274	.....	2,274	1,061	.....	1,061
23	Thar Parkar	79	.....	79	56,943	.....	56,943
24	Nawabshah	1,013	.....	1,013	15,563	.....	15,563
25	Larkana	1,363	.....	1,363	1,060	.....	1,060
26	Sukkur	2,062	.....	2,062	1,354	.....	1,354
27	Upper Sind Frontier	22	.....	22	425	.....	425
	Total Sind	6,846	.....	6,846	67,073	.....	67,073
	Grand Total	146,247	7,194	153,441	2,004,575	141,868	2,146,443

—contd.

Fruits and Vegetables (including root crops).			Miscellaneous Crops.			District.	No.	
39. Fruits and Vegetables.			40. Food crops.					
Reported. 117	Estimated. 118	Total. 119	Reported. 120	Estimated. 121	Total. 122			
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.			
23,924	417	24,341	30	.....	30	PRESIDENCY PROPER. <i>I—Gujarat.</i>		
30,658	658	31,316	48	24	72		Ahmedabad	1
3,320	928	4,248	2	.....	2		Kaira	2
6,494	171	6,665	8	.....	8		Panch Mahals	3
42,827	964	43,791	1	.....	1		Broach	4
						Surat	5	
107,443	3,128	110,571	80	24	118	Total, Gujarat.		
14,709	21	14,730	37	.....	37	<i>II—Deccan.</i>		
31,458	.....	31,458	28	.....	28		West Khandesh	6
24,274	70	24,344	146	.....	146		East Khandesh	7
23,601	72	23,673	183	9	192		Nasik	8
30,281	271	30,552	853	10	863		Ahmednagar	9
13,784	.....	13,784	30	.....	30		Poona	10
45,481	1,878	47,359	500	6	506	Sholapur	11	
						Satara	12	
180,588	2,312	182,900	1,777	25	1,802	Total, Deccan.		
31,074	1,109	32,183	32	.....	32	<i>III—Karnatak.</i>		
19,675	47	19,722	17	.....	17		Belgaum	13
26,340	734	27,074	.....	.....	.....		Bijapur	14
						Dharwar	15	
77,089	1,890	78,979	40	.....	40	Total, Karnatak.		
7,929	110	8,039	.....	.....	.....	<i>IV—Konkan.</i>		
1,807	401	2,208	.....	.....	.....		Thana	16
10,129	307	10,436	.....	.....	.....		Bombay Suburban	17
6,408	18,300	24,708	.....	.....	.....		Kolaba	18
7,446	.....	7,446	.....	.....	.....		Retnagiri	19
						Kanara	20	
32,714	17,033	49,747	.....	.....	.....	Total, Konkan.		
406,928	24,363	431,291	1,915	49	1,964	Total, Presidency proper		
10,282	.....	10,282	3	.....	3	SIND.		
10,660	.....	10,660	10	.....	10		Karachi	21
1,924	.....	1,924	.....	.....	.....		Hyderabad	22
2,180	.....	2,180	.....	.....	.....		Tbar Parkar	23
7,159	.....	7,159	24	.....	24		Nawabshah	24
10,853	.....	10,853	32	.....	32		Larkana	25
3,373	.....	3,373	.....	.....	.....		Sukkur	26
						Upper Sind Frontier	27	
46,981	.....	46,981	69	.....	69	Total, Sind.		
463,210	24,363	487,573	1,984	49	2,033	Grand Total.		

Table III—Crops

No.	District.	Miscellaneous Crops—concl'd.			35. Grand Total of all crops (i. e., Gross area cropped).		
		41. Non-Food crops.			Reported.	Esti- mated.	Total.
		Reported.	Esti- mated.	Total.			
1	2	123	124	125	126	127	128
<b>PRESIDENCY PROPER.</b>							
<b>I—Gujarat.</b>							
1	Ahmedabad	97	1	98	1,364,312	93,126	1,457,438
2	Kaira	39	1	40	822,626	15,795	838,421
3	Panch Mahals	7	.....	7	510,317	142,248	652,565
4	Broach	34	.....	34	814,979	20,250	835,229
5	Surat	77	10	87	786,254	23,607	809,861
Total, Gujarat		254	12	266	4,108,518	295,030	4,403,548
<b>II—Deccan.</b>							
6	West Khandesh	.....	.....	.....	1,459,241	12,698	1,471,939
7	East Khandesh	4	.....	4	2,012,318	.....	2,012,318
8	Nasik	14	.....	14	2,076,027	9,548	2,085,575
9	Ahmednagar	39	.....	39	2,661,298	21,833	2,683,131
10	Poona	1,001	6	1,007	2,039,997	25,504	2,065,501
11	Bholapur	24	.....	24	2,179,092	.....	2,179,092
12	Satara	5	.....	5	2,034,221	76,176	2,110,397
Total, Deccan		1,087	6	1,093	14,462,104	146,059	14,608,163
<b>III—Karnatak.</b>							
13	Belgaum	9	.....	9	1,909,937	45,362	1,955,299
14	Bijapur	40	.....	40	2,288,486	4,316	2,292,802
15	Dharwar	6	.....	6	2,184,333	62,308	2,246,641
Total, Karnatak		55	1	56	6,977,806	105,926	7,083,732
<b>IV—Konkan.</b>							
16	Thana	183	.....	183	571,692	12,181	583,873
17	Bombay Suburban	.....	.....	.....	24,404	8,649	33,053
18	Kolaba	18	.....	18	369,575	23,509	393,084
19	Ratnagiri	3	9	12	201,597	671,781	873,378
20	Kanara	2,388	.....	2,388	260,013	.....	260,013
Total, Konkan		2,542	9	2,551	1,426,281	716,130	2,142,411
Total Presidency proper		3,937	28	3,965	26,874,709	1,263,145	28,137,854
<b>SIND.</b>							
21	Karachi	4	.....	4	441,488	.....	441,488
22	Hyderabad	25,604	.....	25,604	671,691	.....	671,691
23	Thar Parkar	1,876	.....	1,876	967,156	.....	967,156
24	Nawabshah	9,497	.....	9,497	533,707	.....	533,707
25	Larkana	1,108	.....	1,108	1,040,632	5,100	1,045,732
26	Sukkur	797	.....	797	598,667	.....	598,667
27	Upper Sind Frontier	79	.....	79	614,329	2,874	617,203
Total, Sind		38,665	.....	38,665	4,858,055	5,874	4,863,929
Grand Total		42,602	28	42,630	31,732,784	1,269,019	33,001,803

—concl'd.

43.—Area cropped more than once.			44.—Net area cropped.			District.	Serial No.
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
129	130	131	132	133	134	2	
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
7,006	287	7,292	1,367,307	92,859	1,450,146	Ahmedabad	1
10,806	3-	10,841	811,321	15,762	827,583	Kaira	2
80,202	20,523	100,725	440,145	121,736	561,871	Panch Mahals	3
469	.....	469	614,510	20,350	634,793	Broach	4
50,329	580	50,918	735,925	23,018	758,943	Surat	5
148,810	21,436	170,245	3,958,708	273,595	4,233,303	Total, Gujarat.	
II—Deccan.							
22,707	7	22,714	1,486,534	12,691	1,449,226	West Khandesh	6
8,698	.....	8,698	2,004,220	.....	2,004,220	East Khandesh	7
47,897	49	47,939	2,028,130	9,806	2,037,936	Nasik	8
41,363	133	41,496	2,618,845	21,700	2,641,545	Ahmednagar	9
89,196	497	89,693	1,950,801	25,007	1,975,808	Poona	10
25,220	.....	25,220	2,163,873	.....	2,163,873	Sholapur	11
98,182	5,451	103,633	1,938,039	70,725	2,008,764	Batara	12
392,663	6,130	398,793	14,129,441	189,929	14,269,370	Total, Deccan.	
III—Karnatak.							
31,907	103	32,010	1,778,030	45,199	1,823,229	Belgaum	13
5,192	.....	5,192	2,878,294	8,316	2,886,610	Bijapur	14
20,188	112	20,300	2,184,195	52,196	2,216,391	Bharwar	15
57,287	215	57,502	6,820,519	105,711	6,926,230	Total, Karnatak.	
IV—Konkan.							
75,685	25	5,710	566,07	12,165	578,163	Thana	16
236	.....	236	24,188	8,649	32,817	Bombay Suburban	17
11,440	358	11,799	358,135	23,150	361,285	Kolaba	18
10,877	32,631	43,508	189,720	639,160	828,880	Ratnagiri	19
18,450	.....	18,450	241,624	.....	241,624	Kanara	20
46,727	33,015	79,742	1,379,554	683,115	2,062,669	Total, Konkan.	
585,487	60,795	646,282	26,280,223	1,202,350	27,481,572	Total, Presidency proper.	
SIND.							
33,440	.....	33,440	408,034	.....	408,034	Karachi	21
8,698	.....	8,698	663,143	.....	663,143	Hyderabad	22
2,378	.....	2,378	964,278	.....	964,278	Thar Parkar	23
22,231	.....	22,231	531,538	.....	531,538	Nawabshah	24
235,808	.....	235,808	805,224	3,000	808,224	Larkana	25
54,281	.....	54,281	514,370	.....	514,370	Sukkur	26
81,639	.....	81,639	533,690	2,374	535,564	Upper Sind Frontier	27
438,774	.....	438,774	4,419,281	5,874	4,425,155	Total, Sind.	
1,094,261	60,795	1,085,060	30,709,603	1,208,224	31,916,727	Grand Total.	

TABLE IV—  
Area irrigated by different sources of irrigation and under crops

No.	District	Area irri					
		1.—Government Canals.			2.—Private Canals.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	3	4	5	6	7	8
	<b>A.—PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarat.</i>						
1	Ahmedabad	4,761	55	4,816	402	.....	402
2	Kaira	2,170	.....	2,170	.....	.....	.....
3	Panch Mahals	653	10	653	.....	.....	.....
4	Broach	.....	.....	.....	.....	.....	.....
5	Surat	.....	.....	.....	.....	.....	.....
	<b>Total, Gujarat</b>	<b>7,614</b>	<b>65</b>	<b>7,679</b>	<b>402</b>	<b>.....</b>	<b>402</b>
	<i>Deccan.</i>						
6	West Khândesh	10,750	100	10,850	433	.....	433
7	East Khândesh	1,554	.....	1,554	34	.....	34
8	Nâsik	30,720	.....	30,720	8,456	.....	8,456
9	Ahmednagar	67,213	560	67,793	2,655	.....	2,655
10	Poona	85,956	.....	85,956	13,683	.....	13,683
11	Sholapur	12,367	.....	12,367	64	.....	64
12	Sâtara	9,932	3,198	13,130	28,678	2,381	31,059
	<b>Total, Deccan</b>	<b>227,792</b>	<b>3,878</b>	<b>231,670</b>	<b>54,018</b>	<b>2,381</b>	<b>56,399</b>
	<i>Karnâtak.</i>						
13	Belgaum	7,494	.....	7,494	4,019	23	4,042
14	Hijapur	793	.....	793	95	.....	95
15	Dharwâr	6,483	.....	6,483	242	.....	242
	<b>Total, Karnâtak</b>	<b>14,760</b>	<b>.....</b>	<b>14,760</b>	<b>4,356</b>	<b>23</b>	<b>4,379</b>
	<i>Konkan.</i>						
16	Thâna	.....	.....	.....	.....	.....	.....
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolâba	.....	.....	.....	.....	.....	.....
19	Râtnâgiri	.....	.....	.....	1,408	4,224	5,632
20	Kânara	.....	.....	.....	2,995	.....	2,995
	<b>Total, Konkan</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>4,403</b>	<b>4,224</b>	<b>8,627</b>
	<b>Total, A</b>	<b>250,166</b>	<b>3,943</b>	<b>254,109</b>	<b>63,179</b>	<b>6,628</b>	<b>69,807</b>
	<b>B.—SIND.</b>						
21	Karâchi	265,286	.....	265,286	.....	.....	.....
22	Hyderabad	644,546	.....	644,546	.....	.....	.....
23	Thar Pârkar	390,533	.....	390,533	.....	.....	.....
24	Nawâshâh	476,217	.....	476,217	.....	.....	.....
25	Lârâkâna	573,037	2,200	575,237	35	.....	35
26	Sukkur	248,120	.....	248,120	25,000	.....	25,000
27	Upper Sind Frontier	490,065	.....	490,065	.....	.....	.....
	<b>Total, B</b>	<b>3,077,804</b>	<b>2,200</b>	<b>3,080,004</b>	<b>25,035</b>	<b>.....</b>	<b>25,035</b>
	<b>Grand Total</b>	<b>3,327,970</b>	<b>6,143</b>	<b>3,334,113</b>	<b>88,214</b>	<b>6,628</b>	<b>94,842</b>

## IRRIGATION.

irrigated in the Bombay Presidency (including Sind) in 1924-25.

gated from						District.	No
3.—Tanks.			4.—Wells.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
9	10	11	12	13	14	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	A.—PRESIDENCY PROPER.	
8,316	310	8,626	25,735	959	26,694	<i>Gujarat.</i>	
485	70	555	14,241	129	14,370	Ahmedabad	1
.....	.....	.....	2,474	602	3,076	Kaira	2
.....	.....	.....	568	.....	568	Panch Mahals	3
2,021	.....	2,021	4,662	288	4,950	Broach	4
.....	.....	.....	.....	.....	.....	Surat	5
10,822	380	11,202	47,680	1,855	49,535	Total, Gujarat.	
.....	.....	.....	12,810	21	12,831	<i>II.—Deccan.</i>	
.....	.....	.....	19,590	.....	19,590	West Khandesh	6
490	.....	490	34,368	184	34,552	East Khandesh	7
.....	.....	.....	74,800	885	75,685	Nasik	8
4,156	.....	4,156	79,442	674	80,116	Ahmednagar	9
.....	.....	.....	93,448	.....	93,448	Poona	10
8	.....	8	56,590	794	57,384	Sholapur	11
.....	.....	.....	.....	.....	.....	Satara	12
4,654	.....	4,654	371,208	2,556	373,764	Total, Deccan.	
15,002	11	15,013	32,464	623	33,087	<i>III.—Karnatak.</i>	
187	.....	187	24,847	25	24,872	Pelgaum	13
77,402	517	77,919	4,503	630	5,133	Bijapur	14
.....	.....	.....	.....	.....	.....	Dharwar	15
92,601	528	93,129	61,814	1,478	63,292	Total, Karnatak.	
477	.....	477	3,504	.....	3,504	<i>IV.—Konkan.</i>	
3	.....	3	210	.....	210	Thana	16
31	.....	31	606	.....	606	Bombay Suburban	17
783	2,349	3,132	5,425	16,275	21,700	Kolaba	18
11,717	.....	11,717	955	.....	955	Ratnagiri	19
.....	.....	.....	.....	.....	.....	Kanara	20
13,011	2,349	15,360	10,600	16,275	26,875	Total, Konkan.	
121,146	3,257	124,403	491,302	22,196	513,498	Total, A.	
.....	.....	.....	10,673	.....	10,673	<i>B.—SIND.</i>	
.....	.....	.....	247	.....	247	Karachi	21
.....	.....	.....	127	.....	127	Hyderabad	22
.....	.....	.....	7,979	.....	7,979	Thar Parkar	23
.....	.....	.....	1,800	.....	1,800	Nawabshah	24
351	.....	351	21,621	.....	21,621	Larkana	25
.....	.....	.....	551	.....	551	Sukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
351	.....	351	42,928	.....	42,928	Total, B.	
121,497	3,257	124,754	534,230	22,196	556,426	Grand Total.	



TABLE IV—

No.	District.	Area irrigated from—concluded.					
		5.—Other sources of irrigation.			Total area irrigated from all sources of irrigation.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	15	16	17	18	19	20
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>A.—PRESIDENCY PROPER.</b>							
<i>Gujarāt.</i>							
1	Ahmedabad ...	1,297	150	1,447	40,511	1,374	41,885
2	Kaira ...	198	.....	198	17,004	199	17,202
3	Panch Mahāls ...	220	25	245	3,377	644	4,021
4	Broach ...	.....	.....	.....	568	.....	568
5	Surat ...	34	.....	34	6,717	288	7,005
	<b>Total, Gujarāt ...</b>	<b>1,749</b>	<b>175</b>	<b>1,924</b>	<b>68,268</b>	<b>2,505</b>	<b>70,772</b>
<i>Deccan.</i>							
6	West Khāndesh ...	637	.....	637	24,720	121	24,841
7	East Khāndesh ...	730	.....	730	22,178	.....	22,178
8	Nasik ...	422	.....	422	83,468	124	83,592
9	Ahmednagar ...	.....	.....	.....	144,788	1,405	146,193
10	Poona ...	611	.....	611	193,618	674	194,292
11	Sholāpur ...	.....	.....	.....	105,884	.....	105,884
12	Sātara ...	1,226	110	1,336	66,434	6,488	72,922
	<b>Total, Deccan ...</b>	<b>3,616</b>	<b>110</b>	<b>3,726</b>	<b>661,288</b>	<b>8,927</b>	<b>670,215</b>
<i>Karnātāk</i>							
13	Belgaum ...	3,145	187	3,332	82,124	994	83,118
14	Bijāpur ...	26	.....	26	28,948	26	29,000
15	Dhārwar ...	5,741	23	5,764	94,431	1,170	95,601
	<b>Total, Karnātāk ...</b>	<b>8,912</b>	<b>160</b>	<b>9,072</b>	<b>182,503</b>	<b>2,190</b>	<b>184,692</b>
<i>Konkan.</i>							
16	Thāna ...	103	.....	103	4,064	.....	4,064
17	Bombay Suburban ...	.....	.....	.....	213	.....	213
18	Kolāba ...	207	.....	207	744	.....	744
19	Rānāgiri ...	2,431	7,293	9,724	10,047	30,141	40,168
20	Kānara ...	7,125	.....	7,125	22,792	.....	22,792
	<b>Total, Konkan ...</b>	<b>9,866</b>	<b>7,293</b>	<b>17,159</b>	<b>37,880</b>	<b>30,141</b>	<b>68,021</b>
	<b>Total, A ...</b>	<b>24,143</b>	<b>7,788</b>	<b>31,931</b>	<b>940,938</b>	<b>43,782</b>	<b>984,720</b>
<b>B.—SIND.</b>							
21	Karāchi ...	57,841	.....	57,841	383,700	.....	383,700
22	Hyderabad ...	19,350	.....	19,350	663,143	.....	663,143
23	Thar 'ārkar ...	.....	.....	.....	390,660	.....	390,660
24	Nawābahān ...	.....	.....	.....	481,196	.....	481,196
25	Lā-kā'a ...	8,719	.....	8,719	538,591	2,200	540,791
26	Sukkur ...	663	.....	663	285,755	.....	285,755
27	Upper Sind Frontier ...	52,444	.....	52,444	532,690	.....	532,690
	<b>Total, B ...</b>	<b>137,617</b>	<b>.....</b>	<b>137,617</b>	<b>3,285,735</b>	<b>2,200</b>	<b>3,287,935</b>
	<b>Grand Total ...</b>	<b>161,760</b>	<b>7,788</b>	<b>169,548</b>	<b>4,226,673</b>	<b>45,982</b>	<b>4,272,655</b>

IRRIGATION—contd.

Crops irrigated.						District.	No.
1.—Rice.			2.—Wheat.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
21	22	23	24	25	26	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
16,907	528	16,435	10,600	432	11,032	<b>A.—PRESIDENCY PROPR.</b>	
2,647	70	2,917	1,283	28	1,310	<b>Gujarat.</b>	
58	27	85	2,043	354	2,297	Ahmedabad	1
1,813	.....	1,813	7	.....	7	Kaira	2
30,625	625	21,260	13,933	704	14,636	Panch Mahals	3
						Broach	4
						Surat	5
						Total, Gujarat.	
						<b>Deccan.</b>	
437	.....	437	12,297	97	12,394	West Khandesh	6
52	.....	52	4,903	.....	4,903	East Khandesh	7
958	.....	958	37,989	30	37,999	Nasik	8
403	1	403	36,425	169	36,594	Ahmednagar	9
2,734	.....	2,734	16,530	25	16,555	Puna	10
770	.....	770	13,165	.....	13,165	Sholapur	11
9,414	969	10,383	16,678	1,040	17,727	Satara	12
14,737	970	15,707	157,967	1,370	139,337	Total, Deccan.	
						<b>Karnatak.</b>	
18,130	44	18,174	1,083	6	1,089	Belgaum	13
331	.....	331	409	.....	409	Bijapur	14
86,795	539	87,334	30	.....	30	Dharwar	15
105,256	583	105,839	1,522	6	1,528	Total, Karnatak.	
						<b>Konkan.</b>	
.....	.....	.....	.....	.....	.....	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
3,518	10,548	14,064	.....	.....	.....	Kolaba	18
19,476	.....	19,476	.....	.....	.....	Ratnagiri	19
22,992	10,549	33,540	.....	.....	.....	Kanara	20
163,610	12,726	176,336	153,431	2,080	155,501	Total, Konkan.	
						Total, A.	
						<b>B.—SIND.</b>	
243,425	.....	243,423	14,600	.....	14,600	Karachi	21
260,043	.....	260,043	50,059	.....	50,059	Hyderabad	22
54,826	.....	54,826	33,919	.....	33,919	Thar Parkar	23
32,507	.....	32,507	36,023	.....	36,023	Nawabshah	24
422,210	500	422,710	61,127	300	61,427	Larkana	25
65,982	.....	65,982	47,224	.....	47,224	Sukkar	26
96,868	.....	96,868	88,409	.....	88,409	Upper Sind Frontier	27
1,174,961	500	1,175,461	331,361	800	331,661	Total, B.	
1,336,471	13,226	1,351,697	484,792	2,880	487,162	Grand Total.	

TABLE IV—

No.	District.	Crops Irrig.					
		3.—Barley.			4.—Jowar.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	27	28	29	30	31	32
	<b>A.—PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarát.</i>						
1	Ahmedabad	3,647	105	3,752	467	.....	467
2	Kaira	198	4	202	79	.....	79
3	Panch Maháls	.....	.....	.....	.....	.....	.....
4	Brosach	.....	.....	.....	.....	.....	.....
5	Surat	.....	.....	.....	.....	.....	.....
	<b>Total, Gujarát</b>	<b>3,845</b>	<b>109</b>	<b>3,954</b>	<b>546</b>	.....	<b>546</b>
	<i>Deccan.</i>						
6	West Khándesh	.....	.....	.....	11	.....	11
7	East Khándesh	.....	.....	.....	273	.....	273
8	Násik	.....	.....	.....	152	.....	152
9	Ahmednagar	74	1	75	56,686	610	57,296
10	Poona	524	.....	524	66,498	549	67,047
11	Sholápur	1,085	.....	1,085	55,280	.....	55,280
12	Sátára	1,120	54	1,174	34,769	1,532	36,301
	<b>Total, Deccan</b>	<b>2,803</b>	<b>55</b>	<b>2,858</b>	<b>213,749</b>	<b>2,691</b>	<b>216,440</b>
	<i>Karnátak.</i>						
13	Belgaum	2,155	92	2,247	3,238	11	3,249
14	Bijánur	2,561	4	2,565	6,263	.....	6,263
15	Dhárwár	.....	.....	.....	.....	.....	.....
	<b>Total, Karnátak</b>	<b>4,716</b>	<b>96</b>	<b>4,812</b>	<b>9,501</b>	<b>11</b>	<b>9,512</b>
	<i>Konkan.</i>						
16	Thána	.....	.....	.....	.....	.....	.....
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolába	.....	.....	.....	.....	.....	.....
19	Ratnágiri	.....	.....	.....	.....	.....	.....
20	Kánara	.....	.....	.....	.....	.....	.....
	<b>Total, Konkan</b>	.....	.....	.....	.....	.....	.....
	<b>Total, A</b>	<b>11,364</b>	<b>260</b>	<b>11,624</b>	<b>223,796</b>	<b>2,702</b>	<b>226,498</b>
	<b>B.—SIND.</b>						
21	Karachi	7,920	.....	7,920	4,231	.....	4,231
22	Hyderabad	1,624	.....	1,624	10,013	.....	10,013
23	Thar Parkar	114	.....	114	4,693	.....	4,693
24	Nawáshah	1,056	.....	1,056	101,612	.....	101,612
25	Lárkana	341	.....	341	64,828	.....	64,828
26	Sukkur	230	.....	230	141,559	.....	141,559
27	Upper Sind Frontier	.....	.....	.....	.....	.....	.....
	<b>Total, B</b>	<b>11,344</b>	.....	<b>11,344</b>	<b>327,236</b>	.....	<b>327,236</b>
	<b>Grand Total</b>	<b>22,708</b>	<b>260</b>	<b>22,968</b>	<b>551,032</b>	<b>2,702</b>	<b>553,734</b>

IRRIGATION—contd.

gated—contd.

5.—Bajri.			6.—Maize.			District.	No.
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
33	34	35	36	37	38	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	A.—PRESIDENCY PROPEB.	
						<i>Gujarat</i>	
.....	.....	.....	631	40	721	Ahmedabad	1
9	.....	9	2	.....	2	Kaira	2
.....	.....	.....	51	5	56	Panch Mahals	3
.....	.....	.....	.....	.....	.....	Brosch	4
.....	.....	.....	.....	.....	.....	Surat	5
9	.....	9	734	45	779	Total, Gujarat.	
						<i>Deccan.</i>	
598	.....	598	201	.....	201	West Khandeesh	6
82	.....	82	54	.....	54	East Khandeesh	7
7,797	.....	7,797	861	.....	861	Nasik	8
18,973	73	18,946	965	3	968	Ahmednagar	9
27,494	12	27,506	1,292	2	1,294	P.ona	10
3,213	.....	3,213	8,097	.....	8,097	Solapur	11
8,686	649	7,335	3,294	315	3,599	Satara	12
62,743	734	63,477	14,787	329	15,107	Total, Deccan.	
						<i>Karnatak.</i>	
126	.....	126	10,297	15	10,312	Belgaum	13
36	.....	36	1,161	.....	1,161	Bijapur	14
.....	.....	.....	42	36	78	Dharwar	15
164	.....	164	11,600	51	11,651	Total, Karnatak	
						<i>Konkan.</i>	
.....	.....	.....	.....	.....	.....	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Ratnagiri	19
.....	.....	.....	.....	.....	.....	Kanara	20
62,916	734	63,650	27,021	416	27,437	Total, Konkan.	
						Total, A.	
						<i>B.—SIND.</i>	
14,211	.....	14,211	1,532	.....	1,532	Karachi	21
166,065	.....	166,065	259	.....	259	Hyderabad	22
10,987	.....	10,987	443	.....	443	Thar Parkar	23
129,108	.....	129,108	79	.....	79	Nawabshah	24
1,231	.....	1,231	.....	.....	.....	Larkana	25
20,462	.....	20,462	1	.....	1	Sukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
413,114	.....	413,114	2,614	.....	2,614	Total, B.	
476,080	734	476,764	29,635	416	30,051	Grand Total.	

TABLE IV—

No.	District.	Crops Irri					
		7.—Other cereals and pulses.			8.—Sugar-cane.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	39	40	41	42	43	44
	<b>A.—PRESIDENCY PROPER.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarat.</i>						
1	Ahmedabad	469	.....	469	164	8	192
2	Kaira	131	.....	131	9	.....	9
3	Panch Mahals	325	118	443	43	4	47
4	Broach	.....	.....	.....	32	.....	32
5	Surat	.....	.....	.....	2,005	34	2,039
	<b>Total, Gujarat</b>	<b>925</b>	<b>118</b>	<b>1,043</b>	<b>2,273</b>	<b>46</b>	<b>2,319</b>
	<i>Deccan.</i>						
6	West Khandesh	2,329	.....	2,329	960	.....	960
7	East Khandesh	677	.....	677	581	.....	581
8	Nasik	16,199	73	16,272	2,334	4	2,338
9	Ahmednagar	14,003	94	14,097	12,390	352	13,342
10	Poona	52,461	60	52,521	16,606	.....	16,606
11	Sholapur	5,446	.....	5,446	328	.....	328
12	Satara	6,558	531	7,089	6,651	949	7,600
	<b>Total, Deccan</b>	<b>94,173</b>	<b>758</b>	<b>94,931</b>	<b>35,528</b>	<b>1,305</b>	<b>36,833</b>
	<i>Karnatak.</i>						
13	Belgaum	5,912	325	6,237	11,503	239	11,732
14	Bijapur	3,416	.....	3,416	461	4	465
15	Dharwar	4,656	563	5,219	1,858	39	1,897
	<b>Total, Karnatak</b>	<b>13,984</b>	<b>888</b>	<b>14,872</b>	<b>13,822</b>	<b>265</b>	<b>14,087</b>
	<i>Konkan.</i>						
16	Thana	.....	.....	.....	351	.....	351
17	Bombay Suburban	186	.....	186	.....	.....	.....
18	Kolaba	.....	.....	.....	20	.....	20
19	Ratnagiri	1,563	4,689	6,252	541	1,632	2,173
20	Kanara	606	.....	606	2,102	.....	2,102
	<b>Total, Konkan</b>	<b>2,355</b>	<b>4,689</b>	<b>7,044</b>	<b>3,017</b>	<b>1,632</b>	<b>4,649</b>
	<b>Total, A</b>	<b>111,437</b>	<b>6,453</b>	<b>117,890</b>	<b>54,640</b>	<b>3,246</b>	<b>57,886</b>
	<b>B.—SIND.</b>						
21	Karach.	31,275	.....	31,275	1,350	.....	1,350
22	Hyderabad	7,134	.....	7,134	838	.....	838
23	Thar Parkar	2,481	.....	2,481	600	.....	600
24	Nawabshah	18,873	.....	18,873	74	.....	74
25	Larkana	107,865	1,400	109,265	129	.....	129
26	Bukkur	4,523	.....	4,523	331	.....	331
27	Upper Sind Frontier	359,779	.....	359,779	16	.....	16
	<b>Total, B</b>	<b>531,710</b>	<b>1,400</b>	<b>533,110</b>	<b>3,898</b>	<b>.....</b>	<b>3,688</b>
	<b>Grand Total</b>	<b>643,147</b>	<b>7,853</b>	<b>651,000</b>	<b>68,528</b>	<b>3,246</b>	<b>61,576</b>

## IRRIGATION—contd.

gated—conold.						District.	No.
9.—Other food crops.			10.—Cotton.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
45	46	47	48	49	50	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
						<b>A.—PRESIDENCY PROPER.</b>	
						<i>Gujarat.</i>	
2,505	109	2,614	1,917	125	2,042	Ahmedabad	1
1,592	85	1,677	492	.....	492	Kaira	2
889	179	1,068	.....	.....	.....	Panch Mahals	3
248	.....	248	.....	.....	.....	Broach	4
1,964	228	2,192	.....	.....	.....	Surat	5
6,979	551	7,529	2,409	125	2,534	Total, Gujarat	
						<i>Deccan.</i>	
3,511	10	3,521	359	.....	359	West Khandesh	6
9,454	.....	9,454	.....	.....	.....	East Khandesh	7
16,342	27	16,369	1,993	.....	1,993	Nasik	8
9,622	50	9,672	2,711	44	2,755	Ahmednagar	9
24,307	16	24,323	174	.....	174	Poona	10
10,394	.....	10,394	7,314	.....	7,314	Sholapur	11
11,806	514	12,320	77	.....	77	Satara	12
85,426	617	86,043	12,618	44	12,662	Total, Deccan.	
						<i>Karnatak.</i>	
6,887	149	7,036	1,087	.....	1,087	Belgaum	13
4,287	14	4,301	3,798	1	3,799	Bijapur	14
.....	.....	.....	.....	.....	.....	Dharwar	15
11,174	163	11,337	4,885	1	4,886	Total, Karnatak.	
						<i>Konkan.</i>	
3,817	.....	3,817	.....	.....	.....	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
933	.....	933	.....	.....	.....	Kolaba	18
2,712	8,136	10,848	.....	.....	.....	Ratnagiri	19
320	.....	320	.....	.....	.....	Kanara	20
7,783	8,130	15,913	.....	.....	.....	Total, Konkat.	
111,380	9,467	120,847	19,912	170	20,082	Total A.	
						<b>B.—SIND.</b>	
12,698	.....	12,698	1,031	.....	1,031	Karachi	21
12,701	.....	12,701	81,944	.....	81,944	Hyderabad	22
2,111	.....	2,111	181,727	.....	181,727	Thar Parkar	23
3,981	.....	3,981	131,755	.....	131,755	Nawabshah	24
8,227	.....	8,227	.....	.....	.....	Larkana	25
15,974	.....	15,974	1,453	.....	1,453	Sukkur	26
4,020	.....	4,020	.....	.....	.....	Upper Sind Frontier	27
59,652	.....	59,652	397,913	.....	397,913	Total, B.	
171,012	9,467	180,479	417,825	170	417,995	Grand Total.	

TABLE IV--

No.	District.	Crops irrigated--concd.					
		Other non-food crops.			Total crops irrigated.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	51	52	53	54	55	56
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>A.—PRESIDENCY PROPER.</b>							
<i>Gujarat.</i>							
1	Ahmedabad	4,519	37	4,556	40,896	1,374	42,270
2	Kaira	10,799	62	10,861	17,440	199	17,639
3	Panch Mahals	190	57	247	3,379	644	4,023
4	Broach	290	.....	290	.....	.....	.....
5	Surat	994	26	1,020	6,783	288	7,071
	<b>Total, Gujarat</b>	<b>16,792</b>	<b>182</b>	<b>16,974</b>	<b>69,686</b>	<b>2,505</b>	<b>71,573</b>
<i>Deccan.</i>							
6	West Khandesh	5,998	14	6,012	27,201	121	27,322
7	East Khandesh	6,888	.....	6,888	22,974	.....	22,974
8	Nasik	17,408	56	17,464	102,576	190	102,766
9	Ahmednagar	13,190	153	13,303	159,901	1,580	161,451
10	Poona	13,604	10	13,614	216,224	674	216,898
11	Sholapur	19,620	.....	19,620	125,189	.....	125,189
12	Satara	15,932	919	16,911	113,135	7,431	130,616
	<b>Total, Deccan</b>	<b>92,600</b>	<b>1,152</b>	<b>93,812</b>	<b>767,191</b>	<b>10,016</b>	<b>777,207</b>
<i>Karnatak.</i>							
13	Belgaum	8,759	157	8,916	69,179	1,028	70,207
14	Bijapur	5,367	2	5,359	28,080	25	28,105
15	Dharwar	1,277	.....	1,277	94,658	1,170	95,828
	<b>Total, Karnatak</b>	<b>15,393</b>	<b>159</b>	<b>15,552</b>	<b>191,917</b>	<b>2,223</b>	<b>194,140</b>
<i>Konkan.</i>							
16	Thana	745	.....	745	4,913	.....	4,913
17	Bombay Suburban	27	.....	27	213	.....	213
18	Kolaba	16	.....	16	969	.....	969
19	Ratnagiri	1,720	5,160	6,880	10,055	30,165	40,220
20	Kanara	294	.....	294	22,798	.....	23,798
	<b>Total, Konkan</b>	<b>2,502</b>	<b>5,160</b>	<b>7,962</b>	<b>38,948</b>	<b>30,165</b>	<b>69,113</b>
	<b>Total, A</b>	<b>127,647</b>	<b>6,653</b>	<b>134,300</b>	<b>1,067,124</b>	<b>44,909</b>	<b>1,112,033</b>
<b>B.—SIND.</b>							
21	Karachi	33,391	.....	33,391	364,907	.....	364,907
22	Hyderabad	91,101	.....	91,101	671,831	.....	671,831
23	Thar Parkar	10,622	.....	10,622	392,803	.....	392,803
24	Nawabshah	59,924	.....	59,924	506,051	.....	506,051
25	Larkana	29,702	.....	29,702	695,460	2,200	697,660
26	Sukkur	5,916	.....	5,916	304,005	.....	304,005
27	Upper Sind Frontier	65,237	.....	65,237	614,329	.....	614,329
	<b>Total, B</b>	<b>295,893</b>	<b>.....</b>	<b>295,893</b>	<b>3,549,386</b>	<b>2,200</b>	<b>3,551,586</b>
	<b>Grand Total</b>	<b>423,540</b>	<b>6,653</b>	<b>430,193</b>	<b>4,616,510</b>	<b>47,109</b>	<b>4,663,619</b>

## IRRIGATION—concl'd.

Deduct area of crops irrigated more than once.			Net irrigated area.			District.	No.
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
57	58	59	60	61	62	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	A.—PRESIDENCY PROPR.	
						<i>Gujarat.</i>	
385	.....	385	40,511	1,374	41,885	Ahmedabad	1
346	.....	346	17,094	199	17,293	Keira	2
2	.....	2	3,377	644	4,021	Panch Mahals	3
2	.....	2	568	.....	568	Broach	4
66	.....	66	6,717	286	7,005	Surat	5
801	.....	801	68,267	2,505	70,772	Total, Gujarat.	
						<i>Deccan.</i>	
2,481	.....	2,481	24,720	121	24,841	West Khandesh	6
796	.....	796	22,178	.....	22,178	East Khandesh	7
19,110	6	19,116	83,466	184	83,650	Nasik	8
15,144	85	15,229	144,758	1,465	146,223	Ahmednag	9
32,376	.....	32,376	183,848	674	184,522	Poona	10
19,216	.....	19,216	105,884	.....	105,884	Sholapur	11
16,701	993	17,699	96,434	6,483	102,917	Satara	12
105,903	1,089	106,992	661,288	8,927	670,215	Total, Deccan.	
						<i>Karnatak.</i>	
7,055	34	7,089	62,124	994	63,118	Belgaum	13
2,132	.....	2,132	23,948	25	23,973	Bijapur	14
227	.....	227	94,431	1,170	95,601	Dharwar	15
9,414	34	9,448	182,503	2,189	184,692	Total, Karnatak.	
						<i>Konkan.</i>	
829	.....	829	4,084	.....	4,084	Thana	16
.....	.....	.....	213	.....	213	Bombay Suburban	17
225	.....	225	744	.....	744	Kolaba	18
8	24	32	10,047	30,141	40,188	Ratnagiri	19
6	.....	6	22,792	.....	22,792	Kanara	20
1,068	24	1,092	37,580	30,141	68,021	Total, Konkan.	
117,186	1,147	118,333	949,936	43,762	993,700	Total, A.	
						<i>Sind.</i>	
31,207	.....	31,207	333,700	.....	333,700	Karachi	21
5,688	.....	5,688	663,143	.....	663,143	Hyderabad	22
2,143	.....	2,143	390,660	.....	390,660	Thar Parkar	23
21,855	.....	21,855	484,196	.....	484,196	Nawabshah	24
111,869	.....	111,869	593,591	2,200	595,791	Larkana	25
8,260	.....	8,260	295,755	.....	295,755	Sukkur	26
51,639	.....	51,639	532,630	.....	532,630	Upper Sind Frontier	27
265,651	.....	265,651	3,288,735	2,200	3,290,935	Total, B.	
382,837	1,147	383,984	4,283,673	45,962	4,329,635	Grand Total.	



TABLE V—

Estimated outturn of principal Kharif and Rabi crops in parts  
a twelve-anna crop) in the Bombay

No.	District.	Kharif.								
		Jowari.	Bajri.	Rice.	Kodra.	Rajh.	Vari.	Tur.	Udi Mug.	Besane.
1	Ahmedabad ...	68	83	83	83	76	76	68	67	76
2	Kaira ...	75	73	84	92	100	88	75	67	83
3	Panch Mahals ...	67	68	75	92	92	100	8	88	83
4	Broach ...	85	103	98	110	80	...	79	68	83
5	Surat ...	83	77	83	...	82	78	83	78	78
6	West Khandesh ...	83	83	100	83	100	83	100	83	67
7	East Khandesh ...	...	75	75	...	...	67	75	58	75
8	Nasik ...	83	75	50	...	92	...	75	83	60
9	Ahmednagar ...	...	65	92	92	100	100	67	83	67
10	Poona ...	52	52	50	58	67	75	50	49	58
11	Sholapur ...	...	25	43	50	25	50	50	46	83
12	Satara ...	58	67	82	83	92	67	...	83	67
13	Belgaum ...	92	92	93	...	83	67	75	71	67
14	Bijapur ...	50	42	50	33	33	33	25	83	38
15	Dharwar ...	92	83	92	83	83	83	75	75	75
15	Thana ...	92	...	92	92	83	83	83	79	75
17	Bombay Suburban ...	...	...	100	...	100	100	...	...	83
18	Kolaba ...	...	...	100	100	92	92	92	83	92
19	Ratnagiri ...	...	...	10	83	92	75	75	75	83
20	Kanara ...	33	...	75	...	75	...	50	67	67
21	Karachi ...	75	67	75	...	67	67	...	88	58
22	Hyderabad ...	67	75	75	...	75	67	...	67	50
23	Thar Parkar ...	58	68	67	...	50	58	68	63	58
24	Nawabshah ...	67	67	75	...	...	...	...	...	67
25	Larkana ...	50	50	58	...	...	50	...	...	50
26	Sukkur ...	83	67	7	...	75	...	...	58	58
27	Upper Sind Frontier.	83	83	100	...	...	...	...	83	100

## OUTTURN PER CENT.

of 100 (100 denoting a normal, i.e.,  
Presidency during the year 1924-25.

Cotton.		Rabi.						Perennial	District.	No.
Early.	Late.	Jowari.	Wheat.	Gram.	Tobacco.	Linseed.	Rape and Mustard.	Sugar-cane.		
..	100	98	99	67	100	67	78	76	Ahmedabad	1
..	83	..	50	71	100	67	67	76	Kaira	2
..	98	..	67	98	75	75	67	83	Panch Mahals	3
..	103	93	93	95	100	..	..	83	Broach	4
..	88	81	83	75	..	..	..	83	Surat	5
67	..	83	85	83	67	83	67	100	West Khandesh	6
80	..	100	75	75	100	67	..	92	East Khandesh	7
83	..	83	75	75	75	67	..	83	Nasik	8
75	..	68	72	75	46	75	33	92	Ahmednagar	9
33	..	52	55	54	83	42	..	100	Poona	10
42	..	75	70	53	60	50	..	67	Sholapur	11
42	..	53	73	53	75	50	..	83	Satara	12
..	75	75	50	75	..	42	..	83	Belgaum	13
..	50	50	25	33	..	50	..	67	Bijapur	14
..	75	83	68	75	83	67	..	83	Dharwar	15
..	..	..	83	75	..	..	83	83	Thana	16
..	..	..	..	..	..	..	..	..	Bombay Suburban	17
..	..	..	..	92	..	..	..	92	Kolaba	18
..	..	..	..	75	..	..	..	75	Batnagiri	19
..	..	..	..	67	..	58	..	75	Kanara	20
..	58	..	67	75	..	..	75	75	Karachi	21
..	50	..	75	50	50	..	67	75	Hyderabad	22
..	50	..	50	42	67	..	33	58	Thar Parkar	23
..	67	..	48	48	67	..	42	58	Nawabshah	24
..	50	..	58	50	50	..	42	58	Larkana	25
..	67	..	53	58	67	..	50	58	Sukkur	26
..	67	..	67	83	67	..	..	67	Upper Sind Frontier.	27

TABLE V-A—AREA  
Area under food-grain crops (cereals and pulses),  
Sind) and its estimated outturn

Serial Number.	District.	A—Cereals					
		1. Rice.					
		1924-25.		1923-24.		1922-23.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
2	3	4	5	6	7	8	
<i>Gujarat.</i>							
1	Ahmedabad	27,706	15,721	12,760	2,311	27,318	8,897
2	Kaira	58,414	27,253	24,159	2,384	64,396	30,165
3	Panch Mahals	66,344	26,663	63,641	10,844	68,770	30,799
4	Broach	10,321	4,078	8,374	642	13,809	4,862
5	Surat	55,999	54,796	98,959	56,254	101,684	66,247
	<b>Total, Gujarat</b>	<b>266,684</b>	<b>128,514</b>	<b>207,923</b>	<b>72,395</b>	<b>276,077</b>	<b>140,970</b>
<i>Deccan.</i>							
6	West Khandesh	51,810	24,976	50,715	18,488	48,590	19,727
7	East Khandesh	256	82	471	188	388	213
8	Nasik	60,326	14,693	61,792	24,939	62,562	25,096
9	Ahmednagar	19,113	6,428	16,731	7,792	15,869	7,336
10	Poona	26,755	3,916	24,600	24,256	85,905	39,250
11	Sholapur	2,461	490	3,824	718	4,178	813
12	Satara	6,492	19,311	47,149	14,716	47,791	26,256
	<b>Total, Deccan</b>	<b>263,216</b>	<b>68,907</b>	<b>264,305</b>	<b>91,697</b>	<b>265,826</b>	<b>112,670</b>
<i>Karnatak.</i>							
13	Belgaum	115,089	54,456	112,125	43,575	110,748	36,701
14	Bijapur	2,341	448	2,415	431	2,159	410
15	Dharwar	135,715	63,302	116,679	29,180	130,467	28,076
	<b>Total, Karnatak</b>	<b>253,136</b>	<b>118,206</b>	<b>231,222</b>	<b>73,206</b>	<b>243,394</b>	<b>65,187</b>
<i>Konkan.</i>							
16	Thana	309,418	151,946	311,867	153,149	308,901	165,482
17	Bombay Suburban	14,716	7,884	15,566	8,308	16,318	8,581
18	Kolaba	270,922	144,655	268,628	143,894	268,646	138,316
19	Ratnagiri	352,128	161,063	348,110	132,091	344,231	150,159
20	Kanara	167,896	74,682	163,922	79,705	162,569	83,283
	<b>Total, Konkan</b>	<b>1,114,189</b>	<b>610,230</b>	<b>1,107,965</b>	<b>517,167</b>	<b>1,109,305</b>	<b>565,812</b>
	<b>Total, Bombay Presidency</b>	<b>1,887,216</b>	<b>855,857</b>	<b>1,831,415</b>	<b>763,765</b>	<b>1,886,692</b>	<b>884,639</b>
<i>B.—SIND.</i>							
21	Karachi	243,425	106,602	243,538	119,051	233,542	125,007
22	Hyderabad	283,043	98,453	257,193	92,336	252,433	114,158
23	Thar Parkar	54,846	28,710	66,747	31,955	71,892	28,221
24	Nawabshah	32,507	11,880	35,294	12,565	49,872	28,560
25	Larkana	422,710	152,282	418,786	179,730	399,156	233,727
26	Sukkur	63,082	22,470	63,892	16,499	67,306	23,120
27	Upper Sind Frontier	86,888	64,009	107,163	46,261	106,653	47,866
	<b>Total, Sind</b>	<b>1,173,361</b>	<b>509,487</b>	<b>1,190,350</b>	<b>501,555</b>	<b>1,172,786</b>	<b>589,457</b>
	<b>Grand Total</b>	<b>3,062,577</b>	<b>1,365,344</b>	<b>3,021,765</b>	<b>1,265,320</b>	<b>3,059,388</b>	<b>1,474,096</b>

## AND OUTTURN.

in each district of the Bombay Presidency (including during 1924-25 and preceding two years.

2. Wheat.						District.	Serial Number.
1924-25.		1923-24.		1922-23.			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.		
9	10	11	12	13	14	2	1
<i>Gujarat.</i>							
105,731	29,541	67,271	12,430	196,723	30,927	Ahmedabad	1
6,337	1,410	6,779	1,603	11,411	2,811	Kaira	2
21,108	4,434	9,282	2,611	17,782	6,230	Panch Mahals	3
43,945	10,985	8,990	622	59,337	11,864	Broach	4
13,922	2,907	9,389	1,405	20,427	5,052	Surat	5
191,033	49,277	101,711	18,671	305,681	56,934	Total, Gujarat.	
<i>Deccan.</i>							
148,435	37,447	123,282	29,673	125,144	31,227	West Khandesh	6
28,010	6,925	29,247	7,009	32,313	10,012	East Khandesh	7
350,880	64,981	158,924	28,894	137,465	23,303	Nasik	8
183,857	37,857	139,597	23,298	107,652	26,024	Ahmednagar	9
56,547	8,446	49,458	9,079	66,641	10,760	Poona	10
29,364	6,696	26,528	5,749	27,428	5,736	Sholapur	11
42,052	1,369	39,650	8,372	43,789	16,779	Satara	12
830,145	174,721	565,686	112,074	535,431	123,843	Total, Deccan.	
<i>Karnatak.</i>							
75,653	10,063	79,136	6,802	128,816	16,490	Belgaum	13
129,969	9,670	166,511	7,550	276,755	33,076	Bijapur	14
181,937	23,206	217,350	20,275	279,509	36,399	Dharwar	15
387,459	42,958	462,997	34,627	685,083	85,965	Total, Karnatak	
<i>Konkan.</i>							
78	15	159	29	149	33	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Ratnagiri	19
.....	.....	.....	.....	.....	.....	Kanara	20
78	15	159	29	149	33	Total, Konkan.	
1,417,715	266,971	1,130,553	165,401	1,526,344	266,775	Total, Bombay Presidency.	
<i>B.—SIND.</i>							
90,875	6,622	11,819	4,293	14,562	6,306	Karachi	31
50,059	3,944	29,314	1,516	36,392	5,810	Hyderabad	32
34,691	6,090	44,835	7,370	70,169	35,396	Thar Parkar	33
43,390	11,551	44,469	12,060	51,302	23,172	Nawabshah	34
122,749	23,771	91,504	21,197	106,301	20,413	Larkana	35
180,052	39,649	137,069	31,376	118,350	25,584	Sukkur	36
39,253	24,160	73,592	17,604	104,906	32,908	Upper Sind Frontier	37
540,769	110,796	432,802	96,016	502,082	149,689	Total, Sind.	
1,958,484	377,787	1,563,155	261,417	2,023,426	416,464	Grand Total.	

TABLE V-A—AREA AND

Serial Number.	District.	A—Cereals—					
		3. Barley.					
		1924-25.		1923-24.		1922-23.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	15	16	17	18	19	20
	<i>Gujarat.</i>						
1	Ahmedabad	3,792	2,004	5,807	2,216	6,155	2,563
2	Kaira	208	92	999	462	686	246
3	Panch Mahals	5,762	1,470	2,294	644	7,733	2,417
4	Broach	.....	.....	.....	.....	.....	.....
5	Surat	.....	.....	.....	.....	.....	.....
	Total, Gujarat	9,757	3,566	9,100	3,342	14,524	5,246
	<i>Deccan.</i>						
6	West Khandesh	.....	.....	.....	.....	.....	.....
7	East Khandesh	.....	.....	.....	.....	.....	.....
8	Nasik	.....	.....	.....	.....	.....	.....
9	Ahmednagar	142	45	327	80	247	54
10	Poona	637	158	699	117	755	172
11	Sholapur	1,472	376	1,655	355	2,157	415
12	Satara	2,744	813	2,831	637	3,682	1,261
	Total, Deccan	4,926	1,392	5,512	1,189	6,841	1,902
	<i>Karnatak.</i>						
13	Belgaum	2,340	940	2,011	525	2,086	870
14	Bijapur	2,683	843	2,319	652	2,610	775
15	Dharwar	32	6	42	.....	41	5
	Total, Karnatak	5,055	1,779	4,372	1,177	4,737	1,650
	<i>Konkan.</i>						
16	Thana	.....	.....	.....	.....	.....	.....
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	.....	.....	.....	.....	.....	.....
19	Ratnagiri	.....	.....	.....	.....	.....	.....
20	Kanara	.....	.....	.....	.....	.....	.....
	Total, Konkan	.....	.....	.....	.....	.....	.....
	Total, Bombay Presidency	19,807	6,737	18,984	5,708	26,102	8,796
	<i>B.—SIND.</i>						
21	Karachi	9,707	4,240	7,928	3,386	6,396	2,433
22	Hyderabad	1,625	523	2,074	444	2,807	903
23	Thar Parkar	131	32	203	45	1,906	583
24	Nawabshah	1,149	75	1,647	134	2,216	475
25	Larkana	3,002	562	2,368	392	3,062	656
26	Sukkur	399	71	465	100	370	69
27	Upper Sind Frontier.	147	49	76	16	110	29
	Total, Sind	16,160	5,551	14,761	4,457	16,267	5,150
	Grand Total	35,967	12,288	33,745	10,165	42,369	13,948

## OUTTURN—contd.

continued.						District.	Serial Number.
4. Jowar.							
1924-25.		1923-24.		1922-23.			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	2	1
21	22	23	24	25	26		
						<b>Gujarat.</b>	
324,064	51,540	321,999	64,908	317,300	127,729	Ahmedabad	1
51,200	18,030	58,911	18,475	45,182	15,558	Kaira	2
14,020	4,970	14,788	5,762	12,931	6,208	Panch Mahals	3
103,722	25,253	146,323	23,164	106,007	27,236	Broach	4
66,391	18,059	69,536	22,399	93,144	27,361	Surat	6
661,397	167,852	632,067	134,706	574,064	204,182	Total, Gujarat.	
						<b>Deccan.</b>	
156,814	42,007	136,525	34,352	145,594	30,073	West Khandesh	5
305,267	96,019	321,716	86,150	329,716	87,744	East Khandesh	7
240,027	46,432	86,821	12,194	157,899	18,498	Nasik	8
1,430,758	265,548	917,273	143,541	1,093,237	177,316	Ahmednagar	9
1,030,519	141,203	841,618	96,735	955,942	175,597	Poona	10
1,578,195	309,872	1,477,405	223,831	1,500,102	261,055	Sholapur	11
729,693	136,751	666,165	109,830	597,717	186,232	Satara	12
5,531,273	1,097,232	4,447,723	716,963	4,790,147	936,518	Total, Deccan.	
						<b>Karnatak.</b>	
598,826	179,245	540,837	76,532	658,581	157,403	Belgaum	13
1,400,662	170,335	1,232,694	118,159	1,660,868	145,365	Bijapur	14
847,187	144,658	543,388	92,894	662,724	96,563	Dharwar	15
2,841,275	494,238	2,366,819	287,585	2,882,173	398,331	Total, Karnatak.	
						<b>Konkan.</b>	
462	86	457	76	499	79	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Ratnagiri	19
335	35	190	11	32	2	Kanara	20
797	110	647	87	691	81	Total, Konkan.	
8,634,742	1,699,432	7,447,246	1,139,343	8,236,915	1,539,112	Total, Bombay Presidency.	
						<b>B.—SIND.</b>	
46,400	8,622	40,565	6,473	27,488	8,911	Karachi	21
10,023	1,531	7,331	1,115	8,680	2,563	Hyderabad	22
13,460	1,500	9,948	1,668	25,053	7,702	Thar Parkar	23
103,931	33,717	97,323	39,539	109,853	35,861	Nawabshah	24
132,686	24,177	89,359	17,705	81,039	23,497	Larkana	25
141,976	35,807	112,756	19,380	142,062	47,565	Sukkur	26
113,947	30,174	97,493	13,397	89,075	21,991	Upper Sind Frontier.	27
562,423	135,528	454,773	104,080	483,251	152,190	Total, Sind.	
9,197,165	1,834,960	7,902,019	1,243,423	8,720,166	1,691,302	Grand Total.	

TABLE V-A—AREA AND

Serial Number.	District.	A—Cereals—					
		5. Bajri.					
		1924-25.		1923-24.		1922-23.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	27	28	29	30	31	32
<i>Gujarat.</i>							
1	Ahmedabad	149,685	46,776	137,252	21,504	165,371	34,963
2	Kaira	163,589	51,926	163,003	41,190	159,310	41,961
3	Panch Mahals	39,052	8,331	41,737	9,539	42,246	9,072
4	Broach	10,453	3,373	8,850	2,026	10,813	2,933
5	Surat	5,341	1,093	5,625	1,117	6,039	1,605
	<b>Total, Gujarat</b>	<b>368,120</b>	<b>111,499</b>	<b>356,467</b>	<b>75,376</b>	<b>384,679</b>	<b>90,584</b>
<i>Deccan.</i>							
6	West Khandesh	365,716	68,103	332,162	55,642	325,371	54,466
7	East Khandesh	299,595	37,983	309,083	43,741	320,666	40,799
8	Nasik	646,028	78,842	956,661	118,311	795,133	65,024
9	Ahmednagar	351,956	37,732	879,865	73,900	803,064	53,146
10	Poona	372,819	31,735	588,833	55,604	554,440	45,488
11	Sholapur	194,437	4,189	187,195	6,536	188,326	8,697
12	Satara	264,088	23,180	301,195	21,378	405,604	44,438
	<b>Total, Deccan</b>	<b>2,404,659</b>	<b>286,764</b>	<b>3,534,964</b>	<b>373,112</b>	<b>3,372,604</b>	<b>312,078</b>
<i>Karnatak.</i>							
13	Belgaum	119,335	20,573	149,147	11,127	120,247	12,506
14	Bijapur	175,331	10,413	299,634	14,312	133,630	6,379
15	Dharwar	8,734	1,462	9,475	962	7,029	1,569
	<b>Total, Karnatak</b>	<b>303,399</b>	<b>32,448</b>	<b>458,256</b>	<b>26,399</b>	<b>260,906</b>	<b>20,454</b>
<i>Konkan.</i>							
16	Thana	.....	.....	.....	.....	.....	.....
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	.....	.....	.....	.....	.....	.....
19	Ratnagiri	.....	.....	.....	.....	.....	.....
20	Kanara	.....	.....	.....	.....	.....	.....
	<b>Total, Konkan</b>	.....	.....	.....	.....	.....	.....
	<b>Total, Bombay Presidency</b>	<b>3,076,289</b>	<b>430,711</b>	<b>4,349,707</b>	<b>474,879</b>	<b>4,018,069</b>	<b>423,116</b>
<i>B.—SIND.</i>							
21	Karachi	14,906	3,511	11,871	3,066	12,412	1,773
22	Hyderabad	156,127	49,348	166,174	52,523	154,440	67,915
23	Thar Parkar	630,239	71,965	633,151	42,471	619,607	76,657
24	Nawabshah	121,378	29,699	116,111	32,062	121,842	26,087
25	Larkana	1,495	226	1,676	265	2,065	385
26	Sukkur	20,852	3,807	17,226	2,748	25,570	8,219
27	Upper Sind Frontier	53,731	90,103	76,691	11,298	89,665	19,220
	<b>Total, Sind</b>	<b>1,028,729</b>	<b>178,659</b>	<b>1,012,900</b>	<b>144,473</b>	<b>925,631</b>	<b>190,956</b>
	<b>Grand Total</b>	<b>4,105,018</b>	<b>609,370</b>	<b>5,362,607</b>	<b>619,352</b>	<b>4,943,700</b>	<b>613,372</b>

## OUTTURN—contd.

continued.						District.	Serial Number.
6 Bagl.							
1924-25.		1923-24.		1922-23.			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.		
33	34	35	36	37	38	3	1
						<b>Gujarat.</b>	
2,161	1,041	1,147	306	1,473	473	Ahmedabad	1
48,093	30,915	60,437	19,470	65,798	33,778	Kaira	2
20,586	11,966	19,933	10,925	19,901	12,562	Panch Mahals	3
175	94	167	47	267	115	Bromach	4
10,446	4,570	10,717	4,689	11,444	5,313	Surat	5
61,461	48,536	92,291	36,507	98,773	57,321	Total, Gujarat.	
						<b>Deccan.</b>	
11,053	4,441	15,585	4,175	11,794	3,554	West Khandesh	6
111,367	59,314	102,415	32,370	120,293	34,208	East Khandesh	7
21,578	8,571	20,955	5,573	24,167	9,711	Nasik	8
46,453	12,443	42,120	6,500	54,696	10,422	Ahmednagar	9
258	36	67	4	51	13	Poona	10
40,282	14,635	39,162	10,497	99,425	10,577	Sholapur	11
						Satara	12
331,011	79,740	320,234	61,119	330,317	68,485	Total, Deccan.	
						<b>Karnatak.</b>	
32,261	9,741	36,649	4,997	32,934	7,779	Belgaum	13
88	12	261	35	200	27	Bijapur	14
40,061	17,684	29,373	6,566	41,998	4,312	Dharwar	15
72,410	27,637	66,283	11,598	75,132	12,094	Total, Karnatak.	
						<b>Konkan.</b>	
43,739	12,536	44,583	12,779	46,672	14,711	Thana	16
51	18	51	18	58	16	Bombay Suburban	17
37,325	12,914	138,117	12,471	38,671	13,311	Kolaba	18
166,364	45,371	147,039	37,846	142,731	36,552	Retnagiri	19
2,139	1,051	2,111	806	2,338	1,112	Kanara	20
249,538	74,090	231,206	63,920	230,470	66,206	Total, Konkan.	
634,420	230,053	608,714	172,134	634,632	203,943	Total, Bombay Presi- dency.	
						<b>B.—SIND.</b>	
327	117	381	136	531	190	Karachi	21
5	1	2				Hyderabad	22
4	1			4	2	Thar Parkar	23
						Nawabshah	24
				1		Larkana	25
5	1	27	6	51	13	Sukkur	26
						Upper Sind Frontier.	27
341	120	410	141	537	204	Total, Sind.	
634,761	230,173	604,124	172,275	635,269	204,152	Grand Total.	



TABLE V-A—AREA AND

Serial Number. 1	District. 2	A—Cereals—					
		7. Maize.					
		1924-25.		1923-24.		1922-23.	
		Area in acres. 39	Outturn in tons. 40	Area in acres. 41	Outturn in tons. 42	Area in acres. 43	Outturn in tons. 44
<i>Gujarat.</i>							
1	Ahmedabad	4,357	1,804	4,646	1,867	4,957	1,631
2	Kaira	999	402	977	192	948	375
3	Panch Mahals	145,195	64,310	147,146	71,666	149,770	72,963
4	Broach	112	98	42	11	25	10
5	Surat	34	13	21	7	41	21
	Total, Gujarat	160,697	66,627	152,832	73,743	155,741	75,000
<i>Deccan.</i>							
6	West Khandesh	4,559	1,255	7,194	2,280	7,318	2,257
7	East Khandesh	414	120	737	178	1,192	446
8	Nasik	2,925	755	3,819	1,530	3,553	806
9	Ahmednagar	1,068	607	1,565	595	1,245	679
10	Poona	1,407	595	1,782	736	1,946	865
11	Sholsapur	8,672	4,121	10,021	4,644	9,521	5,141
12	Satara	10,192	3,622	9,491	2,717	9,735	3,210
	Total, Deccan	29,257	11,075	34,369	12,728	35,010	13,404
<i>Karnatak.</i>							
13	Belgaum	14,487	7,744	16,328	6,189	16,160	7,309
14	Bijapur	1,236	657	1,802	507	1,840	592
15	Dharwar	75	34	49	.....	70	18
	Total, Karnatak	15,800	8,435	18,179	6,696	18,070	7,919
<i>Konkan.</i>							
16	Thana	17	3	19	3	20	4
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	1	.....	.....	.....	.....	.....
19	Ratnagiri	.....	.....	.....	.....	.....	.....
20	Kanara	74	19	21	3	73	24
	Total, Konkan	92	22	40	6	93	28
	Total, Bombay Presidency	195,846	86,159	205,420	93,173	208,914	96,361
<i>B.—SIND.</i>							
21	Karachi	1,832	666	1,601	684	1,640	597
22	Hyderabad	259	78	140	28	161	71
23	Thar Parkar	444	172	659	294	1,233	550
24	Nawabshah	79	29	83	32	132	51
25	Larkana	.....	.....	.....	.....	.....	.....
26	Sukkur	1	.....	6	1	.....	.....
27	Upper Sind Frontier	10	3	29	11	24	6
	Total, Sind	2,625	950	2,517	950	3,190	1,275
	Grand Total	198,471	87,149	207,937	94,123	212,104	97,626

OUTTURN—*contd.*

<i>continued.</i>						District.	Serial Number.
8. Kodra.							
1924-25.		1923-24.		1922-23.			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	2	1
45	46	47	48	49	50		
						<b>Gujarat.</b>	
5,899	2,594	3,447	864	4,512	945	Ahmedabad	1
90,352	47,150	86,193	19,623	106,060	49,810	Kaira	2
31,933	10,170	25,028	9,989	24,405	12,311	Panch Mahals	3
5,442	2,705	5,608	883	6,385	3,008	Broach	4
11,106	5,181	11,177	3,968	13,578	6,165	Surat	5
134,592	68,100	131,358	35,317	155,840	72,240	Total, Gujarat.	
						<b>Deccan.</b>	
12,325	4,126	11,857	3,573	14,120	4,255	West Khandesh	6
.....	.....	.....	.....	.....	.....	East Khandesh	7
.....	.....	.....	.....	.....	.....	Nasik	8
74	24	52	7	59	.....	Ahmednagar	9
3,817	812	759	136	612	147	Poona	10
9	2	23	6	13	2	Solapur	11
19	6	30	7	41	10	Satara	12
16,244	4,970	12,720	3,729	14,851	4,414	Total, Deccan.	
						<b>Karnatak.</b>	
.....	.....	.....	.....	.....	.....	Belgaum	13
7	1	137	25	246	15	Bijapur	14
58	26	52	.....	397	80	Dharwar	15
65	27	189	25	643	95	Total, Karnatak.	
						<b>Konkan.</b>	
5,182	1,060	.....	.....	5,718	1,499	Thana	16
4,868	1,739	5,430	1,939	5,775	2,062	Bombay Suburban	17
57,484	14,471	60,538	10,647	63,084	17,084	Kolaba	18
.....	.....	.....	.....	.....	.....	Batnagiri	19
.....	.....	.....	.....	.....	.....	Kanara	20
57,534	17,220	65,968	12,586	74,577	20,645	Total, Konkan.	
218,435	90,317	210,235	51,657	245,911	97,394	Total, Bombay Presidency.	
						<b>B.—SIND.</b>	
.....	.....	.....	.....	.....	.....	Karachi	21
.....	.....	.....	.....	.....	.....	Hyderabad	22
.....	.....	.....	.....	.....	.....	Thar Parkar	23
.....	.....	.....	.....	.....	.....	Nawabshah	24
.....	.....	.....	.....	.....	.....	Larkana	25
.....	.....	.....	.....	.....	.....	Sukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
.....	.....	.....	.....	.....	.....	Total, Sind.	
218,435	90,317	210,235	51,657	245,911	97,394	Grand Total.	

TABLE V-A—AREA AND

		A—Cereals—					
Serial Number.	District.	9. Other Cereals.					
		1924-25.		1923-24.		1922-23.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	51	52	53	54	55	56
<i>Gujarat.</i>							
1	Ahmedabad ...	35,177	15,890	25,098	6,782	30,839	9,349
2	Kaira ...	7,964	3,914	8,426	1,734	11,034	4,130
3	Panch Mahals ...	29,563	17,195	31,676	15,965	32,925	18,962
4	Broach ...	351	173	51	10	101	28
5	Surat ...	924	339	1,152	494	1,442	797
	<b>Total, Gujarat ...</b>	<b>74,279</b>	<b>27,505</b>	<b>66,403</b>	<b>24,976</b>	<b>76,342</b>	<b>33,196</b>
<i>Deccan.</i>							
6	West Khandesh ...	23,348	7,103	26,977	7,868	27,059	7,377
7	East Khandesh ...	1,360	322	1,329	315	1,381	389
8	Nasik ...	27,944	7,433	22,075	6,622	26,188	7,775
9	Ahmednagar ...	16,985	5,865	30,529	5,814	35,521	9,924
10	Poona ...	28,786	5,398	30,666	5,722	29,591	7,531
11	Sholapur ...	2,691	558	10,465	4,019	3,892	907
12	Satara ...	51,877	16,127	48,135	10,246	54,865	15,270
	<b>Total, Deccan ...</b>	<b>153,491</b>	<b>42,804</b>	<b>170,225</b>	<b>40,607</b>	<b>178,537</b>	<b>49,013</b>
<i>Karnatak.</i>							
13	Belgaum ...	62,423	15,864	50,028	19,659	100,003	25,965
14	Bijapur ...	23,415	2,422	29,984	4,618	18,249	2,598
15	Dharwar ...	99,260	53,988	119,803	22,562	102,712	21,093
	<b>Total, Karnatak ...</b>	<b>185,098</b>	<b>72,274</b>	<b>209,815</b>	<b>47,038</b>	<b>220,964</b>	<b>49,656</b>
<i>Konkan.</i>							
16	Thana ...	13,291	5,193	18,445	5,642	13,375	5,921
17	Bombay Suburban ...	8	4	7	3	7	2
18	Kolaba ...	24,741	11,560	25,034	11,873	25,141	12,794
19	Ratnagiri ...	41,580	12,529	70,387	21,210	64,412	18,919
20	Kanara ...	23	11	34	15	44	24
	<b>Total, Konkan ...</b>	<b>79,643</b>	<b>29,296</b>	<b>113,907</b>	<b>38,543</b>	<b>102,979</b>	<b>37,653</b>
	<b>Total, Bombay Presidency ...</b>	<b>492,023</b>	<b>161,949</b>	<b>690,350</b>	<b>151,164</b>	<b>578,892</b>	<b>168,819</b>
<b>B.—SIND.</b>							
21	Karachi ...	34	12	34	13	65	23
22	Hyderabad ...	87	24	66	13	59	25
23	Thar Parkar ...	969	302	862	84	852	304
24	Nawabshah ...	647	146	436	143	2,000	596
25	Larkana ...	711	127	503	106	658	141
26	Sukkur ...	2,759	537	1,469	84	1,891	406
27	Upper Sind Frontier ...	4,210	1,645	4,041	946	3,946	896
	<b>Total, Sind ...</b>	<b>10,117</b>	<b>2,843</b>	<b>7,571</b>	<b>1,693</b>	<b>8,871</b>	<b>2,931</b>
	<b>Grand Total ...</b>	<b>502,140</b>	<b>164,792</b>	<b>597,921</b>	<b>162,857</b>	<b>587,693</b>	<b>171,809</b>

OUTTURN—contd.

concluded.						District.	Serial Number.
10. Total, Cereals.							
1924-25.		1923-24.		1922-23.			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.		
57	58	59	60	61	62	3	1
<b>Gujarat.</b>							
658,562	207,214	579,327	119,188	755,749	217,497	Ahmedabad	1
425,151	181,092	409,879	105,153	465,375	189,334	Kaira	2
363,923	149,509	355,425	137,976	376,464	171,664	Panch Mahals	3
174,321	56,759	178,906	37,406	196,334	60,037	Broach	4
206,063	86,862	226,606	90,313	247,789	112,491	Surat	5
<b>1,828,020</b>	<b>681,526</b>	<b>1,750,142</b>	<b>474,035</b>	<b>2,041,721</b>	<b>736,683</b>	<b>Total, Gujarat.</b>	
<b>Deccan.</b>							
774,560	189,459	704,299	156,051	705,930	152,856	West Khandesh	6
634,902	141,458	661,573	137,510	685,555	139,543	East Khandesh	7
1,433,517	252,449	1,392,507	222,860	1,372,973	174,660	Nasik	8
2,081,551	362,777	2,006,524	390,860	2,081,061	284,130	Ahmednagar	9
1,627,740	303,808	1,639,644	200,935	1,730,424	290,232	Poona	10
1,727,582	325,740	1,697,973	265,552	1,715,669	282,784	Sholapur	11
1,187,439	331,914	1,153,868	178,400	1,307,653	282,072	Satara	12
<b>9,473,321</b>	<b>1,907,805</b>	<b>9,255,758</b>	<b>1,412,573</b>	<b>9,419,664</b>	<b>1,632,327</b>	<b>Total, Deccan.</b>	
<b>Karnatak.</b>							
1,014,355	299,646	1,019,261	169,605	1,169,575	264,323	Belgaum	13
1,735,994	194,661	1,785,780	146,309	2,096,460	189,237	Bijapur	14
1,012,959	384,665	1,036,111	172,419	1,124,957	187,021	Dharwar	15
<b>3,763,308</b>	<b>678,972</b>	<b>3,481,132</b>	<b>488,333</b>	<b>4,390,992</b>	<b>640,581</b>	<b>Total, Karnatak.</b>	
<b>Konkan.</b>							
879,187	170,837	375,535	171,678	375,334	187,729	Thana	16
14,775	7,906	15,666	8,322	16,083	8,599	Bombay Suburban	17
336,957	170,183	337,109	169,937	338,233	186,963	Kolaba	18
617,476	236,264	626,074	301,794	614,458	222,638	Ratnagiri	19
170,467	76,783	166,306	80,540	164,398	84,451	Kanara	20
<b>1,611,862</b>	<b>660,963</b>	<b>1,590,593</b>	<b>632,278</b>	<b>1,509,104</b>	<b>690,460</b>	<b>Total, Konkan.</b>	
<b>16,676,981</b>	<b>4,028,186</b>	<b>16,267,624</b>	<b>3,007,234</b>	<b>17,361,381</b>	<b>3,888,951</b>	<b>Total, Bombay Presi- dency.</b>	
<b>B—SIND.</b>							
336,286	130,294	317,735	135,962	296,636	145,143	Karachi	21
478,228	148,903	462,204	148,038	454,972	185,545	Hyderabad	22
734,764	108,781	746,405	87,785	690,058	149,615	Thar Parkar	23
303,051	87,177	295,333	97,360	323,197	114,902	Nawabshah	24
683,354	236,155	692,376	219,394	595,182	268,217	Larkana	25
412,026	93,322	332,650	70,693	353,500	103,975	Sukkur	26
388,866	140,133	359,082	94,633	393,820	122,716	Upper Sind Frontier	27
<b>3,336,625</b>	<b>943,934</b>	<b>3,115,895</b>	<b>853,565</b>	<b>3,112,666</b>	<b>1,090,612</b>	<b>Total, Sind.</b>	
<b>18,913,606</b>	<b>4,472,190</b>	<b>19,483,500</b>	<b>3,860,859</b>	<b>20,474,045</b>	<b>4,779,563</b>	<b>Grand Total.</b>	

TABLE V-A—AREA AND

Serial Number.	District.	11. Tur.					
		1924-25.		1923-24.		1922-23.	
		Area in acres.	Output in tons.	Area in acres.	Output in tons.	Area in acres.	Output in tons.
1	2	63	64	65	66	67	68
<b>Gujarat.</b>							
2	Ahmedabad	9,055	300	1,247	77	3,299	551
3	Kaira	23,948	5,306	21,705	1,560	27,548	7,475
4	Panch-Mahals	7,957	1,688	7,809	895	9,551	2,431
5	Broach	10,109	2,143	9,858	1,011	11,780	2,761
	Surat	10,203	2,578	12,166	3,250	13,778	3,592
	<b>Total, Gujarat</b>	<b>58,272</b>	<b>12,015</b>	<b>52,885</b>	<b>5,793</b>	<b>66,056</b>	<b>15,790</b>
<b>Deccan.</b>							
6	West Khandesh	15,608	7,546	18,830	6,053	19,361	6,691
7	East Khandesh	37,237	12,017	34,096	10,037	34,323	9,807
8	Nasik	7,433	2,434	15,909	3,622	24,459	5,241
9	Ahmednagar	11,295	3,227	35,159	6,200	26,570	4,763
10	Poona	9,434	1,755	13,851	1,504	13,223	2,410
11	Ahmedpur	24,475	5,352	42,506	9,107	36,843	6,510
12	Satara	35,391	11,060	39,325	7,622	43,733	17,562
	<b>Total, Deccan</b>	<b>148,319</b>	<b>43,362</b>	<b>302,576</b>	<b>43,625</b>	<b>197,921</b>	<b>52,974</b>
<b>Karnatak.</b>							
13	Belgaum	49,066	17,524	48,693	8,695	48,590	15,617
14	Bijapur	35,093	3,351	47,398	5,136	32,300	3,405
15	Dharwar	44,835	18,014	50,725	9,068	40,584	10,598
	<b>Total, Karnatak</b>	<b>128,994</b>	<b>38,889</b>	<b>146,786</b>	<b>22,899</b>	<b>122,564</b>	<b>29,620</b>
<b>Konkan.</b>							
16	Thana	4,948	680	4,478	494	5,066	697
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	1,417	237	1,429	240	1,461	213
19	Ratnagiri	1,136	162	1,168	156	773	107
20	Kanara	20	2	35	4	46	5
	<b>Total, Konkan</b>	<b>7,521</b>	<b>1,081</b>	<b>7,110</b>	<b>894</b>	<b>7,386</b>	<b>1,022</b>
	<b>Total, Bombay Presidency</b>	<b>333,106</b>	<b>95,347</b>	<b>409,280</b>	<b>73,301</b>	<b>363,826</b>	<b>99,706</b>
<b>B.—SIND.</b>							
21	Karachi	.....	.....	.....	.....	.....	.....
22	Hyderabad	.....	.....	.....	.....	.....	.....
23	Thar Parkar	89	23	225	64	142	30
24	Nawabshah	.....	.....	.....	.....	.....	.....
25	Larkana	.....	.....	.....	.....	.....	.....
26	Sukkur	.....	.....	.....	.....	.....	.....
27	Upper Sind Frontier	.....	.....	.....	.....	.....	.....
	<b>Total, Sind</b>	<b>89</b>	<b>23</b>	<b>229</b>	<b>65</b>	<b>155</b>	<b>31</b>
	<b>Grand Total</b>	<b>333,195</b>	<b>95,370</b>	<b>409,509</b>	<b>73,366</b>	<b>363,981</b>	<b>99,737</b>

OUTTURN—contd.

19. Gram.						District.	Serial Number.
1924-25.		1923-24.		1922-23.			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.		
69	70	71	72	73	74	2	1
<i>Gujarat.</i>							
101,141	1,573	1,829	48	17,349	2,968	Ahmedabad	1
5,126	844	1,923	142	6,747	1,218	Kaira	2
55,881	16,219	52,218	6,702	67,530	16,582	Panch Mahals	3
1,534	389	252	18	1,886	374	Broach	4
1,773	296	1,579	232	2,335	487	Surat	5
64,465	19,321	37,801	6,142	96,847	21,619	Total, Gujarat.	
<i>Deccan.</i>							
22,182	4,264	22,270	5,804	33,545	6,048	West Khandesh	6
4,931	1,085	5,831	1,026	9,397	1,850	East Khandesh	7
101,470	15,441	69,322	11,973	78,146	10,410	Nasik	8
67,951	11,196	67,929	10,129	64,109	10,085	Ahmednagar	9
50,129	7,770	39,529	5,535	59,810	9,599	Poona	10
32,383	4,037	39,896	3,881	38,179	4,262	Sholapur	11
55,471	6,163	46,890	3,399	71,618	13,373	Satara	12
533,688	49,966	301,907	42,247	354,604	56,947	Total, Deccan.	
<i>Karnatak.</i>							
26,323	3,651	20,687	1,713	41,308	5,436	Belgaum	13
31,736	1,776	33,872	1,708	51,143	3,681	Bijapur	14
24,690	4,132	25,944	2,695	41,235	4,602	Dharwar	15
81,645	9,559	80,503	6,316	133,686	14,321	Total, Karnatak.	
<i>Konkan.</i>							
912	122	1,168	174	910	163	Thana	16
297	46	297	42	235	40	Bombay Suburban	17
36	4	72	10	100	12	Kolaba	18
316	45	238	31	411	59	Ratnagiri	19
						Kanara	20
1,560	217	1,775	260	1,706	274	Total, Konkan.	
501,558	79,063	422,186	54,965	586,043	92,491	Total, Bombay Presi- dency.	
<i>B-SIND.</i>							
1,033	85	397	35	365	33	Karachi	21
309	34	284	37	249	41	Hyderabad	22
637	73	488	64	572	86	Thar Parkar	23
13,344	1,619	11,401	2,148	17,618	2,517	Nawabshah	24
37,028	3,967	30,695	3,289	25,678	2,695	Larkana	25
71,063	7,374	51,099	7,674	48,571	7,247	Sukkur	26
116,487	99,914	108,107	22,901	108,890	93,688	Upper Sind Frontier	27
289,921	53,066	202,456	35,349	201,943	46,506	Total, Sind.	
741,479	132,119	624,642	90,313	737,966	138,697	Grand, Total.	

TABLE V-A—AREA AND

Serial Number.	District.	Pulses—					
		13. Other Pulses.					
		1924-25.		1923-24.		1922-23.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	75	76	77	78	79	80
<i>Gujarat.</i>							
1	Ahmedabad	30,547	4,644	23,167	2,611	37,054	4,565
2	Kaira	20,507	3,412	21,418	1,327	24,367	4,077
3	Panch Mahals	17,639	3,347	16,162	2,543	19,979	3,790
4	Broach	42,132	6,018	24,838	2,428	46,184	12,103
5	Surat	15,277	3,451	14,910	3,128	18,814	4,258
	<b>Total, Gujarat</b>	<b>126,102</b>	<b>20,872</b>	<b>100,495</b>	<b>12,047</b>	<b>146,388</b>	<b>28,793</b>
<i>Deccan.</i>							
6	West Khandesh	90,204	20,892	96,732	19,748	87,042	17,851
7	East Khandesh	225,506	33,524	222,550	33,085	217,315	33,940
8	Nasik	147,229	24,093	157,508	29,602	157,445	22,364
9	Ahmednagar	51,854	8,066	106,153	11,963	94,139	18,378
10	Poona	45,893	5,561	62,395	6,350	62,546	9,095
11	Sholapur	17,910	1,800	24,900	2,252	24,003	2,108
12	Satara	98,338	15,289	95,450	9,897	101,680	18,906
	<b>Total, Deccan</b>	<b>676,964</b>	<b>109,215</b>	<b>794,688</b>	<b>112,897</b>	<b>744,092</b>	<b>123,132</b>
<i>Karnatak.</i>							
13	Belgaum	118,883	18,755	115,586	11,628	83,223	15,813
14	Bijapur	58,775	4,388	79,081	5,972	51,495	4,184
15	Dharwar	129,489	24,412	133,552	13,420	114,158	13,759
	<b>Total, Karnatak</b>	<b>307,147</b>	<b>46,555</b>	<b>328,219</b>	<b>31,020</b>	<b>248,879</b>	<b>33,756</b>
<i>Konkan.</i>							
16	Thana	12,575	1,684	12,526	1,863	13,318	2,127
17	Bombay Suburban	1	.....	1	.....	5	1
18	Kolaba	4,638	812	4,508	829	4,705	905
19	Ratnagiri	49,876	5,261	47,540	5,172	51,076	6,032
20	Kanara	5,337	765	5,279	720	5,493	807
	<b>Total, Konkan</b>	<b>72,397</b>	<b>9,122</b>	<b>69,854</b>	<b>8,584</b>	<b>77,597</b>	<b>9,972</b>
	<b>Total, Bombay Presidency</b>	<b>1,182,650</b>	<b>185,764</b>	<b>1,293,256</b>	<b>164,548</b>	<b>1,216,903</b>	<b>196,563</b>
<i>B.—SIND.</i>							
21	Karachi	29,564	3,323	26,204	2,437	24,417	3,230
22	Hyderabad	5,550	845	5,859	991	6,559	1,217
23	Thar Parkar	2,910	220	2,255	156	4,426	545
24	Nawabshah	25,888	2,872	22,644	4,479	10,501	1,756
25	Larkana	180,759	26,226	171,097	24,824	173,385	25,475
26	Sukkur	34,154	3,831	32,992	5,208	37,081	7,103
27	Upper Sind Frontier	42,244	8,187	44,290	6,169	48,959	5,946
	<b>Total, Sind</b>	<b>322,178</b>	<b>45,504</b>	<b>305,941</b>	<b>44,264</b>	<b>300,828</b>	<b>45,270</b>
	<b>Grand Total</b>	<b>1,504,788</b>	<b>231,268</b>	<b>1,598,597</b>	<b>206,812</b>	<b>1,517,931</b>	<b>240,823</b>

OUTTURN—*contd.*

<i>concluded.</i>						District.	Serial Number.
14. Total, Pulses.							
1924-25.		1923-24.		1922-23.			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.		
81	82	83	84	85	86	9	1
<i>Gujarat.</i>							
43,743	6,517	26,343	2,736	57,702	8,104	Ahmedabad	1
49,591	9,568	45,046	3,039	58,752	12,750	Kaira	2
91,477	21,354	56,189	9,140	97,060	22,803	Panch Mahals	3
53,775	8,550	34,948	3,457	59,850	15,238	Broach	4
27,353	6,325	28,675	5,610	34,927	8,337	Surat	5
263,639	52,908	181,101	23,983	308,291	67,232	Total, Gujarat.	6
<i>Deccan.</i>							
129,994	32,692	147,832	31,605	139,848	30,590	West Khandesh	6
267,884	46,826	263,477	44,138	260,935	45,597	East Khandesh	7
256,434	42,015	273,739	45,197	260,040	38,015	Nasik	8
130,430	22,509	208,241	28,382	184,827	33,716	Ahmednagar	9
105,456	15,087	117,075	13,369	135,579	21,394	Poona	10
74,773	11,069	107,242	15,240	118,525	12,900	Sholapur	11
189,200	32,512	181,565	20,818	217,010	49,341	Satara	12
1,164,171	202,533	1,299,171	198,769	1,286,764	232,053	Total, Deccan.	
<i>Karnatak.</i>							
193,178	39,930	185,136	22,036	173,111	37,268	Belgaum	13
125,604	10,115	160,351	12,816	135,941	10,470	Bijapur	14
199,004	45,538	210,221	25,373	196,077	29,259	Dharwar	15
617,786	95,603	655,708	60,225	605,129	76,997	Total, Karnatak.	
<i>Konkan.</i>							
16,435	2,486	15,172	2,531	19,294	2,987	Thana	16
1	.....	1	.....	5	1	Bombay Suburban	17
6,353	1,065	6,234	1,111	6,391	1,158	Kolaba	18
51,048	5,027	49,790	5,338	54,948	6,151	Ratnagiri	19
5,642	812	5,552	758	5,950	871	Kanara	20
81,478	10,420	78,739	9,738	86,588	11,168	Total, Konkan.	
2,017,274	360,764	2,124,719	292,714	2,196,772	387,450	Total Bombay Presidency.	
<i>B—SIND.</i>							
30,597	3,408	26,591	2,472	24,782	3,263	Karachi	21
5,923	879	6,143	1,028	6,908	1,258	Hyderabad	22
3,656	516	2,963	264	5,140	658	Thar Parkar	23
39,232	4,491	34,049	5,628	24,132	4,274	Nawabshah	24
217,767	30,193	201,792	28,115	199,063	28,370	Larkana	25
105,217	11,205	84,091	12,782	85,652	14,850	Sukkur	26
158,731	48,101	152,997	28,370	152,848	39,634	Upper Sind Frontier	27
562,168	98,593	508,026	79,677	602,426	91,507	Total, Sind.	
2,679,463	459,357	2,632,745	372,321	2,699,198	479,257	Grand Total.	



TABLE V-A.—AREA AND OUTTURN—concl'd.

Serial Number.	District.	15. Total, Cereals and Pulses.					
		1924-25.		1923-24.		1922-23.	
		Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.
1	2	87	88	89	90	91	92
<i>Gujarat.</i>							
1	Ahmedabad	701,805	213,731	606,570	115,924	813,451	225,601
2	Kaira	473,742	190,654	454,925	196,192	524,127	196,584
3	Panch Mahals	455,400	170,563	411,614	147,116	473,524	194,467
4	Broach	228,066	65,309	213,853	30,862	256,184	65,335
5	Surat	233,316	93,277	255,281	95,923	282,726	120,328
	<b>Total, Gujarat</b>	<b>2,091,559</b>	<b>733,734</b>	<b>1,941,243</b>	<b>498,017</b>	<b>2,350,013</b>	<b>602,615</b>
<i>Deccan.</i>							
6	West Khandesh	904,554	222,151	852,191	187,656	845,778	183,446
7	East Khandesh	902,786	186,084	925,015	181,748	946,790	195,140
8	Nasik	1,895,951	294,467	1,666,246	265,937	1,573,013	212,665
9	Ahmednagar	2,211,061	565,285	2,214,765	299,242	2,263,888	317,906
10	Poona	1,733,196	218,895	1,756,799	214,224	1,556,003	311,626
11	Sholapur	1,802,355	336,523	1,804,515	271,102	1,814,193	295,634
12	Satara	1,376,639	364,426	1,335,423	199,218	1,424,663	347,913
	<b>Total, Deccan</b>	<b>10,627,462</b>	<b>2,010,138</b>	<b>10,654,929</b>	<b>1,611,347</b>	<b>10,716,323</b>	<b>1,854,380</b>
<i>Karnatak.</i>							
13	Belgaum	1,208,033	333,576	1,204,397	191,641	1,342,686	301,691
14	Bijapur	1,861,598	204,976	1,946,111	169,125	2,232,401	199,707
15	Dharwar	1,211,963	430,123	1,246,332	197,792	1,321,034	216,250
	<b>Total, Karnatak</b>	<b>4,281,594</b>	<b>973,675</b>	<b>4,396,840</b>	<b>548,558</b>	<b>4,896,121</b>	<b>717,678</b>
<i>Konkan.</i>							
16	Thana	390,622	173,323	393,707	174,309	394,628	190,716
17	Bombay Suburban	14,776	7,906	15,567	8,329	16,088	8,600
18	Kolaba	943,309	171,263	843,343	171,048	844,624	188,141
19	Ratnagiri	668,524	242,311	674,354	207,132	669,406	228,849
20	Kanara	176,109	76,600	171,260	81,293	170,946	85,322
	<b>Total, Konkan</b>	<b>1,593,340</b>	<b>671,408</b>	<b>1,599,331</b>	<b>642,016</b>	<b>1,596,692</b>	<b>701,628</b>
	<b>Total, Bombay Presidency</b>	<b>18,594,255</b>	<b>4,368,950</b>	<b>18,492,343</b>	<b>3,269,933</b>	<b>19,558,153</b>	<b>4,076,401</b>
<i>B.—SIND.</i>							
21	Karachi	366,803	133,802	344,326	138,434	321,418	148,405
22	Hyderabad	485,196	149,781	468,347	149,066	461,780	186,803
23	Thar Parkar	735,420	109,097	749,368	89,069	695,198	150,273
24	Nawabshah	342,313	91,669	329,382	108,888	356,329	119,076
25	Larkana	901,141	266,348	604,068	247,507	794,245	297,187
26	Sukkur	517,243	103,597	416,941	68,475	439,462	118,325
27	Upper Sind Frontier.	547,597	148,294	511,479	122,903	646,669	162,350
	<b>Total, Sind</b>	<b>3,898,713</b>	<b>1,042,527</b>	<b>3,623,911</b>	<b>933,342</b>	<b>3,615,091</b>	<b>1,182,419</b>
	<b>Grand Total</b>	<b>22,492,968</b>	<b>5,431,477</b>	<b>22,116,254</b>	<b>4,233,280</b>	<b>23,173,244</b>	<b>6,258,820</b>

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TABLE VI—PRICES  
1924-25

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TABLE VI—

Prices (prevailing at harvest time) of Staple Articles  
each district of the Bombay Presi

No.	District.	Rate per rupee in					
		Jowari.	Bajri.	Wheat.	Rice.	Nachni (Ragi).	Gram.
<i>Gujarat.</i>		Seers.	Seers.	Seers.	Seers.	Seers.	Seers.
1	Ahmedabad	9.19	7.50	4.88	4.50	.....	7.13
2	Kaira	.....	9.56	4.50	3.50	16.00	5.50
3	Panch Mahals (Gadhra)	12.38*	7.75	5.19	4.75	.....	10.44
4	Broach	7.44	7.50	5.25	5.00	.....	6.75
5	Surat	6.56	7.56	5.59	3.69	.....	8.13
	Average	8.89	7.97	5.10	4.29	16.00	7.99
<i>Deccan.</i>							
6	West Khandesh (Dhulia)	9.81	7.25	5.06	4.38	.....	8.25
7	East Khandesh (Jalgaon)	8.94	7.19	5.31	4.31	.....	9.31
8	Nasik	.....	7.19	5.81	4.63	9.69	9.81
9	Ahmednagar	7.81	6.63	5.26	4.91	.....	9.19
10	Poona	6.88	7.19	4.94	4.31	.....	7.56
11	Sholapur	8.63	8.25	5.50	5.13	.....	8.44
12	Satara	6.06	6.56	5.25	4.94	.....	7.36
	Average	8.02	7.18	5.30	4.66	9.69	8.42
<i>Karnatak.</i>							
13	Belgaum	6.75	6.31	4.19	5.25	9.19	7.56
14	Bijapur	7.94	7.68	4.38	4.88	.....	6.75
15	Dharwar	7.94	6.94	4.75	5.44	.....	7.69
	Average	7.54	7.04	4.44	5.19	9.19	8.00
<i>Konkan.</i>							
16	Thana	.....	6.50	4.19	5.50	.....	6.68
17	Kolaba (Alibag)	.....	.....	3.69	4.81	.....	7.36
18	Ratnagiri	.....	6.63	4.44	6.00	8.56	7.99
19	Kanara (Karwar)	5.19	.....	4.63	5.44	7.36	7.36
	Average	5.19	6.56	4.24	5.19	7.97	7.33
<i>Sind.</i>							
20	Karachi	9.63	8.19	5.56	5.31	.....	8.50
21	Hyderabad	8.38	8.38	5.69	4.88	.....	6.94
22	Thar & Parkar (Mirpurkhas)	.....	9.31	5.88	5.44	.....	5.00
23	Nawabshah	10.69	9.69	6.19	4.50	.....	10.00
24	Larkana	9.19	8.75	5.94	6.00	.....	8.13
25	Sukkur	9.81	9.63	5.00	3.88	.....	8.36
26	Upper Sind Frontier (Jacobabad)	9.94	10.00	6.00	4.00	.....	6.69
	Average	9.61	9.14	5.89	4.86	.....	7.88

Note.—In the case of Sind, rates for muggal are shown in place of turdal.

\* For maize.

## PRICES.

and of Fodder at the Headquarter Station of  
dency (including Sind), during 1924-25.

seers of 80 Tolas.				Price per Indian Maund of 3,200 Tolas.		District.	No.
Turdal.	Gul.	Tobacco.	Cotton cleaned.	Dry Grass.	Jowari Kadbi.		
Seers.	Seers.	Seers.	Seers.	Rs. a. p.	Rs. a. p.	<i>Gujarat.</i>	
5-13	3-00	1-00	0-75	1 9 7	0 14 8	Ahmedabad	1
5-25	3-69	1-50	0-81	.....	1 0 0	Kaira	2
5-31	3-75	1-50	0-94	0 13 10	.....	Panch Mahals (Go- dhra)	3
5-30	3-75	2-25	0-81	2 0 0	2 6 5	Broach	4
4-19	3-00	1-38	0-63	2 5 5	1 9 7	Surat	5
5-07	3-24	1-53	0-79	1 12 3	1 11 8	Average.	
						<i>Deccan.</i>	
6-00	3-44	2-00	0-88	3 13 8	.....	West Khandesh (Dhu- lia)	6
5-56	2-61	2-00	1-00	1 8 0	1 10 8	East Khandesh (Jal- gaon)	7
4-81	3-25	1-44	.....	1 8 0	.....	Nasik	8
5-94	3-69	1-75	.....	.....	1 0 4	Ahmednagar	9
4-69	3-06	1-44	.....	2 0 10	1 9 10	Poona	10
5-69	3-00	1-00	.....	.....	2 3 8	Sholapur	11
5-69	2-81	1-38	.....	1 0 0	2 0 0	Satara	12
5-45	3-15	1-57	0-94	1 15 7	1 11 4	Average.	
						<i>Karnatak.</i>	
5-88	3-31	1-06	.....	0 14 8	.....	Belgaum	13
6-36	3-25	1-18	.....	.....	1 11 0	Bijapur	14
5-81	3-69	1-00	0-81	0 13 9	0 13 3	Dharwar	15
6-02	3-42	1-06	0-81	0 13 8	1 3 7	Average.	
						<i>Konkan.</i>	
4-68	3-13	2-00	.....	.....	0 10 8	Thana	16
4-63	2-81	1-06	.....	.....	.....	Kolaba (Alibag)	17
4-75	3-81	1-38	.....	0 12 4	1 13 9	Ratnagiri	18
4-50	3-38	0-69	.....	.....	0 15 3	Kanara (Karwar)	19
4-69	2-91	1-28	.....	0 12 4	1 2 7	Average.	
						<i>Sind.</i>	
6-25	3-63	1-44	1-13	2 11 7	.....	Karachi	20
5-56	4-19	2-00	0-88	1 2 2*	1 2 3	Hyderabad	21
5-00	3-88	1-00	0-88	1 1 1*	.....	Thar & Parkar (Mir- purkhas)	22
3-50	3-50	1-00	.....	0 15 5*	1 0 3	Nawabshah	23
5-00	3-75	2-00	0-81	.....	1 0 9	Larkana	24
5-50	4-13	5-44	0-94	.....	0 14 0	Sukkur	25
5-38	3-50	.....	0-88	0 12 0	0 9 9	Upper Sind Frontier (Jacobabad)	26
6-17	3-80	2-31	0-92	1 5 3	0 15 0	Average.	

\* For Bajri straw.

Note.—In Konkan, rates for rice straw are shown in place of jowar kadbi.

TABLE VII—  
Agricultural stock in each district of the Bombay Presidency  
cattle census held in January

No.	District.	Catt					
		Plough					
		Ox					
		Castrated.			Entire.		
	Reported.	Estimated.	Total.	Reported.	Estimated.	Total.	
1	2	3	4	5	6	7	8
	<i>Gujarat.</i>	Nos.	Nos.	Nos.	Nos.	Nos.	Nos.
1	Ahmedabad	104,675	5,364	110,039	7,564	323	7,906
2	Kaira	94,867	9,007	103,874	329	60	389
3	Panch Mahals	102,058	19,447	121,506	4,822	1,130	5,952
4	Broach	55,541	1,403	56,944	50	1	51
5	Surat	109,257	2,645	111,902	478	23	501
	<b>Total, Gujarat</b>	<b>466,398</b>	<b>88,066</b>	<b>554,464</b>	<b>13,263</b>	<b>1,536</b>	<b>14,799</b>
	<i>Deccan.</i>						
6	West Khandesh	162,262	1,736	164,048	2,920	49	2,962
7	East Khandesh	212,675	.....	212,675	5,094	.....	5,094
8	Nasik	192,682	1,558	194,235	20,916	36	20,952
9	Ahmednagar	166,116	1,928	168,039	31,442	348	31,790
10	Poona	160,914	2,607	163,521	43,766	668	44,434
11	Sholapur	97,215	2,294	99,509	37,802	1,015	38,527
12	Satara	146,906	9,564	156,370	39,675	2,282	41,957
	<b>Total, Deccan</b>	<b>1,158,870</b>	<b>19,727</b>	<b>1,178,597</b>	<b>181,615</b>	<b>4,391</b>	<b>186,006</b>
	<i>Karnatak.</i>						
13	Belgaum	135,330	4,554	139,784	16,996	973	17,969
14	Bijapur	119,316	265	119,581	13,718	80	13,798
15	Dharwar	165,952	4,976	170,929	21,366	616	21,972
	<b>Total, Karnatak</b>	<b>420,498</b>	<b>9,695</b>	<b>430,193</b>	<b>52,070</b>	<b>1,618</b>	<b>53,688</b>
	<i>Konkan.</i>						
16	Thana	122,384	2,751	125,135	17,607	418	18,325
17	Bombay Suburban	5,345	625	5,970	407	56	463
18	Bombay City	81	.....	81	20	.....	20
19	Kolaba	62,405	4,481	66,886	13,333	553	13,886
20	Ratnagiri	311,090	6,042	317,132	37,844	1,564	39,398
21	Kanara	70,332	.....	70,332	6,536	.....	6,536
	<b>Total, Konkan</b>	<b>491,637</b>	<b>18,899</b>	<b>505,536</b>	<b>76,046</b>	<b>2,580</b>	<b>78,626</b>
	<b>Total Bombay Presi- dency</b>	<b>2,637,208</b>	<b>81,367</b>	<b>2,618,590</b>	<b>323,994</b>	<b>10,125</b>	<b>333,119</b>
	<i>SIND.</i>						
22	Karachi	15,394	1,427	16,721	25,115	5,781	30,886
23	Hyderabad	14,998	27	15,025	71,706	34	71,739
24	Thar Parkar	60,748	3,674	64,422	1,417	1,225	2,642
25	Nawabshah	106,091	2,056	110,147	1,820	191	2,011
26	Larkana	66,139	1,894	68,033	46,212	1,291	47,503
27	Sukkur	87,694	595	88,289	3,420	20	3,440
28	Upper Sind Frontier	45,162	37	45,199	15,893	.....	15,893
	<b>Total, Sind</b>	<b>398,126</b>	<b>9,710</b>	<b>407,836</b>	<b>166,622</b>	<b>8,542</b>	<b>174,064</b>
	<b>Grand Total</b>	<b>2,935,329</b>	<b>91,067</b>	<b>3,026,426</b>	<b>488,516</b>	<b>18,667</b>	<b>507,183</b>

AGRICULTURAL STOCK.  
including Sind as ascertained at the quinquennial  
1925.

cattle.						District.	No.
Total oxen.			He-buffaloes.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
9	10	11	12	13	14	2	1
Nos.	Nos.	Nos.	Nos.	Nos.	Nos.		
112,269	5,666	117,945	230	9	239	<i>Gujarat.</i>	
95,196	9,067	104,263	20	7	27	Ahmedabad	1
106,580	20,577	127,157	17	2	19	Kaira	2
55,591	1,404	56,995	7	4	11	Panch Mahals	3
109,735	2,668	112,403	2,903	34	2,937	Broach	4
						Surat	5
479,661	39,602	519,263	3,077	56	3,133	Total, Gujarat.	
						<i>Deccan.</i>	
165,192	1,828	167,010	1,265	7	1,272	West Khandesh	6
217,769		217,769	303		303	East Khandesh	7
213,596	1,689	215,187	11,973	233	12,206	Nasik	8
217,556	2,271	219,827	2,458	7	2,465	Ahmednagar	9
204,680	3,275	207,955	2,466	66	2,532	Poona	10
135,017	3,309	138,326	1,182	39	1,221	Sholapur	11
186,481	11,846	198,327	7,178	756	7,934	Satara	12
1,340,285	24,118	1,364,403	25,832	1,108	27,940	Total, Deccan.	
						<i>Karnatak.</i>	
162,226	5,626	167,852	13,167	1,160	14,327	Belgaum	13
133,034	296	133,329	763	4	767	Bijapur	14
167,308	5,492	192,800	7,687	165	7,852	Dharwar	15
472,568	11,413	483,981	21,617	1,329	22,946	Total, Karnatak.	
						<i>Konkan.</i>	
140,291	3,169	143,460	31,147	831	31,978	Thana	16
5,752	680	6,432	594	124	718	Bombay Suburban	17
101		101	20		20	Bombay City	18
95,738	5,034	100,772	33,678	1,893	35,571	Kolaba	19
248,934	7,596	256,530	26,998	968	27,966	Ratnagiri	20
76,667		76,667	18,197		18,197	Kanara	21
667,683	16,479	684,162	110,634	8,816	119,450	Total, Konkan	
2,850,197	91,512	2,941,709	162,050	6,809	168,859	Total, Bombay Presidency.	
						<i>Sind.</i>	
40,409	7,208	47,617	5		5	Karachi	22
86,703	61	86,764	193	6	199	Hyderabad	23
62,165	4,899	67,064	132	60	192	Thar Parkar	24
109,911	2,247	112,158	13		13	Nawabshah	25
112,351	3,185	115,536	128	4	132	Larkana	26
91,114	615	91,729	25	1	26	Sukkur	27
60,935	37	61,032	18		18	Upper Sind Frontier	28
563,648	18,252	581,900	504	71	575	Total, Sind.	
3,423,845	100,764	3,524,609	162,664	6,380	169,044	Grand Total.	

TABLE VII—

No.	District.	Cattle—					
		Plough cattle—concid.			Bulls for Breed		
		Total plough cattle.			Bulls.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
		15	16	17	18	19	20
		Nos.	Nos.	Nos.	Nos.	Nos.	Nos.
	<i>Gujarat.</i>						
1	Ahmedabad	112,489	5,635	118,124	1,338	46	1,384
2	Kaira	95,216	9,074	104,290	248	28	276
3	Panch Mahals	106,897	20,579	127,476	285	33	319
4	Broach	55,588	1,408	57,006	98	1	99
5	Surat	112,538	2,902	115,440	237	4	241
	<b>Total, Gujarat</b>	<b>482,738</b>	<b>39,558</b>	<b>622,296</b>	<b>2,207</b>	<b>111</b>	<b>2,318</b>
	<i>Deccan.</i>						
6	West Khandesh	166,447	1,835	168,282	1,997	9	2,006
7	East Khandesh	218,072		218,072	3,318		3,318
8	Nasik	225,571	1,822	227,393	5,926	183	5,408
9	Ahmednagar	220,016	2,278	222,294	337	6	343
10	Poona	207,146	3,341	210,487	747	2	749
11	Sholapur	136,206	3,348	139,554	586	5	601
12	Satara	193,659	12,602	206,261	420	25	445
	<b>Total, Deccan</b>	<b>1,367,117</b>	<b>25,226</b>	<b>1,392,343</b>	<b>12,641</b>	<b>228</b>	<b>12,664</b>
	<i>Karnatak.</i>						
13	Belgaum	165,398	6,686	172,084	774	21	795
14	Bijapur	133,797	299	134,096	771	1	772
15	Dharwar	194,995	5,697	200,692	1,167	140	1,307
	<b>Total, Karnatak</b>	<b>494,090</b>	<b>12,682</b>	<b>506,772</b>	<b>2,712</b>	<b>162</b>	<b>2,674</b>
	<i>Konkan.</i>						
16	Tbana	171,438	4,000	175,438	1,438	6	1,444
17	Bombay Suburban	6,346	804	7,150	190	15	206
18	Bombay City	121		121	160		160
19	Kolaba	129,416	6,927	136,343	235	7	242
20	Ratnagiri	275,932	8,564	284,496	1,150	100	1,350
21	Kanara	95,064		95,064	489		489
	<b>Total, Konkan</b>	<b>678,317</b>	<b>20,295</b>	<b>698,612</b>	<b>3,662</b>	<b>129</b>	<b>3,791</b>
	<b>Total, Bombay Presi-</b>	<b>3,022,257</b>	<b>97,821</b>	<b>3,120,078</b>	<b>21,222</b>	<b>625</b>	<b>21,847</b>
	<i>Sind.</i>						
22	Karachi	40,414	7,206	47,620	1,608	259	1,867
23	Hyderabad	86,896	67	86,963	6,733	21	5,754
24	Tbar Parkar	62,287	4,959	67,246	1,006	1,144	2,150
25	Nawabshah	109,924	2,247	112,171	2,434	98	2,532
26	Larkana	112,479	3,189	115,668	637	12	649
27	Sukkur	91,139	616	91,755	798		798
28	Upper Sind Frontier	61,013	37	61,050	6		6
	<b>Total, Sind</b>	<b>664,162</b>	<b>18,323</b>	<b>682,485</b>	<b>12,221</b>	<b>1,534</b>	<b>13,756</b>
	<b>Grand Total</b>	<b>9,686,409</b>	<b>116,144</b>	<b>9,802,553</b>	<b>38,443</b>	<b>2,159</b>	<b>36,602</b>

AGRICULTURAL STOCK—*contd.*

<i>continued.</i>						District.	No.
purposes.							
Bull-buffaloes.			Total for breeding purposes.			2	1
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
21	22	23	24	25	26		
Nos.	Nos.	Nos.	Nos.	Nos.	Nos.	Gujarat.	
711	53	764	2,049	98	2,147	Ahmedabad	1
800	73	873	1,048	101	1,149	Kaira	2
340	79	419	626	112	738	Panch Mahals	3
231	5	236	329	6	335	Brosch	4
312	11	323	549	15	564	Surat	5
2,394	221	2,615	4,601	332	4,933	Total, Gujarat.	
						Deccan.	
519	1	519	2,515	4	2,519	West Khandesh	6
945		945	4,264		4,264	East Khandesh	7
412	8	420	5,828	190	6,018	Nasik	8
213	2	215	550	6	556	Ahmednagar	9
271	2	273	1,018	4	1,022	Poona	10
273	1	274	869	6	875	Sholapur	11
356	18	374	776	43	819	Satara	12
2,989	32	3,021	15,630	255	15,885	Total, Deccan.	
						Karnatak.	
398	10	408	1,162	31	1,193	Belgaum	13
315	1	316	1,086	2	1,088	Bijapur	14
489	19	508	1,556	159	1,715	Darwar	15
1,192	30	1,222	3,804	192	4,096	Total, Karnatak.	
						Konkan.	
798		798	2,236	6	2,242	Thana	16
69	10	79	249	26	275	Bombay Suburban	17
125		125	285		285	Bombay City	18
202		202	437	7	444	Kolaba	19
638	6	644	1,738	106	1,844	Ratnagiri	20
179		179	668		668	Kanara	21
2,001	16	2,017	5,663	145	5,808	Total, Konkan.	
8,576	299	8,875	29,798	924	30,722	Total, Bombay Presidency.	
						Sind.	
2,358	293	2,651	3,966	552	4,518	Karachi	22
3,394	37	3,431	9,127	58	9,185	Hyderabad	23
410	327	737	1,416	1,471	2,887	Thar Parkar	24
226	37	263	2,760	135	2,895	Nawabshah	25
574	38	612	1,211	50	1,261	Larkana	26
260		260	1,058		1,058	Sukkur	27
			5		5	Upper Sind Frontier	28
7,322	736	8,058	19,543	2,266	21,809	Total, Sind.	
15,898	1,031	16,929	49,341	3,190	52,531	Grand Total.	



TABLE VII—AGRICULTURAL STOCK

		Cattle					
		Cattle for other purposes.					
No.	District.	Oxen.			He-buffaloes.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	27	28	29	30	31	32
	<i>Gujarat.</i>	Nos.	N s.	Nos.	Nos.	Nos.	Nos.
1	Ahmedabad	4,823	184	5,007	451	70	521
2	Kaira	909	50	959	62	.....	62
3	Panch Mahals	294	5	299	52	3	55
4	Broach	1,130	7	1,137	23	.....	23
5	Surat	7,543	31	7,574	102	5	107
	<b>Total, Gujarat</b>	<b>14,699</b>	<b>277</b>	<b>14,976</b>	<b>690</b>	<b>78</b>	<b>768</b>
	<i>Deccan.</i>						
6	West Khandesh	7,258	13	7,270	365	2	367
7	East Khandesh	19,000	.....	19,000	1,345	.....	1,345
8	Nasik	7,659	66	7,725	427	1	428
9	Ahmednagar	5,556	2	5,558	302	5	307
10	Poona	4,907	20	4,927	373	2	375
11	Sholapur	3,065	19	3,104	969	25	994
12	Satara	1,804	182	1,986	468	27	495
	<b>Total, Deccan</b>	<b>49,169</b>	<b>301</b>	<b>49,470</b>	<b>4,249</b>	<b>62</b>	<b>4,311</b>
	<i>Karnatak.</i>						
13	Belgaum	2,746	29	2,775	509	6	515
14	Bijapur	2,239	1	2,240	676	2	678
15	Dharwar	4,682	62	4,744	715	12	727
	<b>Total, Karnatak</b>	<b>9,667</b>	<b>92</b>	<b>9,659</b>	<b>1,900</b>	<b>20</b>	<b>1,920</b>
	<i>Konkan.</i>						
16	Tnana	2,231	55	2,286	367	2	369
17	Bombay Suburban	1,876	363	2,239	228	54	282
18	Bombay City	22,270	.....	22,270	317	.....	317
19	Kolaba	3,119	34	3,153	306	3	309
20	Ratnagiri	1,766	1	1,767	579	1	580
21	Kanara	4,742	.....	4,742	1,561	.....	1,561
	<b>Total, Konkan</b>	<b>36,003</b>	<b>453</b>	<b>36,456</b>	<b>3,358</b>	<b>60</b>	<b>3,418</b>
	<b>Total, Bombay Presidency</b>	<b>106,438</b>	<b>1,123</b>	<b>110,561</b>	<b>10,197</b>	<b>220</b>	<b>10,417</b>
	<i>Sind.</i>						
22	Karachi	4,919	20	4,939	186	37	223
23	Hyderabad	19,179	.....	19,179	169	91	260
24	Thar Parkar	3,323	5,871	9,194	209	866	1,064
25	Nawabshah	1,502	115	1,617	2	.....	2
26	Larkana	2,325	178	2,503	352	30	382
27	Sukkur	2,021	.....	2,021	44	.....	44
28	Upper Sind Frontier	2,583	.....	2,583	145	.....	145
	<b>Total, Sind</b>	<b>35,852</b>	<b>6,184</b>	<b>42,036</b>	<b>1,109</b>	<b>1,013</b>	<b>2,122</b>
	<b>Grand Total</b>	<b>146,290</b>	<b>7,307</b>	<b>153,597</b>	<b>11,306</b>	<b>1,233</b>	<b>12,539</b>

—contd.

—continued.						District.	No.
Milch-cattle.							
Cows.			She-buffaloes.			District.	No.
Reported.	Estimated.	Total	Reported.	Estimated.	Total.		
33	34	35	36	37	38	2	1
Nos.	Nos.	Nos.	Nos.	Nos.	Nos.	Gujarat.	
92,297	4,862	97,159	95,446	4,960	100,428	Ahmedabad	1
27,956	3,318	31,274	102,741	10,341	113,082	Kaira	2
68,361	14,565	82,946	36,465	6,595	43,050	Panch Mahals	3
11,021	208	11,229	27,662	614	28,276	Brosch	4
66,045	1,450	67,495	52,399	1,718	54,117	Surat	5
265,700	24,403	290,103	314,705	24,248	338,953	Total, Gujarat.	
						Deccan.	
87,733	551	88,284	37,959	351	38,300	West Khandesh	6
95,533	.....	95,533	75,192	.....	75,192	East Khandesh	7
157,254	2,098	159,352	28,565	143	28,708	Nasik	8
132,954	1,134	134,088	17,260	261	17,521	Ahmednagar	9
126,323	2,491	128,814	36,631	811	37,442	Poona	10
76,241	1,822	78,063	24,183	475	24,658	Sholapur	11
111,573	7,870	119,443	62,036	5,877	67,913	Satara	12
787,916	15,966	803,882	301,876	7,928	309,804	Total, Deccan.	
						Karnatak.	
63,532	3,006	66,538	87,074	2,117	89,191	Belgaum	13
49,536	145	49,681	44,965	148	45,113	Bijapur	14
82,229	3,216	85,445	81,153	1,822	82,975	Dharwar	15
194,697	6,367	201,064	213,192	4,087	217,279	Total, Karnatak.	
						Konkan.	
106,545	3,392	109,937	31,731	701	32,432	Thana	16
3,140	650	3,790	5,049	498	5,547	Bombay Suburban	17
3,345	.....	3,345	17,831	.....	17,831	Bombay City	18
80,592	3,973	84,565	26,980	1,321	28,301	Kolaba	19
130,867	4,452	135,319	43,246	1,157	44,403	Ratnagiri	20
63,670	.....	63,670	24,511	.....	24,511	Kanara	21
388,169	12,467	400,636	149,348	3,677	153,025	Total, Konkan.	
1,636,472	59,203	1,695,675	979,121	39,940	1,019,061	Total, Bombay Presi- dency.	
						Sind.	
77,863	8,318	86,081	45,363	10,856	56,221	Karachi	22
113,303	116	113,419	75,672	227	75,899	Hyderabad	23
93,733	149,092	242,795	23,153	3,647	26,800	Thar Parkar	24
94,469	3,713	98,182	31,519	2,712	34,231	Nawabshah	25
80,068	3,163	83,231	76,198	1,486	77,684	Larkana	26
94,665	734	95,399	35,139	182	35,321	Sukkur	27
72,560	138	72,698	22,662	.....	22,662	Upper Sind Frontier	28
626,561	165,134	791,695	309,706	19,124	328,830	Total, Sind.	
2,263,093	224,337	2,487,370	1,288,837	59,064	1,347,901	Grand Total.	

TABLE VII--AGRICULTURAL STOCK

No.	District.	Cattle					
		Milk-cattle--concd.			Young		
		Total milk-cattle.			Calves.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	3	4	5	6	7	
	<i>Gujarat.</i>	Nos.	Nos.	Nos.	Nos.	Nos.	Nos.
1	Ahmedabad	167,745	9,842	197,587	69,097	2,594	71,691
2	Kaira	130,697	13,659	144,356	50,118	6,255	56,373
3	Panch Mahals	104,836	21,160	125,996	80,300	15,667	95,967
4	Broach	38,683	822	39,505	15,962	287	16,249
5	Surat	118,444	3,168	121,612	86,511	1,824	88,335
	<b>Total, Gujarat</b>	<b>580,405</b>	<b>48,651</b>	<b>629,056</b>	<b>301,988</b>	<b>26,627</b>	<b>328,615</b>
	<i>Deccan.</i>						
6	West Khandesh	125,692	912	126,604	80,530	615	81,145
7	East Khandesh	170,455		170,455	93,509		93,509
8	Nasik	185,939	2,241	188,180	129,636	2,124	131,760
9	Ahmednagar	150,214	1,368	151,582	114,209	1,529	115,738
10	Poona	162,934	3,302	166,236	110,281	2,243	112,524
11	Solapur	100,424	2,287	102,711	51,651	1,878	53,529
12	Satara	193,914	13,747	207,661	101,990	7,770	109,760
	<b>Total, Deccan</b>	<b>1,089,592</b>	<b>23,994</b>	<b>1,113,586</b>	<b>720,846</b>	<b>15,969</b>	<b>736,815</b>
	<i>Karnatak.</i>						
13	Belgaum	149,606	6,123	155,729	70,863	3,063	73,926
14	Bijapur	94,501	293	94,794	56,086	199	56,285
15	Dharwar	163,782	6,098	169,880	86,991	3,164	90,155
	<b>Total, Karnatak</b>	<b>407,889</b>	<b>10,514</b>	<b>418,403</b>	<b>213,940</b>	<b>6,426</b>	<b>220,366</b>
	<i>Konkan.</i>						
16	Thana	136,276	4,093	140,369	108,901	3,173	112,074
17	Bombay Suburban	8,189	1,148	9,337	2,768	521	3,289
18	Bombay City	21,176		21,176	2,069		2,069
19	Kolaba	107,572	5,294	112,866	81,273	4,688	85,961
20	Ratnagiri	174,113	5,609	179,722	147,339	5,083	152,422
21	Kanara	88,181		88,181	72,546		72,546
	<b>Total, Konkan</b>	<b>537,507</b>	<b>16,144</b>	<b>553,651</b>	<b>408,916</b>	<b>13,431</b>	<b>422,347</b>
	<b>Total, Bombay Presidency</b>	<b>2,515,393</b>	<b>96,143</b>	<b>2,611,536</b>	<b>1,548,890</b>	<b>69,443</b>	<b>1,618,332</b>
	<i>Sind.</i>						
22	Karachi	123,226	19,076	142,302	36,638	2,969	39,607
23	Hyderabad	188,675	343	189,018	66,056	45	66,101
24	Thar Parkar	116,886	152,709	269,595	47,004	44,966	91,970
25	Nawabshah	125,988	6,435	132,423	77,081	3,562	80,643
26	Larkana	156,266	4,661	160,927	58,881	19,44	60,775
27	Sukkur	129,804	906	130,710	43,559	268	43,827
28	Upper Sind Frontier	95,222	118	95,340	94,104	32	94,136
	<b>Total, Sind</b>	<b>936,267</b>	<b>184,258</b>	<b>1,120,525</b>	<b>363,273</b>	<b>63,966</b>	<b>427,239</b>
	<b>Grand Total</b>	<b>3,551,660</b>	<b>288,401</b>	<b>3,840,061</b>	<b>2,011,963</b>	<b>118,999</b>	<b>2,130,962</b>

—contd.

—concluded.						District.	No.
Buffaloe-calves.			Total cattle.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
45	46	47	48	49	50	2	1
Nos.	Nos.	Nos.	Nos.	Nos.	Nos.	Gujarat.	
70,826	3,225	74,051	447,480	21,708	469,188	Ahmedabad	1
102,066	10,094	112,160	380,136	39,283	419,369	Kaira	2
33,339	6,262	39,601	325,344	63,788	390,132	Panch Mahals	3
26,287	648	26,935	138,012	3,176	141,188	Broach	4
42,193	1,276	43,471	367,880	9,223	377,103	Surat	5
274,731	21,605	296,336	1,659,852	137,128	1,796,980	Total, Gujarat.	
						Deccan.	
37,696	307	38,003	419,543	3,687	423,230	West Khandesh	6
55,413	.....	55,413	562,258	.....	562,258	East Khandesh	7
20,051	126	20,177	574,821	5,570	581,391	Nasik	8
12,580	249	12,829	503,427	5,266	508,693	Ahmednagar	9
21,481	622	22,103	506,130	9,464	517,594	Poona	10
22,227	551	22,778	345,431	8,124	353,555	Sholapur	11
61,271	4,509	65,780	553,682	38,880	592,762	Sutara	12
220,719	6,264	226,983	3,467,492	71,891	3,539,483	Total, Deccan.	
						Karnatak.	
55,908	1,563	57,471	456,187	16,501	472,688	Belgaum	13
32,741	111	32,852	323,126	907	324,033	Bijapur	14
54,464	1,268	55,732	607,065	15,390	622,445	Dharwar	15
163,113	2,942	166,055	1,286,398	52,788	1,319,166	Total Karnatak.	
						Konkan.	
21,748	524	22,272	440,197	11,519	452,016	Thana	16
1,461	113	1,574	21,116	3,029	24,145	Bombay Suburban	17
9,966	.....	2,966	49,254	.....	49,254	Bombay city	18
21,164	987	22,151	343,287	17,940	361,227	Kolaba	19
36,803	1,207	38,010	638,320	20,571	658,891	Ratnagiri	20
16,473	.....	16,473	279,235	.....	279,235	Kanara	21
100,646	2,831	103,476	1,771,409	53,359	1,824,768	Total Konkan.	
749,208	33,542	782,750	8,165,151	295,246	8,483,397	Total, Bombay Presi- dency.	
						Sind.	
16,653	1,338	18,051	227,204	30,950	258,154	Karachi	22
38,832	66	38,898	336,634	670	337,304	Hyderabad	23
10,397	1,532	11,929	241,532	212,353	453,875	Thar Parkar	24
15,259	778	16,037	332,516	13,552	346,068	Nawabshah	25
39,715	521	40,236	371,159	10,573	381,732	Larkana	26
14,033	45	14,078	281,638	1,335	283,493	Sukkur	27
8,798	.....	8,798	301,970	107	302,077	Upper Sind Frontier	28
135,187	4,340	139,527	2,054,663	270,040	2,324,703	Total, Sind.	
884,395	37,882	922,277	10,239,814	565,286	10,825,100	Grand Total.	

TABLE VII—AGRICULTURAL STOCK

No.	District.	Other					
		Sheep.			Goats.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
		51	52	53	54	55	56
	<i>Gujarat.</i>	Nos.	Nos.	Nos.	Nos.	Nos.	Nos.
1	Ahmedabad	44,395	3,603	47,998	79,339	4,396	83,735
2	Kaira	15,458	1,187	16,645	49,488	5,980	55,478
3	Panch Mahals	7,462	3,147	10,609	63,276	12,638	75,914
4	Broach	11,966	203	12,189	28,619	806	29,419
5	Surat	23,222	293	23,515	92,946	546	93,491
	<b>Total, Gujarat</b>	<b>102,526</b>	<b>8,333</b>	<b>110,859</b>	<b>313,672</b>	<b>24,365</b>	<b>338,037</b>
	<i>Deccan.</i>						
6	West Khandesh	35,511	.....	35,511	141,619	701	142,320
7	East Khandesh	73,532	.....	73,532	212,100	.....	212,100
8	Nasik	114,606	157	114,793	223,146	1,083	224,229
9	Ahmednagar	251,398	2,967	254,365	347,703	3,977	351,680
10	Poona	189,951	135	190,086	219,072	1,943	221,016
11	Sholapur	209,139	5,868	215,007	245,458	6,427	251,885
12	Satara	254,189	15,917	300,106	163,316	10,776	174,092
	<b>Total, Deccan</b>	<b>1,168,316</b>	<b>25,074</b>	<b>1,183,390</b>	<b>1,552,414</b>	<b>24,907</b>	<b>1,577,321</b>
	<i>Karnatak.</i>						
13	Belgaum	188,934	4,119	193,053	129,094	3,227	192,321
14	Bijapur	161,605	239	161,844	283,250	1,041	284,291
15	Dharwar	98,820	3,311	102,131	103,926	6,087	110,013
	<b>Total, Karnatak</b>	<b>349,359</b>	<b>7,669</b>	<b>457,028</b>	<b>516,270</b>	<b>10,356</b>	<b>526,628</b>
	<i>Konkan.</i>						
16	Thana	3,819	3	3,962	55,638	1,143	56,781
17	Bombay Suburban	209	3	212	3,370	809	4,179
18	Bombay City	715	.....	715	24,335	.....	24,335
19	Kolaba	3,707	2	3,709	30,963	1,627	32,590
20	Ratnagiri	1,297	.....	1,297	66,796	1,900	68,696
21	Ranara	2,011	.....	2,011	3,642	.....	3,642
	<b>Total, Konkan</b>	<b>16,758</b>	<b>11</b>	<b>16,906</b>	<b>174,744</b>	<b>5,479</b>	<b>180,223</b>
	<b>Total, Bombay Presidency.</b>	<b>1,626,959</b>	<b>41,224</b>	<b>1,768,183</b>	<b>2,567,100</b>	<b>65,106</b>	<b>2,632,206</b>
	<i>Sind.</i>						
22	Karachi	61,067	23,836	84,903	61,293	37,393	98,686
23	Hyderabad	32,010	191	32,201	201,760	149	201,909
24	Thar Parkar	68,521	72,569	140,890	223,119	212,865	435,984
25	Nawabshah	90,305	3,677	94,082	301,064	7,091	308,175
26	Larkana	74,243	9,622	83,865	151,293	13,764	165,047
27	Sukkur	34,465	270	34,735	167,997	741	168,739
28	Upper Sind Frontier	151,262	2,040	153,292	132,133	138	152,271
	<b>Total, Sind</b>	<b>611,773</b>	<b>112,195</b>	<b>623,968</b>	<b>1,238,678</b>	<b>272,131</b>	<b>1,510,809</b>
	<b>Grand Total</b>	<b>2,138,732</b>	<b>159,419</b>	<b>2,298,151</b>	<b>3,795,778</b>	<b>337,237</b>	<b>4,133,015</b>

—contd.

Quadrupeds.						District.	No.
Horses and ponies.							
Males.			Females.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
57	58	59	60	61	62	2	1
Nos.	Nos.	Nos.	Nos.	Nos.	Nos.	<i>Gujarat.</i>	
2,843		3,010	3,151	187	3,336	Ahmedabad	1
637	99	736	1,052	177	1,229	Kaira	2
974	89	1,063	1,283	155	1,438	Panch Mahals	3
1,598	33	1,631	1,819	43	1,862	Broach	4
2,109	16	2,125	844	9	853	Surat	5
8,211	404	8,615	8,149	571	8,720	Total, Gujarat.	
						<i>Deccan.</i>	
10,125	108	10,233	1,917	18	1,935	West Khandesh	6
8,778		8,778	1,843		1,843	East Khandesh	7
6,397	9	6,406	2,629	10	2,639	Nasik	8
5,874	15	5,889	6,192	76	6,268	Ahmednagar	9
3,819	18	3,837	3,915	36	3,951	Poona	10
1,985	44	2,029	2,733	57	2,790	Sholapur	11
2,856	170	3,026	2,507	120	2,627	Satara	12
39,334	364	39,698	21,796	317	22,113	Total, Deccan.	
						<i>Karnatak.</i>	
1,793	59	1,852	1,905	106	2,011	Belgaum	13
2,321	3	2,322	2,906	6	2,912	Bijapur	14
1,533	78	1,611	1,288	43	1,331	Dharwar	15
5,637	118	5,815	6,049	160	6,209	Total, Karnatak.	
						<i>Konkan.</i>	
2,063	11	2,074	311	3	314	Thana	16
370	46	416	28	3	31	Bombay Suburban	17
7,819		7,819	413		413	Bombay City	18
520	8	528	334	3	337	Kolaba	19
230	1	231	60	2	62	Ratnagiri	20
82		82	58		58	Kanara	21
11,084	66	11,150	1,204	11	1,215	Total, Konkan.	
64,326	952	65,278	37,198	1,059	38,257	Total, Bombay Presidency.	
						<i>Sind.</i>	
4,837	306	5,143	3,116	644	3,760	Karachi	22
6,445	5	6,450	6,6	2	6,649	Hyderabad	23
3,761	1,038	4,859	5,612	1,751	7,363	Thar Parkar	24
5,643	10	5,750	4,736	163	4,959	Nawabshah	25
5,936	208	6,196	5,417	190	5,607	Larkana	26
4,844	13	4,857	3,362	22	3,384	Sukkur	27
2,810		2,810	4,453	2	4,455	Upper Sind Frontier	28
34,328	1,739	36,067	33,433	2,774	36,207	Total, Sind.	
99,654	2,691	101,345	70,531	3,833	74,464	Grand Total.	

TABLE VII—AGRICULTURE STOCK

No.	District.	Other					
		Horses and Ponies—concl'd.			Mules.		
		Young stock.					
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	63	64	65	66	67	68
	<i>Gujarat.</i>	Nos.	Nos.	Nos.	Nos.	Nos.	Nos.
1	Ahmedabad	4,166	22	4,188	99	.....	99
2	Kaira	503	45	548	.....	.....	.....
3	Panch Mahals	638	66	704	2	.....	2
4	Baruch	645	9	654	6	.....	6
5	Surat	234	.....	234	2	.....	2
	<b>Total, Gujarat</b>	<b>6,086</b>	<b>135</b>	<b>6,221</b>	<b>109</b>	<b>.....</b>	<b>109</b>
	<i>Deccan.</i>						
6	West Khandesh	958	6	964	1	.....	1
7	East Khandesh	1,189	.....	1,189	2	.....	2
8	Nasik	1,923	10	1,933	77	.....	77
9	Ahmednagar	2,638	32	2,670	301	.....	301
10	Poona	1,688	16	1,704	518	.....	518
11	Sholapur	1,441	44	1,485	3	.....	3
12	Satara	942	90	1,032	6	7	13
	<b>Total, Deccan</b>	<b>10,679</b>	<b>196</b>	<b>10,875</b>	<b>908</b>	<b>7</b>	<b>915</b>
	<i>Karnatak.</i>						
13	Belgaum	4,371	480	4,851	9	.....	9
14	Bijapur	1,375	1	1,376	.....	.....	.....
15	Dharwar	442	3	445	5	.....	6
	<b>Total, Karnatak</b>	<b>6,188</b>	<b>494</b>	<b>6,682</b>	<b>14</b>	<b>.....</b>	<b>14</b>
	<i>Konkan.</i>						
16	Thana	178	1	179	11	.....	11
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Bombay City	2	.....	2	16	.....	16
19	Kolaba	60	4	64	9	.....	9
20	Ratnagiri	23	.....	23	1	.....	1
21	Kanara	14	.....	14	.....	.....	.....
	<b>Total, Konkan</b>	<b>272</b>	<b>6</b>	<b>278</b>	<b>37</b>	<b>.....</b>	<b>37</b>
	<b>Total, Bombay Presidency.</b>	<b>23,225</b>	<b>632</b>	<b>23,857</b>	<b>1,068</b>	<b>7</b>	<b>1,075</b>
	<i>Sind.</i>						
22	Karachi	698	301	999	179	.....	179
23	Hyderabad	1,034	1	1,035	13	.....	13
24	Thar Parkar	1,075	305	1,380	3	.....	3
25	Nawabshah	983	32	1,015	29	.....	29
26	Larkana	647	32	679	81	20	101
27	Sukkur	706	6	712	13	.....	13
28	Upper Sind Frontier	712	.....	712	8	.....	8
	<b>Total, Sind</b>	<b>5,785</b>	<b>677</b>	<b>6,462</b>	<b>326</b>	<b>20</b>	<b>346</b>
	<b>Grand Total</b>	<b>29,010</b>	<b>1,509</b>	<b>30,519</b>	<b>1,394</b>	<b>27</b>	<b>1,421</b>

—contd.

Quadrupeds—concd.						District.	No.
Donkeys.			Camels.				
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
69	70	71	72	73	74	8	1
Nos.	Nos.	Nos.	Nos.	Nos.	Nos.	<i>Gujarat.</i>	
14,732	363	15,095	1,019	98	1,057	Ahmedabad	1
4,906	328	5,234	489	39	528	Kaira	2
2,363	360	2,723	101	.....	101	Panch Mahals	3
1,690	18	1,708	102	.....	102	Broach	4
449	.....	449	2	.....	2	Surat	5
24,140	1,069	25,209	1,713	77	1,790	Total, Gujarat	
						<i>Deccan.</i>	
4,455	19	4,487	1	.....	1	West Khandesh	6
6,496	.....	6,496	2	.....	2	East Khandesh	7
3,528	3	3,531	1	.....	1	Nasik	8
6,344	37	6,381	.....	.....	.....	Ahmednagar	9
4,728	21	4,749	1	.....	1	Poona	10
3,722	100	3,822	30	.....	30	Sholapur	11
2,139	63	2,202	.....	.....	.....	Satara	12
32,002	236	32,238	35	.....	35	Total, Deccan.	
						<i>Karnatak.</i>	
2,320	63	2,384	49	.....	49	Belgaum	13
3,513	5	3,518	44	.....	44	Bijapur	14
3,364	104	3,468	45	5	50	Dharwar	15
9,698	172	9,870	138	5	143	Total, Karnatak.	
						<i>Konkan.</i>	
245	.....	245	72	.....	72	Thana	16
171	39	210	.....	.....	.....	Bombay Suburban	17
134	.....	134	1	.....	1	Bombay City	18
494	.....	494	.....	.....	.....	Kolaba	19
368	4	372	.....	.....	.....	Ratnagiri	20
90	.....	90	.....	.....	.....	Kanara	21
1,392	43	1,435	73	.....	73	Total, Konkan.	
67,232	1,520	68,752	1,959	62	2,041	Total, Bombay Presidency.	
						<i>Sind.</i>	
14,360	2,906	17,256	17,019	2,320	20,949	Karachi	22
21,900	1	21,901	39,115	5	39,120	Hyderabad	23
13,341	30,221	44,262	13,405	41,397	54,802	Thar Parkar	24
16,311	994	17,305	26,150	1,300	27,450	Nawabshah	25
15,785	669	16,454	11,560	2,149	13,709	Larkana	26
8,662	44	8,906	6,607	13	6,620	Sukkur	27
6,123	1	6,124	7,571	.....	7,571	Upper Sind Frontier	28
96,672	35,536	132,208	130,447	48,794	169,241	Total, Sind.	
163,904	37,056	200,960	192,406	48,876	171,282	Grand Total	



TABLE VII—AGRICULTURAL STOCK

No.	District.	Flou					
		Wooden ploughs.					
		Large.			Small.		
		Reported.	Estimated.	Total.	Reported.	Estima ed.	Total.
1	2	75	76	77	78	79	80
	<i>Gujarat.</i>	o .	Nos.	Nos.	Nos.	Nos.	Nos.
1	Ahmedabad ...	5,760	185	5,935	50,762	2,382	53,144
2	Kaira ...	13	.....	13	54,790	4,583	59,373
3	Panch Mahals ...	160	.....	160	32,200	9,805	42,014
4	Broach ...	4,227	32	4,259	23,259	812	24,071
5	Surat ...	1,068	2	1,068	31,769	992	52,781
	<b>Total, Gujarat ...</b>	<b>11,216</b>	<b>219</b>	<b>11,435</b>	<b>237,609</b>	<b>18,574</b>	<b>256,383</b>
	<i>Deccan.</i>						
6	West Khandesh ...	1,369	.....	1,368	65,869	825	66,694
7	East Khandesh ...	32,516	.....	32,516	29,984	.....	29,984
8	Nasik ...	26,103	46	26,149	54,346	882	56,228
9	Ahmednagar ...	23,668	88	23,756	14,878	33	14,911
10	Poona ...	15,691	216	15,907	37,153	974	28,127
11	Sholapur ...	3,755	140	3,895	4,283	148	4,431
12	Satara ...	13,751	671	14,422	26,026	2,903	29,019
	<b>Total, Deccan ...</b>	<b>119,132</b>	<b>1,161</b>	<b>120,313</b>	<b>232,539</b>	<b>5,855</b>	<b>238,394</b>
	<i>Karnatak.</i>						
13	Belgaum ...	6,916	301	7,217	56,906	2,162	59,068
14	Bijapur ...	2,851	4	2,855	40,704	68	40,792
15	Dharwar ...	9,881	47	9,928	72,914	2,262	75,176
	<b>Total, Karnatak ...</b>	<b>19,648</b>	<b>352</b>	<b>20,000</b>	<b>170,524</b>	<b>4,512</b>	<b>175,036</b>
	<i>Konkan</i>						
16	Thana ...	2,279	49	2,328	70,238	1,716	71,964
17	Bombay Suburban ...	4	.....	4	9,460	271	9,735
18	Bombay City ...	.....	.....	.....	30	.....	30
19	Kolaba ...	32	.....	32	66,904	3,078	69,982
20	Ratnagiri ...	.....	.....	.....	132,046	4,370	136,416
21	Kanara ...	.....	.....	.....	55,463	.....	55,463
	<b>Total, Konkan ...</b>	<b>2,315</b>	<b>49</b>	<b>2,364</b>	<b>317,141</b>	<b>9,435</b>	<b>326,576</b>
	<b>Total, Bombay Presi-</b>	<b>152,331</b>	<b>1,781</b>	<b>154,112</b>	<b>948,013</b>	<b>38,576</b>	<b>986,389</b>
	<i>Sind.</i>						
22	Karachi ...	10,338	2,020	12,358	10,498	3,396	13,894
23	Hyderabad ...	45,961	32	46,993	1,554	.....	1,554
24	Thar Parkar ...	10,518	1,982	12,500	13,674	29,346	48,023
25	Nawabshah ...	27	.....	27	48,602	1,090	49,692
26	Larkana ...	4,632	62	4,694	49,193	1,440	50,633
27	Sukkur ...	.....	.....	.....	41,698	284	41,982
28	Upper Sind Frontier ...	16	.....	16	2,688	.....	2,688
	<b>Total, Sind ...</b>	<b>72,722</b>	<b>4,096</b>	<b>76,818</b>	<b>172,907</b>	<b>35,559</b>	<b>208,466</b>
	<b>Grand Total ...</b>	<b>225,053</b>	<b>5,677</b>	<b>230,930</b>	<b>1,130,920</b>	<b>73,935</b>	<b>1,194,855</b>

—contd.

Iron Ploughs.			Total ploughs.			District.	
Reported.	Estimated.	Total.	Reported.	Estimated.	Total.		
81	82	83	84	85	86	2	1
Nos.	Nos.	Nos.	Nos.	Nos.	Nos.	Gujarat.	
220	1	221	56,792	2,566	59,358	Ahmedabad	1
57	11	68	64,860	4,594	69,454	Kaira	2
18	.....	18	52,387	9,805	62,192	Panch Mahals	3
7	.....	7	32,498	844	33,342	Broach	4
87	6	93	62,942	1,000	63,942	Surat	5
369	18	407	249,414	18,811	268,225	Total, Gujarat.	
						Deccan.	
182	.....	182	67,419	825	68,244	West Khandesh	6
557	.....	557	63,357	.....	63,357	East Khandesh	7
777	21	798	83,226	949	84,175	Nasik	8
7,466	81	7,547	46,032	202	46,234	Ahmednagar	9
7,508	27	7,535	50,352	1,217	51,569	Poona	10
6,047	136	6,183	14,086	424	14,509	Sholapur	11
4,129	169	4,298	43,906	3,833	47,739	Satara	12
26,686	434	27,120	268,377	7,450	275,827	Total, Deccan.	
						Karnatak.	
2,060	68	2,128	65,912	2,516	68,428	Belgaum	13
.....	13	.....	43,555	92	43,647	Bijapur	14
549	.....	549	88,344	2,322	90,666	Dharwar	15
2,639	66	2,705	192,811	4,930	197,741	Total, Karnatak.	
						Konkan.	
68	.....	68	72,585	1,765	74,350	Thana	16
.....	.....	.....	2,464	371	2,835	Bombay Suburban	17
2	.....	2	32	.....	32	Bombay City	18
6	.....	6	56,942	3,078	60,020	Kolaba	19
10	.....	10	132,056	4,370	136,426	Ratnagiri	20
124	.....	124	65,587	.....	65,587	Kanara	21
210	.....	210	319,665	9,484	329,150	Total, Konkan.	
29,924	518	30,442	1,130,258	40,675	1,170,933	Total, Bombay Presidency.	
						Sind.	
91	.....	91	20,927	5,416	26,343	Karachi	22
29	.....	29	48,544	32	48,576	Hyderabad	23
922	.....	922	30,014	31,331	61,345	Tbar Parkar	24
326	.....	326	48,955	1,090	50,045	Newabshah	25
143	.....	143	54,168	1,502	55,670	Larkana	26
42	.....	42	41,740	284	42,024	Sukkur	27
102	.....	102	2,836	.....	2,836	Upper Sind Pro	28
1,555	.....	1,555	247,184	39,655	286,839	Total, Si n.	
31,479	518	31,997	1,377,452	60,330	1,437,782	Grand Total.	

TABLE VII - AGRICULTURAL STOCK—concl'd.

No.	District.	Carts.					
		For Riding.			For loading.		
		Reported.	Estimated.	Total.	Reported.	Estimated.	Total.
1	2	87	88	89	90	91	92
	<i>Gujarat.</i>	Nos.	Nos.	Nos.	Nos.	Nos.	Nos.
1	Ahmedabad	2,818	117	2,935	22,388	1,347	23,735
2	Kaira	1,794	148	1,942	23,872	1,723	25,595
3	Pench Mahals	377	18	395	10,960	1,796	12,746
4	Broach	4,208	74	4,277	15,404	344	15,748
5	Surat	10,572	306	11,178	35,504	811	36,315
	<b>Total, Gujarat</b>	<b>20,064</b>	<b>663</b>	<b>20,727</b>	<b>108,618</b>	<b>6,021</b>	<b>114,139</b>
	<i>Deccan.</i>						
6	West Khandesh	17,584	162	17,546	37,714	406	38,192
7	East Khandesh	38,170	.....	38,170	57,595	.....	57,595
8	Nasik	5,776	24	5,810	37,159	186	37,377
9	Ahmednagar	10,739	29	10,768	23,324	310	23,584
10	Poona	7,008	37	7,045	27,524	317	27,841
11	Sholapur	1,718	50	1,768	18,164	437	18,601
12	Satara	4,006	284	4,290	25,375	1,423	26,798
	<b>Total, Deccan</b>	<b>88,011</b>	<b>596</b>	<b>88,697</b>	<b>226,855</b>	<b>2,933</b>	<b>229,788</b>
	<i>Karnatak.</i>						
13	Belgaum	2,118	26	2,144	37,437	1,018	38,450
14	Bijapur	1,555	2	1,557	23,811	68	23,874
15	Dharwar	16,907	163	17,070	33,545	988	39,536
	<b>Total, Karnatak</b>	<b>20,580</b>	<b>191</b>	<b>20,771</b>	<b>99,796</b>	<b>2,064</b>	<b>101,860</b>
	<i>Konkan.</i>						
16	Thana	5,742	62	5,804	33,268	640	33,918
17	Bombay Suburban	526	108	622	2,567	269	2,829
18	Bombay City	5,303	.....	5,303	11,294	.....	11,294
19	Kolaba	3,341	134	3,475	10,432	620	11,102
20	Ratnagiri	754	18	772	4,361	65	4,426
21	Kanara	429	.....	429	6,722	.....	6,722
	<b>Total, Konkan</b>	<b>16,095</b>	<b>317</b>	<b>16,412</b>	<b>68,694</b>	<b>1,597</b>	<b>70,281</b>
	<b>Total, Bombay Presidency</b>	<b>144,750</b>	<b>1,787</b>	<b>146,507</b>	<b>603,463</b>	<b>12,605</b>	<b>516,068</b>
	<i>Sind.</i>						
22	Karachi	115	.....	115	2,469	35	2,494
23	Hyderabad	535	.....	535	2,064	.....	2,064
24	Thar Parkar	13	.....	13	3,220	686	3,908
25	Nawabshah	60	.....	60	2,803	12	2,815
26	Larkana	126	1	129	24,264	389	24,653
27	Sukkur	126	.....	126	20,899	98	20,997
28	Upper Sind Frontier	155	.....	155	20,174	6	20,180
	<b>Total, Sind</b>	<b>1,132</b>	<b>1</b>	<b>1,133</b>	<b>75,903</b>	<b>1,226</b>	<b>77,131</b>
	<b>Grand Total</b>	<b>145,882</b>	<b>1,788</b>	<b>147,640</b>	<b>579,366</b>	<b>13,833</b>	<b>593,199</b>

*Report.*

Season and Crop — for the year  
1924-25.

GOVERNMENT OF BOMBAY.

REVENUE DEPARTMENT.

Resolution No. P.—119.

Bombay Castle, 30th October 1925.

Letter from the Director of Agriculture No. P—11 dated 7th October 1925—Submitting the Season and Crop Report of the Bombay Presidency for the year 1924-25.

RESOLUTION.—Recorded.

By order of the Government of Bombay  
(Transferred Departments).

H. K. KIRPALANI,

Deputy Secretary to Government.

To

The Commissioner in Sind,  
The Commissioners of Divisions,  
All Collectors, including the Deputy Commissioner, Upper Sind  
Frontier,  
The Director of Agriculture,  
The Settlement Commissioner and Director of Land Records,  
The Chief Conservator of Forests, Bombay Presidency,  
The Conservators of Forests, N., C., S. and Sind Circles,  
The Finance Department,  
The Public Works Department,  
The High Commissioner for India in the United Kingdom (by  
letter).

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No. P. — 11 of 1926

From

Dr. H. H. MANN, D.Sc.,  
DIRECTOR OF AGRICULTURE,  
BOMBAY PRESIDENCY, POONA ;

To

THE SECRETARY TO GOVERNMENT,  
REVENUE DEPARTMENT, BOMBAY.

Poona, 15th October 1926.

Sir,

I have the honour to submit herewith the Annual Season and Crop Report of the Bombay Presidency for the year ending 31st July 1926.

I have the honour to be,

Sir,

Your most obedient servant,

H. H. MANN,  
Director of Agriculture.

## SEASON AND CROP REPORT OF THE BOMBAY PRESIDENCY FOR 1925-26

### CHAPTER I.—CHARACTER OF THE SEASON

1. **General.**—The agricultural season of 1925-26 was, on the whole, moderate, and below average. It was definitely poor over a large part of Gujarat and East Khandesh and in many places of the East Deccan and Karnatak comprising chiefly the eastern portions of Poona, Satara, Ahmednagar and Dharwar, almost the whole of the Bijapur District (except Indi taluka) and the east of Belgaum, especially the Athni taluka. On the other hand, the season was fairly satisfactory in West Khandesh and Sholapur in the Deccan, and also in the central portions of both Deccan and Karnatak; while in the West of these two divisions and in most of the Konkan it was generally fully average. In Sind, the season was much below the normal owing to the late rise and early fall of the river there. Details regarding the season in its various aspects are contained in the following section.

2. **Distribution of Rainfall.**—Statement No. I (pages 30-31) compares the rainfall of the year with the average fall of rain at each representative station in the Presidency and Sind. The average rainfall figures for each station are, as during the last year, those supplied by the Indian Meteorological Department, based on the rainfall statistics available upto and including 1920.

**Kharif Rains.**—Generally speaking, the *Kharif* rains were below the normal almost throughout the Presidency and Sind. In Gujarat, they were about the average at Kaira, but at the other stations of the Division they did not generally exceed two-thirds the usual amount. The peculiarity, however, was that while the June and early July rains were very good, the precipitation then suddenly stopped and the later *Kharif* rain both in Gujarat and the Deccan was very deficient. In the Deccan, in total amount they somewhat exceeded the normal at Ahmednagar and approached it at Sholapur, but at the other stations in the Division they ranged from a little over one-half to three-fourths the usual quantity. In the Karnatak, they slightly exceeded the standard at Dharwar and in the Hilly Tracts and were a little below it at Belgaum, but at Bijapur they were very deficient amounting to only a little over one-half the usual amount. In the Konkan, these (*Kharif*) rains slightly exceeded the normal at Karwar (Kanara), but at the other stations they amounted to about two-thirds the usual quantity. In Sind, the distribution of the *Kharif* rains was very uneven. They exceeded the normal at Sukkur and Jacobabad (Upper Sind Frontier) and nearly approached it at Larkana and Mirpurkhas (Thar Parkar), but they were very deficient at the other stations. Thus, while at Karachi they were about two-thirds of the normal, they were less than one-third at Nawabshah, while Hyderabad had to be satisfied with less than an inch against an average of over six inches.

**Rabi Rains.**—Except in Khandesh and the East Deccan and Karnatak, where they considerably exceeded the average, the *rabi* rains were generally far below the usual quantity both in the Presidency and Sind. In Gujarat,

they were about half the average at Broach but at the other stations in the Division they did not exceed a few drops against an average of one to two inches. In the Deccan, they amounted to three times the usual quantity at Dhulia (West Khandesh) and were about twice the normal at Jalgaon (East Khandesh), Ahmednagar and Sholapur, while in the Hilly Tracts they approached the normal. At the other stations (Nasik, Poona and Satara) they ranged from one-third to two-thirds the usual amount. In the Karnatak, they were much above the average at Bijapur, a little above the average at Dharwar but slightly below it (average) at Belgaum and in the Hilly Tracts. In the Konkan, they just equalled the average at Karwar (Kanara) but were generally somewhat below the average at the other stations. In Sind, they exceeded the average at Nawabshah and Sukkur, and approached it at Larkana, but amounted to only one-third to one-half the standard at Karachi, Mirpurkhas (Thar Parkar) and Jacobabad (Upper Sind Frontier), while at Hyderabad they did not exceed a few drops against an average of about two-thirds of an inch.

**Hot Weather Rains.**—These presented no features of special importance during the season under review.

3. **Nature of the Season in different Divisions.**—The following remarks will show in detail the nature of the season in each Division of the Bombay Presidency including Sind.

**Konkan.**—The regular monsoon commenced in the last week of May, and the rains from this time to the end of August were generally satisfactory (except for rice in a few places for which they were rather deficient). As a result, all agricultural operations proceeded smoothly and the crops showed good development. In September, the rain amounted to from only one-fourth to one-half the usual amount, but as the crops had sufficient previous moisture to fall back upon, they did not suffer to any serious extent anywhere except in the case of rice. The rainfall in October, though much below the average, was very well-distributed and having come at the most opportune time it proved very useful for the standing crops. As a result of the seasonal conditions described above, the outturn of all crops (except rice in a few places) was generally about the average and even that of rice was not much below. Garden crops also did very well generally and returned a fully average yield except mango which was exceptionally poor. As regards crop diseases, the season was generally free from them. Except for a somewhat serious attack of caterpillars on rice in the coastal tract of the Kanara and South Ratnagiri districts and of 'Koleroga' or mildew on betel-nut in the up-ghat talukas of the Kanara district there was no serious disease anywhere in the Division.

**Gujarat.**—The monsoon commenced in the last week of May—about three weeks earlier than usual—and gave good rain throughout the Division. This rain being supplemented by excellent rain in June, the *Kharij* sowings were completed in time and transplantation of rice was commenced generally. In July, the rainfall was considerably below the average throughout the Division but proved upto the needs of the moment owing to the heavy rains received in the previous month (June). To the rice crop in Surat and other areas, however, the July rains proved



inadequate. In August, the rainfall was again meagre, ranging from one-fourth to one-half the usual amount, in most of the Division, with the result that the crops began to show signs of distress while a failure of the rice crop was feared. In September, with the exception of some light rain in Surat, the month was practically rainless with the consequence that the rice crop was ruined in many areas, while the other crops too showed signs of withering. The harvesting of early crops was started in places in this month. October was again totally dry. The standing *Kharif* crops further deteriorated, while the sowing of *rabi* crops was confined to places with irrigation facilities. Some light to fair rain was received in November only in parts of the Kaira and Ahmedabad districts but it proved useful only to the late crops there as the early crops were nearly reaped. There was no rain in December and even the late crops began to suffer except where they were helped with irrigation. The rainfall in January was fairly heavy and proved most untimely. It affected the colour and quality of both grain and fodder and caused considerable damage to cotton. Dewfall and foggy weather in February affected further the cotton crop which was ready to be picked. The season was thus, on the whole, very disappointing. It was the worst season experienced by growers of cotton and tobacco for some years due to low prices coupled with low yields. Mango growers also suffered heavy losses due to a failure of the crop in most places. As regards crop diseases, the season was generally free from them as, except a slight attack of woolly-mites on cotton in places in South Gujarat and of hairy caterpillars in parts of North Gujarat, the usual crop diseases were rather less virulent than usual.

**Deccan.**—The good rain received in the first half of May was useful for preparatory tillage. The monsoon commenced in good time in June and the rains in this and the following month (July) were good in the West where sowings were done in time and crops progressed well. In East Khandesh and the east of the Division, however, these rains were generally poor with the result that the situation here was one of anxiety at the end of July. In August, the conditions continued satisfactory in the West and the situation was relieved in parts of Khandesh as a result of the good rains received there. But in the East, the rains were again partial and deficient with the result that *Kharif* sowings could not be completed in many areas here and all hopes of the cultivators were centred on the chance of the September rains to allow of *rabi* sowings. During the two succeeding months, September and October, the rains were generally poor in the North Deccan and, in consequence, the standing crops suffered and *rabi* sowings were considerably checked. On the other hand, the rainfall in these two months, especially that in the second week of October, proved to be the turning point in the fortunes of the season of the South Deccan. For, except in the east of the Poona and Satara districts, these rains proved to be quite sufficient almost everywhere, reviving the standing crops which had yet survived and allowing *rabi* sowings to be made on a fairly extensive scale. In the West, the rainfall in these two months was generally upto the requirements of the crops which, in consequence, came out successfully nearly everywhere. In November, the rainfall was about double the usual amount in the North

Deccan and proved very useful for the *rabi* crops there but very injurious to the quality of the cotton grown. In the South Deccan also the rainfall was good, though in the east of the Poona and Satara districts more was still wanted. Light to fair rain in December again in the North Deccan proved beneficial to the *rabi* crops there, but the rain being totally absent in the South Deccan, the crops here, especially in the East, began to suffer. There was fairly heavy and general rain in January. It proved most untimely and damaged seriously the crops of *rabi jowar* and wheat which were nearing maturity. It also spoiled very badly the *jowar* fodder. As a result of the seasonal factors detailed above, the season under review was generally satisfactory in the West. In the other areas, however, owing to the very uneven distribution of rainfall at different places and different periods, the season was nowhere first rate, while it was definitely poor in the East of Ahmednagar, Poona and Satara and parts of East Khandesh. As regards irrigated crops, sugarcane, cotton and groundnut did very well generally but the *jowar* crop was spoiled by the January rains, while wheat was generally poor owing to untimely late rains and absence of cold weather. The mango crop was almost a total failure. With regard to crop diseases, cotton suffered heavily from green caterpillars in Khandesh and the South Deccan, the wheat crop had a slight attack of rust in Nasik, Sholapur and on the Deccan Canals, while the attack of smut on *jowar* was very severe in Ahmednagar and Sholapur districts.

**Karnatak.**—Fairly good rain was received in the first half of May which proved useful for the preliminary field operations. Regular monsoon started early in June. The rainfall in June and July was good in the Mallad (West) where, consequently, the sowing of rice, *nagli* and other *Kharif* crops was done in time and the crops progressed well; but in the East, the rains were very deficient and the sowings were checked in many areas. In August, the rainfall was deficient almost everywhere in the Division and while the crops in the West held their own on the strength of the previous moisture, the situation became definitely anxious in the other areas. In September, the rainfall in the first three weeks was again deficient and the situation was getting critical when excellent showers were received in the last week of the month. These were further supplemented by good rain on the first two days and again in the second week of October with the result that the scales were turned in most parts of the Division. *Rabi* sowings on a fairly extensive scale were eagerly started and the *Kharif* crops which had not yet hopelessly gone were saved. The outlook at the end of October was thus quite hopeful. In November, however, the rainfall was deficient and more was needed especially in the East. In December, the rainfall was only light to fair and was also partial with the result that the crops in the East further deteriorated and the high hopes entertained in October were not realised. There was fairly heavy and general rain in January. This rain though useful to the late-sown *rabi* crops which were still young, in places, proved, on the whole, very injurious to the standing crops which were ripe for harvest and also to grain and fodder lying in threshing yards. It was particularly harmful to cotton, as the opening of the bolls having already commenced, it discoloured cotton in many places. From what

has been said above, it will be seen that the season was excellent in most of the Mallad (Western) tract but was generally poor in the East. For the irrigated crops, the season was very good and the crops of sugarcane, cotton and tobacco did very well generally. As for crop diseases, *Kharif jowar* had a slight attack of grasshoppers in places in the transition tract. The cotton crop, however, was rather hard hit by a serious attack of semi-looper in Gadinad or the central belt and of red-leaf disease on American Cotton in Bijapur.

**Sind.**—The main factor in the agricultural season of this Province is the supply of irrigation water. This unfortunately was bad due to the vagaries of the river Indus. Not only was the river late in rising but it failed fully a month and a half earlier than the normal period of the inundation. The rains, both *Kharif* and *rabi*, were also generally much below the already low average for the Province. The result was that the main *Kharif* crops, viz., cotton and rice, suffered and the *rabi* crops, the bulk of which is sown on the moisture left by the heavy flooding of the land at the close of the inundation, either could not be sown or where sown were below the average for want of sufficient moisture. There was no damage to crops from frost, as no frost worth the name occurred in the season under review. As regards crop diseases and pests, the *Kharif* crops were entirely free from any kind of disease, but rust on wheat occurred late in the season when late-sown crops suffered to some extent; and a very serious attack of an unknown disease, probably of fungus origin, damaged badly the rice in Upper Sind.

## CHAPTER II.—AREA CULTIVATED AND UNCULTIVATED

(Statement No. II, pages 32 to 37)

4. **Number of Villages.**—The total number of villages (22,913½) in the Presidency proper decreased by one, owing to two surveyed villages in the Bhatkal Peta of the Kanara District being amalgamated with the adjoining villages in the same Peta and a new village being formed in the Parola taluka of the East Khandesh District due to survey measurements.

One village each in the Ahmednagar and Kolaba Districts was transferred from the class of 'available statistics' to that of 'unavailable statistics' due to corrections in survey records, while one village in the Bijapur District was surveyed and transferred from the class of 'unavailable statistics' to that of 'available statistics.'

In Sind, the total number of villages increased by three, owing to three unsurveyed *dehs* (villages) in the Shahbunder taluka of the Karachi District being formed into six surveyed *dehs*.

### Total Area and Reporting and Non-reporting Area in the Presidency proper

5. **Total Area.**—The total area showed an increase of 12,000 acres in the Presidency proper, the increase occurring exclusively in the District of Ahmedabad due to the detailed survey of the talukdari villages being taken into account in the year under report.

6. **Reporting Area.**—The total area, for which statistics are regularly collected and reported in the Presidency, rose by 6,000 acres. The districts

that contributed to the increase were Ahmedabad (+14,000 acres) and Kaira and Bijapur (+1,000 acres each). Against this, there was a decline of 10,000 acres in the Kolaba District. The increase in Ahmedabad, Kaira and Bijapur was due to more survey measurements while the decrease in Kolaba was due to corrections in survey records.

7. **Non-reporting Area.**—Under the non-reporting area, Ahmedabad showed a decline of 2,000 acres and Ahmednagar, Bijapur and Ratnagiri of 1,000 acres each, due to new survey measurements. On the other hand, Kolaba showed an increase of 9,000 acres due to corrections in survey records.

#### Total Area and Reporting and Non-reporting Area in Sind

8. In Sind, the total area showed a decline of 71,000 acres owing to an area of about 75,000 acres of the Jati taluka of the Karachi District being transferred to the Cutch State. On the other hand, there was a very slight increase (+4,000 acres) in the Sukkur District. The non-reporting area of the Province remained stationary.

9. **Estimates for Non-reporting Areas.**—Estimates of the probable cropping of the areas for which statistics were not forthcoming were, as usual, received from all the District Officers except Ratnagiri, for which they were added, as usual, in the Director's office.

10. **Cultivated (i.e., occupied) and Uncultivated Area.**—Details regarding this, as compared with the last year, are shown in Appendix A (page 23).

11. **Gross Cropped Area.**—In the Presidency proper, the gross cropped area dropped by 311,000 acres. The districts which were mainly responsible for the decline were the Panch Mahals (— 110,000 acres), Surat (— 52,000 acres), Broach (— 31,000 acres), Ratnagiri (— 96,000 acres), Nasik (— 33,000 acres), Ahmednagar (— 25,000 acres), Sholapur (— 16,000 acres) and Poona (— 10,000 acres), due to deficiency of rains at the time of sowing both the *Kharif* and *rabi* crops in many parts of the Presidency. Against this, there was an expansion of area in Bijapur (+ 35,000 acres), Satara (+ 20,000 acres) and East Khandesh and Belgaum (+ 10,000 acres each) due to the suitability of the sowing rains in parts of these districts.

12. **Twice Cropped Area.**—The area cropped more than once showed a decrease of 159,000 acres mostly in Gujarat and West Khandesh where owing to the short duration of the rainy season, no time was found to raise two or more crops. The decline was specially noticeable in the Panch Mahals (— 97,000 acres), Surat (— 44,000 acres) and West Khandesh (— 11,000 acres). The variations in other districts are small and call for no remarks.

13. **Net Cropped Area.**—This showed a set-back of 152,000 acres in the Presidency proper. The decrease was general but was particularly marked in Gujarat (—161,000 acres) where, owing to the uncertain nature of the rains of the season, sowings were curtailed almost everywhere. There was also a decline of over eighty thousand acres in the Deccan (except Satara which showed a rise of about twenty thousand acres) owing to the failure of the *Kharif* rains in the East and of the

*rabi* rains again in parts of the East and also of the North of the Division. There was also some decrease (—87,000 acres) in the Ratnagiri District. The decrease was, however, partly made up by an extension in the net cropped area in the Karnatak by about fifty thousand acres which was mostly due to the good *Kharif* rains in the West and good *rabi* rains in the East at the time of putting the seed in the ground. The variations in the other districts are generally small and demand no explanation.

In Sind, the gross cropped area, the area cropped more than once and the net cropped area, all fell by 605, 125 and 480 thousand acres respectively owing to the late and poor inundation of the year.

14. **Assessed and Unassessed Area.**—In the Presidency proper, the assessed area increased by 53,000 acres while there was a very slight fall (of 8,000 acres) in the unassessed area. In Sind, the assessed area increased by 194,000 acres and the unassessed area decreased by 298,000 acres.

15. **Temporary Cultivation in Forest Lands and Culturable Waste.**—In the Presidency proper, about 81,000 acres of Forest lands were given out for temporary cultivation mainly in West Khandesh (24,000 acres), Poona (20,000 acres), Sholapur (22,000 acres), Thana (9,000 acres), Ahmednagar (5,000 acres) and Belgaum (1,000 acres); and about 41,000 acres of Culturable Waste mainly in Ahmedabad (5,000 acres), Broach (3,000 acres), East Khandesh (3,000 acres), Nasik (6,000 acres), Poona (6,000 acres), Satara (3,000 acres), Ahmednagar (2,000 acres), Belgaum (4,000 acres), Thana (7,000 acres) and Kolaba (2,000 acres) were similarly dealt with.

In Sind, the area under Forest was nearly the same as last year and that under Culturable Waste increased by 93,000 acres (the increase being shared by all the districts).

### CHAPTER III.—CROPPED AREA

(Statement III, pages 38 to 59)

16. **Variations in Cropped Area.**—The main features of the season and of the harvest have been described elsewhere in the Report. Appendix B (pages 24-25) shows the effect of the season under report on the area sown as compared with the average and with the preceding year's area under principal crops.

17. **Food Crops.**—In the Presidency proper, the area under food crops fell by 631,000 acres or by 3·3 per cent. below the previous year and 1,019,000 acres or 5·2 per cent. below the average. *Jowar* (mostly *rabi*), wheat and gram showed a considerable decline due to want of late rains in many places, but *Bajri* and rice showed an advance due to good early rains at sowing time. Sugarcane cultivation also extended as a result of good water-supply in irrigation sources at the time of planting.

18. **Non-food Crops.**—Among non-food crops, the expansion of area was marked in the case of oilseeds, mostly under groundnut, due to greater foreign demand. Cotton also showed a slight extension due to the stimulus of high prices fetched by the crop in the market in recent years. The area under tobacco was stationary, but there was some decline under the other minor non-food crops.

The net result of the variations in the food and non-food crops, as noted above, was a decrease of 312,000 acres or 1.1 per cent. under the total cropped area of the last year.

19. **Cropped Area in Sind.**—In Sind, with the exception of rice which showed a slight increase due to the incentive of high prices, and tobacco which remained stationary, the area under all the crops, both food and non-food, fell to a considerable extent due to the late and poor inundation of the year.

20. **Kharif and Rabi Seasons.**—The following table compares as usual the *Kharif* and *rabi* seasons of the year in the Presidency proper with those of the preceding two years.

Area in thousands of acres.

Details	1923-24			1924-25			1925-26		
	Cereals	Pulses	Total cereals and pulses	Cereals	Pulses	Total cereals and pulses	Cereals	Pulses	Total cereals and pulses
Karif ..	9,991	1,653	11,644	8,890	1,365	10,255	8,945	1,534	10,479
Rabi ..	6,376	471	6,847	7,687	652	8,339	7,005	483	7,488
Total ..	16,367	2,124	18,491	16,577	2,017	18,594	15,948	2,017	17,967

It will be seen from the above statement that though there was a slight increase in the *Kharif* area as compared with the last year owing to the favourable early rains, the area under *rabi* crops considerably receded owing to deficiency of the late rains.

21. **Variations under Principal Crops.**—The detailed remarks below explain the variations under the principal crops :—

**Jowar and Bajri.**—The following table compares the extent of cultivation of these staple grains in the different divisions of the Presidency :—

Division	Jowari			Bajri		
	Normal *	1924-25	1925-26	Normal *	1924-25	1925-26
Gujarat ..	610	561	530	426	368	291
Deccan ..	4,595	5,531	4,841	3,419	2,405	2,927
Karnatak ..	2,697	2,541	2,448	394	303	414
Total Presidency ..	7,902	8,633	7,819	4,239	3,076	3,632
Sind ..	598	562	496	1,029	1,029	1,019
Grand Total ..	8,500	9,195	8,315	5,268	4,105	4,651

\* Average of the five years 1916-17 to 1922-23 excluding the two abnormal years 1918-19 and 1920-21.

Owing to the failure of the late rains, the area under *jowar* (chiefly *rabi*) showed a considerable drop throughout the Presidency proper of over eight lakhs of acres or 9·4 per cent. below the previous year, but the decline was partly made up by a net increase of 556,000 acres or 18·0 per cent. in the area under *bajri* the cultivation of which increased almost everywhere in the Deccan (except Khandesh) and the Karnatak, though it fell seriously in North Gujarat owing to the indifferent *Kharif* rains there.

In Sind, the decline under both *jowar* and *bajri* was general owing to the unsatisfactory inundation.

**Rice.**—The increase under rice in the Presidency proper is negligible being about 19,000 acres or only one per cent. over the previous year. It was due to the good rains of June and July received in the rice tracts.

In Sind, the area under the crop increased by 28,000 acres, mainly in Upper Sind Frontier (+14,000 acres) and Sukkur (+13,000 acres), under the incentive of high prices.

**Wheat.**—In the Presidency proper, the area under wheat was curtailed by about 284,000 acres mainly in Gujarat (—115,000 acres) and the Deccan (—311,000 acres) due to deficiency of rains at sowing time. Against this, there was an increase of 142,000 acres in the Karnatak owing to the splendid rains of the last week of September and the second week of October.

In Sind, the area under wheat showed a drop of 174,000 acres owing to the late rise and premature fall of the river there.

**Oilseeds.**—In the Presidency proper, the total area under oilseeds (1,220,000 acres) rose by 239,000 acres or by 24·4 per cent. over the area of the previous year and by 338,000 acres or 38·3 per cent. over the average. The groundnut crop alone was responsible for most of the increase (+248,000 acres), the variations under the other oilseeds being generally small.

The table in the margin shows and the following remarks explain the variations under the principal oilseeds as compared with the previous year.

Increase or decrease in thousands of acres as compared with the last year.

Oilseed	Bombay Presidency	Sind
Linseed ..	—14	..
Sesamum ..	+7	—2
Rapeseed and Mustard ..	—11	—213
Groundnut ..	+248	..
Castorseed ..	+19	..
Cocoanut ..	+6	..
Others ..	—25	..

**Groundnut.**—This crop is becoming more and more popular with the cultivators everywhere due to the good prices and the ready sale it obtains in the market, and consequently the area under it is advancing recently almost by leaps and bounds. For instance, during the season under review the area under the crop was fully double that of the previous year in Gujarat and the North Deccan, while even elsewhere there has been a substantial increase in each district without exception. The total area under the crop during the season under report was 592,000 acres against 344,000 acres in the last year. The following table shows the distribution

of the area under the crop, in the year under report, in the various districts of the Presidency proper where the crop is cultivated, as compared with the previous year.

(Area in thousands of acres)

District	1924-25	1925-26	Increase	District	1924-25	1925-26	Increase
Ahmedabad ..	9	18	9	Ahmednagar ..	3	3	..
Kaira ..	2	13	11	Poona ..	13	18	5
Panch Mahals ..	29	44	15	Sholapur ..	8	16	8
West Khandesh ..	23	47	24	Satara ..	103	123	20
East Khandesh ..	117	250	133	Belgaum ..	17	24	7
Nasik ..	8	14	6	Dharwar ..	12	22	10
Total, Bombay Presidency (Proper) ..					344	592	248

The increased cultivation of groundnut is one of the most striking agricultural changes in recent years.

**Sesamum.**—Sesamum, which is principally a *Kharif* crop, showed a slight increase of 7,000 acres in the Presidency as a result of the adequacy of the early rains.

**Linseed.**—The area under linseed receded by 14,000 acres mostly in the North Deccan (Nasik—16,000 acres, Ahmednagar—4,000 acres and West Khandesh—1,000 acres) owing to the deficiency of the late rains, though the decrease was partly made up by an increase in area in Bijapur (+6,000 acres) and Dharwar (+2,000 acres) where the cultivation extended owing to the good rains of the third week of September and early October.

**Rapeseed and Mustard.**—These oilseeds, which are mostly cultivated in Gujarat in the Presidency proper, showed a drop of 10,000 acres in area, due to the deficiency of the late rains in that division (Gujarat).

**Castorseed.**—The area under castorseed advanced by 15,000 acres, mostly in West Khandesh, due to the suitability of the sowing rains there and to the increasing demand for the seed.

**Oilseeds in Sind.**—As regards oilseeds in Sind, the only oilseeds of importance in the Province are Rapeseed and Mustard (which are by far the most important) and sesame, the area under other oilseeds such as linseed, groundnut, castorseed, cocoanut, etc., being quite negligible in this Province. The area under sesame was stationary but that under Rapeseed and Mustard decreased by 213,000 acres below the previous year due to the very unsatisfactory behaviour of the river. The decrease was shared by all the districts.

**Cotton.**—In the Presidency proper, on account of the stimulus of high prices fetched by the crop in recent years and also owing to the favourable rains at the time of sowing in many places, the area under cotton showed an advance of 195,000 acres or 3·9 per cent. over last year. The increase



occurred chiefly in Ahmedabad (+101,000 acres), Broach (+17,000 acres), West Khandesh (+57,000 acres), Nasik (+95,000 acres) and Ahmednagar (+100,000 acres). The increase in Ahmedabad was due rather to the incentive of high prices than the favourable nature of the rains, but in the other districts noted above, both the factors, high prices and the suitability of the sowing rains, contributed to the increase. On the other hand, the area under the crop receded in East Khandesh (— 56,000 acres), Sholapur (— 16,000 acres), Belgaum (— 69,000 acres) and Bijapur (— 81,000 acres) due to the indifferent nature of the sowing rains in many parts of these districts.

In Sind, there was a decline of 38,000 acres or 9·5 per cent. under the previous year and the decline occurred almost exclusively in the two cotton growing districts of Thar Parkar (—23,000 acres) and Nawabshah (—15,000 acres) due to the late and poor inundation in the year.

**Sugarcane.**—In the Presidency proper, the area under sugarcane showed a slight increase of 7,000 acres mostly in the canal areas of the Deccan due to good water-supply in the canals at the time of planting. In Sind, the area under the crop remained stationary.

**Tobacco.**—Among other crops, the area under tobacco receded by four thousand acres in the Presidency, mostly in Gujarat, owing to deficient water-supply there. In Sind, the area under tobacco was almost the same as last year.

**Fruits and Vegetables.**—These showed a slight decline in the Presidency proper (—10,000 acres) due to deficient water-supply, but in Sind the area under them was almost stationary.

#### CHAPTER IV.—IRRIGATED AREA

(Statement No. IV, pages 60 to 69)

22. **Variations in Irrigated Area and Crops.**—Appendix D (page 28) exhibits variations under the several heads of irrigation and crops irrigated as compared with similar details of the previous year.

23. **Area Irrigated.**—In the Presidency proper, the area irrigated remained almost stationary having advanced from 994,000 acres in the previous year to 996,000 acres or by only 0·2 per cent. during the year under report. There were, however, large variations in some parts. The principal variations occurred in Gujarat and in the Nasik, Ahmednagar and Poona Districts in the Deccan. There was thus an increase of 65,000 acres in Gujarat and of 15,000 acres in Ahmednagar in the Deccan where, owing to the failure of the late rains, the fullest use was made of the irrigation facilities available. On the other hand, there was a decrease of 56,000 acres in Poona and 17,000 acres in Nasik, due to shortage of water in wells and other irrigation sources.

24. **Area under different sources of Irrigation in the Presidency proper—**

**Government Canals.**—The area under Government canals decreased by 13,000 acres. The districts which chiefly contributed to the decline were Poona (—17,000 acres), Nasik (—12,000 acres), Sholapur (—2,000 acres),

and Bijapur (— 1,000 acres) owing to shortage of water in canals. On the other hand, there was an increase in Ahmedabad (+ 10,000 acres), Ahmednagar (+ 6,000 acres) and Kaira (+ 1,000 acres) where owing to the failure of the late rains, irrigation from Government canals had to be resorted to as far as possible.

**Private Canals.**—Irrigation from private canals decreased by 19,000 acres, the decrease occurring almost exclusively in the Deccan where it was shared by almost all the districts. The decrease was due chiefly to a shortage of water in these (private) canals, mostly in Nasik, Ahmednagar and Poona.

**Wells.**—Well irrigation showed an increase of 11,000 acres in the Presidency. The increase occurred mainly in North Gujarat (+ 39,000 acres) due to the necessity of helping the crops with well irrigation wherever possible, owing to the failure of late rains. This increase was, however, counterbalanced by a decrease of about 22,000 acres in the Deccan, chiefly in Poona (— 20,000 acres), Bijapur (— 1,000 acres) and Dharwar (— 2,000 acres) due to shortage of water in wells and in Kolaba (— 1,000 acres) and Ratnagiri (— 3,000 acres) in the Konkan where there was not much necessity of helping the crops with irrigation.

**Tanks.**—The increase of 12,000 acres in the area irrigated from tanks was chiefly noticed in the two districts of Sholapur (+7,000 acres) and Kaira (+5,000 acres) and was due to deficiency of rains in these districts and the consequent necessity of helping the crops with irrigation.

**Other sources.**—Under the "other sources" the only district showing a large variation was Ahmedabad (+12,000 acres) and the increase, as already noticed under canals and wells above, was due to the necessity of making the fullest use of all available irrigation facilities.

#### 25. Area Irrigated from Different Sources of Irrigation in Sind—

**Government Canals.**—In Sind, which is mainly dependent for cultivation on irrigation, the area irrigated by Government canals showed a considerable drop (— 240,000 acres) as a result of the poor inundation of the year and the decrease was shared by all the districts except Karachi where the area remained stationary.

**Private Canals.**—There is hardly any cultivation, worth the name, under private canals in Sind except in the district of Sukkur. In this district, the area fell from 25,000 acres during the previous year to 15,000 acres during the year under report owing to shortage of water in the canals.

**Wells.**—Irrigation by wells showed an advance of 6,000 acres and this increase was shared by almost all the districts as, the inundation being poor, greater use had to be made of the well water available.

**Tanks.**—The area irrigated by tanks is insignificant in Sind—the total area in the Province hardly exceeding a thousand acres and that too is confined to the Sukkur district. Here it remained stationary.

**Other Sources.**—Irrigation from other sources fell by 27,000 acres due to deficient water supply and the decrease was shared by almost all the districts.

26. **The ratio of irrigated area to net cropped area was 3·7 per cent. in the Presidency and 76·4 per cent. in Sind.**

27. **Crops Irrigated (Presidency Proper)**—

**Jowar.**—The area under irrigated *jowar* showed an expansion of 9,000 acres. This increase was chiefly marked in Ahmedabad (+16,000 acres) where, owing to the absence of the late rains, the crop had to be irrigated to save it from withering away and in Sholapur (+9,000 acres) where preference was given to the crop for its fodder. Against this, there was a decline in Poona (—10,000 acres) and Ahmednagar (—7,000 acres) due to shortage of water in the irrigation sources.

**Bajri.**—Irrigated *bajri* declined by 19,000 acres. The decline occurred chiefly in Poona (—10,000 acres), Nasik (—4,000 acres), Ahmednagar (—3,000 acres) due to deficiency of water in wells and other sources of irrigation in these districts.

**Rice.**—The area under irrigated rice rose by 21,000 acres, the increase being chiefly marked in two districts of North Gujarat, *viz.*, Ahmedabad (+13,000 acres) and Kaira (+9,000 acres), where the crop had to be raised chiefly by the help of irrigation owing to the precarious condition of rainfall.

**Wheat.**—Irrigated wheat showed a decline of 11,000 acres, chiefly in Nasik (—13,000 acres) and Poona (—3,000 acres) due to deficient water supply in wells. On the other hand, there was an increase of 4,000 acres in Ahmedabad where, in the absence of the late rains, the crop had to be helped with irrigation to save it from destruction.

**Cotton.**—Under the stimulus of high prices the area under irrigated cotton slightly increased—by 8,000 acres—but the increase was not striking in any particular district to call for special remarks.

**Sugarcane.**—The area under sugarcane increased by 6,000 acres mostly in the Canal areas of the Deccan due to good water supply in canals there at the time of planting.

In this connection it may be stated that the area under sugarcane over the whole Bombay Presidency is gradually increasing under canals while the proportion of the total area under the other sources, including wells, is rapidly decreasing. Thus in 1915-16, out of the total of 66,000 acres under sugarcane only 20,000 acres or 30 per cent. were irrigated by Government canals while the remaining 46,000 acres or 70 per cent. were irrigated from "other sources". In 1921-22, the area irrigated by Government canals rose to about 40 per cent., the canals irrigating 21,000 acres out of the total acreage of 54,000 acres under the crop, while in 1924-25, the latest year for which figures of irrigation under Government canals are available, the area irrigated by Government canals exceeded 60 per cent.—the canals irrigating about 36,000 acres out of the total of 59,000 acres under the crop.

This change is still more remarkable in the Deccan where the largest development of Government canals has taken place. Here cane

cultivation under wells is rapidly disappearing in the last ten years, the figures being as follows :—

—			Total area under sugarcane	Area under Government canals	Proportion under Government canals
			Acres	Acres	Per cent.
1915-16	..	..	40,101	19,373	48·3
1920-21	..	..	35,336	22,196	62·8
1924-25	..	..	37,003	34,235	92·5

The phenomenon is one of the most striking changes in agricultural practice in recent years.

Considering the variations in area under sugarcane in relation to prices of *gul* it appears that the limit of cultivation has been nearly reached ; for, in spite of the favourable prices of *gul* which prevailed about end of 1924, the area did not exceed 65,000 acres and it seems doubtful whether anything like the acreage of 1917-18, *viz.*, 92,000 acres, will be again attained in the near future.

28. **Crops Irrigated (Sind).**—In Sind, the area under irrigated **rice** rose by 28,000 acres under the incentive of high prices fetched by the grain as compared with other food grains, but the areas under all the other irrigated crops such as **Jowar** (— 32,000 acres), **bajri** (— 24,000 acres), **wheat** (— 105,000 acres), **cotton** (— 36,000 acres), etc., fell considerably owing to the late rise and early fall of the river.

#### CHAPTER V.—OUTTURN OF CROPS

(Statements V and V-A, pages 70 to 86)

29. **Yield of Principal Crops.**—Statement V (pages 70-71) shows the estimated yield of the principal *kharif* and *rabi* crops in parts of 100 which is taken as normal. It is prepared from the district estimates which are returned in annas taking twelve annas to represent a normal crop. The figures are therefore approximate only. The character of the season has already been described elsewhere.

30. **Outturn of Crops in the Presidency Proper in parts of the normal—**

##### A—Kharif Crops—

**Jowar.**—Except Ahmedabad, the Panch Mahals and Poona where it was only about one-third the normal and in West Khandesh and Thana where it was nearly normal, the outturn of *kharif jowar* ranged from one-half to three-fourths of the normal in all the districts.

**Bajri.**—The yield of *bajri* was about four-fifths of the normal in Surat, West Khandesh and Nasik and only two-fifths of the normal in Sholapur. In all other districts it ranged between one-half and three-fourths of the normal.

**Rice.**—Rice returned nearly a normal yield throughout the Konkan except Kanara where the outturn came to about three-fourths of the normal. In Broach, West Khandesh, Nasik, Satara and Dharwar it yielded about four-fifths of the normal, while in the remaining districts of the Deccan and Karnatak it yielded from one-half to three-fourths of the normal. Throughout Gujarat (except Broach), however, the crop was definitely poor and returned only between one-fourth and two-fifths of the normal yield.

**Cotton.**—The yield of cotton ranged between one-half and three-fourths of the normal in all the Gujarat districts and between one-half and two-thirds of the normal in all the Deccan districts. In the Karnatak, however, the yield was more varying, for whereas it was three-fourths of the normal in Dharwar and four-fifths of it at Belgaum, it came only to two-fifths of the normal in Bijapur.

**Sesame.**—Except in Sholapur where it came only to one-third of the normal, the yield of sesame ranged from one-half to two-thirds of the normal in the Deccan and from one-half to three-fourths of the normal in the Karnatak. In the Konkan, while the outturn was about two-thirds of the normal in Kanara and about the normal in Kolaba, it was four-fifths of the normal elsewhere. In Gujarat, the crop was almost a failure in the North, where its outturn ranged from one-sixth to one-third of the normal. In South Gujarat, however, it was a little better, the yield coming to one-half the normal at Surat and three-fourths of the normal in Broach.

**B.—Rabi Crops—**

**Jowar (Rabi).**—The yield of *rabi jowar* came to two-fifths of the normal in Ahmedabad and two-thirds of the normal in Broach and Surat in Gujarat. In the Deccan, it was about four-fifths of the normal in Sholapur and about the normal in West Khandesh. In the other districts of the Deccan, it ranged between one-half and two-thirds of the normal. In the Karnatak, the yield was two-fifths, three-fourths and two-thirds of the normal in Belgaum, Bijapur and Dharwar respectively.

**Wheat.**—The yield of wheat varied very widely in different districts of Gujarat. Thus, the yield was only one-fourth of the normal in Surat, about half the normal in Broach and Kaira, nearly two-thirds of the normal in Ahmedabad and four-fifths of it in the Panch Mahals. In the Deccan, the outturn was about one-half the normal in Poona and nearly a full normal in West Khandesh. In the other districts of the Division, it ranged from two-thirds to four-fifths of the normal. In the Karnatak, wheat returned from a little over one-half to two-thirds of the normal.

**Gram.**—The yield of gram ranged between one-third and one-half the normal in Gujarat, between two-thirds and a full normal in the Deccan (except in Poona where it was somewhat less than one-half the normal), between one-half and two-thirds of the normal in the Karnatak and between two-thirds and four-fifths of the normal in the Konkan.

**Tobacco.**—Tobacco yielded from one-half to two-thirds of the normal in Gujarat, between one-half and three-fourths of the normal in the Deccan

(except in West Khandesh where its outturn came to four-fifths of the normal) and from two-thirds to three-fourths of the normal in the Karnatak.

**Linseed.**—The yield of linseed was only about one-sixth the normal in the Panch Mahals and one-fourth of the normal in Poona. In West Khandesh and Dharwar, the outturn was four-fifths and three-fourths of the normal respectively. Everywhere else in the Presidency where the crop is cultivated, the outturn ranged from one-half to two-thirds of the normal.

**Rapeseed and Mustard.**—The outturn of rapeseed and mustard came to one-third the normal in the Panch Mahals, a little over one-half the normal in Ahmedabad and West Khandesh, about two-thirds of the normal in Kaira and Nasik and three-fourths of the normal in Dharwar. The crop is not grown to any appreciable extent in the other districts of the Presidency.

### 31. Outturn of Crops in Sind in parts of the normal—

#### A.—Kharif Crops—

**Jowar.**—In Sind, *kharif jowar* returned about one-half the normal in Karachi, Nawabshah and Larkana, two-fifths of the normal in Thar Parkar and Sukkur and from two-thirds to three-fourths of the normal elsewhere.

**Bajri.**—*Bajri* was almost a failure in Thar Parkar and returned about one-sixth of the normal in that district, but in the other districts of the Province the outturn of the crop ranged from one-half to two-thirds of the normal.

**Rice.**—Rice was very poor in Sukkur where it yielded only one-fourth of the normal. In Karachi and Hyderabad it yielded about three-fourths of the normal and in Upper Sind Frontier about four-fifths of the normal. In the other districts the yield of the crop came to about one-half the normal.

**Cotton.**—The yield of cotton ranged between one-half and two-thirds of the normal in all the districts of the Province.

#### B.—Rabi Crops—

**Wheat.**—Except in Thar Parkar where it came to one-third of the normal and in Larkana where it was a little over one-half the normal the yield of wheat was about two-thirds of the normal in all the districts in Sind.

**Gram.**—The yield of gram was about two-fifths of the normal in Nawabshah and Sukkur and three-fourths of the normal in Upper Sind Frontier. Everywhere else the outturn of the crop ranged from one-half to two-thirds of the normal.

**Tobacco.**—Except in Thar Parkar where it was two-fifths of the normal and in Upper Sind Frontier where it was four-fifths of the normal, the yield of tobacco varied from one-half to two-thirds of the normal.

**Rapeseed and Mustard.**—Except in Thar Parkar where it was one-fourth of the normal and in Sukkur where it was four-fifths of the normal

the yield of rapeseed and mustard ranged between two-fifths and a little over one-half the normal.

**32. Outturn of Sugarcane in the Presidency and Sind in parts of the normal.**—In Gujarat, sugarcane yielded about one-half the normal in Ahmedabad, and four-fifths of it in the Panch Mahals. In all the other districts of the division, the yield came to about three-fourths of the normal. The crop yielded about two-thirds of the normal in East Khandesh and three-fourths of it in Bijapur. Everywhere else in the Presidency, the outturn ranged between four-fifths and a full normal.

In Sind, the yield of sugarcane came to two-fifths of the normal in Thar Parkar, a little over one-half of it in Larkana and about four-fifths of the normal in Upper Sind Frontier. In all the other districts, the yield amounted to two-thirds of the normal.

**33. Outturn in Tons of Food-grain Crops.**—Statement V-A (pages 72 to 86) compares the acreage under food grain crops (cereals and pulses) in the various divisions of the Presidency and their approximate outturn in tons during the year under report with similar statistics for the two preceding years. The following table sums up the result.

Division	Area in thousands of acres			Outturn in thousands of tons		
	1923-24	1924-25	1925-26	1923-24	1924-25	1925-26
Gujarat .. ..	1,941	2,092	1,798	498	734	440
Deccan .. ..	10,555	10,627	10,219	1,611	2,010	1,757
Karnatak .. ..	4,397	4,282	4,451	549	974	816
Konkan .. ..	1,599	1,593	1,499	642	671	624
Total Bombay Presidency ..	18,492	18,594	17,967	3,300	4,389	3,637
Sind .. ..	3,624	3,899	3,528	933	1,042	809
Grand Total ..	22,116	22,493	21,495	4,233	5,431	4,446

It will be noticed that while the area under food-grains in the Presidency fell only by 3.4 per cent. the outturn fell by as much as 17.1 per cent. below the previous year thus depicting the unfavourable character of the season under review over a large part of the Presidency.

In Sind, as a result of the late rise and early fall of the river, there was a drop both in the area as well as in the yield, of the food crops—of 9.6 per cent. in area and of 22.4 per cent. in outturn—as compared with the previous year. It will be noticed that, like the Presidency proper, even in this Province (Sind) the drop in outturn was proportionately much more than the drop in area, which exhibits the unsatisfactory condition of things in this Division (Sind) also.

## CHAPTER VI.—PRICES, TRADE AND STOCK

**34. Prices of Principal Articles.**—Statement VI (pages 87 to 89) shows in detail the retail prices of the principal staples and of fodder ruling at harvest time at each district head-quarter station in the Presidency and in Sind. The detailed remarks, below, explain the variations in prices of the principal articles.

**Jowar.**—In the Presidency proper, *jowar* was dearer by one to two seers per rupee at Ahmedabad, Godhra (Panch Mahals), Dhulia (West Khandesh) and Jalgaon (East Khandesh), while its price was generally constant at Surat, Poona and Karwar (Kanara). At all the other stations the price of the article ruled easier by from one to two and three-fourths seers per rupee.

In Sind, the price of the article rose by two and a half seers per rupee at Nawabshah, but at the other stations the rise ranged only between two-thirds and one and two-thirds seers per rupee.

**Bajri.**—Except at Broach, Jalgaon (East Khandesh), Nasik, Poona and Thana, where it was almost stationary in price and at Ahmedabad, Godhra (Panch Mahals), Surat and Dhulia (West Khandesh), where it was dearer by a little over one seer per rupee, *bajri* ruled cheaper by from three-fourths of a seer to one and a half seers per rupee at all the stations in the Presidency. At Kaira, however, it was dearer by as much as three seers per rupee.

In Sind, *bajri* was almost stationary in price at Karachi but was dearer by from one to two seers per rupee at all the other stations.

**Rice.**—Except at Godhra (Panch Mahals), Sholapur, Satara and Karwar (Kanara), where the price of rice was dearer by from one-third to three-fourths of a seer per rupee and at Kaira where it was cheaper by one and a quarter seers per rupee, the price of the article was either stationary or showed a slight fall.

In Sind, the price of rice was almost the same as last year at Mirpurkhas (Thar Parkar), Nawabshah and Sukkur. At Hyderabad and Jacobabad (Upper Sind Frontier) it was cheaper by one-half seer and one seer per rupee respectively, while at Karachi and Larkana it was dearer by one-third and four-fifths of a seer per rupee respectively.

**Wheat.**—The price of this article was almost stationary throughout Gujarat, except Surat where it was cheaper by about four-fifths of a seer per rupee. In the rest of the Presidency except at Satara, Ratnagiri and Karwar (Kanara) where it rose by one-third to one-half seer per rupee, the price ruled easier by one-fourth to one and one-third seers per rupee.

In Sind, the price of wheat was nearly stationary at Mirpurkhas (Thar Parkar) and rose by a little over a seer at Nawabshah but fell everywhere else by about one-third of a seer per rupee.

**Gram.**—Gram was almost steady in price at Godhra (Panch Mahals) and Broach in Gujarat, and at Poona and Sholapur in the Deccan. At all other stations, however, it rose in price by from about a seer to two seers and a quarter per rupee.



In Sind, the price of the article was nearly the same as last year at Hyderabad, Mirpurkhas (Thar Parkar) and Jacobabad (Upper Sind Frontier) but rose by one-third of a seer to one seer per rupee at the other stations in the Province.

**Turdal.**—*Turdal* ruled easier by one-third of a seer per rupee at Surat, by one and a half seers per rupee at Jalgaon (East Khandesh) and by three-fourths of a seer per rupee at Ratnagiri. It was stationary in price at Nasik, Poona, Thana and Karwar (Kanara), while at the other stations it rose by from one-half to one and a quarter seers per rupee.

In Sind, where *mugdā* is used in place of *turdal*, the price of the article (*mugdā*) was either stationary or showed but slight variations except at Sukkur and Karachi where it was dearer by two-thirds of a seer and one seer per rupee respectively.

**Gul or Raw Sugar.**—The price of *gul* was stationary at Ahmedabad and Alibag (Kolaba) and nearly so at Kaira, Broach, Surat, Dhulia (West Khandesh), Jalgaon (East Khandesh) and Ratnagiri. At the other stations in the Presidency, the price rose by from one-third of a seer to one and one-third seers per rupee.

In Sind, the price of the article was the same as last year at Nawabshah and nearly so at Karachi, Sukkur and Jacobabad (Upper Sind Frontier). At Larkana, the price ruled easier by one-third of a seer per rupee, while at Hyderabad and Mirpurkhas (Thar Parkar) it rose by one-half and one-third of a seer per rupee respectively.

**Tobacco.**—Tobacco ruled easier by about one-half of a seer per rupee at Kaira and by one-fourth seer per rupee at Broach and Karwar (Kanara). On the other hand, it was dearer by one-half seer at Godhra (Panch Mahals) and by a quarter of a seer at Ahmednagar. At the other stations, however, the price of the article was either stationary or showed but slight variations—of less than one-fifth of a seer per rupee.

In Sind, the price of tobacco was nearly the same as last year at all the stations except Sukkur.

**Cotton.**—Under the incentive of high prices fetched by the crop during recent years and the suitability, if not sufficiency, of the rains at sowing time in places, the area under Cotton in the Presidency including Sind, Western India Agency and other Indian States stood at 8,117 thousand acres, thus showing a rise of 404 thousand acres or 5·3 per cent. over the last year but the outturn fell from 1,589 thousand bales to 1,566 thousand bales, owing to deficient moisture, thus showing a drop of 23,000 bales or 1·5 per cent. below the previous year. Of this total outturn (of 1,566,000 bales), 476 thousand bales or 30·4 per cent. represented the yield of the long stapled Broach, Dharwar and Kumpta varieties while the remaining 1,090 thousand bales or 69·6 per cent. belonged to short-stapled varieties of Khandesh, Gujarat and Sind. As compared with the previous year the outturn of the long-stapled cotton fell by 6·1 per cent. but that of the short-stapled cotton remained almost stationary.

The following table compares the prices of cotton during the year under report with those of the previous year and the average of the preceding five years:—

Variety	Price per bale of 400 lbs.			Decrease	
	Average of five years ending 1924	Average of the seven months ending 31st July		Compared with the average	Compared with the price in 1925
		1925	1926		
	Rs.	Rs.	Rs.	Per cent.	Per cent.
Broach .. ..	254	245	183	28·0	25·3
Khandesh .. ..	188	235	153	18·6	34·9
Dharwar .. ..	238	233	175	26·5	24·9

It will be seen that the prices for all the varieties fell considerably both as compared with the last year and with the average of the preceding five years. This serious fall in prices was due mainly to the demand for Indian Cotton in the foreign market being not as keen as during the previous year and partly due to the quality of cotton being seriously affected by the untimely rains of January in many places.

**Fodder.**—Generally speaking, it may be stated that there was no actual scarcity of fodder, during the year under report, except in North Gujarat. This was not because the season under review produced enough, but because as a result of the favourable nature of the previous season (1924-25), ample stocks of fodder were available and this saved the situation in many places. In North Gujarat, however, considerable scarcity of fodder was felt in the early months of 1926 when prices rose very high and people had to resort to grass stored for famine purposes to save their cattle.

**Dry Grass.**—Dry grass was somewhat dearer at Ahmedabad and Broach in Gujarat and cheaper at Dhulia (West Khandesh), Poona, Satara and Belgaum. Everywhere else in the Presidency the price was either stationary or showed only slight variations.

In Sind, except at Mirpurkhas (Thar Parkar) where it was much dearer, dry grass remained almost steady in price at all the other stations.

**Jowari Kadbi.**—This was very much dearer at Ahmedabad and much dearer at Kaira, Broach and (Jalgaon), while it was appreciably cheaper at Sholapur, Satara and Ratnagiri. Everywhere else in the Presidency it was either stationary or showed only slight difference in the market rate.

In Sind, except at Sukkur, where it was appreciably cheaper, the price of the article remained almost constant at the other stations of the Province.

**CHAPTER VII.—AGRICULTURAL STOCK**

35. Information under this head is collected only once in five years. The result of the last enumeration has been published in the Season and Crop Report for the year 1924-25.

**CHAPTERS VIII AND IX.—CONDITION OF THE AGRICULTURAL POPULATION**

36. Generally speaking, the agricultural season of 1925-26 was, so far as the actual produce of the land is concerned, decidedly inferior to its predecessor. Though the outturn of crops was generally up to the standard in most parts of the Konkan and in the West Deccan and Karnatak, excepting in these favoured areas, it was first rate nowhere; while in most parts of Gujarat and East Khandesh and in many places in the East Deccan and Karnatak it was definitely poor. As a result, remissions and suspensions of Land Revenue were found necessary in parts of Gujarat, the Deccan and Karnatak to ameliorate the distress in these areas. Fortunately, as a result of the favourable nature of the previous season (1924-25), ample stocks of food-grains and fodder were available and there was, thus, no actual scarcity of food or fodder in any area during the year under report except in parts of North Gujarat and Khandesh where scarcity of fodder was felt later in the season. The scarcity, however, was nowhere so acute in the Presidency, as to affect the agricultural stock seriously. There was also no serious disease among cattle during the year under review (except a rather serious attack of rinderpest in parts of Kanara) and the condition of cattle was, thus, generally good in the Presidency. In Sind, however, the condition of cattle was far from satisfactory on account of the scarcity of fodder.

37. Prices of Agricultural products remained either constant or showed a downward tendency, while in the case of articles like cotton, *gul*, turmeric, etc., they showed a considerable drop. On the other hand, wages continued high and scarcity of labour was felt in many places. The net result was that for the classes labouring for cash wages, conditions, during the year, continued very satisfactory. For, while the wages continued high, the prices showed, if anything, a downward tendency. This meant an increase in the purchasing power of agricultural labourers. In other words, they could better afford to live in a state of reasonable ease and comfort. The self-dependent small farmer with an economic holding, chiefly using his own labour in producing food for himself, has not suffered seriously though the fall in prices coupled with sub-normal yields in parts must have caused more difficulty in paying the high labour charges and the Government assessment. But the larger man, chiefly cultivating by employed labour, has been very hard hit almost everywhere. Thus for example, the year under report has been a very unsatisfactory one for the growers of sugarcane, cotton and turmeric as compared with those to which the people have been accustomed during the past, as the low prices of the products coupled with low yields and the increased cost of cultivation have given a severe blow to the cultivation of these crops.

38. The general result seems to be a rise in the prosperity of the labouring classes in the rural areas. The small farmer who cultivates his

own land, produces crops essentially for maintenance, and employs the minimum of labour is hardly holding his own, while the larger man producing market crops and employing labour largely in his work has suffered badly. These facts may lead to very marked economic changes in future, but it is not possible, at this stage, to forecast the nature of these changes as everything will depend on whether the conditions mentioned above continue for some years.

## APPENDIX A

## CULTIVATED AND UNCULTIVATED AREA

Area in thousands of acres

Details 1	Bombay Presidency (Proper)			Sind		
	1924-25 2	1925-26 3	Increase (+) or decrease (-) per cent. 4	1924-25 5	1925-26 6	Increase (+) or decrease (-) per cent. 7
<b>A.—Cultivated area</b>	Acres	Acres	Per cent.	Acres	Acres	Per cent.
Gross cropped area ...	28,138	27,826	- 1.1	4,884	4,260	-12.4
Area cropped more than once	646	487	-24.6	439	314	-28.6
Net area cropped ...	27,492	27,339	- 0.7	4,425	3,946	-10.8
Current fallows ...	5,962	6,160	+ 3.4	5,072	5,446	+ 7.4
Assessed ...	33,304	33,357	+ 0.2	8,695	8,888	+ 2.2
Unassessed ...	150	142	- 5.3	802	504	-37.2
<b>Total, Cultivated area ...</b>	<b>33,454</b>	<b>33,499</b>	<b>+ 0.1</b>	<b>9,497</b>	<b>9,392</b>	<b>- 1.1</b>
<b>B.—Uncultivated area</b>						
Available for cultivation (culturable waste)	913	900	- 1.4	5,967	6,060	+ 1.6
Not available for cultivation { Forest ...	8,535	8,511	- 0.3	784	785	+ 0.1
{ Others ...	5,798	5,802	+ 0.1	13,860	13,900	- 0.5
<b>Total, Uncultivated area...</b>	<b>15,246</b>	<b>15,213</b>	<b>- 0.2</b>	<b>20,661</b>	<b>20,695</b>	<b>+ 0.2</b>
<b>Total Area ...</b>	<b>48,700</b>	<b>48,712</b>	<b>.....</b>	<b>30,158</b>	<b>30,087</b>	<b>- 0.2</b>

## APPENDIX

## CROPPED

Area in thousands

Crops	Bombay Presidency (Proper)				
	Average*	1924-25	1925-26	Percentage by which area in 1925-26 exceeds (+) or falls short of (-) the	
	1	2	3	Average	Area in 1924-25
				5	6
I.—Food crops	Acres	Acres	Acres	Per cent.	Per cent.
(a) Cereals and pulses—					
Jowari ...	7,902	8,635	7,819	- 1.1	- 9.4
Bajri ...	4,239	3,076	3,632	-14.3	+18.0
Rice ...	1,911	1,887	1,906	- 0.3	+ 1.0
Wheat ...	1,627	1,418	1,134	-30.3	-20.0
Gram ...	605	501	413	-31.7	-17.6
Others ...	2,577	3,077	3,063	+18.8	- 0.4
Total cereals and pulses ...	18,861	18,594	17,967	- 4.8	- 3.4
(b) Sugarcane ...	66	59	65	- 1.5	+10.9
(c) Other food crops†	548	494	424	-22.6	- 9.3
Total, Food crops ...	19,475	19,087	18,456	- 5.2	- 3.3
II.—Non-food crops					
(a) Tobacco ...	100	116	114	+14.0	- 1.7
(b) Oil seeds ...	882	931	1,220	+58.3	+24.4
(c) Cotton ...	3,860	4,917	5,112	+32.4	+ 3.9
(d) Other non-food crops‡	2,602	3,037	2,924	+12.4	- 3.7
Total, Non-food crops ...	7,444	9,051	9,370	+ 25.9	+ 3.5
Total, Crops	26,919	28,138	27,826	+ 3.4	- 1.1

\* Average of the five years 1916-17 to 1922-23 excluding the two abnormal years 1918-19 and 1923-24.

† These include fruits, vegetables and miscellaneous food crops.

‡ These include condiments and spices, dyes, drugs and narcotics (excluding tobacco which

## B

## AREA

of acres

Sind					Crops
Average*	1924-25	1925-26	Percentage by which area in 1925-26 exceeds (+) or falls short of (-) the		
			Average	Area in 1924-25	
7	8	9	10	11	1
Acres	Acres	Acres	Per cent.	Per cent.	<b>I—Food Crops</b>
598	562	496	-17.1	-11.7	(a) Cereals and pulses—
1,029	1,029	1,019	- 0.9	- 0.9	Jowari.
1,152	1,175	1,303	+ 4.4	+ 2.4	Bajri.
556	541	367	-35.0	-32.2	Rice.
161	240	173	+ 7.4	-27.9	Wheat.
297	352	270	- 9.1	-23.3	Gram.
3,793	3,899	3,528	- 7.0	- 9.5	Others.
4	4	3	-25.0	-25.0	Total cereals and pulses.
48	49	49	+ 3.1	.....	(b) Sugarcane.
3,845	3,962	3,580	- 6.9	- 9.5	(c) Other food crops.†
					<b>Total, Food crops.</b>
					<b>II—Non-Food crops</b>
8	7	7	-12.5	.....	(a) Tobacco.
367	387	217	-33.2	-43.9	(b) Oil seeds.
944	400	362	+48.4	- 9.5	(c) Cotton.
130	118	94	-27.7	-20.3	(d) Other non-food crops.‡
739	912	680	-8.0	-25.4	<b>Total, Non-food crops</b>
4,584	4,564	4,260	-7.1	-12.3	<b>Total, Crops.</b>

1920-21.

has been separately noted), fodder and miscellaneous non-food crops.

## APPENDIX C—

Percentage of the gross cropped area in each

No.	District	Food								
		Cereals and pul								
		Rice	Wheat	Barley	Jowari	Bajri	Ragi	Maize	Gram	Other cereals & pulses
1	2	3	4	5	6	7	8	9	10	11
<b>BOMBAY PRESIDENCY</b>										
<b>Gujarat</b>										
1	Ahmedabad ...	3	4	...	19	9	...	...	...	5
2	Kaira ...	11	1	...	5	13	7	...	...	17
3	Panch Mahals ...	12	...	...	2	7	3	27	1	11
4	Broach ...	2	2	...	19	1	...	...	...	7
5	Surat ...	11	...	...	11	1	1	...	...	5
	Average ... { 1925-26	7	2	...	13	7	2	3	...	8
	1924-25	6	4	...	13	8	2	3	2	9
<b>Deccan</b>										
6	West Khandesh ...	4	6	...	9	21	1	...	2	11
7	East Khandesh ...	1	2	...	13	13	...	...	...	19
8	Nasik ...	3	8	...	5	41	5	...	3	12
9	Ahmednagar ...	1	4	...	39	27	1	...	2	5
10	Poona ...	4	3	...	48	30	2	...	2	4
11	Sholapur ...	...	1	...	75	4	...	...	2	3
12	Satara ...	2	2	...	39	13	2	...	3	8
	Average ... { 1925-26	2	4	...	33	20	1	...	2	8
	1924-25	2	6	...	38	16	2	...	2	7
<b>Karnatak</b>										
13	Belgaum ...	6	5	...	34	7	2	1	2	13
14	Bijapur ...	...	6	...	45	10	...	...	1	4
15	Dharwar ...	7	12	...	23	...	2	...	2	11
	Average ... { 1925-26	4	7	...	35	6	1	...	1	9
	1924-25	4	5	...	37	4	1	...	1	9
<b>Konkan</b>										
16	Thana ...	53	...	...	...	...	7	...	...	6
17	Bombay Suburban ...	38	...	...	...	...	...	...	...	...
18	Kolaba ...	69	...	...	...	...	9	...	...	9
19	Ratnagiri ...	41	...	...	...	...	16	...	...	17
20	Kanara ...	64	...	...	...	...	1	...	...	2
	Average ... { 1925-26	52	...	...	...	...	10	...	...	10
	1924-25	52	...	...	...	...	11	...	...	11
	Average of Bom- bay Presidency (Proper.) { 1925-26	7	4	...	28	13	2	1	1	8
	1924-25	7	5	...	31	11	2	1	2	8
<b>Sind</b>										
21	Karachi ...	63	3	2	6	3	...	1	...	6
22	Hyderabad ...	40	7	...	1	23	...	...	...	1
23	Thar Parkar ...	7	2	...	1	71	...	...	...	...
24	Nawabshah ...	7	7	...	20	24	...	...	2	4
25	Larkana ...	48	9	...	15	...	...	...	3	15
26	Sukkur ...	17	26	...	27	5	...	...	11	6
27	Upper Sind Frontier ...	22	11	...	22	14	...	...	17	7
	Average of Sind. { 1925-26	28	9	...	11	24	...	...	4	6
	1924-25	24	11	...	12	21	...	...	5	7
	Average of the Presidency in- cluding Sind. { 1925-26	10	5	...	26	14	2	1	2	8
	1924-25	9	6	...	28	12	2	1	2	8



DISTRIBUTION OF CROPS

district of the Bombay Presidency including Sind

crops			Non-food crops				Total			District	No.
Total cereals & pulses	Other food crops	Total food crops	Cotton	Oil seeds	Other non-food crops	Total non-food crops	Food crops	Non-food crops	Food and non-food crops		
										12	13
<b>BOMBAY PRESIDENCY</b>											
<b>Gujarat</b>											
40	2	42	45	4	9	58	42	58	100	Ahmedabad	1
54	3	57	17	6	20	43	57	43	100	Kaira	2
63	1	64	9	14	13	36	64	36	100	Panch Mahals	3
31	1	32	57	2	9	68	32	66	100	Brosch	4
29	1	30	27	1	42	70	30	70	100	Surat	5
42	2	44	33	5	18	56	44	56	100	1925-26 } Average 1924-25 }	
47	3	50	29	4	17	50	50	50	100		
<b>Deccan</b>											
54	1	55	36	8	1	45	55	45	100	West Khandesh	6
42	1	43	43	13	1	57	43	57	100	East Khandesh	7
77	2	79	8	7	6	21	79	21	100	Nasik	8
79	2	81	9	2	8	19	81	19	100	Ahmednagar	9
83	2	85	3	3	12	15	85	15	100	Poona	10
85	1	86	2	1	11	14	86	14	100	Sholapur	11
63	3	66	1	6	27	34	66	34	100	Satara	12
70	2	72	13	5	10	28	72	28	100	1925-26 } Average 1924-25 }	
73	2	75	12	4	9	25	75	25	100		
<b>Karnatak</b>											
69	2	71	4	2	13	29	71	29	100	Belgaum	13
66	1	67	28	2	3	33	67	33	100	Bijapur	14
57	1	58	33	2	7	42	58	42	100	Dharwar	15
63	1	64	26	2	8	36	64	36	100	1925-26 } Average 1924-25 }	
61	3	64	28	1	7	36	64	36	100		
<b>Konkan</b>											
66	1	67	...	1	32	33	67	33	100	Thana	16
33	5	43	...	2	55	57	43	57	100	Bombay Suburban	17
87	3	90	...	1	9	10	90	10	100	Kolaba	18
74	2	76	...	7	17	24	76	24	100	Ratnagiri	19
67	3	70	...	5	25	30	70	30	100	Kanara	20
72	3	75	...	4	21	25	75	25	100	1925-26 } Average 1924-25 }	
74	3	77	...	4	19	23	77	23	100		
64	2	66	18	5	11	34	66	34	100	1925-26 } Average of Bom- 1924-25 } bay Presidency (Proper.)	
67	3	70	17	3	10	30	70	30	100		
<b>Sind</b>											
84	3	87	...	8	6	13	87	13	100	Karachi	21
72	2	74	13	8	6	26	74	26	100	Hyderabad	22
81	...	81	17	1	1	19	81	19	100	Thar Parkar	23
64	...	64	26	5	5	36	64	36	100	Nawabshah	24
90	1	91	...	8	1	9	91	9	100	Larkana	25
92	2	94	...	4	2	6	94	6	100	Sukkur	26
99	1	94	...	5	1	6	94	6	100	Upper Sind Frontier	27
82	1	83	9	5	3	17	83	17	100	1925-26 } Average of Sind 1924-25 }	
80	1	81	8	8	3	19	81	19	100		
68	1	69	17	4	10	31	69	31	100	1925-26 } Average of the 1924-25 } Presidency in- cluding Sind.	
65	2	70	16	4	10	30	70	30	100		

## APPENDIX D

## IRRIGATED AREA

Area in thousands of acres

Details 1	Bombay Presidency (Proper)			Sind		
	1924-25 2	1925-26 3	Increase (+) or decrease (-) per cent. 4	1924-25 5	1925-26 6	Increase (+) or decrease (-) per cent. 7
	Acres	Acres	Per cent.	Acres	Acres	Per cent.
<b>A.—Area irrigated</b>						
Irrigated from Government canals.	254	241	- 5.1	3,080	2,840	- 7.8
Do. private canals.	70	51	-27.1	25	16	-36.0
Do. wells	514	524	+ 2.0	43	49	+14.0
Do. tanks	124	137	+10.5	...	...	.....
Do. other sources	32	43	+34.4	138	111	+19.6
<b>Total, Area irrigated</b>	<b>994</b>	<b>996</b>	<b>+ 0.2</b>	<b>3,286</b>	<b>3,016</b>	<b>- 8.2</b>
<b>B.—Crops irrigated</b>						
Rice	176	197	+11.9	1,175	1,203	+2.4
Wheat	156	144	- 7.7	332	277	-31.6
Barley	12	12	.....	11	10	-9.1
Jowari	236	236	+ 4.4	440	408	-7.3
Bajri	64	44	-31.3	497	473	-4.8
Maize	27	23	-14.9	3	3	.....
Other cereals and pulses	119	86	-35.3	533	172	-67.7
Sugarcane	58	64	+10.4	4	3	-25.0
Other food crops	121	125	+ 4.0	60	63	+38.3
Cotton	30	28	+40.0	398	362	-9.0
Other non-food crops	134	143	+ 6.7	296	181	-38.6
<b>Total, Crops irrigated</b>	<b>1,112</b>	<b>1,102</b>	<b>- 0.9</b>	<b>3,749</b>	<b>3,125</b>	<b>-6.8</b>

Note.—The difference in Totals A and B is due to the inclusion in the latter of the area cropped more than once.

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TABLE I—RAINFALL

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TABLE I—  
Rainfall from 1st June 1925 to 31st May 1926, as  
Districts of the Bombay

No.	District Headquarter Station	Kharif rains (1st June 1925 to 30th September 1925)				Rabi rains (1st October 1925 to 28th February 1926)			
		Average		1925		Average		1925-26	
		Rain-fall 3	Rainy days 4	Rain-fall 5	Rainy days 6	Rain-fall 7	Rainy days 8	Rain-fall 9	Rainy days 10
	<b>Gujarat</b>	Ins.	No.	Ins.	No.	Ins.	No.	Ins.	No.
1	Ahmedabad	27.65	33	20.81	30	0.66	2	0.63	2
2	Kaira	31.33	36	27.10	24	1.05	2	0.37	1
3	Godhra (Panch Mahals)	36.88	41	23.42	31	1.31	3	0.14	...
4	Broach	37.38	40	25.59	33	1.97	2	1.08	2
5	Surat	37.25	43	24.76	41	2.22	3	0.78	2
	<b>Deccan</b>								
6	Dhulia (West Khandesh)	19.30	30	14.82	23	3.82	4	8.12	12
7	Jalgaon (East Khandesh)	26.26	40	15.56	29	2.19	4	5.42	10
8	Nasik	25.26	41	18.65	36	3.56	6	1.45	5
9	Ahmednagar	17.79	28	19.12	20	4.46	7	8.00	6
10	Poona	21.30	36	11.52	28	5.49	7	2.96	9
11	Sholapur	21.12	30	18.40	28	4.75	7	7.30	11
12	Satara	32.07	53	22.26	51	5.19	9	3.55	10
13	Hilly Deccan Tracts*	63.70	70	49.39	70	4.29	7	4.11	8
	<b>Karnatak</b>								
14	Belgaum	33.80	61	34.63	55	6.06	11	4.80	9
15	Bijapur	15.09	25	9.43	18	5.66	9	8.30	14
16	Dharwar	20.05	44	21.04	42	7.63	12	8.46	12
17	Hilly Karnatak Tracts*	58.97	66	67.24	66	6.89	11	5.49	11
	<b>Konkan</b>								
18	Thana	92.81	86	69.21	87	3.74	5	2.38	5
19	Alibag (Kolaba)	81.18	76	55.61	72	3.15	4	2.66	5
20	Ratnagiri	90.68	83	67.60	73	4.66	7	3.98	7
21	Karwar (Kanara)	106.73	89	109.10	83	7.49	10	7.40	10
	<b>Sind</b>								
22	Karachi	5.78	5	3.95	8	1.24	3	0.49	2
23	Hyderabad	6.21	7	0.97	2	0.62	1	0.04	...
24	Mirpurkhas (Thar Parkar)	3.97	7	3.18	4	0.32	1	0.18	1
25	Nawabshah	5.74	6	1.78	5	0.22	1	0.33	1
26	Larkana	3.51	4	2.85	5	0.37	1	0.30	1
27	Sukkur	1.81	3	2.49	8	0.33	1	0.65	2
28	Jacobabad Upper Frontier.	2.59	4	3.87	7	0.62	2	0.35	2

\* The figures for the Hilly Tracts of the Deccan and Karnatak

## RAINFALL

compared with the average at each of the representative stations of the Presidency, including Sind.

Hot weather rains (1st March 1926 to 31st May 1926)				Total				District Headquarter Station	No
Average		1926		Average		1925-26			
Rain-fall 11	Rainy days 12	Rain-fall 13	Rainy days 14	Rain-fall 15	Rainy days 16	Rain-fall 17	Rainy days 18		
Ins.	No.	Ins.	No.	Ins.	No.	Ins.	No.	2	1
<b>Gujarat</b>									
0.49	1	0.27	1	29.00	36	21.71	33	Ahmedabad ...	1
0.46	1	1.32	3	32.85	39	28.79	28	Kaira ...	2
0.59	1	0.25	2	33.78	45	23.81	33	Godhra (Panch Mahala) ...	3
0.34	1	...	...	39.69	43	26.67	35	Broach ...	4
0.30	...	0.15	1	39.77	46	25.69	44	Surat ...	5
<b>Deccan</b>									
0.42	1	0.14	...	22.54	35	23.08	32	Dhulia (West Khandesh) ...	6
0.61	1	0.31	2	29.06	45	21.29	41	Jalgaon (East Khandesh) ...	7
1.13	1	...	...	29.98	48	20.10	41	Nasik ...	8
1.25	3	0.26	1	23.50	38	27.38	27	Ahmednagar ...	9
2.07	4	0.73	2	25.86	47	15.21	39	Poona ...	10
1.68	3	...	...	27.55	40	25.70	39	Sholapur ...	11
2.49	5	2.48	2	39.75	67	29.29	63	Satara ...	12
1.48	3	0.71	1	69.44	80	54.21	79	Hilly Deccan Tracts*	13
<b>Karnatak</b>									
4.69	9	3.05	4	60.55	81	42.48	68	Belgaum ...	14
3.33	5	0.92	2	23.28	39	18.65	34	Bijapur ...	15
5.12	10	2.86	3	32.88	66	32.36	57	Dharwar ...	16
3.38	7	1.32	3	69.74	84	74.04	80	Hilly Karnatak Tracts*	17
<b>Konkan</b>									
1.04	1	...	...	97.59	92	71.59	92	Thana ...	18
0.96	1	...	...	85.29	81	58.27	77	Alibag (Kolaba) ...	19
1.45	2	...	...	96.69	92	71.48	81	Ratnagiri ...	20
1.09	4	0.13	1	118.31	103	116.63	94	Karwar (Kanara) ...	21
<b>Sind</b>									
0.60	1	0.88	1	7.62	9	5.32	11	Karachi ...	22
0.42	1	2.10	2	7.25	9	3.11	4	Hyderabad ...	23
0.47	1	1.71	2	4.76	9	5.07	7	Mirpurkhas (Thar Parkar) ...	24
0.46	...	1.09	3	6.42	7	3.20	9	Nawabshah ...	25
0.56	1	0.93	2	4.44	6	4.08	8	Larkana ...	26
0.45	1	2.14	3	2.66	5	5.23	13	Sukkur ...	27
0.60	2	1.85	4	4.00	8	6.07	13	Jacobabad (Upper Sind Frontier) ...	28

\* are averages for six and two stations respectively.

Total area and area cultivated and uncultivated in each District

No.	District	Area by village papers. (Total area of the district.)	Area for which no returns exist	Net area for which statistics are available	CULTIVATED		
					Gross area cropped		
					Reported	Estimated	Total
1	2	3	4	5	6	7	8
<b>BOMBAY PRESIDENCY.</b>		<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>
<i>Gujarat</i>							
1	Ahmedabad	2,463,797	128,786	2,335,011	1,983,906	92,103	1,466,409
2	Kaira	1,036,874	19,272	1,017,602	806,155	15,833	821,988
3	Panch Mahals	1,029,734	175,803	853,931	430,923	122,387	653,210
4	Broach	98,992	23,012	75,980	534,788	19,742	604,530
5	Surat	1,033,264	24,820	1,008,444	734,496	24,143	767,639
	<b>Total, Gujarat</b>	<b>6,526,661</b>	<b>371,693</b>	<b>6,154,968</b>	<b>3,939,668</b>	<b>263,108</b>	<b>4,202,776</b>
<i>Deccan</i>							
6	West Khandesh	3,481,174	966,216	2,514,958	1,435,063	12,864	1,448,827
7	East Khandesh	2,008,700	.....	2,008,700	2,022,468	.....	2,022,468
8	Nasik	3,771,560	15,295	3,756,265	2,042,348	9,758	2,052,106
9	Ahmednagar	4,242,128	33,411	4,208,717	2,636,056	21,753	2,657,809
10	Poona	3,427,438	48,907	3,378,531	2,028,726	27,133	2,055,859
11	Solapur	2,915,144	.....	2,915,144	2,163,168	.....	2,163,168
12	Satara	3,143,903	122,874	3,021,029	2,062,822	76,747	2,139,569
	<b>Total, Deccan</b>	<b>23,885,101</b>	<b>1,186,703</b>	<b>22,701,398</b>	<b>14,392,151</b>	<b>146,254</b>	<b>14,538,405</b>
<i>Karnatak</i>							
13	Belgaum	2,932,417	120,807	2,811,610	1,811,279	55,808	1,867,087
14	Bijapur	3,662,987	10,538	3,652,449	2,919,035	7,611	2,926,646
15	Dharwar	2,346,935	72,401	2,274,534	2,181,475	62,382	2,243,857
	<b>Total, Karnatak</b>	<b>9,532,399</b>	<b>203,766</b>	<b>9,328,633</b>	<b>6,911,789</b>	<b>115,801</b>	<b>7,027,590</b>
<i>Konkan</i>							
16	Thana	2,191,687	50,195	2,141,392	573,914	11,783	585,697
17	Bombay Suburban	98,906	15,324	83,582	20,388	9,549	38,937
18	Kolaba	1,365,418	65,007	1,300,411	367,467	25,101	392,568
19	atnagiri	2,563,859	1,886,381	677,478	193,256	592,471	765,727
20	Kanara	2,125,917	.....	2,125,917	262,614	.....	262,614
	<b>Total, Konkan</b>	<b>8,763,687</b>	<b>2,016,910</b>	<b>6,746,777</b>	<b>1,426,639</b>	<b>638,904</b>	<b>2,065,543</b>
	<b>Total, Bombay Presidency.</b>	<b>48,712,848</b>	<b>3,779,072</b>	<b>44,933,776</b>	<b>26,660,247</b>	<b>1,166,067</b>	<b>27,826,314</b>
<i>SIND</i>							
21	Karachi	7,465,169	.....	7,465,169	363,216	.....	363,216
22	Hyderabad	2,834,535	.....	2,834,535	656,037	.....	656,037
23	Tbar Parkar	8,727,143	.....	8,727,143	912,356	.....	912,356
24	Nawabshah	2,494,737	.....	2,494,737	492,163	.....	492,163
25	Larkana	3,241,795	140,829	3,101,166	856,011	3,000	859,011
26	Sukkur	3,593,061	.....	3,593,061	456,989	.....	456,989
27	Upper Sind Frontier	1,724,675	124,906	1,599,769	498,944	1,511	500,455
	<b>Total, Sind</b>	<b>30,087,118</b>	<b>265,557</b>	<b>29,821,579</b>	<b>4,255,715</b>	<b>4,511</b>	<b>4,260,226</b>
	<b>Grand total</b>	<b>78,799,964</b>	<b>4,044,609</b>	<b>74,755,355</b>	<b>30,915,962</b>	<b>1,170,578</b>	<b>32,086,540</b>

## II—AREA

of the Bombay Presidency (including Sind) in 1925-26

AREA						District	No.
Area cropped more than once			Net cropped area				
Reported	Estimated	Total	Reported	Estimated	Total		
9	10	11	12	13	14	8	1
Acres	Acres	Acres	Acres	Acres	Acres	BOMBAY PRESIDENCY	
						<i>Gujarat</i>	
9,835	230	9,865	1,373,671	81,873	1,455,544	Ahmedabad	1
8,553	116	8,674	797,597	15,717	813,314	Kaira	2
4,102	359	4,361	426,821	122,023	548,844	Panch Mahals	3
63	.....	63	684,725	19,742	604,467	Broach	4
7,257	324	7,581	727,239	22,819	750,058	Surat	5
29,615	929	30,544	3,910,053	262,179	4,172,232	Total, Gujarat.	
						<i>Deccan</i>	
12,303	10	12,216	1,423,757	12,854	1,436,611	West Khandesh	6
15,154	.....	15,154	2,007,314	.....	2,007,314	East Khandesh	7
41,781	42	41,833	2,001,157	9,716	2,010,873	Nasik	8
44,960	178	45,078	2,591,096	21,684	2,612,730	Ahmednagar	9
84,356	503	84,869	1,944,370	26,630	1,971,000	Poona	10
24,137	.....	24,137	2,139,031	.....	2,139,031	Sholapur	11
98,744	5,190	103,934	1,954,078	71,557	2,025,635	Satara	12
3,21,343	5,863	3,27,211	14,060,803	142,391	14,203,194	Total, Deccan.	
						<i>Karnatak</i>	
27,603	120	27,723	1,763,676	55,688	1,819,364	Belgaum	13
3,769	.....	3,769	2,916,266	7,611	2,922,877	Bijapur	14
20,495	15	20,510	2,160,980	52,367	2,213,347	Dharwar	15
51,867	135	52,002	6,869,922	115,666	6,975,588	Total, Karnatak.	
						<i>Konkan</i>	
3,727	26	3,753	570,187	11,757	581,944	Thana	16
127	.....	127	29,261	9,549	38,810	Bombay Suburban	17
11,908	357	12,345	855,479	24,744	380,223	Kolaba	18
10,711	32,867	43,578	182,545	559,604	742,149	Ratnagiri	19
17,857	.....	17,857	244,757	.....	244,757	Kanara	20
44,410	33,250	77,660	1,362,229	605,654	1,967,883	Total, Konkan.	
447,240	40,177	487,417	26,213,007	1,125,890	27,338,897	Total, Bombay Presidency Proper.	
						<i>SIND</i>	
23,490	.....	23,490	359,726	.....	359,726	Karachi	21
6,759	.....	6,759	649,278	.....	649,278	Hyderabad	22
2,811	.....	2,811	909,545	.....	909,545	Thar Parkar	23
10,834	.....	10,834	481,323	.....	481,323	Nawabshah	24
178,413	.....	178,413	677,598	3,000	680,598	Larkana	25
31,646	.....	31,646	425,342	.....	425,342	Sukkur	26
59,858	.....	59,858	439,066	1,511	440,577	Upper Sind Frontier.	27
313,811	.....	313,811	3,941,904	4,511	3,946,415	Total, Sind.	
761,051	40,177	801,228	30,154,911	1,130,401	31,285,312	Grand Total.	

TABLE

No.	District	CULTIVATED					
		Current fallows			Total cultivated area		
		Reported	Estimated	Total	Reported	Estimated	Total
1	2	15	16	17	18	19	20
	<b>BOMBAY PRESIDENCY</b>	Acres	Acres	Acres	Acres	Acres	Acres
	<i>Gujarat</i>						
1	Ahmedabad	379,102	39,697	418,799	1,752,773	121,670	1,874,443
2	Kaira	44,144	1,691	45,835	641,741	17,608	659,349
3	Panch Mahals	61,286	26,156	87,442	468,107	149,184	617,291
4	Broach	62,058	1,132	63,190	646,783	20,894	667,677
5	Surat	26,308	272	26,580	753,547	23,091	776,638
	<b>Total, Gujarat</b>	<b>572,898</b>	<b>69,168</b>	<b>642,066</b>	<b>4,482,951</b>	<b>331,347</b>	<b>4,814,298</b>
	<i>Deccan</i>						
6	West Khandesh	184,120	251	184,371	1,507,677	13,105	1,620,982
7	East Khandesh	59,939	.....	59,939	2,067,313	.....	2,067,313
8	Nasik	475,053	1,906	476,959	2,476,210	11,622	2,487,832
9	Ahmednagar	592,607	5,230	597,837	3,183,903	26,864	3,210,767
10	Poona	563,907	23,543	587,450	2,508,277	47,173	2,555,450
11	Sholapur	402,645	.....	402,645	2,541,676	.....	2,541,676
12	Satara	297,220	13,862	311,082	2,251,298	86,419	2,337,717
	<b>Total, Deccan</b>	<b>2,575,761</b>	<b>42,792</b>	<b>2,618,543</b>	<b>16,636,564</b>	<b>185,183</b>	<b>16,821,737</b>
	<i>Karnatak</i>						
13	Belgaum	334,149	20,939	355,088	2,117,825	86,627	2,203,452
14	Bijapur	309,765	2,380	312,145	3,325,031	9,991	3,235,022
15	Dharwar	199,417	5,423	204,839	2,360,397	67,789	2,428,186
	<b>Total, Karnatak</b>	<b>843,331</b>	<b>28,741</b>	<b>872,072</b>	<b>7,703,253</b>	<b>164,407</b>	<b>7,867,660</b>
	<i>Konkan</i>						
16	Thana	371,521	25,364	396,885	941,708	37,121	978,829
17	Bombay Suburban	16,680	4,926	21,606	45,943	14,473	60,416
18	Kolaba	393,177	35,420	428,597	748,656	50,164	798,830
19	Ratnagiri	244,999	831,458	1,076,457	427,444	1,391,062	1,818,506
20	Kanara	105,426	.....	105,426	350,183	.....	350,183
	<b>Total, Konkan</b>	<b>1,131,703</b>	<b>887,168</b>	<b>2,018,871</b>	<b>2,513,934</b>	<b>1,492,820</b>	<b>4,006,754</b>
	<b>Total Bombay Presidency Proper.</b>	<b>5,123,683</b>	<b>1,038,869</b>	<b>6,162,552</b>	<b>31,336,692</b>	<b>2,162,767</b>	<b>33,499,449</b>
	<b>SIND</b>						
21	Karachi	472,775	.....	472,775	832,501	.....	832,501
22	Hydrabad	608,227	.....	608,227	1,347,505	.....	1,347,505
23	Thar & Parkar	1,495,322	.....	1,495,322	2,404,867	.....	2,404,867
24	Nawabshah	772,065	.....	772,065	1,253,394	.....	1,253,394
25	Larkana	663,351	137,620	800,970	1,340,949	140,629	1,481,578
26	Sukkur	680,852	.....	680,852	1,106,194	.....	1,106,194
27	Upper Sind Frontier	514,063	11,674	525,737	953,149	13,385	966,534
	<b>Total, Sind</b>	<b>5,296,655</b>	<b>149,693</b>	<b>5,446,348</b>	<b>9,238,559</b>	<b>154,014</b>	<b>9,392,673</b>
	<b>Grand Total</b>	<b>10,420,338</b>	<b>1,188,562</b>	<b>11,608,900</b>	<b>40,575,251</b>	<b>2,316,781</b>	<b>42,892,032</b>



## II—AREA—contd.

AREA						District	No.
Details of cultivated area							
Assessed			Unassessed				
Reported	Estimated	Total	Reported	Estimated	Total		
21	22	23	24	25	26	27	28
Acres	Acres	Acres	Acres	Acres	Acres		
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1,746,476	121,870	1,868,046	6,297	.....	6,297	Ahmedabad	1
840,769	17,608	858,367	982	.....	982	Kaira	2
488,037	148,184	636,221	70	.....	70	Panch Mahals	3
543,261	20,894	564,155	3,522	.....	3,522	Broach	4
753,183	23,081	776,264	1,364	10	1,374	Surat	5
4,470,716	331,397	4,802,053	12,335	10	12,345	Total, Gujarat.	
<i>Deccan</i>							
1,575,688	13,101	1,588,799	32,179	4	32,183	West Khandesh	6
2,062,964	.....	2,062,964	4,349	.....	4,349	East Khandesh	7
2,469,779	21,622	2,491,401	6,431	.....	6,431	Nasik	8
3,177,517	26,364	3,203,881	6,386	.....	6,386	Ahmednagar	9
2,482,927	47,173	2,530,100	25,350	.....	25,350	Poona	10
2,519,584	.....	2,519,584	22,092	.....	22,092	Sholapur	11
2,247,891	86,419	2,334,310	3,407	.....	3,407	Satara	12
16,536,360	185,179	16,721,539	100,194	4	100,198	Total, Deccan.	
<i>Karnatak</i>							
2,118,789	85,627	2,204,416	5,036	.....	5,036	Belgaum	13
3,224,693	9,991	3,234,684	438	.....	438	Bijapur	14
2,960,812	57,799	2,418,101	85	.....	85	Dharwar	15
7,697,694	153,407	7,851,101	5,559	.....	5,559	Total, Karnatak.	
<i>Konkan</i>							
920,819	37,121	957,940	20,889	.....	20,889	Thana	16
45,789	14,473	60,262	154	.....	154	Bombay Suburban	17
746,591	50,164	796,755	2,066	.....	2,066	Kolaba	18
427,428	1,391,062	1,818,485	21	.....	21	Batnagiri	19
349,323	.....	349,323	860	.....	860	Kanara	20
2,489,945	1,492,820	3,982,765	23,939	.....	23,939	Total, Konkan.	
31,194,715	2,162,743	33,357,458	141,977	14	141,991	Total, Bombay Presidency Proper.	
<i>SIND</i>							
630,415	.....	630,415	202,086	.....	202,086	Karachi	21
1,337,776	.....	1,337,776	9,729	.....	9,729	Hyderabad	22
2,326,486	.....	2,326,486	78,332	.....	78,332	Tnar Parkar	23
1,234,525	.....	1,234,525	18,869	.....	18,869	Nawabshah	24
1,255,268	140,629	1,395,897	25,681	.....	25,681	Larkana	25
1,077,327	.....	1,077,327	28,867	.....	28,867	Sukkar	26
866,635	.....	866,635	66,614	13,385	79,999	Upper Sind Frontier.	27
8,748,331	140,629	8,888,960	490,228	13,385	503,613	Total, Sind.	
39,943,046	2,309,373	42,246,418	632,205	18,399	645,604	Grand Total.	

TABLE

No.	District	UNCULTIVATED					
		Culturable waste unoccupied and unassessed			Not available		
		A			2		
		Reported	Estimated	Total	Reported	Estimated	Total
1	2	27	28	29	30	31	32
		Acres	Acres	Acres	Acres	Acres	Acres
	<b>BOMBAY PRESIDENCY</b>						
	<i>Gujarat</i>						
1	Ahmedabad ...	98,744	1,882	100,626	8,702	.....	8,702
2	Kaira ...	17,654	.....	17,654	.....	.....	.....
3	Panch Mahals ...	73,596	303	73,899	202,062	10,175	213,237
4	Broach ...	21,557	.....	21,557	.....	.....	.....
5	Surat ...	60,129	17	60,146	45,277	.....	45,277
	<b>Total, Gujarat</b> ...	<b>271,680</b>	<b>2,202</b>	<b>273,882</b>	<b>256,041</b>	<b>10,175</b>	<b>266,216</b>
	<i>Deccan</i>						
6	West Khandesh ...	136,522	603	137,125	499,015	951,593	1,450,609
7	East Khandesh ...	58,825	.....	58,825	415,365	.....	415,365
8	Nasik ...	66,443	.....	66,443	514,081	1,269	515,350
9	Ahmednagar ...	46,123	15	46,143	523,585	.....	523,585
10	Poona ...	9,252	4	9,256	414,062	14	414,076
11	Sholapur ...	16,987	.....	16,987	85,663	.....	85,663
12	Satara ...	20,875	4,976	25,851	447,908	415	448,323
	<b>Total, Deccan</b> ...	<b>354,032</b>	<b>5,598</b>	<b>359,630</b>	<b>3,214,847</b>	<b>953,291</b>	<b>4,168,138</b>
	<i>Karnatak</i>						
13	Belgaum ...	56,325	856	57,182	446,670	.....	446,670
14	Bijapur ...	44,927	315	45,242	176,036	.....	176,036
15	Dharwar ...	48,918	572	49,090	241,172	.....	241,172
	<b>Total, Karnatak</b> ...	<b>149,771</b>	<b>1,743</b>	<b>151,514</b>	<b>863,878</b>	<b>.....</b>	<b>863,878</b>
	<i>Konkan</i>						
16	Thana ...	41,603	430	42,033	800,338	1,156	801,994
17	Bombay Suburban ...	6,478	11	6,487	3,932	.....	3,932
18	Kolaba ...	19,156	104	19,299	327,438	1,357	328,795
19	Ratnagiri ...	6,156	3,166	9,324	8,879	3,795	12,674
20	Kanara ...	37,978	.....	37,978	2,062,818	.....	2,062,818
	<b>Total, Konkan</b> ...	<b>111,406</b>	<b>3,713</b>	<b>115,121</b>	<b>3,206,905</b>	<b>6,308</b>	<b>3,213,213</b>
	<b>Total, Bombay Presidency Proper</b> ...	<b>886,891</b>	<b>13,286</b>	<b>900,177</b>	<b>7,541,671</b>	<b>969,774</b>	<b>8,511,445</b>
	<i>SIND</i>						
21	Karachi ...	1,241,075	.....	1,241,075	172,706	.....	172,706
22	Hyderabad ...	992,200	.....	992,200	70,994	.....	70,994
23	Thar & Parkar ...	1,757,048	.....	1,757,048	43,331	.....	43,331
24	Nawabshah ...	432,917	.....	432,917	89,485	.....	89,485
25	Larkana ...	896,499	.....	896,499	5,116	.....	5,116
26	Sukkur ...	443,099	.....	443,099	264,035	.....	264,035
27	Upper Sind Frontier ...	20,583	.....	20,583	39,723	.....	39,723
	<b>Total, Sind</b> ...	<b>6,059,721</b>	<b>.....</b>	<b>6,059,721</b>	<b>735,394</b>	<b>.....</b>	<b>735,394</b>
	<b>Grand Total</b> ...	<b>6,916,612</b>	<b>13,286</b>	<b>6,959,898</b>	<b>8,277,065</b>	<b>969,774</b>	<b>9,246,839</b>

## II—AREA—concl'd.

ANSA						District	Serial No.
for cultivation			Total uncultivated area				
Others			Reported	Estimated	Total		
Reported	Estimated	Total					
33	34	35	36	37	38	2	1
Acres	Acres	Acres	Acres	Acres	Acres		
474,792	5,334	480,126	582,238	7,216	589,454	<b>BOMBAY PRESIDENCY</b>	
158,207	1,664	159,871	175,861	1,664	177,525	<b>Gujarat</b>	
89,166	17,141	106,307	364,824	27,619	392,443	Ahmedabad	1
247,640	2,118	249,758	269,107	2,118	271,225	Kaira	2
174,491	1,712	176,203	279,897	1,729	281,626	Panch Mahals	3
						Broach	4
						Surat	5
1,144,296	27,969	1,172,265	1,672,017	40,346	1,712,363	Total, Gujarat.	
						<b>Deccan</b>	
271,547	915	272,462	907,085	853,111	1,860,196	West Khandesh	6
367,196	.....	367,196	841,387	.....	841,387	East Khandesh	7
399,531	2,404	401,935	1,280,055	3,673	1,283,728	Nasik	8
450,000	6,532	456,532	1,024,814	6,447	1,031,261	Ahmednagar	9
446,990	1,716	448,706	870,304	1,734	872,038	Poona	10
262,813	.....	262,813	374,468	.....	374,468	Sholapur	11
297,886	31,064	328,952	766,731	36,455	803,186	Satara	12
2,496,966	42,631	2,539,596	6,064,844	1,001,520	7,066,364	Total, Deccan.	
						<b>Karnatak</b>	
190,789	94,384	285,173	693,765	35,180	728,945	Belgaum	13
196,435	222	196,657	417,399	567	417,966	Bijapur	14
224,507	14,040	238,547	514,197	14,612	528,809	Dharwar	15
611,731	48,666	660,397	1,625,360	50,359	1,675,719	Total, Karnatak.	
						<b>Konkan</b>	
357,243	11,488	368,731	1,199,684	13,074	1,212,758	Thana	16
27,231	840	28,071	57,639	861	58,499	Bombay Suburban	17
225,122	13,382	238,504	571,755	14,843	586,598	Kolaba	18
234,966	496,399	731,365	250,031	495,322	745,353	Ratnagiri	19
71,938	.....	71,938	2,175,734	.....	2,175,734	Kanara	20
916,530	514,069	1,430,599	4,234,843	524,090	4,758,933	Total, Konkan.	
5,168,522	633,255	5,801,777	13,597,084	1,616,315	15,213,399	Total, Bombay Presidency.	
						<b>SIND</b>	
5,218,888	.....	5,218,888	6,632,668	.....	6,632,668	Karachi	21
423,831	.....	423,831	1,487,080	.....	1,487,080	Hyderabad	22
4,491,897	.....	4,491,897	6,322,276	.....	6,322,276	Thar Parkar	23
718,942	.....	718,942	1,241,344	.....	1,241,344	Nawabshah	24
808,602	.....	808,602	1,760,217	.....	1,760,217	Larkana	25
1,785,733	.....	1,785,733	2,492,867	.....	2,492,867	Sukkur	26
340,012	111,523	451,535	646,616	111,523	758,141	Upper Sind Frontier.	27
13,787,905	111,523	13,899,428	20,583,020	111,523	20,694,543	Total, Sind.	
18,966,427	744,778	19,701,205	34,160,104	1,727,838	35,907,942	Grand Total.	

TABLE III—  
Area under different crops in each District

Serial No. 1	District 2	Cereals					
		1. Rice*			2. Wheat		
		Reported 3	Estimated 4	Total 5	Reported 6	Estimated 7	Total 8
	<b>BOMBAY PRESIDENCY</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>
	<i>Gujarat</i>						
1	Ahmedabad ...	42,047	1,923	43,970	49,686	4,358	54,224
2	Kaira ...	86,554	1,010	87,564	6,667	37	6,694
3	Panch Mahals ...	57,410	8,536	65,946	895	72	967
4	Broach ...	9,704	83	9,787	11,013	351	11,364
5	Surat ...	82,569	1,885	84,454	3,770	8	2,778
	<b>Total, Gujarat ...</b>	<b>278,284</b>	<b>13,437</b>	<b>291,721</b>	<b>71,201</b>	<b>4,826</b>	<b>76,027</b>
	<i>Deccan</i>						
6	West Khandesh ...	52,413	1,048	53,461	98,696	1,620	90,316
7	East Khandesh ...	195	...	195	31,684	...	31,684
8	Nasik ...	57,045	731	58,068	168,013	312	168,325
9	Ahmednagar ...	15,008	2	15,010	109,566	935	110,501
10	Poona ...	81,280	3,801	85,181	56,443	676	57,119
11	Sholapur ...	3,181	...	3,181	27,802	...	27,802
12	Satara ...	44,697	2,862	46,869	39,944	1,911	41,885
	<b>Total, Deccan ...</b>	<b>254,639</b>	<b>8,534</b>	<b>263,173</b>	<b>522,148</b>	<b>5,544</b>	<b>627,662</b>
	<i>Karnatak</i>						
13	Belgaum ...	111,161	6,700	117,861	96,860	1,298	98,158
14	Bijapur ...	2,632	3	2,635	169,820	486	170,306
15	Dharwar ...	146,916	1,746	147,692	253,009	8,445	261,454
	<b>Total, Karnatak ...</b>	<b>259,739</b>	<b>8,449</b>	<b>268,188</b>	<b>519,789</b>	<b>10,227</b>	<b>630,016</b>
	<i>Konkan</i>						
16	Thana ...	303,708	6,697	310,405	78	...	78
17	Bombay Suburban ...	10,970	3,635	14,608	...	...	...
18	Kolaba ...	251,942	19,455	271,397	...	...	...
19	Ratnagiri ...	78,667	240,734	319,341	...	...	...
20	Kanara ...	167,445	...	167,445	...	...	...
	<b>Total, Konkan ...</b>	<b>812,672</b>	<b>279,524</b>	<b>1,093,196</b>	<b>78</b>	<b>...</b>	<b>78</b>
	<b>Total, Bombay Presidency ...</b>	<b>1,605,334</b>	<b>300,941</b>	<b>1,906,278</b>	<b>1,113,316</b>	<b>20,597</b>	<b>1,133,813</b>
	<b>SIND</b>						
21	Karachi ...	240,907	...	240,907	14,751	...	14,751
22	Hyderabad ...	261,717	...	261,717	48,034	...	48,034
23	Thar Parkar ...	61,933	...	61,933	16,482	...	16,482
24	Nawabshah ...	36,443	...	36,443	37,121	...	37,121
25	Larkana ...	412,274	500	412,774	75,155	300	75,455
26	Sukkur ...	79,933	...	79,933	117,785	...	117,785
27	Upper Sind Frontier ...	111,285	...	111,285	54,294	34	54,328
	<b>Total, Sind ...</b>	<b>1,802,762</b>	<b>500</b>	<b>1,203,262</b>	<b>366,642</b>	<b>334</b>	<b>366,976</b>
	<b>Grand Total ...</b>	<b>2,808,096</b>	<b>301,444</b>	<b>3,109,540</b>	<b>1,479,858</b>	<b>20,931</b>	<b>1,500,789</b>

\* Of this area Belgaum had 230 acres, Ratnagiri 10,136 acres

† Of this area the following districts cultivated Jowari as a rabi crop as shown below:—

District	Acres	District	Acres	District	Acres
Ahmedabad ...	19,520	Surat ...	8,435	Ahmednagar ...	1,037,914
Kaira ...	451	West Khandesh ...	61,565	Poona ...	137,324
Broach ...	111,865	Nasik ...	64,841	Sholapur ...	1,637,293

## CROPS

## of the Bombay Presidency (including Sind) in 1925-26

and Pulses						District	Serial No.
3. Barley			4. Jowar†				
Reported	Estimated	Total	Reported	Estimated	Total	2	1
	10	11	12	13	14		
Acres	Acres	Acres	Acres	Acres	Acres	BOMBAY PRESIDENCY	
						<i>Gujarat</i>	
4,689	880	4,957	260,667	21,516	281,213	Ahmedabad	1
414	8	422	49,091	549	49,640	Kaira	2
118	36	149	8,679	2,884	11,107	Panch Mahāla	3
...	...	...	112,663	4,092	116,655	Broach	4
...	...	...	75,777	4,021	79,798	Surat	5
5,315	313	5,628	497,971	31,442	529,413	Total, Gujarat.	
						<i>Deccan</i>	
...	...	...	130,972	2,308	133,280	West Khāndesh	6
...	...	...	289,676	.....	289,676	East Khāndesh	7
...	...	...	92,650	101	92,751	Nāsik	8
119	6	127	1,027,591	10,623	1,037,914	Ahmednagar	9
433	...	433	973,948	8,473	982,421	Poona	10
1,196	...	1,196	1,627,293	...	1,627,293	Sholapur	11
2,455	177	2,632	678,152	19,926	698,108	Sātara	12
4,203	185	4,388	4,800,012	41,431	4,841,443	Total, Deccan.	
						<i>Karnatak</i>	
1,987	199	2,186	612,931	12,739	625,669	Belgaum	13
2,870	2	2,872	1,307,034	4,676	1,311,710	Bijāpur	14
83	...	83	494,562	15,631	510,093	Dhārwar	15
4,887	201	5,088	2,414,527	32,945	2,447,472	Total, Karnatak.	
						<i>Konkan</i>	
...	...	...	454	.....	454	Thāna	16
...	...	...	...	.....	.....	Bombay Suburban	17
...	...	...	...	.....	.....	Kolāba	18
...	...	...	...	.....	.....	Ratnāgiri	19
...	...	...	587	.....	587	Kanara	20
...	...	...	1,041	.....	1,041	Total, Konkan.	
14,305	699	15,004	7,713,551	105,815	7,819,369	Total, Bombay Presidency.	
						<i>Sind</i>	
8,055	...	8,055	22,055	.....	22,055	Karachi	21
1,183	...	1,183	7,013	.....	7,013	Hyderabad	22
167	...	167	7,873	.....	7,873	Thar Pākhar	23
823	...	823	101,044	.....	101,044	Nawābshāh	24
1,723	...	1,723	124,845	1,490	126,245	Larkāna	25
383	...	383	122,758	.....	122,758	Sukkur	26
165	...	165	107,269	1,477	108,746	Upper Sind Frontier	27
12,489	...	12,489	492,957	2,877	495,834	Total, Sind.	
28,804	699	27,509	8,208,508	108,695	8,315,203	Grand Total.	

and Kanara 9,600 acres under late rice.

Satara	Acres.	477,745	Dharwar	Acres.	120,685
Belgaum	...	320,721			
Bijapur	...	1,084,711			

TABLE III—CROPS

Serial No. 1	District 2	Cereals and					
		5. Bajri			6. Rdgi (Nachani)		
		Reported 15	Estimated 16	Total 17	Reported 18	Estimated 19	Total 20
	<b>BOMBAY PRESIDENCY</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>	<b>Acres</b>
	<i>Gujarat</i>						
1	Ahmedabad	131,870	5,701	137,572	2,503	108	2,611
2	Kaira	102,153	3,094	105,247	58,897	1,186	60,083
3	Panch Mahals	29,208	8,331	36,539	14,302	3,768	18,070
4	Broach	6,478	98	6,576	97	...	97
5	Surat	4,825	6	4,831	8,658	254	8,912
	<b>Total, Gujarat</b>	<b>278,554</b>	<b>17,229</b>	<b>295,783</b>	<b>84,457</b>	<b>5,306</b>	<b>89,763</b>
	<i>Deccan</i>						
6	West Khandesh	297,390	506	297,896	9,145	129	9,274
7	East Khandesh	27,335	...	27,335	...	...	...
8	Nasik	843,616	2,214	845,830	97,914	1,598	99,512
9	Ahmednagar	721,571	2,413	724,484	22,419	...	22,419
10	Poona	414,379	2,725	417,104	35,148	2,044	40,192
11	Sholapur	81,603	...	81,603	151	...	151
12	Satara	275,955	9,982	285,937	34,576	3,400	37,976
	<b>Total, Deccan</b>	<b>2,908,819</b>	<b>18,340</b>	<b>2,927,159</b>	<b>202,358</b>	<b>7,171</b>	<b>209,529</b>
	<i>Karnatak</i>						
13	Belgaum	136,842	3,433	140,275	27,808	5,616	33,424
14	Bijapur	264,618	666	265,284	194	1	195
15	Darwar	6,272	2,399	8,671	33,378	601	33,979
	<b>Total, Karnatak</b>	<b>407,732</b>	<b>6,498</b>	<b>414,230</b>	<b>61,380</b>	<b>6,118</b>	<b>67,418</b>
	<i>Konkan</i>						
16	Thana	...	...	...	40,483	1,307	41,790
17	Bombay Suburban	...	...	...	51	...	51
18	Kolaba	...	...	...	36,672	1,441	37,113
19	Natnagiri	...	...	...	30,440	93,222	123,662
20	Kanara	...	...	...	1,887	...	1,887
	<b>Total, Konkan</b>	<b>...</b>	<b>...</b>	<b>...</b>	<b>108,523</b>	<b>95,990</b>	<b>204,513</b>
	<b>Total, Bombay Presidency</b>	<b>3,590,105</b>	<b>41,972</b>	<b>3,632,077</b>	<b>456,863</b>	<b>114,586</b>	<b>571,449</b>
	<b>SIND</b>						
21	Karachi	11,350	...	11,350	454	...	454
22	Hyderabad	153,134	...	153,134	...	...	...
23	Thar Parkar	644,982	...	644,982	...	...	...
24	Nawabshah	116,185	...	116,185	...	...	...
25	Larkana	1,418	...	1,418	...	...	...
26	Sukkur	21,963	...	21,963	12	...	12
27	Upper Sind Frontier	70,183	...	70,183	...	...	...
	<b>Total, Sind</b>	<b>1,019,215</b>	<b>...</b>	<b>1,019,215</b>	<b>468</b>	<b>...</b>	<b>468</b>
	<b>Grand Total</b>	<b>4,609,320</b>	<b>41,972</b>	<b>4,651,292</b>	<b>457,129</b>	<b>114,586</b>	<b>577,714</b>

—contd.

pulses—continued						District	Serial No.
7. Maize			8. Gram				
Reported	Estimated	Total	Reported	Estimated	Total		
21	22	23	24	25	26	2	1
Acres	Acres	Acres	Acres	Acres	Acres		
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
5,823	...	5,823	5,301	176	5,477	Abmeabad	1
1,244	2	1,246	699	15	714	Kaira	2
105,052	44,787	149,839	1,291	2,238	3,529	Vaugh Mahals	3
120	...	120	656	61	717	Broach	4
18	8	24	903	42	945	Surat	5
112,255	44,777	157,032	8,750	2,532	11,282	Total, Gujarat.	
<i>Deccan</i>							
4,937	47	5,014	35,352	509	35,861	West Khandesh	6
613	...	613	6,721	...	6,721	East Khandesh	7
3,246	27	3,273	69,071	295	69,366	Nasik	8
1,003	3	1,006	91,777	622	92,399	Ahmednagar	9
1,591	2	1,593	41,168	765	41,933	Poona	10
6,101	...	6,101	36,068	...	36,068	Solapur	11
9,349	707	10,056	65,184	2,272	67,456	Satara	12
27,069	786	27,855	296,145	4,463	300,608	Total, Deccan.	
<i>Karnatak</i>							
13,844	354	14,198	28,426	2,083	30,519	Belgaum	13
1,134	1	1,135	32,409	82	32,491	Bijapur	14
15	40	55	36,232	931	37,163	Dharwar	15
14,993	395	15,388	97,067	3,106	100,173	Total, Karnatak.	
<i>Konkan</i>							
21	...	21	675	...	675	Thana	16
...	...	...	...	...	...	Bombay Suburban	17
...	...	...	277	9	286	Kolaba	18
...	...	...	22	67	89	Ratsagiri	19
68	...	68	205	...	205	Kanara	20
90	...	90	1,179	76	1,255	Total, Konkan.	
154,407	45,958	200,365	403,141	10,177	413,318	Total, Bombay Presidency.	
<i>Sind</i>							
2,227	...	2,227	839	...	839	Karachi	21
241	...	241	301	...	301	Hyderabad	22
597	...	597	300	...	300	Thar Parkar	23
110	...	110	9,901	...	9,901	Nawatsuh	24
...	...	...	26,267	...	26,267	Larkana	25
1	...	1	50,906	...	50,906	Sukkur	26
17	...	17	84,111	...	84,111	Upper Sind Frontier	27
3,193	...	3,193	172,855	...	172,855	Total, Sind.	
157,600	45,958	203,558	575,996	10,177	586,173	Grand Total.	

TABLE III—CROPS

Serial No.	District	Cereals and Pulses—concluded.					
		9. Other food-grains including pulses			10. Total Cereals and Pulses		
		Reported 27	Estimated 28	Total 29	Reported 30	Estimated 31	Total 32
		Acres	Acres	Acres	Acres	Acres	Acres
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad ...	64,498	3,200	67,698	567,262	36,262	603,545
2	Kaira ...	134,415	2,389	136,804	431,197	8,210	439,407
3	Panch Mahals ...	48,001	14,866	62,867	265,235	54,628	350,063
4	Broach ...	41,943	1,527	43,470	182,600	6,270	188,870
5	Surat ...	33,364	1,427	34,791	208,732	7,651	216,383
	<b>Total, Gujarat ...</b>	<b>323,389</b>	<b>23,459</b>	<b>346,848</b>	<b>1,655,076</b>	<b>143,321</b>	<b>1,798,397</b>
<i>Deccan</i>							
6	West Khandesh ...	153,348	1,117	154,465	772,283	7,284	779,567
7	East Khandesh ...	256,314	.....	256,314	837,558	.....	837,558
8	Nasik ...	238,784	2,108	240,892	1,571,248	7,376	1,578,621
9	Ahmednagar ...	139,534	1,564	141,098	2,289,248	16,730	2,305,978
10	Poona ...	83,234	2,997	86,231	1,696,461	21,583	1,718,044
11	Sholapur ...	53,982	.....	53,982	1,831,367	.....	1,831,367
12	Satara ...	168,945	8,654	177,599	1,308,797	50,921	1,359,718
	<b>Total, Deccan ...</b>	<b>1,099,671</b>	<b>17,440</b>	<b>1,117,111</b>	<b>10,114,959</b>	<b>103,894</b>	<b>10,218,853</b>
<i>Karnatak</i>							
13	Belgaum ...	212,964	8,909	221,873	1,242,823	41,343	1,284,166
14	Bijapur ...	128,723	297	129,020	1,009,534	6,114	1,015,648
15	Dharwar ...	243,673	9,104	252,777	1,213,067	38,697	1,251,684
	<b>Total, Karnatak ...</b>	<b>585,360</b>	<b>18,210</b>	<b>603,570</b>	<b>4,365,424</b>	<b>86,054</b>	<b>4,451,478</b>
<i>Konkan</i>							
16	Thana ...	33,160	1,330	34,490	378,579	9,334	387,913
17	Bombay Suburban ...	9	.....	9	11,030	3,638	14,668
18	Kolaba ...	33,207	963	34,170	321,069	21,903	342,972
19	Ratnagiri ...	33,008	101,087	134,095	142,077	435,110	677,187
20	Kanara ...	5,785	.....	5,785	175,977	.....	175,977
	<b>Total, Konkan ...</b>	<b>105,169</b>	<b>103,400</b>	<b>208,569</b>	<b>1,028,752</b>	<b>499,990</b>	<b>1,498,742</b>
	<b>Total, Bombay Presidency</b>	<b>2,113,480</b>	<b>162,509</b>	<b>2,275,989</b>	<b>17,164,211</b>	<b>803,259</b>	<b>17,967,470</b>
<b>SIND</b>							
21	Karachi ...	24,156	.....	24,156	324,794	.....	324,794
22	Hyderabad ...	7,080	.....	7,080	478,733	.....	478,733
23	Thar Parkar ...	1,548	.....	1,548	733,232	.....	733,232
24	Nawabshah ...	19,632	.....	19,632	321,239	.....	321,239
25	Larkana ...	135,174	.....	135,174	779,566	2,200	782,066
26	Sukkur ...	25,544	.....	25,544	421,295	.....	421,295
27	Upper Sind Frontier...	37,428	.....	37,428	484,952	1,511	486,463
	<b>Total, Sind ...</b>	<b>253,582</b>	<b>.....</b>	<b>253,582</b>	<b>3,524,151</b>	<b>3,711</b>	<b>3,527,862</b>
	<b>Grand Total ...</b>	<b>2,367,061</b>	<b>162,509</b>	<b>2,529,570</b>	<b>20,688,362</b>	<b>806,970</b>	<b>21,495,332</b>



—contd.

Oil-seeds						District	Serial No.
11. Linseed			12. Sesame (Til)				
Reported 33	Esti- mated 34	Total 35	Reported 36	Esti- mated 37	Total 38		
Acres	Acres	Acres	Acres	Acres	Acres	9	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
5	...	5	20,770	197	20,967	Ahmedabad	1
6	...	6	17,668	132	17,800	Kaira	2
2	...	2	19,617	4,658	24,275	Panch Mahals	3
...	...	...	8,559	38	8,597	Broach	4
...	...	...	1,138	24	1,162	Surat	...
13	...	13	67,762	4,949	72,711	Total, Gujarat.	
						<i>Deccan</i>	
3,307	112	3,419	16,842	200	17,042	West Khandesh	5
1,372	...	1,372	9,708	...	9,708	East Khandesh	7
20,389	95	20,484	20,071	3	20,074	Nasik	8
12,678	183	12,861	20,649	93	20,742	Ahmednagar	9
622	24	646	11,944	786	12,690	Poona	10
13,498	...	13,498	2,415	...	2,415	Sholapur	11
3,008	107	3,115	259	10	269	Satara	12
54,854	521	55,375	81,688	1,049	82,737	Total, Deccan.	
						<i>Karnatak</i>	
3,239	...	3,239	4,166	691	4,857	Belgaum	13
43,178	177	43,355	9,116	13	9,129	Bijapur	14
12,507	223	12,730	6,677	315	6,992	Dharwar	15
64,924	400	65,324	19,942	1,019	20,961	Total, Karnatak.	
						<i>Konkan</i>	
...	...	...	1,062	38	1,100	Thana	16
...	...	...	4	...	4	Bombay Suburban	17
...	...	...	2,002	53	2,055	Kolaba	18
...	...	...	8,386	10,216	18,551	Ratnagiri	19
9	...	9	58	...	58	Kanara	20
9	...	9	6,462	10,306	16,768	Total, Konkan.	
119,600	921	120,521	178,061	17,318	195,379	Total, Bombay Presidency	
						<b>SIND</b>	
...	...	...	2,594	...	2,594	Karachi	21
...	...	...	3,100	...	3,100	Hyderabad	22
165	...	165	1,451	...	1,451	Tar Parkar	23
49	...	49	9,843	...	9,843	Nawabshah	24
...	...	...	5,268	...	5,268	Larkana	25
...	...	...	3,454	...	3,454	Sukkur	26
...	...	...	7,517	...	7,517	Upper Sind Frontier	27
214	...	214	33,227	...	33,227	Total, Sind.	
120,014	921	120,935	209,278	17,318	226,596	Grand Total.	

TABLE III—CROPS

Serial No.	District	Oil-seeds—					
		13. Rape and Mustard			14. Groundnut		
		Reported 39	Estimated 40	Total 41	Reported 42	Estimated 43	Total 44
	<b>BOMBAY PRESIDENCY</b>	Acres	Acres	Acres	Acres	Acres	Acres
	<i>Gujarat</i>						
1	Ahmedabad	3,655	1	3,656	18,481	20	18,504
2	Kaira	74	.....	74	11,950	877	12,827
3	Panch Mahals	13	.....	13	40,576	3,909	44,541
4	Broach	38	2	40	192	4	196
5	Surat	39	.....	39	474	13	487
	<b>Total, Gujarat</b>	<b>3,819</b>	<b>3</b>	<b>3,822</b>	<b>71,673</b>	<b>4,893</b>	<b>76,566</b>
	<i>Deccan</i>						
6	West Khindesh	1,571	14	1,585	46,687	129	46,816
7	East Khindesh	37	.....	37	250,395	.....	250,395
8	Nasik	1,361	6	1,367	13,971	5	13,976
9	Ahmednagar	4	.....	4	3,446	9	3,450
10	Poona	6	.....	6	18,064	333	18,397
11	Sholapur	.....	.....	.....	16,335	.....	16,335
12	Satara	.....	.....	.....	116,752	5,899	122,651
	<b>Total, Deccan</b>	<b>2,979</b>	<b>20</b>	<b>2,999</b>	<b>463,650</b>	<b>6,375</b>	<b>472,025</b>
	<i>Karnatak</i>						
13	Belgaum	.....	.....	.....	23,675	60	23,735
14	Bijapur	.....	.....	.....	255	.....	255
15	Ubarwar	130	1	131	22,263	171	22,434
	<b>Total, Karnatak</b>	<b>130</b>	<b>1</b>	<b>131</b>	<b>46,213</b>	<b>281</b>	<b>46,414</b>
	<i>Konkan</i>						
16	Thana	3	.....	3	1	.....	1
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	.....	.....	.....	.....	.....	.....
19	Ratnagiri	.....	.....	.....	123	278	401
20	Kanara	6	.....	6	159	.....	159
	<b>Total, Konkan</b>	<b>9</b>	<b>.....</b>	<b>9</b>	<b>283</b>	<b>278</b>	<b>561</b>
	<b>Total, Bombay Presidency</b>	<b>6,837</b>	<b>21</b>	<b>6,858</b>	<b>583,821</b>	<b>11,767</b>	<b>595,588</b>
	<b>SIND</b>						
21	Karachi	27,292	.....	27,292	.....	.....	.....
22	Hyderabad	6,251	.....	6,251	.....	.....	.....
23	Thar Parkar	2,412	.....	2,412	.....	.....	.....
24	Nawabshah	12,294	.....	12,294	.....	.....	.....
25	Larkana	67,285	800	68,085	.....	.....	.....
26	Sukkur	13,171	.....	13,171	.....	.....	.....
27	Upper Sind Frontier	20,569	.....	20,569	.....	.....	.....
	<b>Total, Sind</b>	<b>139,577</b>	<b>800</b>	<b>140,377</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>
	<b>Grand Total</b>	<b>146,514</b>	<b>821</b>	<b>147,335</b>	<b>583,821</b>	<b>11,767</b>	<b>595,588</b>

—contd.

continued						District	Serial No.
15. Coconut			16. Castor Seed				
Reported 45	Estimated 46	Total 47	Reported 48	Estimated 49	Total 50		
Acres	Acres	Acres	Acres	Acres	Acres		
.....	.....	.....	10,773	371	11,724	<b>BOMBAY PRESIDENCY</b>	
.....	.....	.....	18,535	538	19,471	<i>Gujarat</i>	
.....	.....	.....	1,716	265	1,981	Ahmedabad	1
8	.....	3	1,327	52	1,379	Kaira	2
29	.....	29	5,374	159	5,563	Paruch Mahals	3
						Broach	4
						Surat	5
32	.....	32	37,705	1,413	39,118	Total, Gujarat.	
						<i>Deccan</i>	
.....	.....	.....	29,711	566	29,297	West Khandesh	6
.....	.....	.....	.....	.....	.....	East Khandesh	7
.....	.....	.....	.....	.....	.....	Nasik	8
.....	.....	.....	.....	.....	.....	Ahmednagar	9
.....	.....	.....	57	.....	57	Poona	10
.....	.....	.....	1,137	.....	1,437	Sholapur	11
27	.....	27	222	12	234	Satara	12
27	.....	27	30,477	578	31,055	Total, Deccan.	
						<i>Karnatak</i>	
11	.....	11	1,219	18	1,237	Belgaum	13
6	.....	6	904	1	905	Bijapur	14
446	.....	446	4,129	55	4,184	Dharwar	15
463	.....	463	6,252	74	6,326	Total, Karnatak.	
						<i>Konkan</i>	
300	.....	300	224	.....	224	Thana	16
776	.....	776	.....	.....	.....	Bombay Suburban	17
1,126	.....	1,126	8	.....	8	Kolaba	18
7,618	23,330	30,948	.....	.....	.....	Ratnagiri	19
11,543	.....	11,543	34	.....	34	Kanara	20
21,363	23,330	44,693	266	.....	266	Total, Konkan.	
21,585	23,330	45,215	74,720	2,065	76,785	Total, Bombay Presidency.	
						<i>SIND</i>	
24	.....	24	91	.....	91	Karachi	21
.....	.....	.....	.....	.....	.....	Hyderabad	22
.....	.....	.....	325	.....	325	Dhar Parkar	23
.....	.....	.....	.....	.....	.....	Nawal Shah	24
.....	.....	.....	.....	.....	.....	Larkana	25
.....	.....	.....	.....	.....	.....	Bukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
24	.....	24	416	.....	416	Total, Sind.	
21,900	23,330	45,230	76,136	2,065	77,201	Grand Total.	

TABLE III—CROPS

Serial No.	District	Oil-seeds—concluded.					
		17. Other oil-seeds			18. Total oil-seeds		
		Reported 51	Esti- mated 52	Total 53	Reported 54	Esti- mated 55	Total 56
1	BOMBAY PRESIDENCY	Acres	Acres	Acres	Acres	Acres	Acres
	<i>Gujarat</i>						
1	Ahmedabad	588	...	588	51,255	589	54,844
2	Kaira	806	...	806	43,838	1,545	50,383
3	Panch Mahals	5,310	1,369	7,179	87,733	10,161	77,894
4	Broach	110	...	110	10,228	96	10,325
5	Surat	200	...	200	7,254	228	7,480
	Total, Gujarat	7,313	1,369	9,682	188,309	12,617	200,926
	<i>Deccan</i>						
6	West Khândesh	8,988	139	9,125	106,124	1,160	107,284
7	East Khândesh	452	...	452	261,064	...	261,964
8	Nâsik	83,251	1,439	89,740	144,843	1,598	145,641
9	Ahmednagar	13,348	123	13,469	50,103	408	50,511
10	Poona	18,462	1,155	19,617	49,185	2,243	51,433
11	Sholâpur	4,074	...	4,074	37,759	...	37,759
12	Sâtara	9,023	481	9,604	129,291	6,509	135,800
	Total, Deccan	142,594	3,337	145,981	778,469	11,923	790,392
	<i>Karnatak</i>						
13	Belgaum	3,534	713	4,247	36,834	1,482	37,316
14	Bijâpur	4,043	31	4,067	63,302	215	63,717
15	Dhârwar	4,208	309	4,517	50,380	1,074	51,454
	Total, Karnatak	11,785	1,046	12,831	149,716	2,771	152,487
	<i>Konkan</i>						
16	Thâna	4,657	228	4,885	6,207	306	6,533
17	Bombay Suburban	18	...	18	796	...	796
18	Kolâba	947	33	980	4,033	86	4,169
19	Ratnâgiri	1,936	6,029	7,965	13,013	39,662	52,665
20	Kânara	269	...	269	12,078	...	12,078
	Total, Konkan	7,825	6,290	14,115	36,237	40,204	76,441
	Total, Bombay Presidency	169,517	12,092	181,609	1,152,781	67,515	1,220,246
	<i>SIND</i>						
21	Karîchi	...	...	...	30,001	...	30,001
22	Hyderabad	42,972	...	42,972	52,323	...	52,323
23	Thar Pârkar	244	...	244	4,597	...	4,697
24	Nawâshâh	1	...	1	23,187	...	23,187
25	Lârkhânâ	2	...	2	62,558	500	63,368
26	Sukkur	5	...	5	16,430	...	16,430
27	Upper Sind Frontier	3	...	3	22,089	...	22,089
	Total, Sind	43,227	..	43,227	216,635	800	217,455
	Grand Total	213,744	12,092	224,836	1,369,416	68,315	1,437,731

—contd.

Condiments and Spices			Sugars			District	Serial No.
19. Condiments and Spices			20. Sugarcane				
Reported 57	Esti- mated 58	Total 59	Reported 60	Esti- mated 61	Total 62		
Acres	Acres	Acres	Acres	Acres	Acres		
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1,788	126	1,914	154	4	158	Ahmedabad ... 1	
2,996	38	3,034	35	.....	35	Kaira ... 2	
984	189	1,173	26	1	27	Panch Mahals ... 3	
349	.....	349	23	.....	23	Broach ... 4	
1,412	123	1,535	1,705	20	1,726	Surat ... 5	
7,629	476	8,005	1,943	25	1,968	Total, Gujarat.	
<i>Deccan</i>							
5,770	55	5,825	887	.....	887	West Khandesh ... 6	
10,915	.....	10,915	596	.....	596	East Khandesh ... 7	
8,347	41	8,388	3,689	7	3,696	Nasik ... 8	
5,631	76	5,707	14,584	474	15,058	Ahmednagar ... 9	
11,566	28	11,594	14,557	1	14,558	Poona ... 10	
7,557	.....	7,557	767	.....	767	Sholapur ... 11	
26,266	1,549	26,805	6,279	1,018	7,297	Satara ... 12	
76,642	1,749	77,391	41,359	1,500	42,859	Total, Deccan.	
<i>Karnatak</i>							
24,559	302	24,861	11,302	318	11,620	Belgaum ... 13	
3,134	12	3,146	500	4	504	Bijapur ... 14	
51,377	628	52,005	2,777	28	2,805	Dharwar ... 15	
79,070	942	80,012	14,579	260	14,839	Total, Karnatak.	
<i>Konkan</i>							
1,314	28	1,342	328	.....	328	Thana ... 16	
27	.....	27	.....	.....	.....	Bombay Suburban ... 17	
386	5	391	26	10	35	Kolaba ... 18	
788	2,304	3,092	550	1,650	2,200	Ratnagiri ... 19	
4,581	.....	4,581	3,002	.....	3,002	Kanara ... 20	
7,576	2,835	9,911	3,903	1,660	5,563	Total, Konkan.	
169,717	5,502	175,219	61,784	3,465	65,249	Total, Bombay Presidency.	
<b>SIND</b>							
662	.....	662	1,257	.....	1,257	Karachi ... 21	
445	.....	445	1,109	.....	1,109	Hyderabad ... 22	
167	.....	167	253	.....	253	Mir Parkar ... 23	
32	.....	32	37	.....	37	Nawabshah ... 24	
1,107	.....	1,107	116	.....	116	Larkana ... 25	
600	.....	600	385	.....	385	Sukkur ... 26	
320	.....	320	20	.....	20	Upper Sind Frontier ... 27	
3,333	.....	3,333	3,177	.....	3,177	Total, Sind.	
173,050	5,502	178,552	64,961	3,465	68,426	Grand Total.	

TABLE III—CROPS

Serial No. 1	District 2	Sugar—concluded					
		21. Others			22. Total sugars		
		Reported 63	Esti- mated 64	Total 65	Reported 66	Esti- mated 67	Total 68
	<b>BOMBAY PRESIDENCY.</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarat</i>						
1	Ahmedabad	15	.....	15	169	4	173
2	Kaira	.....	.....	.....	35	.....	35
3	Panch Mahals	.....	.....	.....	26	1	27
4	Broach	110	.....	110	133	.....	133
5	Surat	374	.....	374	2,079	20	2,099
	<b>Total, Gujarat</b>	<b>499</b>	<b>.....</b>	<b>499</b>	<b>2,442</b>	<b>25</b>	<b>2,467</b>
	<i>Deccan</i>						
6	West Khândesh	46	.....	46	933	.....	933
7	East Khândesh	.....	.....	.....	598	.....	598
8	Nasik	.....	.....	.....	3,059	7	3,066
9	Ahmednagar	1	.....	1	14,585	474	15,059
10	Poona	72	.....	72	14,029	1	14,030
11	Sholapur	.....	.....	.....	767	.....	767
12	Sâtara	8	.....	8	6,257	1,018	7,305
	<b>Total, Deccan</b>	<b>127</b>	<b>.....</b>	<b>127</b>	<b>41,486</b>	<b>1,500</b>	<b>42,986</b>
	<i>Karnatak</i>						
13	Belgaum	25	.....	25	11,327	248	11,575
14	Bijapur	2	.....	2	702	4	506
15	Dharwar	61	.....	61	2,334	28	2,366
	<b>Total, Karnatak</b>	<b>88</b>	<b>.....</b>	<b>88</b>	<b>14,067</b>	<b>280</b>	<b>14,347</b>
	<i>Konkan</i>						
16	Thâna	.....	.....	.....	326	.....	326
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	12	.....	12	37	10	47
19	Ratnâgiri	.....	.....	.....	550	1,650	2,200
20	Kâsara	.....	.....	.....	3,02	.....	3,002
	<b>Total, Konkan</b>	<b>12</b>	<b>.....</b>	<b>12</b>	<b>3,915</b>	<b>1,660</b>	<b>5,575</b>
	<b>Total, Bombay Presidency</b>	<b>726</b>	<b>.....</b>	<b>726</b>	<b>62,510</b>	<b>3,465</b>	<b>65,975</b>
	<b>SIND</b>						
21	Karachi	98	.....	98	1,355	.....	1,355
22	Hyderabad	21	.....	21	1,130	.....	1,130
23	Thar Parkar	2	.....	2	265	.....	265
24	Nawâshah	.....	.....	.....	37	.....	37
25	Larkana	306	.....	306	422	.....	422
26	Sukkur	2,239	.....	2,239	2,624	.....	2,624
27	Upper Sind Frontier	9	.....	9	39	.....	29
	<b>Total, Sind</b>	<b>2,675</b>	<b>.....</b>	<b>2,675</b>	<b>5,852</b>	<b>.....</b>	<b>5,852</b>
	<b>Grand Total</b>	<b>3,401</b>	<b>.....</b>	<b>3,401</b>	<b>68,362</b>	<b>3,465</b>	<b>71,827</b>

—contd.

Fibres.						District.	Serial No.
28. Cotton.			24. Jute.				
Reported.	Esti- mated.	Total.	Reported.	Estimated.	Total.		
69	70	71	72	73	74	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
615,534	41,453	656,987	.....	.....	.....	Abmedabad	1
485,407	1,376	486,783	.....	.....	.....	Kaira	2
41,610	6,446	48,056	.....	.....	.....	Panch Mahāla	3
332,872	10,860	343,732	.....	.....	.....	Broach	4
105,365	5,877	111,242	.....	.....	.....	Surat	5
1,323,788	66,012	1,389,800	.....	.....	.....	Total, Gujarat.	
						<i>Deccan</i>	
572,235	4,075	576,310	.....	.....	.....	West Khāndesh	6
868,364	.....	868,364	.....	.....	.....	East Khāndesh	7
169,846	104	169,950	.....	.....	.....	Nāsik	8
240,048	2,568	242,616	.....	.....	.....	Ahmednagar	9
4,850	.....	4,850	.....	.....	.....	Poona	10
41,145	.....	41,145	.....	.....	.....	Bholāpur	11
21,432	192	21,624	.....	.....	.....	Sātara	12
1,867,920	6,929	1,874,849	.....	.....	.....	Total, Deccan.	
						<i>Karnatak</i>	
262,712	6,904	269,616	.....	.....	.....	Belgaum	13
834,871	948	835,819	.....	.....	.....	Bijāpur	14
711,888	9,741	721,629	.....	.....	.....	Dhārwar	15
1,829,471	17,693	1,847,164	.....	.....	.....	Total, Karnatak.	
						<i>Konkan</i>	
.....	.....	.....	.....	.....	.....	Thāna	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolāba	18
.....	.....	.....	.....	.....	.....	Ratnāgiri	19
.....	.....	.....	.....	.....	.....	Kanāra	20
1	3	4	.....	.....	.....	Total, Konkan.	
5,021,180	90,537	5,111,717	.....	.....	.....	Total, Bombay Presidency.	
						<b>SIND</b>	
1,220	.....	1,220	.....	.....	.....	Karāchi	21
81,524	.....	81,324	.....	.....	.....	Hyderabad	22
159,210	.....	159,210	.....	.....	.....	Thar Pārkar	23
116,688	.....	116,688	.....	.....	.....	Nawābahāh	24
494	.....	404	.....	.....	.....	Lārkāna	25
1,818	.....	1,818	.....	.....	.....	Sukkur	26
210	.....	210	.....	.....	.....	Upper Sind Frontier	27
362,313	.....	362,313	.....	.....	.....	Total, Sind.	
5,383,493	90,537	5,474,030	.....	.....	.....	Grand Total.	

TABLE III—CROPS

Serial No.	District.	Fibres—concluded.					
		25. Other Fibres.			26. Total Fibres.		
		Re-ported. 75	Esti-mated. 76	Total. 77	Re-ported. 78	Esti-mated. 79	Total. 80
	<b>BOMBAY PRESIDENCY</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarat</i>						
1	Ahmedabad ...	6,621	8	6,629	622,155	41,461	663,616
2	Kaira ...	4,773	44	4,816	140,190	1,419	141,599
3	Panch Mahals ...	9,143	2,236	10,379	52,753	8,682	61,435
4	Broach ...	161	...	151	333,023	10,860	343,883
5	Surat ...	1,504	65	1,569	106,869	5,942	202,811
	<b>Total, Gujarat ...</b>	<b>21,192</b>	<b>2,352</b>	<b>23,544</b>	<b>1,344,930</b>	<b>68,364</b>	<b>1,413,344</b>
	<i>Deccan</i>						
6	West Khândesh ...	10,407	232	10,639	632,643	4,307	536,049
7	East Khândesh ...	7,426	...	7,426	875,790	...	875,790
8	Nasik ...	4,629	4	4,633	174,474	108	174,582
9	Ahmednagar ...	10,363	111	10,474	260,402	2,569	262,971
10	Poona ...	1,979	41	2,020	6,823	41	6,870
11	Sholapur ...	8,394	...	8,394	49,529	...	49,529
12	Sâtara ...	5,327	222	5,549	24,769	414	27,173
	<b>Total, Deccan ...</b>	<b>43,505</b>	<b>610</b>	<b>49,115</b>	<b>1,916,425</b>	<b>7,539</b>	<b>1,923,964</b>
	<i>Karnatak</i>						
13	Belgaum ...	10,657	297	10,954	373,369	7,201	280,670
14	Bijapur ...	8,106	6	8,112	841,977	954	841,931
15	Dhârwar ...	5,183	119	5,282	737,051	9,560	746,611
	<b>Total, Karnatak ...</b>	<b>21,926</b>	<b>422</b>	<b>22,348</b>	<b>1,551,397</b>	<b>18,015</b>	<b>1,569,412</b>
	<i>Konkan</i>						
16	Thâna ...	1,215	104	1,319	1,215	104	1,319
17	Bombay Suburban ...	...	...	...	...	...	...
18	Kolâba ...	142	...	142	142	...	142
19	Râtnâgiri ...	2,029	6,987	8,116	2,030	6,060	8,120
20	Kânara ...	133	...	133	133	...	133
	<b>Total, Konkan ...</b>	<b>3,519</b>	<b>6,191</b>	<b>9,710</b>	<b>3,520</b>	<b>6,194</b>	<b>9,714</b>
	<b>Total, Bombay Presidency</b>	<b>95,142</b>	<b>9,575</b>	<b>104,717</b>	<b>5,116,322</b>	<b>100,112</b>	<b>5,216,434</b>
	<b>SIND</b>						
21	Karâchi ...	46	...	46	1,268	...	1,268
22	Hyderabad ...	258	...	258	82,082	...	82,082
23	Thar Pârkar ...	69	...	69	159,313	...	159,313
24	Nawâbsuh ...	102	...	102	116,960	...	116,960
25	Larkâna ...	47	...	47	451	...	451
26	Sokkur ...	5	...	5	1,823	...	1,823
27	Upper Sind Frontier ...	7	...	7	917	...	917
	<b>Total, Sind ...</b>	<b>534</b>	<b>...</b>	<b>534</b>	<b>362,847</b>	<b>...</b>	<b>362,847</b>
	<b>Grand Total ...</b>	<b>95,676</b>	<b>9,575</b>	<b>105,251</b>	<b>5,479,169</b>	<b>100,112</b>	<b>5,579,281</b>



—contd.

Dyes.						District.	No.
27. Indigo.			28. Other dyes.				
Re-ported. 81	Esti- mated 82	Total. 83	Re-ported. 84	Esti- mated. 85	Total. 86		
Aores.	Aores.	Aores.	Aores.	Aores.	Aores.	2	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
64	.....	64	485	.....	485	Ahmedabad	1
.....	.....	.....	2	.....	2	Kaira	2
.....	.....	.....	.....	.....	.....	Panch Mahals	3
.....	.....	.....	.....	.....	.....	Broach	4
.....	.....	.....	.....	.....	.....	Surat	5
64	.....	64	487	.....	487	Total, Gujarat	
						<i>Deccan</i>	
.....	.....	.....	3	.....	3	West Khandesh	6
6	.....	6	2,466	.....	2,466	East Khandesh	7
.....	.....	.....	6,430	.....	6,442	Nasik	8
.....	.....	.....	137,339	1,040	138,379	Ahmednagar	9
.....	.....	.....	91,055	519	91,574	Poona	10
.....	.....	.....	135,915	.....	135,915	Sholapur	11
.....	.....	.....	36,463	754	37,217	Satara	12
6	.....	6	409,871	2,425	412,296	Total, Deccan.	
						<i>Karnatak</i>	
.....	.....	.....	24,516	891	25,407	Belgaun	13
.....	.....	.....	70,497	271	70,768	Bijapur	14
.....	.....	.....	41,493	1,310	42,803	Dharwar	1
.....	.....	.....	136,506	2,272	138,778	Total, Karnatak.	
						<i>Konkan</i>	
.....	.....	.....	.....	.....	.....	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Hatnagiri	19
.....	.....	.....	1	.....	1	Kanara	20
.....	.....	.....	1	.....	1	Total, Konkan.	
70	.....	70	546,963	4,697	551,662	Total, Bombay Presidency ..	
						<b>SIND</b>	
.....	.....	.....	.....	.....	.....	Karachi	21
.....	.....	.....	11	.....	11	Hyderabad	22
.....	.....	.....	.....	.....	.....	Thar Parkar	23
849	.....	849	2	.....	2	Nawabshah	24
.....	.....	.....	408	.....	408	Larkana	25
106	.....	106	555	.....	555	Sukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
855	.....	855	676	.....	676	Total, Sind.	
1,025	.....	1,025	547,941	4,697	552,638	Grand Total.	

TABLE III—CROPS

Serial No.	District.	Dyes—concluded.			Drugs		
		29. Total dyes.			30. Opium.		
		Re-ported. 87	Esti-mated. 88	Total. 89	Re-ported. 90	Esti-mated. 91	Total. 92
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<b>BOMBAY PRESIDENCY</b>						
	<i>Gujarāt</i>						
1	Ahmedabad	549	...	549	.....	...	...
2	Kaira	2	...	2	.....	...	...
3	Panch Mahāls	...	...	...	.....	...	...
4	Broach	...	...	...	.....	...	...
5	Surat	...	...	...	.....	...	...
	<b>Total, Gujarat</b>	551	...	551	.....	...	...
	<i>Deccan</i>						
6	West Khāndesh	3	.....	3	.....	...	...
7	East Khāndesh	2,472	.....	2,472	.....	...	...
8	Nāsik	6,430	12	6,442	.....	...	...
9	Ahmednagar	137,339	1,040	138,379	.....	...	...
10	Poona	91,055	619	91,674	.....	...	...
11	Sholāpūr	135,915	...	135,915	.....	...	...
12	Sātāra	36,463	754	37,217	.....	...	...
	<b>Total, Deccan</b>	409,677	2,425	412,102	.....	...	...
	<i>Karnātāk</i>						
13	Belgaum	24,516	691	25,207	.....	...	...
14	Bijapur	70,497	371	70,868	.....	...	...
15	Dhārwar	41,483	1,310	42,893	.....	...	...
	<b>Total, Karnatak</b>	136,506	2,272	138,778	.....	...	...
	<i>Konkan</i>						
16	Thāna	...	...	...	.....	...	...
17	Bombay Suburban	...	...	...	.....	...	...
18	Kolāba	...	...	...	.....	...	...
19	Ratnāgiri	...	...	...	.....	...	...
20	Kānara	1	...	1	.....	...	...
	<b>Total, Konkan</b>	1	...	1	.....	...	...
	<b>Total, Bombay Presidency</b>	546,735	4,697	551,432	.....	...	...
	<b>SIND</b>						
21	Karāchi	...	...	.....	.....	...	...
22	Hyderabad	11	...	11	.....	...	...
23	Thar Parkar	...	...	.....	.....	...	...
24	Nawābshāh	851	...	851	.....	...	...
25	Larkāna	408	...	408	.....	...	...
26	Sukkur	361	...	361	.....	...	...
27	Upper Sind Frontier	...	...	.....	.....	...	...
	<b>Total, Sind</b>	1,631	...	1,631	.....	...	...
	<b>Grand Total</b>	548,366	4,697	553,063	.....	...	...

-contd.

and Narcotics.						District.	No.
31. Coffee.			32. Tea.				
Re-ported. 93	Esti-mated. 94	Total. 95	Re-ported. 96	Esti-mated. 97	Total. 98		
Acre.	Acre.	Acre.	Acre.	Acre.	Acre.		
...	...	...	1	...	1	<b>BOMBAY PRESIDENCY</b>	
...	...	...	...	...	...	<i>Gujarat</i>	
...	...	...	1	...	1	Ahmedabad	1
...	...	...	...	...	...	Kaira	2
...	...	...	1	...	1	Panch Mahals	3
...	...	...	1	...	1	Broach	4
...	...	...	1	...	1	Surat	5
...	...	...	3	...	3	Total, Gujarat.	
...	...	...	...	...	...	<i>Deccan</i>	
...	...	...	...	...	...	West Khândesh	6
...	...	...	...	...	...	East Khândesh	7
...	...	...	...	...	...	Nâsik	8
...	...	...	...	...	...	Ahmednagar	9
...	...	...	...	...	...	Poona	10
2	...	2	13	...	13	Sholapur	11
...	...	...	...	...	...	Sâtara	12
2	...	2	13	...	13	Total, Deccan.	
...	...	...	...	...	...	<i>Karnatak</i>	
...	...	...	...	...	...	Belgaum	13
...	...	...	...	...	...	Bijâpur	14
...	...	...	...	...	...	Dharwâr	15
...	...	...	...	...	...	Total, Karnatak.	
...	...	...	2	...	2	<i>Konkan</i>	
...	...	...	...	...	...	Thâna	16
...	...	...	...	...	...	Bombay Suburban	17
...	...	...	...	...	...	Koisa	18
7	...	7	...	...	...	Matnâgiri	19
...	...	...	...	...	...	Kânara	20
7	...	7	2	...	2	Total, Konkan.	
9	...	9	18	...	18	Total, Bombay Presidency ...	
...	...	...	...	...	...	<i>SIND</i>	
...	...	...	...	...	...	Karâchi	21
...	...	...	...	...	...	Hyderabad	22
...	...	...	...	...	...	Thar Pârkar	23
...	...	...	...	...	...	Nawâbahâh	24
...	...	...	...	...	...	Lârkâna	25
...	...	...	...	...	...	Sukkur	26
...	...	...	...	...	...	Upper Sind Frontier	27
...	...	...	...	...	...	Total, Sind.	
9	...	9	18	...	18	Grand Total.	

TABLE III—CROPS

1 Serial No	District.	Drugs and					
		33. Tobacco.			34. Cinchona.		
		Re-ported. 99	Esti- mated. 100	Total. 101	Re-ported. 102	Esti- mated 103	Total. 104
	<b>BOMBAY PRESIDENCY</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarat</i>						
1	Abmedabad	2,073	11	2,084	...	...	...
2	Naira	46,637	302	46,939	...	...	...
3	Panch Mahals	415	174	589	...	...	...
4	Broach	1,389	21	1,410	...	...	...
5	Surat	478	17	495	...	...	...
	Total, Gujarat	51,042	526	51,567	...	...	...
	<i>Deccan</i>						
6	West Khandesh	156	...	156	...	...	...
7	East Khandesh	1,372	...	1,372	...	...	...
8	Nasik	1,074	...	1,074	...	...	...
9	Ahmednagar	1,585	9	1,574	...	...	...
10	Poona	634	...	634	...	...	...
11	Sholapur	1,488	...	1,488	...	...	...
12	Satara	10,336	443	10,679	...	...	...
	Total, Deccan	16,475	462	16,927	...	...	...
	<i>Karnatak</i>						
13	Belgaum	43,018	369	43,377	...	...	...
14	Bijapur	1,388	...	1,388	...	...	...
15	Dharwar	956	...	956	...	...	...
	Total, Karnatak	46,362	369	46,721	...	...	...
	<i>Konkan</i>						
16	Thana	...	...	...	...	...	...
17	Bombay Suburban	...	...	...	...	...	...
18	Kolaba	...	...	...	...	...	...
19	Ratnagiri	...	...	...	...	...	...
20	Kanara	...	...	...	...	...	...
	Total, Konkan	...	...	...	...	...	...
	Total, Bombay Presidency	112,879	1,336	114,215	...	...	...
	<b>SIND</b>						
21	Karachi	44	...	44	...	...	...
22	Hyderabad	2,483	...	2,483	...	...	...
23	Tbar Parkar	128	...	128	...	...	...
24	Nawabshah	1,626	...	1,626	...	...	...
25	Larkana	1,330	...	1,330	...	...	...
26	Sukkur	1,711	...	1,711	...	...	...
27	Upper Sind Frontier	40	...	40	...	...	...
	Total, Sind	7,342	...	7,342	...	...	...
	Grand Total	120,221	1,336	121,557	...	...	...

—contd.

Narcotics—continued.						District.	Serial No.
36. Indian Hemp.			36. Other drugs and narcotics.				
Re-ported. 106	Esti-mated. 106	Total. 107	Re-ported. 108	Esti-mated. 109	Total. 110		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
...	...	...	...	...	...	<b>BOMBAY PRESIDENCY</b>	
...	...	...	...	...	...	<b>Gujarat.</b>	
...	...	...	...	...	...	Ahmedabad	1
...	...	...	...	...	...	Kaira	2
...	...	...	...	...	...	Panch Mahals	3
...	...	...	3	...	3	Broach	4
...	...	...	...	...	...	Surat	5
...	...	...	3	...	3	Total, Gujarat.	
...	...	...	...	...	...	<b>Deccan</b>	
...	...	...	89	...	89	West Khandesh	6
...	...	...	235	...	235	East Khandesh	7
...	...	...	340	...	340	Nasik	8
396	...	396	167	...	167	Ahmednagar	9
...	...	...	613	1	614	Poona	10
...	...	...	164	...	164	Sholapur	11
...	...	...	881	43	924	Satara	12
396	...	396	2,439	44	2,483	Total, Deccan.	
...	...	...	...	...	...	<b>Karnatak</b>	
...	...	...	464	10	474	Belgaum	13
...	...	...	139	...	139	Bijapur	14
...	...	...	1,638	5	1,633	Dharwar	15
...	...	...	2,231	15	2,246	Total, Karnatak.	
...	...	...	...	...	...	<b>Konkan</b>	
...	...	...	557	...	557	Thana	16
...	...	...	...	...	...	Bombay Suburban	17
...	...	...	488	...	488	Kolaba	18
...	...	...	1,807	5,421	7,228	Ratnagiri	19
...	...	...	17,451	...	17,451	Kanara	20
...	...	...	20,301	5,421	25,722	Total, Konkan.	
396	...	396	24,974	5,461	30,435	Total, Bombay Presidency	
...	...	...	...	...	...	<b>SIND</b>	
...	...	...	...	...	...	Karachi	21
...	...	...	...	...	...	Hydrabad	22
...	...	...	...	...	...	Thar Parkar	23
...	...	...	...	...	...	Navabshah	24
70	...	70	...	...	...	Larkana	25
...	...	...	2	...	2	Sukkur	26
...	...	...	...	...	...	Upper Sind Frontier	27
70	...	70	2	...	2	Total, Sind.	
468	...	468	24,976	5,490	30,466	Grand Total.	

TABLE III—CROPS

No.	District	Drugs and Narcotics— <i>concls</i>			Fodder crops		
		37. Total drugs and narcotics			38. Fodder crops		
		Reported 111	Esti- mated 112	Total 113	Reported 114	Esti- mated 115	Total 116
1	2	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad	2,074	11	2,085	116,304	3,292	119,596
2	Kaira	46,687	302	46,989	109,027	3,317	112,344
3	Panch Mahals	415	174	589	41,331	17,424	58,755
4	Brosch	1,363	21	1,414	52,110	2,249	54,379
5	Surat	479	17	496	306,871	8,533	315,404
	<b>Total, Gujarat</b>	<b>51,049</b>	<b>525</b>	<b>51,573</b>	<b>625,633</b>	<b>34,835</b>	<b>660,468</b>
<i>Deccan</i>							
6	West Khandesh	195	.....	195	1,970	19	1,989
7	East Khandesh	1,697	.....	1,697	3,207	.....	3,207
8	Nasik	1,364	.....	1,364	101,163	596	101,759
9	Ahmednagar	2,123	9	2,137	39,880	203	40,083
10	Poona	1,247	1	1,248	118,199	2,247	120,446
11	Sholapur	1,652	.....	1,652	78,930	.....	78,930
12	Satara	11,132	436	11,618	460,799	12,897	473,696
	<b>Total, Deccan</b>	<b>19,325</b>	<b>496</b>	<b>19,821</b>	<b>802,177</b>	<b>15,962</b>	<b>818,139</b>
<i>Karnatak</i>							
13	Belgaum	43,452	369	43,861	123,555	2,221	125,776
14	Bijapur	1,327	.....	1,327	8,321	.....	8,321
15	Dharwar	2,584	5	2,589	69,310	113	69,423
	<b>Total, Karnatak</b>	<b>47,363</b>	<b>374</b>	<b>47,737</b>	<b>191,186</b>	<b>2,334</b>	<b>193,520</b>
<i>Konkan</i>							
16	Thana	559	.....	559	178,669	1,938	180,607
17	Bombay Suburban	.....	.....	.....	15,963	5,493	21,456
18	Kolaba	486	.....	486	20,352	2,731	23,083
19	Ratnagiri	1,897	5,421	7,328	27,462	84,122	111,584
20	Kanara	17,758	.....	17,758	38,941	.....	38,941
	<b>Total, Konkan</b>	<b>20,610</b>	<b>5,421</b>	<b>26,031</b>	<b>291,408</b>	<b>94,284</b>	<b>385,692</b>
	<b>Total, Bombay Presidency</b>	<b>138,576</b>	<b>6,816</b>	<b>145,392</b>	<b>1,910,364</b>	<b>147,415</b>	<b>2,057,779</b>
<b>SIND</b>							
21	Karachi	44	.....	44	14,573	.....	14,573
22	Hyderabad	2,463	.....	2,463	979	.....	979
23	Thar Parkar	123	.....	123	10,341	.....	10,341
24	Nawabshah	1,629	.....	1,629	17,639	.....	17,639
25	Larkana	1,400	.....	1,400	1,085	.....	1,085
26	Sukkur	1,713	.....	1,713	888	.....	888
27	Upper Sind Frontier	40	.....	40	1,145	.....	1,145
	<b>Total, Sind</b>	<b>7,414</b>	<b>.....</b>	<b>7,414</b>	<b>47,200</b>	<b>.....</b>	<b>47,200</b>
	<b>Grand Total</b>	<b>145,990</b>	<b>6,816</b>	<b>152,806</b>	<b>1,957,564</b>	<b>147,415</b>	<b>2,104,979</b>

—contd.

Fruits and Vegetables (including root crops)			Miscellaneous Crops			District	No.
39. Fruits and Vegetables			40. Food crops				
Reported	Estimated	Total	Reported	Estimated	Total	3	1
117	118	119	120	121	122		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
18,691	834	18,985	21	.....	21	Ahmedabad	1
27,142	900	28,042	29	20	49	Kaira	2
2,396	828	3,224	.....	.....	.....	Panch Mahals	3
4,922	228	5,149	1	.....	1	Broach	4
10,628	621	11,249	.....	.....	.....	Surat	5
63,719	2,909	66,628	51	20	71	Total, Gujarat	
						<i>Deccan</i>	
15,987	39	15,976	86	.....	86	West Khandesh	6
28,214	.....	28,214	29	.....	29	East Khandesh	7
31,484	20	31,504	108	.....	108	Nasik	8
46,535	135	46,660	165	8	173	Ahmednagar	9
39,854	364	39,718	153	.....	153	Poona	10
13,586	.....	13,586	54	.....	54	Sholapur	11
47,468	2,191	49,659	565	8	573	Satara	12
222,568	2,749	225,317	1,250	16	1,266	Total, Deccan	
						<i>Karnatak</i>	
31,787	1,951	33,738	20	.....	20	Belgaum	13
21,133	40	21,173	3	1	4	Bijapur	14
23,371	767	24,138	.....	.....	.....	Dharwar	15
76,291	2,758	79,049	23	1	24	Total, Karnatak	
						<i>Konkan</i>	
6,359	115	6,474	.....	.....	.....	Thana	16
1,554	416	1,970	.....	.....	.....	Bombay Suburban	17
10,975	360	11,235	.....	.....	.....	Kolaba	18
5,549	17,222	22,771	.....	.....	.....	Ratnagiri	19
7,704	.....	7,704	.....	.....	.....	Kanara	20
32,041	18,818	50,854	.....	.....	.....	Total, Konkan	
394,619	27,229	421,848	1,324	37	1,361	Total, Bombay Presidency	
						<i>SIND</i>	
10,514	.....	10,514	3	.....	3	Farachi	21
10,666	.....	10,666	10	.....	10	Hyderabad	22
1,866	.....	1,866	3	.....	3	Thar Parkar	23
2,347	.....	2,347	.....	.....	.....	Nawabshah	24
6,976	.....	6,976	27	.....	27	Larkana	25
9,784	.....	9,784	9	.....	9	Sukkur	26
3,423	.....	3,423	.....	.....	.....	Upper Sind Frontier	27
45,676	.....	45,676	52	.....	52	Total, Sind	
440,195	27,229	467,424	1,376	37	1,413	Grand Total	

TABLE III—CROPS

No.	District	Miscellaneous Crops—concl'd.			35. Grand Total of all crops (i.e., Gross area cropped)		
		41. Non-Food crops			Reported 126	Esti- mated 127	Total 128
		Reported 123	Esti- mated 124	Total 125			
1	2						
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad	97	4	101	1,383,306	82,103	1,465,409
2	Kaira	23	2	24	806,156	15,883	821,988
3	Panch Mahals	.....	.....	.....	430,923	132,287	563,210
4	Broach	29	.....	29	584,788	19,742	604,530
5	Surat	123	10	133	734,496	23,143	757,639
Total, Gujarat		270	16	286	3,939,668	263,108	4,202,776
<i>Deccan</i>							
6	West Khandesh	20	.....	20	1,435,963	12,564	1,448,527
7	East Khandesh	116	.....	116	2,022,468	.....	2,022,468
8	Nasik	12	.....	12	2,042,948	9,788	2,052,706
9	Ahmednagar	50	.....	50	2,638,056	21,752	2,657,808
10	Poona	49	1	49	2,028,728	27,133	2,055,869
11	Sholapur	22	.....	22	2,163,168	.....	2,163,168
12	Satara	6	.....	6	2,052,322	76,747	2,129,569
Total, Deccan		273	1	274	14,382,151	148,264	14,530,405
<i>Karnatak</i>							
13	Belgaum	7	.....	7	1,811,279	65,908	1,867,087
14	Bijapur	5	.....	5	3,919,035	7,611	3,926,646
15	Dharwar	4	.....	4	2,181,475	52,382	2,233,857
Total, Karnatak		16	.....	16	6,911,789	115,903	7,027,690
<i>Konkan</i>							
16	Thana	126	.....	126	573,914	11,788	585,697
17	Bombay Suburban	.....	.....	.....	29,358	9,549	38,937
18	Kolaba	17	.....	17	367,467	25,101	392,568
19	Ratnagiri	.....	.....	.....	193,256	692,471	785,727
20	Kanara	2,439	.....	2,439	262,614	.....	262,614
Total, Konkan		2,482	.....	2,482	1,426,639	639,904	2,066,543
Total Bombay Presidency		3,141	17	3,158	26,680,247	1,196,087	27,826,314
<b>SIND</b>							
21	Karachi	4	.....	4	363,216	.....	363,216
22	Hyderabad	27,195	.....	27,195	656,737	.....	656,737
23	Thar Parkar	1,949	.....	1,949	912,356	.....	912,356
24	Nawabshah	9,145	.....	9,145	492,103	.....	492,103
25	Larkana	1,691	.....	1,691	856,011	3,100	859,011
26	Sukkur	961	.....	961	454,958	.....	454,958
27	Upper Sind Frontier	29	.....	29	493,444	1,511	500,455
Total, Sind		40,974	.....	40,974	4,255,715	4,511	4,260,226
Grand Total		44,115	17	44,132	30,915,963	1,170,578	32,086,540



—concl'd.

43.—Area cropped more than once			44.—Net area cropped			District	No.
Reported 129	Estimated 130	Total 131	Reported 132	Estimated 133	Total 134		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	<b>BOMBAY PRESIDENCY</b>	
						<b>Gujarat</b>	
9,685	230	9,915	1,373,671	61,873	1,435,544	Ahmedabad	1
3,558	118	3,676	707,597	15,717	723,314	Kaira	2
4,102	259	4,361	426,821	123,023	549,844	Panch Mahals	3
63	.....	63	584,725	19,743	604,467	Broach	4
7,287	324	7,611	737,239	32,619	769,858	Surat	5
29,615	929	30,544	3,910,053	202,179	4,112,232	Total, Gujarat	
						<b>Deccan</b>	
12,306	10	12,316	1,423,767	12,854	1,436,621	West Khandesh	6
15,154	.....	15,154	2,007,314	.....	2,007,314	East Khandesh	7
41,791	42	41,833	2,001,137	9,716	2,010,853	Nasik	8
44,960	118	45,078	2,591,096	21,634	2,612,730	Ahmednagar	9
84,356	503	84,859	1,944,370	26,630	1,971,000	Poona	10
24,137	.....	24,137	2,139,031	.....	2,139,031	Sholapur	11
98,744	5,190	103,934	1,464,078	71,657	1,535,735	Satara	12
321,348	5,863	327,211	14,060,803	143,891	14,204,694	Total, Deccan	
						<b>Karnatak</b>	
27,603	120	27,723	1,788,676	55,688	1,844,364	Belgaum	13
3,706	.....	3,706	2,915,396	7,611	2,923,007	Bijapur	14
20,495	15	20,510	2,160,980	62,267	2,223,247	Dharwar	15
51,807	135	51,942	6,869,052	116,666	6,985,718	Total, Karnatak	
						<b>Konkan</b>	
3,727	26	3,753	370,187	11,767	381,954	Thana	16
127	.....	127	29,261	9,549	38,810	Bombay Suburban	17
11,988	357	12,345	355,479	24,744	380,223	Kulaba	18
10,711	32,967	43,678	182,545	659,604	742,149	Ratnagiri	19
17,857	.....	17,857	244,767	.....	244,767	Kanara	20
44,410	33,250	77,660	1,362,229	605,654	1,967,883	Total, Konkan	
447,240	40,177	487,417	26,213,007	1,126,690	27,339,697	Total, Bombay Presidency	
						<b>SIND</b>	
23,490	.....	23,490	359,726	.....	359,726	Karachi	21
6,789	.....	6,789	649,278	.....	649,278	Hyderabad	22
2,811	.....	2,811	909,645	.....	909,645	Tbar Parkar	23
10,834	.....	10,834	481,329	.....	481,329	Nawabshah	24
178,413	.....	178,413	677,508	3,000	680,508	Larkana	25
31,646	.....	31,646	425,243	.....	425,243	Sukkur	26
59,858	.....	59,858	439,086	1,511	440,597	Upper Sind Frontier	27
313,611	.....	313,611	3,941,904	4,511	3,946,415	Total, Sind	
761,051	40,177	801,228	30,154,911	1,130,401	31,285,312	Grand Total	

TABLE IV—  
Area irrigated by different sources of irrigation and under crops

No.	District	Area irri					
		1.—Government Canals			2.—Private Canals.		
		Reported	Estimated	Total	Reported	Estimated	Total
1	2	3	4	5	6	7	8
	<b>BOMBAY PRESIDENCY</b>						
	<i>Gujarát</i>						
1	Ahmedabad ...	13,464	221	13,685	2,046	.....	2,046
2	Kaira ...	3,300	.....	3,300	.....	.....	.....
3	Panch Maháls ...	631	29	660	.....	.....	.....
4	Broach ...	.....	.....	.....	.....	.....	.....
5	Surat ...	.....	.....	.....	.....	.....	.....
	Total, Gujarát ...	17,404	250	17,654	2,046	.....	2,046
	<i>Deccan</i>						
6	West Khándesh ...	10,793	62	10,855	811	.....	811
7	East Khándesh ...	1,775	.....	1,775	6	.....	6
8	Násik ...	27,957	.....	27,957	2,217	.....	2,217
9	Ahmednagar ...	73,651	722	74,373	1,241	.....	1,241
10	Poona ...	68,985	.....	68,985	4,717	.....	4,717
11	Sholápur ...	10,190	.....	10,190	109	.....	109
12	Sátára ...	10,806	3,282	14,088	24,118	1,819	25,937
	Total, Deccan ...	204,067	4,076	208,133	33,219	1,849	35,068
	<i>Karnátak</i>						
13	Bolgaum ...	7,966	.....	7,966	4,434	11	4,445
14	Bijápúr ...	751	.....	751	92	.....	92
15	Dhárwár ...	6,961	50	7,011	280	.....	280
	Total, Karnátak ...	15,698	50	15,748	4,786	11	4,797
	<i>Konkan</i>						
16	Thána ...	.....	.....	.....	.....	.....	.....
17	Bombay Suburban ...	.....	.....	.....	.....	.....	.....
18	Kolábu ...	.....	.....	.....	.....	.....	.....
19	Ratnágiri ...	.....	.....	.....	1,504	4,752	6,376
20	Kánara ...	.....	.....	.....	2,887	.....	2,887
	Total, Konkan ...	.....	.....	.....	4,431	4,782	9,263
	Total, Bombay Presidency	237,159	4,376	241,535	44,532	6,642	51,174
	<b>SIND</b>						
21	Karschl ...	268,676	.....	268,676	.....	.....	.....
22	Hyderabad ...	641,234	.....	641,234	.....	.....	.....
23	Thar Párkur ...	352,700	.....	352,700	.....	.....	.....
24	Nawábsháh ...	430,738	.....	430,738	.....	.....	.....
25	Lárkána ...	604,201	600	604,701	754	.....	754
26	Sukkur ...	243,905	.....	243,905	15,066	.....	15,066
27	Upper Sind Frontier ...	397,935	.....	397,935	.....	.....	.....
	Total, Sind ...	2,839,289	600	2,839,789	15,820	.....	15,820
	Grand Total ...	3,076,445	4,376	3,081,321	60,352	6,642	66,994

## IRRIGATION.

irrigated in the Bombay Presidency (including Sind) in 1925-26.

gated from						District	No.
3.—Tanks			4.—Wells				
Reported	Estimated	Total	Reported	Estimated	Total		
9	10	11	12	13	14	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	BOMBAY PRESIDENCY	
						<i>Gujarat</i>	
7,590	430	8,019	48,354	2,229	50,583	Ahmedabad	1
4,741	40	4,781	29,780	366	30,146	Kaira	2
266	.....	266	1,033	77	1,139	Panch Mahals	3
3	.....	3	606	...	606	Broach	4
1,190	1	1,191	4,673	272	4,945	Surat	5
13,780	490	14,260	84,475	2,941	87,418	Total, Gujarat	
						<i>Deccan</i>	
.....	.....	.....	12,178	16	12,194	West Khândesh	6
.....	.....	.....	19,890	.....	19,890	East Khândesh	7
378	.....	378	35,789	124	35,893	Nasik	8
.....	.....	.....	82,558	760	83,418	Ahmednagar	9
5,338	.....	5,338	49,591	172	49,763	Poona	10
6,565	.....	6,565	92,826	.....	92,826	Sholapur	11
.....	.....	.....	55,927	1,832	57,929	Satara	12
12,279	.....	12,279	548,899	3,004	551,903	Total, Deccan.	
						<i>Karnatak</i>	
15,050	10	15,060	31,802	1,042	32,844	Belgaum	13
293	.....	293	24,376	17	24,393	Bijâpur	14
78,452	700	79,152	2,325	14	2,339	Dhârwar	15
98,795	710	99,505	58,903	1,073	59,976	Total, Karnatak.	
						<i>Konkan</i>	
355	.....	355	4,849	.....	4,848	Thâna	16
3	.....	3	210	.....	210	Bombay Suburban	17
42	.....	42	422	.....	422	Kolâba	18
655	1,905	2,620	4,597	13,791	18,388	Ratnâgiri	19
11,808	.....	11,808	1,241	.....	1,241	Kânara	20
12,803	1,905	14,828	11,318	13,791	25,109	Total, Konkan.	
132,717	3,155	135,872	503,565	20,813	524,407	Total, Bombay Presidency	
						<i>SIND</i>	
.....	.....	.....	5,799	.....	5,799	Karâchi	21
.....	.....	.....	397	.....	397	Hyderabad	22
.....	.....	.....	352	.....	352	Thar Parkar	23
.....	.....	.....	11,326	.....	11,326	Nawâshâh	24
.....	.....	.....	5,776	.....	5,776	Lârkaua	25
631	.....	631	23,557	.....	23,557	Sukkur	26
.....	.....	.....	1,590	.....	1,590	Upper Sind Frontier	27
631	.....	631	48,797	.....	48,797	Total, Sind	
133,348	3,155	136,503	552,392	20,813	573,204	Grand Total.	

TABLE IV—

No.	District	Area irrigated from—concluded					
		5.—Other sources of irrigation			Total area irrigated from all sources of irrigation		
		Reported 15	Estimated 16	Total 17	Reported 18	Estimated 19	Total 20
1	2	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarāt</i>							
1	Ahmedabad ...	13,078	612	13,688	84,520	3,501	88,021
2	Kaira ...	440	.....	440	38,270	408	38,710
3	Panch Mahāls ...	.....	.....	.....	1,959	108	2,065
4	Broach ...	.....	.....	.....	609	.....	609
5	Surat ...	24	.....	24	5,387	273	5,411
	<b>Total, Gujarāt ...</b>	<b>13,540</b>	<b>612</b>	<b>14,152</b>	<b>131,246</b>	<b>4,268</b>	<b>135,514</b>
<i>Deccan</i>							
6	West Khāndesh ...	153	.....	153	23,935	78	24,013
7	East Khāndesh ...	651	.....	651	32,319	.....	32,319
8	Nāsik ...	549	.....	549	66,868	134	67,002
9	Ahmednagar ...	.....	.....	.....	157,450	1,482	158,932
10	Poona ...	398	.....	398	129,029	172	129,201
11	Sholāpur ...	2	.....	2	109,892	.....	109,892
12	Sātāra ...	899	113	1,012	91,820	7,188	98,008
	<b>Total, Deccan ...</b>	<b>2,652</b>	<b>113</b>	<b>2,765</b>	<b>601,106</b>	<b>9,042</b>	<b>610,148</b>
<i>Karnātak</i>							
13	Belgaum ...	4,007	109	4,116	63,279	1,172	64,451
14	Bijāpur ...	.....	.....	.....	25,412	17	25,429
15	Dhārwar ...	8,256	626	8,882	96,754	1,390	98,144
	<b>Total, Karnātak ...</b>	<b>12,263</b>	<b>735</b>	<b>12,998</b>	<b>185,445</b>	<b>2,579</b>	<b>188,024</b>
<i>Konkan</i>							
16	Thāna ...	78	.....	78	5,281	.....	5,281
17	Bombay Suburban ...	.....	.....	.....	213	.....	213
18	Kolāba ...	301	.....	301	766	.....	766
19	Ratnāgiri ...	1,433	4,299	5,732	8,279	24,237	31,116
20	Kānara ...	6,885	.....	6,885	22,821	.....	22,821
	<b>Total, Konkan ...</b>	<b>8,697</b>	<b>4,299</b>	<b>12,996</b>	<b>37,359</b>	<b>24,837</b>	<b>62,196</b>
	<b>Total, Bombay Presidency ...</b>	<b>37,152</b>	<b>5,759</b>	<b>42,911</b>	<b>955,155</b>	<b>40,741</b>	<b>995,896</b>
<b>SIND</b>							
21	Karāchl ...	51,611	.....	51,611	326,088	.....	326,088
22	Hyderabad ...	7,647	.....	7,647	649,278	.....	649,278
23	Thar Pārkar ...	.....	.....	.....	363,652	.....	363,652
24	Nawāshah ...	.....	.....	.....	442,064	.....	442,064
25	Lārkāna ...	10,565	.....	10,565	521,296	500	521,796
26	Sukkur ...	.....	.....	.....	283,159	.....	283,159
27	Upper Sind Frontier ...	41,172	.....	41,172	439,086	1,511	440,597
	<b>Total, Sind ...</b>	<b>110,995</b>	<b>.....</b>	<b>110,995</b>	<b>3,014,021</b>	<b>2,011</b>	<b>3,016,032</b>
	<b>Grand Total ...</b>	<b>148,147</b>	<b>5,759</b>	<b>153,906</b>	<b>3,969,176</b>	<b>42,752</b>	<b>4,011,931</b>

IRRIGATION—contd.

Crops irrigated						District	No.
1.—Rice			2.—Wheat				
Reported 21	Estimated 22	Total 23	Reported 24	Estimated 25	Total 26		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		1
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
97,550	1,263	28,913	14,425	825	15,310	Ahmedabad	1
11,753	108	11,859	2,537	37	2,574	Kaira	2
262	.....	262	711	59	769	Panch Mahals	3
.....	.....	.....	4	.....	4	Broach	4
1,147	.....	1,147	1	1	2	Surat	5
40,712	1,369	42,081	17,733	921	18,659	Total, Gujarat	
<i>Deccan</i>							
937	.....	937	11,081	21	11,102	West Khandesh	6
48	.....	48	6,089	.....	6,089	East Khandesh	7
1,473	.....	1,473	25,419	32	25,451	Nasik	8
343	1	344	28,558	233	28,791	Ahmednagar	9
1,957	.....	1,957	12,980	10	12,990	Poona	10
629	.....	629	12,859	.....	12,859	Sholapur	11
9,268	1,009	10,277	15,003	985	15,988	Satara	12
14,650	1,009	15,659	122,289	1,371	123,660	Total, Deccan	
<b>Karnatak</b>							
18,257	7	18,264	1,871	.....	1,871	Belgaum	13
375	.....	375	338	.....	338	Bijapur	14
88,628	1,040	89,668	1	.....	1	Dharwar	15
107,260	1,047	108,307	2,010	.....	2,010	Total, Karnatak	
<b>Konkan</b>							
.....	.....	.....	.....	.....	.....	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
2,531	8,493	11,324	.....	.....	.....	Ratnagiri	19
19,385	.....	19,385	.....	.....	.....	Kanara	20
22,216	8,493	30,709	.....	.....	.....	Total, Konkan	
184,38	11,918	196,296	142,037	2,192	144,229	Total, Presidency	Bombay
<b>SIND</b>							
240,907	.....	240,907	14,496	.....	14,496	Karachi	21
261,717	.....	261,717	43,034	.....	43,034	Hyderabad	22
61,208	.....	61,208	16,462	.....	16,462	Thar Parker	23
30,443	.....	30,443	25,680	.....	25,680	Nawabshah	24
412,374	500	412,774	31,541	.....	31,541	Larkana	25
78,883	.....	78,883	36,970	.....	36,970	Sukkur	26
111,255	.....	111,255	54,294	34	54,328	Upper Sind Frontier	27
1,202,762	500	1,203,262	227,477	24	227,511	Total, Sind	
1,387,600	12,418	1,400,018	369,514	2,216	371,730	Grand Total.	

TABLE IV—

No.	District	Crops Irri					
		3.—Barley			4.—Jowar		
		Reported 27	Estimated 28	Total 29	Reported 30	Estimated 31	Total 32
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarāt</i>							
1	Abmedabad	4,144	123	4,272	16,464	839	17,303
2	Kaira	390	8	398	592	.....	592
3	Panch Mahāls	80	2	82	.....	.....	.....
4	Broach	.....	.....	.....	.....	.....	.....
5	Surat	.....	.....	.....	.....	.....	.....
	<b>Total, Gujarāt</b>	<b>4,614</b>	<b>136</b>	<b>4,752</b>	<b>17,056</b>	<b>839</b>	<b>17,895</b>
<i>Deccan</i>							
6	West Khāndesh	.....	.....	.....	43	.....	43
7	East Khāndesh	.....	.....	.....	12	.....	12
8	Nasik	.....	.....	.....	370	.....	370
9	Ahmednagar	81	8	89	50,741	536	51,277
10	Poona	354	.....	354	56,541	50	56,591
11	Sholapur	83	.....	83	83,981	.....	83,981
12	Sātara	826	89	915	32,171	1,840	34,011
	<b>Total, Deccan</b>	<b>2,099</b>	<b>47</b>	<b>2,146</b>	<b>201,862</b>	<b>2,426</b>	<b>207,228</b>
<i>Karnātak</i>							
13	Belgaum	1,696	199	1,895	2,632	.....	2,632
14	Bijāpur	2,870	2	2,872	8,174	.....	8,174
15	Dhārwar	.....	.....	.....	.....	.....	.....
	<b>Total, Karnātak</b>	<b>4,566</b>	<b>201</b>	<b>4,767</b>	<b>11,026</b>	.....	<b>11,026</b>
<i>Konkan</i>							
16	Thāna	.....	.....	.....	.....	.....	.....
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolāba	.....	.....	.....	.....	.....	.....
19	Ratnāgiri	.....	.....	.....	.....	.....	.....
20	Kānara	.....	.....	.....	.....	.....	.....
	<b>Total, Konkan</b>	.....	.....	.....	.....	.....	.....
	<b>Total, Bombay Presidency</b>	<b>11,279</b>	<b>383</b>	<b>11,662</b>	<b>232,914</b>	<b>3,265</b>	<b>236,209</b>
<b>SIND</b>							
21	Karachi	6,969	.....	6,969	3,970	.....	3,970
22	Hyderabad	1,183	.....	1,183	7,004	.....	7,004
23	Thar Pārkar	167	.....	167	6,226	.....	6,226
24	Nawābahān	396	.....	396	99,932	.....	99,932
25	Lārkana	583	.....	583	59,084	.....	59,084
26	Sukkur	224	.....	224	122,753	.....	122,753
27	Upper Sind Frontier	165	.....	165	107,269	1,477	108,746
	<b>Total, Sind</b>	<b>9,667</b>	.....	<b>9,667</b>	<b>406,243</b>	<b>1,477</b>	<b>407,720</b>
	<b>Grand Total</b>	<b>20,946</b>	<b>386</b>	<b>21,332</b>	<b>639,167</b>	<b>4,742</b>	<b>643,928</b>

IRRIGATION—contd.

gated—contd.						District	No.
5.—Bajri			6.—Maize				
Reported 33	Estimated 34	Total 35	Reported 36	Estimated 37	Total 38		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
12	.....	12	439	.....	439	<b>BOMBAY</b>	
296	40	336	6	.....	6	<b>PRESDENCY</b>	
.....	.....	.....	6	.....	6	<i>Gujarat</i>	
.....	.....	.....	.....	.....	.....	Ahmedabad	1
.....	.....	.....	.....	.....	.....	Kaira	2
.....	.....	.....	.....	.....	.....	Panch Mahals	3
.....	.....	.....	.....	.....	.....	Broach	4
.....	.....	.....	.....	.....	.....	Surat	5
307	40	347	451	.....	451	Total, Gujarat.	
						<i>Deccan</i>	
472	.....	472	403	.....	403	West Khandesh	6
.....	.....	.....	44	.....	44	East Khandesh	7
3,579	.....	3,579	502	.....	502	Nasik	8
19,822	20	19,842	1,003	3	1,006	Ahmednagar	9
16,681	50	16,731	1,527	.....	1,527	Poona	10
3,053	.....	3,053	5,276	.....	5,276	Sholapur	11
5,139	862	5,991	2,690	309	3,003	Satara	12
42,751	923	43,673	11,453	312	11,765	Total, Deccan	
						<i>Karnatak</i>	
105	.....	105	9,504	20	9,524	Belgaum	13
120	.....	120	953	1	957	Bijapur	14
.....	.....	.....	59	38	97	Dharwar	15
231	.....	231	10,519	59	10,578	Total, Karnatak	
						<i>Konkan</i>	
.....	.....	.....	.....	.....	.....	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Ratnagiri	19
.....	.....	.....	.....	.....	.....	Kanara	20
.....	.....	.....	.....	.....	.....	Total Konkan.	
43,280	993	44,273	22,429	371	22,794	Total, Bombay, Presidency.	
						<i>SIND.</i>	
11,264	.....	11,264	2,227	.....	2,227	Karachi	21
153,128	.....	153,128	241	.....	241	Hyderabad	22
100,006	.....	100,006	597	.....	597	Tar Parkar	23
115,858	.....	115,858	110	.....	110	Nawabshah	24
987	.....	987	.....	.....	.....	Larkana	25
21,983	.....	21,983	1	.....	1	Sukkur	26
70,183	.....	70,183	17	.....	17	Upper Sind Frontier	27
473,389	.....	473,389	3,193	.....	3,193	Total, Sind.	
516,678	993	517,671	25,616	371	25,987	Grand Total.	

TABLE IV—

No.	District	Crops irri					
		7.—Other cereals and pulses			8.—Sugar-cane		
		Reported	Estimated	Total	Reported	Estimated	Total
1	2	30	40	41	42	43	44
	<b>BOMBAY PRESIDENCY</b>	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<i>Gujarat</i>						
1	Ahmedabad	5,941	.....	5,941	151	4	155
2	Kaira	717	.....	717	35	.....	35
3	Panch Mahals	373	29	402	28	1	29
4	Broach	.....	.....	.....	23	.....	23
5	Surat	.....	.....	.....	1,704	21	1,725
	<b>Total, Gujarat</b>	<b>6,931</b>	<b>29</b>	<b>6,960</b>	<b>1,942</b>	<b>26</b>	<b>1,968</b>
	<i>Deccan</i>						
6	West Khandesh	1,703	.....	1,703	887	.....	887
7	East Khandesh	672	.....	672	590	.....	590
8	Nasik	13,183	19	13,182	3,673	7	3,680
9	Ahmednagar	24,013	25	24,034	14,522	474	14,996
10	Poona	11,016	.....	11,016	14,534	1	14,535
11	Sholapur	7,774	.....	7,774	767	.....	767
12	Satara	6,252	342	6,594	6,100	897	6,997
	<b>Total, Deccan</b>	<b>64,593</b>	<b>386</b>	<b>64,979</b>	<b>41,073</b>	<b>1,379</b>	<b>42,452</b>
	<i>Karnatak</i>						
13	Belgaum	6,246	359	6,605	11,302	248	11,550
14	Bijapur	3,348	1	3,349	500	4	504
15	Dharwar	318	35	353	2,777	28	2,805
	<b>Total, Karnatak</b>	<b>9,912</b>	<b>395</b>	<b>10,307</b>	<b>14,579</b>	<b>280</b>	<b>14,859</b>
	<i>Konkan</i>						
16	Thana	.....	.....	.....	326	.....	326
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	.....	.....	.....	82	.....	82
19	Ratnagiri	1,098	3,294	4,392	550	1,650	2,200
20	Kanara	619	.....	619	2,262	.....	2,262
	<b>Total, Konkan</b>	<b>1,717</b>	<b>3,294</b>	<b>5,011</b>	<b>3,169</b>	<b>1,650</b>	<b>4,919</b>
	<b>Total, Bombay, Presidency.</b>	<b>83,153</b>	<b>4,104</b>	<b>87,257</b>	<b>60,754</b>	<b>3,335</b>	<b>64,089</b>
	<b>SIND</b>						
21	Karach.	26,276	.....	26,276	1,257	.....	1,257
22	Hyderabad	4,579	.....	4,579	1,109	.....	1,109
23	Thar Parkar	1,685	.....	1,685	253	.....	253
24	Nawabshah	10,478	.....	10,478	37	.....	37
25	Larkana	3,619	.....	3,619	112	.....	112
26	Sukkar	3,424	.....	3,424	365	.....	365
27	Upper Sind Frontier	121,913	.....	121,913	20	.....	20
	<b>Total, Sind</b>	<b>171,974</b>	<b>.....</b>	<b>171,974</b>	<b>3,173</b>	<b>.....</b>	<b>3,173</b>
	<b>Grand Total</b>	<b>255,127</b>	<b>4,104</b>	<b>259,231</b>	<b>63,927</b>	<b>3,335</b>	<b>67,262</b>



IRRIGATION—*contd.*

gated— <i>consolidated</i> .						District	No.
9.—Other food crops			10.—Cotton				
Reported 45	Estimated 46	Total 47	Reported 48	Estimated 49	Total 50		
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
3,394	166	3,560	5,612	100	5,712	Ahmedabad	1
2,011	30	2,041	509	.....	509	Kaira	2
839	11	850	.....	.....	.....	Panch Mahala	3
252	.....	252	.....	.....	.....	Broach	4
1,949	218	2,166	.....	.....	.....	Surat	5
6,944	425	7,369	6,121	100	6,221	Total, Gujarat.	
						<i>Deccan</i>	
3,439	48	3,487	326	.....	326	West Khandesh	6
8,120	.....	8,120	.....	.....	.....	East Khandesh	7
16,955	40	16,995	2,052	.....	2,052	Nasik	8
14,697	60	14,697	1,238	65	1,293	Ahmednagar	9
22,725	89	22,814	3,792	.....	3,792	Poona	10
9,827	.....	9,827	10,967	.....	10,967	Sholapur	11
11,121	515	11,636	280	.....	280	Satara	12
86,810	752	87,562	18,655	65	18,710	Total, Deccan.	
						<i>Karnatak</i>	
6,428	167	6,595	1,211	.....	1,211	Belgaum	13
4,357	2	4,359	2,439	2	2,441	Bijapur	14
4,052	15	4,067	.....	.....	.....	Dharwar	15
14,837	184	15,021	3,650	2	3,652	Total, Karnatak.	
						<i>Konkan</i>	
4,969	.....	4,969	.....	.....	.....	Thana	16
189	.....	189	.....	.....	.....	Bombay Suburban	17
966	.....	966	.....	.....	.....	Kolaba	18
2,347	7,041	9,388	.....	.....	.....	Hatnagiri	19
391	.....	391	.....	.....	.....	Kanara	20
8,982	7,041	15,923	.....	.....	.....	Total, Konkan.	
117,493	8,402	125,895	28,426	157	28,583	Total, Bombay Presidency.	
						<i>SIND</i>	
11,223	.....	11,223	1,220	.....	1,220	Karachi	21
13,516	.....	13,516	81,524	.....	81,524	Hyderabad	22
2,104	.....	2,104	159,244	.....	159,244	Thar Parkar	23
2,446	.....	2,446	116,898	.....	116,898	Nawabshah	24
8,071	.....	8,071	174	.....	174	Larkana	25
14,050	.....	14,050	1,702	.....	1,702	Sukkur	26
31,249	.....	31,249	910	.....	910	Upper Sind Frontier	27
82,659	.....	82,659	361,960	.....	361,960	Total, Sind.	
300,152	8,402	308,554	390,398	157	390,543	Grand Total.	

TABLE IV—

No.	District	Crops irrigated—concd.					
		Other non-food crops			Total crops irrigated		
		Reported	Estimated	Total	Reported	Estimated	Total
1	2	51	52	53	54	55	56
		Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	<b>BOMBAY PRESIDENCY</b>						
	<i>Gujarat</i>						
1	Ahmedabad	7,732	187	7,919	84,827	3,512	88,339
2	Kaira	19,873	188	20,061	38,718	409	39,127
3	Panch Mahals	162	5	167	1,959	106	2,065
4	Broach	333	.....	333	612	.....	612
5	Surat	1,120	33	1,153	5,920	273	6,193
	<b>Total, Gujarat</b>	<b>29,220</b>	<b>413</b>	<b>29,633</b>	<b>132,036</b>	<b>4,300</b>	<b>136,336</b>
	<i>Deccan</i>						
6	West Khandesh	6,224	9	6,233	35,514	78	35,592
7	East Khandesh	8,105	.....	8,105	23,686	.....	23,686
8	Nasik	18,622	56	18,678	85,808	154	85,962
9	Ahmednagar	13,039	111	13,150	172,397	1,516	173,913
10	Poona	10,724	35	10,759	152,584	175	152,759
11	Sholapur	12,464	.....	12,464	122,440	.....	122,440
12	Satara	16,000	1,183	17,183	103,854	7,975	111,859
	<b>Total, Deccan</b>	<b>85,178</b>	<b>1,389</b>	<b>86,567</b>	<b>694,483</b>	<b>9,898</b>	<b>704,381</b>
	<i>Karnatak</i>						
13	Belgaum	10,525	259	10,784	69,798	1,259	71,057
14	Bijapur	4,067	5	4,072	27,550	17	27,567
15	Dharwar	1,836	17	1,853	97,456	1,390	98,846
	<b>Total, Karnatak</b>	<b>16,428</b>	<b>281</b>	<b>16,709</b>	<b>194,804</b>	<b>2,666</b>	<b>197,470</b>
	<i>Konkan</i>						
16	Thana	739	.....	739	6,054	.....	6,054
17	Bombay Suburban	27	.....	27	216	.....	216
18	Kolaba	4	.....	4	992	.....	992
19	Ratnagiri	1,550	4,650	6,200	8,376	25,128	33,504
20	Kanara	177	.....	177	22,634	.....	22,811
	<b>Total, Konkan</b>	<b>2,497</b>	<b>4,650</b>	<b>7,147</b>	<b>38,472</b>	<b>25,128</b>	<b>63,600</b>
	<b>Total, Bombay, Presidency</b>	<b>133,326</b>	<b>6,733</b>	<b>140,059</b>	<b>1,059,795</b>	<b>41,992</b>	<b>1,101,787</b>
	<i>SIND</i>						
21	Karachi	29,606	.....	29,606	349,415	.....	349,415
22	Hyderabad	83,702	.....	83,702	656,037	.....	656,037
23	Thar Parkar	7,790	.....	7,790	355,737	.....	355,737
24	Nawabshah	44,632	.....	44,632	452,899	.....	452,899
25	Larkana	7,103	.....	7,103	523,528	500	524,028
26	Sukkur	5,915	.....	5,915	256,325	.....	262,240
27	Upper Sind Frontier	1,639	.....	1,639	498,944	1,511	500,455
	<b>Total, Sind</b>	<b>180,397</b>	<b>.....</b>	<b>180,397</b>	<b>3,122,884</b>	<b>2,011</b>	<b>3,124,895</b>
	<b>Grand Total</b>	<b>313,723</b>	<b>6,733</b>	<b>320,456</b>	<b>4,182,679</b>	<b>44,003</b>	<b>4,226,683</b>

IRRIGATION—*concl'd.*

Deduct area of crops irrigated more than once			Net irrigated area			District	No.
Reported	Estimated	Total	Reported	Estimated	Total		
57	58	59	60	61	62	2	1
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.		
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
307	11	318	84,620	3,501	88,021	Ahmedabad	1
448	3	451	38,270	406	38,676	Kaira	2
.....	.....	.....	1,959	106	2,065	Panch Mahals	3
3	.....	3	609	.....	609	Broach	4
38	.....	38	5,887	273	6,150	Surat	5
791	14	805	131,245	4,286	135,531	Total, Gujarat.	
<i>Deccan</i>							
1,579	.....	1,579	23,925	78	24,013	West Kandesh	6
1,374	.....	1,374	22,312	.....	22,312	East Kandesh	7
18,940	30	18,970	64,868	124	65,092	Nasik	8
14,847	34	14,881	157,450	1,432	158,882	Ahmednagar	9
23,855	3	23,858	129,029	172	129,201	Poona	10
18,748	.....	18,748	109,692	.....	109,692	Sholapur	11
14,034	789	14,823	91,820	7,186	99,006	Satara	12
93,377	856	94,233	601,106	9,042	610,148	Total, Deccan.	
<i>Karnatak</i>							
6,519	87	6,606	63,279	1,172	64,451	Belgaum	13
2,138	.....	2,138	25,412	17	25,429	Bijapur	14
702	.....	702	96,754	1,890	98,144	Dharwar	15
9,359	87	9,446	165,445	3,579	168,024	Total, Karnatak.	
<i>Konkan</i>							
773	.....	773	5,281	.....	5,281	Thana	16
3	.....	3	213	.....	213	Bombay Suburban	17
227	.....	227	765	.....	765	Kolaba	18
97	291	388	8,279	24,837	33,116	Ratnagiri	19
13	.....	13	22,821	.....	22,821	Kanara	20
1,112	291	1,404	37,359	24,837	62,196	Total Konkan.	
104,640	1,248	105,888	955,155	40,744	995,899	Total, Bombay Presid- ency.	
<b>SIND</b>							
23,329	.....	23,329	326,066	.....	326,066	Karachi	21
6,759	.....	6,759	649,278	.....	649,278	Hyderabad	22
2,685	.....	2,685	353,052	.....	353,052	Thar Parkar	23
10,834	.....	10,834	442,064	.....	442,064	Nawabshah	24
2,232	.....	2,232	521,296	500	521,796	Larkana	25
3,166	.....	3,166	283,159	.....	283,159	Sukkur	26
59,858	.....	59,858	439,086	1,511	440,597	Upper Sind Frontier	27
106,463	.....	106,868	3,014,021	2,011	3,016,032	Total, Sind.	
213,503	1,248	214,751	3,969,176	42,755	4,011,931	Grand Total.	

TABLE V—OUTTURN

Estimated outturn of principal Kharif and Rabi  
twelve-anna crop) in the Bombay

Serial Number	District	Kharif								
		Jowari	Bajri	Rice	Kodra	Ragi	Yari	Tur	Udd. Mug	Besane
	<b>Gujarat</b>				Per cent. of the normal					
1	Ahmedabad	34	67	38	33	50	50	33	33	25
2	Kaira	54	63	29	63	63	67	33	42	32
3	Panch Mahals	38	50	42	67	46	50	33	29	17
4	Broach	50	66	80	61	75	...	42	25	78
5	Surat	68	83	48	73	54	67	60	55	56
	<b>Deccan</b>									
6	West Khandesh	100	83	83	83	83	83	83	83	67
7	East Khandesh	50	67	50	58	...	58	50	42	50
8	Nasik	75	83	83	...	83	83	75	75	67
9	Ahmednagar	...	59	67	50	67	58	50	54	67
10	Poona	33	51	75	58	75	75	50	50	50
11	Sholapur	...	42	54	67	54	67	67	50	33
12	Satara	63	58	88	...	96	79	54	58	50
	<b>Karnatak</b>									
13	Belgaum	67	67	75	...	50	67	58	58	58
14	Bijapur	...	58	60	50	58	50	58	50	58
15	Dharwar	75	67	83	83	83	83	50	63	75
	<b>Konkan</b>									
16	Thana	92	...	92	83	83	92	75	83	83
17	Bombay Suburban.	...	...	100	...	100	...	...	...	83
18	Kolaba	...	...	100	92	92	92	83	83	92
19	Ratnagiri	...	...	92	92	92	83	75	75	83
20	Kanara	75	...	75	...	67	...	75	67	67
	<b>Sind</b>									
21	Karachi	54	67	75	...	67	33	...	67	58
22	Hyderabad	75	58	75	...	...	67	...	58	50
23	Thar Parker	42	16	58	...	50	50	50	50	33
24	Nawabshah	50	50	58	...	...	...	...	...	50
25	Larkana	50	50	50	...	...	67	...	46	42
26	Sukkur	42	50	25	...	58	...	...	58	42
27	Upper Sind Frontier.	67	67	83	...	...	...	...	75	67

(PER CENT. OF THE NORMAL).

crops in parts of 100 (100 denoting a normal, i.e.,  
Presidency during the year 1925-26.

Cotton		Rabi						Perennial	District	Serial Number
Early	Late	Jowari	Wheat	Gram	Tobacco	Linseed	Rape and Mustard	Sugar-cane		
		Per cent. of the normal								
...	50	41	65	42	67	...	58	50	<b>Gujarat</b>	
...	58	...	49	33	57	...	67	71	Ahmedabad ...	1
...	58	...	82	33	54	17	33	83	Kaira ...	2
...	71	61	46	38	68	...	...	75	Panch Mahals ...	3
...	68	65	25	48	68	...	...	73	Brosch ...	4
									Surat ...	5
									<b>Deccan</b>	
67	...	100	100	100	83	83	58	100	West Khandesh ...	6
58	...	...	75	67	58	67	...	67	East Khandesh ...	7
67	...	...	64	75	58	67	67	83	Nasik ...	8
67	...	68	64	68	75	67	...	100	Ahmednagar ...	9
65	...	58	56	46	63	25	...	100	Poona ...	10
49	...	84	67	67	54	58	...	83	Sholapur ...	11
67	...	50	82	64	75	50	...	83	Satara ...	12
									<b>Karnatak</b>	
...	83	42	58	46	67	63	...	83	Belgaum ...	13
...	42	75	58	50	67	50	...	75	Bijapur ...	14
...	75	67	67	67	75	75	75	83	Dharwar ...	15
									<b>Konkan</b>	
...	...	...	75	75	...	...	...	83	Thana ...	16
...	...	...	...	...	...	...	...	...	Bombay Suburban ...	17
...	...	...	...	83	...	...	...	83	Kolaba ...	18
...	...	...	...	67	...	...	...	83	Ratnagiri ...	19
...	...	...	...	67	...	...	...	83	Kanara ...	20
									<b>Sind</b>	
...	67	...	67	67	58	...	58	67	Karachi ...	21
...	50	...	67	58	50	...	50	67	Hyderabad ...	22
...	58	...	33	58	42	...	25	42	Thar Parkar ...	23
...	67	...	69	39	67	...	...	67	Nawabshah ...	24
...	50	...	58	50	50	...	42	58	Larkana ...	25
...	67	...	69	42	67	...	53	67	Sukkur ...	26
...	50	...	67	75	83	...	50	83	Upper Sind Frontier.	27

TABLE V-A—AREA

Area under food-grain crops (cereals and pulses),  
Sind) and its estimated outturn

I Serial Number	District	A—Cereals					
		1. Rice					
		1925-26		1924-25		1923-24	
		Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons
2	3	4	5	6	7	8	
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat.</i>							
1	Ahmedabad ...	43,370	10,627	27,706	15,724	12,760	2,311
2	Kaira ...	87,664	17,089	56,414	27,252	24,150	2,364
3	Panch Mahals ...	65,946	14,766	66,344	26,663	63,641	10,804
4	Broach ...	9,787	1,505	10,321	4,078	8,374	642
5	Surat ...	84,454	23,554	95,809	54,726	98,989	56,254
	<b>Total, Gujarat ...</b>	<b>291,721</b>	<b>72,541</b>	<b>256,684</b>	<b>128,514</b>	<b>207,923</b>	<b>72,366</b>
<i>Deccan</i>							
6	West Khandesh ...	53,461	21,514	51,810	24,978	50,718	18,488
7	East Khandesh ...	195	46	255	89	471	188
8	Nasik ...	58,666	23,622	60,326	14,693	61,792	24,939
9	Ahmednagar ...	15,610	4,867	15,113	6,428	16,751	7,752
10	Poona ...	65,181	31,661	86,755	3,018	83,600	24,256
11	Sholapur ...	3,191	682	2,464	490	3,624	718
12	Satara ...	46,869	20,506	46,492	19,211	47,149	14,716
	<b>Total, Deccan ...</b>	<b>263,173</b>	<b>103,094</b>	<b>263,216</b>	<b>68,907</b>	<b>264,305</b>	<b>91,067</b>
<i>Karnatak</i>							
13	Belgaum ...	117,861	44,807	115,080	54,456	112,495	48,576
14	Bijapur ...	2,635	506	2,341	448	2,328	451
15	Dharwar ...	147,692	64,622	135,715	63,302	116,679	29,180
	<b>Total, Karnatak ...</b>	<b>268,188</b>	<b>109,940</b>	<b>253,136</b>	<b>118,206</b>	<b>231,222</b>	<b>78,206</b>
<i>Konkan</i>							
16	Thana ...	310,405	152,431	309,418	151,946	311,967	153,149
17	Bombay Suburban ...	14,606	7,826	14,716	7,884	15,508	8,306
18	Kolaba ...	271,397	145,321	270,022	144,656	268,528	143,854
19	Ratnagiri ...	319,341	133,297	352,128	161,063	343,110	132,091
20	Kanara ...	167,445	70,141	167,696	74,682	163,962	79,705
	<b>Total, Konkan ...</b>	<b>1,083,196</b>	<b>509,066</b>	<b>1,114,180</b>	<b>540,230</b>	<b>1,107,965</b>	<b>517,107</b>
	<b>Total, Bombay Presidency ...</b>	<b>1,906,278</b>	<b>794,661</b>	<b>1,887,216</b>	<b>865,867</b>	<b>1,811,415</b>	<b>753,766</b>
<b>SIND</b>							
21	Karachi ...	240,907	106,042	242,426	106,602	243,538	119,061
22	Hyderabad ...	261,717	94,064	260,043	93,463	257,103	92,396
23	Thar Parkar ...	61,223	28,060	54,806	28,710	66,747	34,963
24	Nawabshah ...	36,443	10,445	32,507	11,960	35,204	12,965
25	Larkana ...	412,774	162,396	422,710	182,292	416,766	179,730
26	Sukkur ...	78,933	11,665	65,982	22,470	63,832	16,499
27	Upper Sind Frontier ...	111,285	60,015	96,868	64,000	107,160	46,261
	<b>Total, Sind ...</b>	<b>1,203,262</b>	<b>462,676</b>	<b>1,175,861</b>	<b>509,487</b>	<b>1,190,350</b>	<b>501,865</b>
	<b>Grand Total ...</b>	<b>3,109,540</b>	<b>1,257,337</b>	<b>3,062,577</b>	<b>1,365,344</b>	<b>3,011,765</b>	<b>1,255,630</b>

## AND OUTTURN

in each district of the Bombay Presidency (including during 1925-26 and preceding two years)

2. Wheat						District	Serial Number
1925-26.		1924-25		1923-24			
Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons		
9	10	11	12	13	14	3	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
54,224	12,708	105,721	29,541	67,271	12,430	Ahmedabad	1
6,694	1,391	6,337	1,410	6,779	1,603	Kaira	2
967	432	21,108	4,434	9,232	2,611	Panch Mahals	3
11,364	1,896	43,945	10,985	8,990	622	Broach	4
2,775	371	13,922	2,907	9,869	1,405	Surat	5
76,027	16,298	191,033	49,277	101,711	18,671	Total, Gujarat.	
						<i>Deccan</i>	
90,316	27,300	148,435	37,447	123,283	29,673	West Khandesh	6
31,624	7,752	28,010	6,925	28,247	7,009	East Khandesh	7
168,325	32,079	350,880	64,961	158,924	38,894	Nasik	8
110,561	23,990	183,857	37,267	139,597	23,258	Ahmednagar	9
57,119	7,522	56,547	8,446	49,458	9,079	Poona	10
27,502	6,204	29,364	6,696	26,528	5,749	Sholapur	11
41,885	12,307	42,052	12,379	39,650	8,372	Satara	12
527,692	117,254	839,145	174,731	555,636	112,074	Total, Deccan.	
						<i>Karnatak</i>	
26,166	14,643	75,653	10,063	79,136	6,802	Bolgaum	13
170,406	37,624	129,969	9,470	156,511	7,550	Bijapur	14
261,454	88,667	181,837	23,205	217,350	20,275	Dharwar	15
530,016	71,334	387,459	42,958	462,997	34,627	Total, Karnatak	
						<i>Konkan</i>	
76	13	78	15	159	29	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Ratnagiri	19
.....	.....	.....	.....	.....	.....	Kanara	20
78	13	78	15	159	29	Total, Konkan.	
1,133,813	204,894	1,417,715	266,971	1,130,553	165,401	Total, Bombay Presidency.	
						<i>SIND</i>	
14,761	6,789	20,575	6,623	11,819	4,293	Karachi	21
48,032	3,215	50,059	3,944	29,314	1,516	Hyderabad	22
16,462	1,960	34,691	6,009	44,835	7,970	Thar Parkar	23
37,121	9,309	43,390	11,551	44,489	12,060	Nawabshah	24
78,435	17,249	122,749	28,771	91,504	21,197	Larkana	25
117,795	26,480	120,052	29,649	137,060	31,376	Sukkur	26
54,328	14,630	89,253	24,160	73,592	17,601	Upper Sind Frontier.	27
366,976	79,442	540,768	110,796	432,602	96,016	Total, Sind.	
1,500,789	284,336	1,958,484	377,767	1,563,156	261,417	Grand Total.	

TABLE V-A—AREA AND

Serial Number	District	A—Cereals—					
		3. Barley					
		1925-26		1924-25		1923-24	
		Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons
1	2	15	16	17	18	19	20
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad ...	4,957	2,155	3,792	2,004	5,907	2,816
2	Kaira ...	422	157	208	92	999	452
3	Panch Mahals ...	149	55	5,762	1,470	2,394	644
4	Brosch ...	...	.....	.....	.....	.....	.....
5	Surat ...	..	.....	.....	.....	.....	.....
	<b>Total, Gujarat ...</b>	<b>5,528</b>	<b>2,377</b>	<b>9,757</b>	<b>3,566</b>	<b>9,100</b>	<b>3,342</b>
<i>Deccan</i>							
6	West Khandesh ...	...	.....	.....	.....	.....	.....
7	East Khandesh ...	...	.....	.....	.....	.....	.....
8	Nasik ...	...	.....	.....	.....	.....	.....
9	Ahmednagar ...	127	60	142	45	327	80
10	Poona ...	433	119	637	158	699	117
11	Sholapur ...	1,196	306	1,472	376	1,655	365
12	Satara ...	2,632	655	2,744	813	2,831	637
	<b>Total, Deccan ...</b>	<b>4,368</b>	<b>1,140</b>	<b>4,995</b>	<b>1,392</b>	<b>5,512</b>	<b>1,189</b>
<i>Karnatak</i>							
13	Belgaum ...	2,186	706	2,340	940	9,011	585
14	Bijapur ...	2,872	1,639	2,663	843	2,319	662
15	Dharwar ...	30	2	32	6	42	.....
	<b>Total, Karnatak ...</b>	<b>5,088</b>	<b>2,247</b>	<b>5,035</b>	<b>1,789</b>	<b>4,372</b>	<b>1,177</b>
<i>Konkan</i>							
16	Thana ...	...	.....	.....	.....	.....	.....
17	Bombay Suburban ...	...	.....	.....	.....	.....	.....
18	Kolaba ...	...	.....	.....	.....	.....	.....
19	Ratnagiri ...	...	.....	.....	.....	.....	.....
20	Kanara ...	...	.....	.....	.....	.....	.....
	<b>Total, Konkan ...</b>	<b>...</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>
	<b>Total, Bombay Presidency ...</b>	<b>15,004</b>	<b>5,764</b>	<b>19,807</b>	<b>6,747</b>	<b>18,084</b>	<b>5,708</b>
<b>SIND</b>							
21	Karachi ...	8,055	3,102	9,707	4,240	7,928	3,326
22	Hyderabad ...	1,183	295	1,625	523	2,074	444
23	Thar Parkar ...	167	28	131	32	203	45
24	Nawabshah ...	823	69	1,149	75	1,647	134
25	Larkana ...	1,723	334	3,002	562	2,368	399
26	Sukkur ...	383	85	399	.....	465	100
27	Upper Sind Frontier ...	165	50	147	71	76	16
	<b>Total, Sind ...</b>	<b>12,499</b>	<b>3,959</b>	<b>16,160</b>	<b>5,551</b>	<b>14,761</b>	<b>4,457</b>
	<b>Grand Total ...</b>	<b>27,508</b>	<b>9,717</b>	<b>35,967</b>	<b>12,298</b>	<b>33,745</b>	<b>10,165</b>



OUTTURN—*contd.*

<i>continued</i>						District	Serial Number
4. Jowar							
1925-26		1924-25		1923-24			
Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons		
21	22	23	24	25	26	27	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
281,213	46,584	324,064	91,540	321,899	64,909	Ahmedabad	1
40,640	10,351	51,200	18,030	58,911	18,475	Kaira	2
11,107	2,211	14,020	4,970	14,788	5,762	Panch Mahals	3
116,655	25,797	103,722	35,253	146,923	23,164	Broach	4
79,798	18,395	68,391	18,059	89,536	22,399	Surat	5
529,413	109,338	561,397	167,852	632,067	134,708	Total, Gujarat	
						<i>Deccan</i>	
133,280	41,311	156,814	42,007	136,525	34,352	West Khandesh	6
269,676	43,341	305,267	98,019	321,716	86,130	East Khandesh	7
92,751	16,218	240,027	45,432	86,821	12,194	Nasik	8
1,037,914	190,042	1,490,758	265,548	917,273	143,341	Ahmednagar	9
982,421	85,240	1,030,519	141,203	841,818	95,735	Poona	10
1,627,283	356,302	1,573,125	309,272	1,471,405	233,631	Sholapur	11
626,106	136,235	729,626	136,751	666,165	103,230	Satara	12
4,841,443	869,289	5,531,273	1,037,232	4,447,723	716,963	Total, Deccan	
						<i>Karnatak</i>	
625,669	121,327	593,326	179,245	540,837	76,532	Belgaum	13
1,311,710	240,506	1,400,862	170,335	1,282,694	118,159	Bijapur	14
510,093	110,941	547,187	144,658	543,288	92,694	Dharwar	15
2,447,472	472,874	2,541,275	494,238	2,366,819	287,585	Total, Karnatak	
						<i>Konkan</i>	
454	84	462	85	457	76	Thana	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
.....	.....	.....	.....	.....	.....	Kolaba	18
.....	.....	.....	.....	.....	.....	Ratnagiri	19
587	97	335	95	190	11	Kanara	20
1,041	181	797	110	647	87	Total, Konkan	
7,819,369	1,445,682	8,634,743	1,699,432	7,447,246	1,139,343	Total, Bombay Presidency	
						<b>SIND</b>	
22,055	3,743	45,400	8,622	40,563	5,473	Karachi	21
7,018	122	10,023	1,531	7,331	1,118	Hyderabad	22
7,973	783	13,460	1,500	9,948	1,568	Thar Parkar	23
101,044	24,796	103,931	33,717	97,323	39,859	Nawabshah	24
126,245	22,317	132,686	24,177	89,359	17,705	Larkana	25
322,758	15,455	141,976	35,807	112,755	19,880	Sukkur	26
108,746	23,459	113,947	30,174	97,423	18,397	Upper Sind Frontier	27
495,834	90,675	562,423	135,528	454,773	104,080	Total, Sind	
8,315,203	1,536,337	9,197,165	1,834,960	7,902,019	1,243,423	Grand Total	

TABLE V-A—AREA AND

Serial Number	District	A—Cereals—					
		5. Bajri					
		1925-26		1924-25		1923-24	
		Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons
1	2	27	29	29	30	31	32
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad	137,572	34,394	149,685	46,776	137,252	21,504
2	Kaira	106,247	28,441	163,589	51,926	163,003	41,190
3	Panch Mahals	36,559	6,688	39,062	8,331	41,737	9,559
4	Broach	6,694	1,357	10,453	3,373	8,850	2,028
5	Surat	4,831	1,067	5,341	1,068	5,625	1,117
	<b>Total, Gujarat</b>	<b>290,783</b>	<b>71,947</b>	<b>368,120</b>	<b>111,499</b>	<b>366,467</b>	<b>75,376</b>
<i>Deccan.</i>							
6	West Khandesh	297,896	55,481	365,716	68,103	332,162	55,642
7	East Khandesh	272,355	30,761	299,693	37,963	309,083	43,741
8	Nasik	845,630	113,639	646,028	78,842	956,661	116,311
9	Ahmednagar	724,444	65,900	351,956	37,732	879,665	73,900
10	Poona	417,094	33,367	372,819	31,735	583,823	55,604
11	Sholapur	63,603	4,672	104,457	4,189	167,195	6,636
12	Satara	285,937	27,248	264,038	28,160	301,195	21,378
	<b>Total, Deccan</b>	<b>2,927,159</b>	<b>331,468</b>	<b>2,404,659</b>	<b>286,764</b>	<b>3,594,984</b>	<b>373,112</b>
<i>Karnatak</i>							
13	Belgaum	140,260	16,683	119,385	20,573	149,147	11,127
14	Bijapur	365,184	19,499	175,391	10,413	299,634	14,312
15	Dharwar	8,671	1,161	8,734	1,462	9,475	962
	<b>Total, Karnatak</b>	<b>414,135</b>	<b>37,343</b>	<b>303,510</b>	<b>32,448</b>	<b>458,256</b>	<b>26,391</b>
<i>Konkan</i>							
16	Thana	.....	.....	.....	.....	.....	.....
17	Bombay Suburban	.....	.....	.....	.....	.....	.....
18	Kolaba	.....	.....	.....	.....	.....	.....
19	Ratnagiri	.....	.....	.....	.....	.....	.....
20	Kanara	.....	.....	.....	.....	.....	.....
	<b>Total, Konkan</b>	.....	.....	.....	.....	.....	.....
	<b>Total, Bombay Presidency</b>	<b>3,632,077</b>	<b>440,758</b>	<b>3,076,289</b>	<b>430,711</b>	<b>4,349,707</b>	<b>474,879</b>
<b>SIND</b>							
21	Karachi	11,350	2,789	14,906	3,511	11,971	3,086
22	Hyderabad	153,134	37,667	156,127	49,348	166,174	52,623
23	Thar Parkar	644,982	23,221	630,239	71,965	623,151	42,471
24	Nawabshah	116,185	21,363	121,378	29,699	116,111	32,082
25	Larkana	1,418	218	1,496	226	1,676	265
26	Sukkur	21,963	3,000	20,552	3,807	17,236	2,748
27	Upper Sind Frontier	70,133	13,786	83,731	20,103	76,691	11,298
	<b>Total, Sind</b>	<b>1,029,215</b>	<b>102,045</b>	<b>1,028,739</b>	<b>178,659</b>	<b>1,012,900</b>	<b>144,473</b>
	<b>Grand Total</b>	<b>4,661,292</b>	<b>542,803</b>	<b>4,105,018</b>	<b>609,370</b>	<b>5,362,607</b>	<b>619,352</b>

OUTTURN—*contd.*

continued.						District	Serial Number
6. Ragi							
1925-26		1924-25		1923-24			
Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons		
33	34	35	36	37	38	2	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
2,611	804	2,161	1,041	1,147	306	Ahmedabad	1
60,083	22,567	48,093	30,915	60,437	19,470	Kaira	2
18,060	5,243	30,566	11,966	19,833	10,995	Panch Mahals	3
97	48	175	94	167	47	Broach	4
8,912	2,586	10,446	4,570	10,717	4,689	Surat	5
69,763	31,253	81,461	43,586	92,291	35,507	Total, Gujarat.	
						<i>Deccan</i>	
9,374	3,104	11,053	4,441	15,585	4,176	West Khandesh	6
99,512	31,540	111,387	59,314	102,415	32,370	East Khandesh	7
22,419	5,910	21,578	6,871	20,865	5,573	Nasik	8
40,192	12,110	46,453	12,443	42,120	8,500	Ahmednagar	9
151	37	258	36	87	4	Poona	10
37,976	14,636	40,282	14,835	39,162	10,497	Sholapur	11
						Satara	12
209,524	67,437	231,011	79,740	220,234	61,119	Total, Deccan.	
						<i>Karnatak</i>	
33,424	6,966	32,261	9,741	29,549	4,997	Belgaum	13
195	47	88	12	261	35	Bijapur	14
33,829	15,102	40,061	17,884	29,373	6,556	Dharwar	15
67,448	22,105	72,410	27,637	59,823	11,588	Total, Karnatak.	
						<i>Konkan</i>	
41,790	11,977	43,739	12,536	44,588	12,779	Thana	16
51	18	51	18	51	18	Bombay Suburban	17
37,133	12,202	37,325	12,914	38,117	12,471	Kolaba	18
123,682	34,835	166,284	48,271	147,039	37,346	Ratnagiri	19
1,687	506	2,139	1,051	2,111	808	Kanara	20
204,513	59,538	249,538	74,090	231,906	62,920	Total, Konkan.	
571,248	180,333	634,420	230,053	603,714	172,134	Total, Bombay Presidency.	
						<b>SIND</b>	
454	142	327	117	381	136	Karachi	21
.....	.....	6	1	2	.....	Hyderabad	22
.....	.....	4	1	.....	.....	Thar Parkar	23
.....	.....	.....	.....	.....	.....	Nawabshah	24
.....	.....	.....	.....	.....	.....	Larkana	25
12	3	5	1	27	6	Sukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
466	144	341	120	410	141	Total, Sind.	
571,714	180,477	634,761	230,173	604,124	172,275	Grand Total.	

TABLE V-A--AREA AND

		A--Cereals--					
		7. Maize					
Serial Number 1	District 2	1925-26		1924-25		1923-24	
		Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons
		39	40	41	42	43	44
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad ...	5,823	1,696	4,357	1,804	4,646	1,867
2	Katra ...	1,246	365	599	402	977	193
3	Panch Mahals ...	149,819	56,334	145,135	64,310	147,145	71,566
4	Broach ...	120	31	112	98	49	11
5	Surat ...	24	8	34	13	21	7
	<b>Total, Gujarat ...</b>	<b>157,032</b>	<b>58,484</b>	<b>150,697</b>	<b>66,627</b>	<b>152,833</b>	<b>73,743</b>
<i>Deccan</i>							
6	West Khandesh ...	5,014	1,483	4,559	1,355	7,194	2,280
7	East Khandesh ...	613	90	414	120	727	176
8	Nasik ...	3,273	661	2,925	755	3,819	1,530
9	Ahmednagar ...	1,006	606	1,088	607	1,265	595
10	Poona ...	1,592	692	1,407	585	1,792	785
11	Sholapur ...	6,101	2,712	8,672	4,121	10,091	4,644
12	Satara ...	10,256	3,023	10,192	3,622	9,491	2,717
	<b>Total, Deccan ...</b>	<b>27,855</b>	<b>9,247</b>	<b>29,257</b>	<b>11,075</b>	<b>34,369</b>	<b>12,723</b>
<i>Karnatak</i>							
13	Belgaum ...	14,198	6,546	14,487	7,744	16,328	6,139
14	Bijapur ...	1,135	396	1,238	657	1,803	507
15	Dharwar ...	55	11	75	34	49	.....
	<b>Total, Karnatak ...</b>	<b>15,388</b>	<b>6,953</b>	<b>15,800</b>	<b>8,435</b>	<b>18,179</b>	<b>6,696</b>
<i>Konkan</i>							
16	Thana ...	91	4	17	3	19	3
17	Bombay Suburban ...	.....	.....	.....	.....	.....	.....
18	Kolaba ...	1	.....	1	.....	.....	.....
19	Ratnagiri ...	.....	.....	.....	.....	.....	.....
20	Kanara ...	68	18	74	19	21	3
	<b>Total, Konkan ...</b>	<b>90</b>	<b>22</b>	<b>92</b>	<b>22</b>	<b>40</b>	<b>6</b>
	<b>Total, Bombay Presidency ...</b>	<b>200,365</b>	<b>74,706</b>	<b>195,945</b>	<b>86,159</b>	<b>205,420</b>	<b>93,173</b>
<b>SIND</b>							
21	Karachi ...	2,227	812	1,832	668	1,801	684
22	Hyderabad ...	241	59	259	78	140	28
23	Thar Parkar ...	597	200	444	172	659	294
24	Nawabshah ...	110	32	79	29	33	32
25	Larkana ...	.....	.....	.....	.....	.....	.....
26	Sukkur ...	1	.....	1	.....	5	1
27	Upper Sind Frontier ...	17	4	10	3	29	11
	<b>Total, Sind ...</b>	<b>3,193</b>	<b>1,107</b>	<b>2,625</b>	<b>960</b>	<b>2,517</b>	<b>960</b>
	<b>Grand Total ...</b>	<b>203,558</b>	<b>75,813</b>	<b>198,471</b>	<b>87,109</b>	<b>207,939</b>	<b>94,133</b>

## OUTTURN—contd.

continued.						District	Serial Number
8. Kodra							
1925-26		1924-25		1923-24			
Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	Area in acres.	Outturn in tons.	2	1
45	46	47	48	49	50		
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
7,211	1,416	5,899	2,694	3,447	864	Ahmedabad	1
92,402	32,675	90,352	47,150	86,198	19,623	Kaira	2
19,238	6,468	21,993	10,170	25,028	9,989	Panch Mahals	3
4,498	1,283	5,242	2,705	5,508	883	Broach	4
11,078	4,015	11,106	5,181	11,177	3,958	Surat	5
134,427	46,057	134,592	68,100	131,358	36,317	Total, Gujarat.	
						<i>Deccan</i>	
12,572	4,210	12,325	4,126	11,857	3,573	West Khandesh	6
362	72	.....	.....	.....	.....	East Khandesh	7
.....	.....	.....	.....	.....	.....	Nasik	8
18	3	74	24	52	7	Ahmednagar	9
2,109	438	3,817	812	759	186	Poona	10
5	.....	9	2	23	6	Sholapur	11
.....	.....	19	6	30	7	Satara	12
15,066	4,723	16,244	4,970	12,721	3,729	Total, Deccan.	
						<i>Karnatak</i>	
.....	.....	.....	.....	.....	.....	Belgaum	13
4	1	7	1	197	25	Bijapur	14
11	5	58	26	52	.....	Dharwar	15
15	6	65	27	189	25	Total, Karnatak.	
						<i>Konkan</i>	
4,876	926	5,182	1,060	.....	.....	Thane	16
.....	.....	.....	.....	.....	.....	Bombay Suburban	17
4,269	1,397	4,868	1,739	5,430	1,939	Kolaba	18
49,332	13,619	57,484	14,421	60,533	10,647	Ratnagiri	19
.....	.....	.....	.....	.....	.....	Kanara	20
58,526	15,942	67,534	17,220	65,963	12,586	Total, Konkan.	
208,054	66,728	218,435	90,317	210,236	51,657	Total, Bombay Presidency.	
						<b>SIND</b>	
.....	.....	.....	.....	.....	.....	Karachi	21
.....	.....	.....	.....	.....	.....	Hyderabad	22
.....	.....	.....	.....	.....	.....	Thar Parkar	23
.....	.....	.....	.....	.....	.....	Nawabshah	24
.....	.....	.....	.....	.....	.....	Larkana	25
.....	.....	.....	.....	.....	.....	Sukkur	26
.....	.....	.....	.....	.....	.....	Upper Sind Frontier	27
.....	.....	.....	.....	.....	.....	Total, Sind.	
208,054	66,728	218,435	90,317	210,236	51,657	Grand Total.	

TABLE V-A—AREA AND

		A—Cereals—					
Serial Number	District	9. Other Cereals					
		1925-26		1924-25		1923-24	
		Area in acres.	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons
1	2	51	52	53	54	55	56
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad ...	35,826	9,097	35,177	15,980	25,098	6,792
2	Kaira ...	6,137	2,414	7,964	3,914	9,426	1,734
3	Panch Mahals ...	23,733	8,537	29,563	17,195	31,676	15,966
4	Broach ...	16	4	351	173	51	10
5	Surat ...	696	177	924	333	1,153	484
	<b>Total, Gujarat ...</b>	<b>66,408</b>	<b>20,229</b>	<b>74,379</b>	<b>37,505</b>	<b>66,403</b>	<b>24,976</b>
<i>Deccan</i>							
6	West Khandesh ...	20,103	5,986	23,848	7,102	26,977	7,868
7	East Khandesh ...	1,485	288	1,360	322	1,329	316
8	Nasik ...	17,432	4,356	27,944	7,432	22,075	6,622
9	Ahmednagar ...	27,111	5,634	16,985	5,565	30,529	5,814
10	Poona ...	27,883	7,675	23,766	5,398	30,665	5,732
11	Sholapur ...	3,236	966	2,691	558	19,455	4,019
12	Satara ...	49,850	13,474	51,877	16,127	48,185	10,246
	<b>Total, Deccan ...</b>	<b>146,135</b>	<b>38,576</b>	<b>153,431</b>	<b>42,804</b>	<b>170,225</b>	<b>40,607</b>
<i>Karnatak</i>							
13	Belgaum ...	60,251	15,113	62,423	15,564	90,028	19,858
14	Bijapur ...	34,489	8,190	23,415	2,492	49,384	4,618
15	Dharwar ...	85,877	26,454	99,260	33,988	119,503	22,562
	<b>Total, Karnatak ...</b>	<b>180,617</b>	<b>49,667</b>	<b>185,098</b>	<b>52,044</b>	<b>259,315</b>	<b>47,038</b>
<i>Konkan</i>							
16	Thana ...	12,793	5,600	13,291	5,192	18,445	5,642
17	Bombay Suburban ...			8	4	7	3
18	Kolaba ...	23,715	11,063	24,741	11,560	25,034	11,673
19	Ratanagiri ...	34,637	11,697	41,560	12,529	70,387	21,310
20	Kanara ...	43	14	23	11	34	15
	<b>Total, Konkan ...</b>	<b>71,187</b>	<b>28,174</b>	<b>79,643</b>	<b>29,296</b>	<b>113,907</b>	<b>38,543</b>
	<b>Total, Bombay Presidency ...</b>	<b>464,347</b>	<b>136,646</b>	<b>492,511</b>	<b>161,949</b>	<b>590,350</b>	<b>161,164</b>
<b>SIND</b>							
21	Karachi ...	18	3	34	12	34	13
22	Hyderabad ...	65	17	87	84	66	13
23	Tbar Parkar ...	431	115	969	303	862	284
24	Nawabshah ...	422	94	647	146	498	148
25	Larkana ...	572	103	711	137	603	105
26	Sukkur ...	9,835	548	2,750	587	1,469	84
27	Upper Sind Frontier ...	3,709	993	4,910	1,645	4,041	945
	<b>Total, Sind ...</b>	<b>6,852</b>	<b>1,873</b>	<b>10,117</b>	<b>2,843</b>	<b>7,571</b>	<b>1,693</b>
	<b>Grand Total ...</b>	<b>472,399</b>	<b>138,519</b>	<b>502,628</b>	<b>164,792</b>	<b>597,921</b>	<b>152,857</b>

## OUTTURN—contd.

10. Total, Cereals						District	Serial Number
1925-26		1924-25.		1923-24.			
Area in acres.	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons		
57	58	59	60	61	62	2	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
573,407	119,496	658,562	207,214	579,327	113,188	Ahmedabad	1
400,435	115,650	425,151	181,092	409,879	105,153	Kaira	2
325,558	100,789	363,923	149,509	353,425	137,976	Panch Mahals	3
149,130	31,421	174,321	66,759	178,905	27,405	Broach	4
192,571	55,173	206,063	86,952	226,606	90,813	Surat	5
1,641,101	423,519	1,828,020	681,526	1,750,142	474,035	Total, Gujarat.	
						<i>Deccan</i>	
631,916	160,369	774,560	189,450	704,299	156,051	West Khandesh	6
576,390	82,350	634,902	141,458	661,573	137,610	East Khandesh	7
1,235,759	222,321	1,489,517	252,449	1,392,507	222,860	Nasik	8
1,939,210	297,099	2,081,551	362,777	2,006,524	290,890	Ahmednagar	9
1,614,029	179,324	1,627,740	203,805	1,639,724	200,935	Poona	10
1,752,629	372,681	1,727,582	325,740	1,697,273	255,862	Sholapur	11
1,172,493	228,084	1,137,439	331,914	1,153,658	178,400	Satara	12
8,962,465	1,542,228	9,473,291	1,607,605	9,255,753	1,412,578	Total, Deccan.	
						<i>Karnatak</i>	
1,092,025	226,781	1,014,355	206,646	1,019,261	169,605	Belgaum	13
1,733,630	336,517	1,735,994	194,961	1,735,760	145,309	Bijapur	14
1,047,712	257,171	1,012,959	384,565	1,036,111	172,419	Dharwar	15
3,928,367	772,469	3,763,308	678,072	3,841,132	488,333	Total, Karnatak.	
						<i>Konkan</i>	
370,516	170,935	373,167	170,837	375,535	171,678	Thana	16
14,659	7,844	14,775	7,906	15,566	8,329	Bombay Suburban	17
336,605	170,053	336,967	170,168	337,109	169,937	Kolaba	18
526,922	193,346	617,476	236,284	626,074	201,794	Ratnagiri	19
170,029	70,776	170,487	75,788	166,308	60,540	Kanara	20
1,418,631	612,956	1,511,862	660,933	1,520,592	632,278	Total, Konkan.	
15,950,554	3,360,172	16,576,961	4,028,186	16,367,624	3,007,324	Total, Bombay Presi- dency.	
						<b>SIND</b>	
299,817	122,432	336,286	130,394	317,735	135,962	Karachi	21
471,387	135,423	478,228	148,902	462,204	148,038	Hyderabad	22
731,815	54,368	734,764	108,761	746,405	87,785	Thar Parkar	23
292,148	66,108	303,081	87,177	295,333	97,260	Nawabshah	24
621,217	193,206	683,354	236,155	602,276	219,304	Larkana	25
344,680	67,235	412,026	92,892	332,850	70,693	Sukkur	26
348,433	113,137	388,866	140,133	359,082	94,533	Upper Sind Frontier	27
3,109,407	741,915	3,336,525	943,034	3,116,865	852,665	Total, Sind.	
19,060,052	4,092,087	19,913,506	4,972,120	19,483,609	3,860,889	Grand Total.	

TABLE V-A—AREA AND

Serial Number 1	District 2	Pul					
		11. Tur					
		1925-26		1924-25		1923-24	
		Area in acres 63	Outturn in tons 64	Area in acres 65	Outturn in tons 66	Area in acres 67	Outturn in tons 68
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad ...	2,399	305	2,055	300	1,247	77
2	Kaira ...	21,244	2,181	22,948	5,306	21,705	1,560
3	Panch Mahals ...	6,924	537	7,957	1,638	7,803	895
4	Draoch ...	8,474	947	10,109	2,143	9,858	1,011
5	Surat ...	11,897	2,167	10,303	2,578	12,186	2,250
	<b>Total, Gujarat</b> ...	<b>50,933</b>	<b>6,087</b>	<b>53,272</b>	<b>13,015</b>	<b>52,805</b>	<b>5,793</b>
<i>Deccan</i>							
6	West Khandesh ...	16,258	5,906	17,608	7,546	18,830	6,053
7	East Khandesh ...	33,759	7,233	37,397	12,017	35,095	10,027
8	Nasik ...	14,441	4,641	7,739	2,454	16,909	3,622
9	Ahmednagar ...	29,577	6,378	11,295	3,247	35,159	6,950
10	Poona ...	10,590	1,914	9,434	1,756	14,851	1,504
11	Solapur ...	30,680	8,852	24,475	5,252	42,506	9,107
12	Satara ...	36,623	8,480	35,391	11,060	39,925	7,022
	<b>Total, Deccan</b> ...	<b>171,733</b>	<b>43,304</b>	<b>143,319</b>	<b>43,863</b>	<b>202,576</b>	<b>43,625</b>
<i>Karnatak</i>							
13	Belgaum ...	43,755	13,194	49,066	17,624	45,663	8,695
14	Bijapur ...	30,726	7,851	36,093	3,961	47,396	6,136
15	Dharwar ...	39,127	10,645	44,835	18,014	60,725	9,058
	<b>Total, Karnatak</b> ...	<b>119,211</b>	<b>31,590</b>	<b>128,994</b>	<b>39,499</b>	<b>146,786</b>	<b>22,869</b>
<i>Konkan</i>							
16	Uhana ...	4,528	562	4,948	630	4,478	494
17	Bombay Suburban ...	.....	.....	.....	.....	.....	.....
18	Kolaba ...	1,513	247	1,417	237	1,429	240
19	Ratnagiri ...	1,415	204	1,136	162	1,169	166
20	Kanara ...	25	3	20	2	38	4
	<b>Total, Konkan</b> ...	<b>7,586</b>	<b>1,016</b>	<b>7,521</b>	<b>1,031</b>	<b>7,113</b>	<b>864</b>
	<b>Total, Bombay Presidency</b> ...	<b>349,488</b>	<b>81,927</b>	<b>333,106</b>	<b>95,947</b>	<b>409,380</b>	<b>73,201</b>
<b>SIND</b>							
21	Karachi ...	.....	.....	.....	.....	.....	.....
22	Hyderabad ...	.....	.....	.....	.....	.....	.....
23	Thar Parkar ...	182	39	89	23	225	64
24	Nawabshah ...	.....	.....	.....	.....	4	1
25	Larkana ...	.....	.....	.....	.....	.....	.....
26	Sukkur ...	.....	.....	.....	.....	.....	.....
27	Upper Sind Frontier ...	.....	.....	.....	.....	.....	.....
	<b>Total, Sind</b> ...	<b>182</b>	<b>39</b>	<b>89</b>	<b>23</b>	<b>229</b>	<b>65</b>
	<b>Grand Total</b> ...	<b>349,650</b>	<b>81,966</b>	<b>333,195</b>	<b>96,970</b>	<b>409,509</b>	<b>73,266</b>



## OUTTURN—contd.

19. Gram						District	Serial Number
1925-26		1924-25		1923-24			
Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons		
69	70	71	72	73	74	2	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
5,477	511	10,141	1,573	1,829	48	Ahmedabad	1
714	54	5,136	644	1,928	142	Kaira	2
3,529	419	55,961	16,210	32,215	5,702	Panch Mahals	3
717	72	1,534	389	252	18	Broach	4
845	91	1,773	296	1,579	232	Surat	5
11,282	1,147	84,465	19,321	57,901	6,142	Total, Gujarat.	
						<i>Deccan</i>	
35,861	8,154	22,182	4,264	32,270	5,804	West Khandesh	6
5,721	999	4,991	1,065	5,831	1,026	East Khandesh	7
69,372	12,437	101,476	15,441	69,322	11,973	Nasik	8
52,390	12,154	67,251	11,196	67,929	10,129	Ahmednagar	9
12,731	1,953	50,129	7,730	39,829	5,535	Poona	10
36,068	4,936	32,388	4,037	39,836	3,881	Sholapur	11
57,456	7,382	55,471	6,163	45,890	3,899	Satara	12
300,608	51,015	333,888	49,966	301,907	42,247	Total, Deccan.	
						<i>Karnatak</i>	
30,512	3,425	25,229	3,551	20,827	1,713	Belgaum	13
32,491	2,180	31,736	1,776	33,672	1,708	Bijapur	14
37,163	5,563	24,580	4,132	25,944	3,896	Dharwar	15
100,173	11,178	81,545	9,559	80,503	6,316	Total, Karnatak.	
						<i>Konkan</i>	
475	90	912	122	1,168	174	Thana	16
286	40	297	46	297	42	Bombay Suburban	17
89	8	36	4	72	10	Kolaba	18
205	28	315	45	238	34	Ratnagiri	19
						Kanara	20
1,253	166	1,560	217	1,775	260	Total, Konkan.	
419,318	69,506	501,558	79,053	422,186	54,965	Total, Bombay Presidency.	
						<b>SIND</b>	
839	61	1,033	85	387	35	Karachi	21
331	45	309	34	284	37	Hyderabad	22
300	47	657	73	483	64	Thar Parkar	23
0,901	1,361	13,344	1,619	11,401	2,146	Nawabshah	24
25,267	2,815	37,023	3,967	30,695	3,259	Larkana	25
50,906	3,680	71,063	7,374	51,099	7,574	Sukkur	26
84,311	25,971	115,487	39,914	108,107	22,301	Upper Sind Frontier	27
172,855	33,980	239,921	53,066	202,456	35,348	Total, Sind.	
596,173	97,486	741,479	132,119	624,642	90,313	Grand, Total.	

TABLE V-A—AREA AND

Serial Number 1	District 2	Pulses—					
		13. Other Pulses					
		1925-26		1924-25		1923-24	
		Area in acres 75	Outturn in tons 76	Area in acres 77	Outturn in tons 78	Area in acres 79	Outturn in tons 80
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad ...	22,272	1,573	20,547	4,644	23,167	2,611
2	Kaira ...	17,094	1,777	20,507	3,412	21,418	1,337
3	Panch Mahals ...	14,052	934	17,639	3,347	16,162	3,543
4	Broach ...	20,538	3,640	42,132	6,018	24,338	2,428
5	Surat ...	11,120	1,852	15,277	3,451	14,910	3,128
	<b>Total, Gujarat ...</b>	<b>95,076</b>	<b>9,776</b>	<b>126,102</b>	<b>20,872</b>	<b>100,495</b>	<b>12,047</b>
<i>Deccan</i>							
6	West Khandesh ...	106,532	23,716	90,204	20,322	96,732	19,748
7	East Khandesh ...	223,688	28,768	225,506	33,524	232,550	33,035
8	Nasik ...	209,019	26,948	147,229	24,093	187,506	29,602
9	Ahmednagar ...	84,792	10,307	51,884	8,066	106,153	11,963
10	Poona ...	50,694	5,826	45,893	5,561	62,395	6,350
11	Sholapur ...	20,091	1,977	17,910	1,800	24,900	2,252
12	Satara ...	93,241	13,478	98,338	15,289	95,450	9,897
	<b>Total, Deccan ...</b>	<b>784,057</b>	<b>121,020</b>	<b>676,964</b>	<b>109,315</b>	<b>794,688</b>	<b>112,897</b>
<i>Karnatak</i>							
13	Belgaum ...	112,864	16,514	118,883	18,755	115,686	11,628
14	Bijapur ...	63,601	7,121	58,775	4,368	79,081	5,972
15	Dharwar ...	127,062	17,966	129,459	23,412	153,662	13,420
	<b>Total, Karnatak ...</b>	<b>303,527</b>	<b>41,601</b>	<b>307,117</b>	<b>46,535</b>	<b>328,219</b>	<b>31,020</b>
<i>Konkan</i>							
16	Thana ...	12,194	1,811	12,575	1,684	12,526	1,853
17	Bombay Suburban ...	9	2	1	.....	1	.....
18	Kolaba ...	4,588	803	4,608	812	4,508	829
19	Ratnagiri ...	48,761	6,092	49,876	5,861	47,540	5,172
20	Kanara ...	5,718	872	5,337	765	5,279	720
	<b>Total, Konkan ...</b>	<b>71,270</b>	<b>9,580</b>	<b>72,397</b>	<b>9,122</b>	<b>69,854</b>	<b>8,584</b>
	<b>Total, Bombay Presidency ...</b>	<b>1,254,130</b>	<b>181,977</b>	<b>1,182,610</b>	<b>186,764</b>	<b>1,293,256</b>	<b>164,548</b>
<b>SIND</b>							
21	Karachi ...	24,138	2,705	29,564	3,322	26,204	2,437
22	Hyderabad ...	7,015	1,355	5,650	845	5,659	991
23	Thar Parkar ...	935	102	2,910	220	2,255	156
24	Nawabshah ...	19,210	3,426	25,888	2,872	22,544	4,479
25	Larkana ...	134,602	16,286	180,759	26,226	171,097	24,324
26	Sukkur ...	25,709	3,730	34,154	3,891	32,992	5,208
27	Upper Sind Frontier ...	33,719	5,224	42,244	8,187	44,290	6,189
	<b>Total, Sind ...</b>	<b>245,328</b>	<b>32,828</b>	<b>322,178</b>	<b>45,504</b>	<b>305,341</b>	<b>44,264</b>
	<b>Grand Total ...</b>	<b>1,499,458</b>	<b>214,805</b>	<b>1,504,788</b>	<b>231,268</b>	<b>1,598,597</b>	<b>208,812</b>

OUTTURN—*contd.*

<i>concluded</i>						District	Serial Number
14. Total, Pulses							
1925-26		1924-25		1923-24			
Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons		
81	82	83	84	85	86	2	1
						<b>BOMBAY PRESIDENCY</b>	
						<i>Gujarat</i>	
30,138	2,389	42,743	6,517	26,243	2,786	Ahmedabad	1
59,052	4,012	48,591	9,363	45,046	3,089	Kaira	2
24,505	1,940	91,477	21,254	56,189	9,140	Panch Mahals	3
39,739	4,659	53,775	8,560	34,348	3,457	Broach	4
23,862	4,110	27,253	6,325	28,675	5,610	Surat	5
157,296	17,010	263,839	52,208	181,101	23,982	Total, Gujarat.	
						<i>Deccan</i>	
157,651	37,675	129,994	32,693	147,832	31,606	West Khandesh	6
261,168	37,000	267,884	46,628	263,477	44,138	East Khandesh	7
292,832	54,026	256,434	42,019	273,739	45,197	Nasik	8
166,768	28,839	130,430	23,609	208,241	28,382	Ahmednagar	9
104,015	12,693	105,456	15,087	117,075	13,389	Poona	10
86,739	15,765	74,773	11,089	107,242	15,240	Sholapur	11
187,225	29,340	189,200	32,512	181,565	20,818	Satara	12
1,256,398	215,339	1,154,171	292,533	1,299,171	198,769	Total, Deccan.	
						<i>Karnatak</i>	
192,141	33,143	193,178	39,930	185,136	23,036	Belgaum	13
127,018	16,982	125,604	10,115	160,351	12,816	Bijapur	14
203,862	34,174	199,004	45,553	210,221	25,373	Dharwar	15
523,111	84,299	517,786	95,603	556,708	60,225	Total, Karnatak.	
						<i>Konkan</i>	
17,397	2,463	18,485	2,486	18,172	2,531	Thana	16
9	2	1	.....	1	.....	Bombay Suburban	17
6,492	1,090	6,352	1,095	6,234	1,111	Kolaba	18
50,265	6,304	51,048	6,027	48,780	6,338	Ratnagiri	19
5,948	903	5,642	812	5,552	758	Kanara	20
80,111	10,762	81,478	10,420	78,739	9,738	Total, Konkan.	
2,016,916	327,410	2,017,374	360,764	2,134,719	292,714	Total, Bombay Presidency.	
						<b>SIND</b>	
24,977	2,765	30,697	3,408	26,591	2,472	Karachi	21
7,346	1,400	6,968	879	6,143	1,028	Hyderabad	22
1,416	184	3,656	316	2,963	264	Thar Parkar	23
29,111	4,787	39,232	4,491	34,049	6,628	Nawabshah	24
180,869	19,101	217,767	30,133	201,732	28,113	Larkana	25
76,615	7,410	105,217	11,205	84,061	12,782	Sukkur	26
118,030	31,155	158,731	48,101	152,397	23,370	Upper Sind Frontier	27
418,364	56,847	562,168	98,593	508,026	79,677	Total, Sind.	
2,435,230	394,267	2,579,462	459,367	2,632,745	372,391	Grand Total.	

TABLE V-A.—AREA AND OUTTURN—concl'd.

Serial Number	District	Cereals and Pulses					
		15. Total, Cereals and Pulses					
		1925-26		1924-25		1923-24	
		Area in acres	Outturn in tons	Area in acres	Outturn in tons	Area in acres	Outturn in tons
1	2	87	88	89	90	91	92
<b>BOMBAY PRESIDENCY</b>							
<i>Gujarat</i>							
1	Ahmedabad ...	693,545	121,775	701,305	213,731	695,570	115,924
2	Kaira ...	439,439	119,652	473,742	190,654	454,925	108,192
3	Panch Mahals ...	350,063	102,729	456,400	170,763	411,614	147,116
4	Broach ...	188,869	36,080	228,096	65,309	213,853	80,862
5	Surat ...	216,433	59,283	233,316	93,277	255,261	95,923
	<b>Total, Gujarat ...</b>	<b>1,798,397</b>	<b>439,629</b>	<b>2,091,859</b>	<b>733,734</b>	<b>1,941,243</b>	<b>498,017</b>
<i>Deccan</i>							
6	West Khandesh ...	779,567	198,045	904,534	222,151	852,131	187,556
7	East Khandesh ...	537,558	119,560	902,786	188,084	925,050	181,748
8	Nasik ...	1,678,621	276,347	1,695,951	394,467	1,666,246	268,057
9	Ahmednagar ...	2,105,978	325,938	2,211,981	365,286	2,214,765	299,242
10	Poona ...	1,718,044	194,017	1,735,196	218,836	1,756,799	214,324
11	Sholapur ...	1,839,367	383,446	1,802,355	336,829	1,804,515	271,102
12	Satara ...	1,359,718	257,434	1,376,639	364,426	1,335,423	199,218
	<b>Total, Deccan ...</b>	<b>10,218,853</b>	<b>1,757,667</b>	<b>10,627,462</b>	<b>2,010,138</b>	<b>10,554,929</b>	<b>1,611,947</b>
<i>Karnatak</i>							
13	Belgaum ...	1,284,166	259,924	1,208,038	336,576	1,204,307	191,641
14	Bijapur ...	1,915,648	305,499	1,861,598	204,978	1,946,111	159,125
15	Dharwar ...	1,251,664	291,345	1,211,963	430,123	1,246,332	197,792
	<b>Total, Karnatak ...</b>	<b>4,451,479</b>	<b>856,768</b>	<b>4,281,599</b>	<b>973,675</b>	<b>4,396,840</b>	<b>548,558</b>
<i>Konkan</i>							
16	Thana ...	387,913	173,398	390,622	173,323	393,707	174,200
17	Bombay Suburban ...	14,668	7,846	14,776	7,906	15,567	8,329
18	Kolaba ...	342,997	171,143	343,309	171,263	343,343	171,048
19	Ratnagiri ...	577,187	199,652	668,524	242,311	674,854	207,132
20	Kanara ...	175,977	71,679	176,109	76,600	171,860	81,296
	<b>Total, Konkan ...</b>	<b>1,498,742</b>	<b>623,719</b>	<b>1,593,340</b>	<b>671,403</b>	<b>1,599,331</b>	<b>642,016</b>
	<b>Total, Bombay Presidency ...</b>	<b>17,967,470</b>	<b>3,677,632</b>	<b>18,594,255</b>	<b>4,338,960</b>	<b>18,492,343</b>	<b>3,299,936</b>
<b>SIND</b>							
21	Karachi ...	324,594	125,196	366,503	133,602	344,336	138,434
22	Hyderabad ...	478,733	136,820	483,196	149,761	468,347	149,066
23	Thar Parkar ...	733,232	54,556	739,420	109,927	749,368	88,069
24	Nawabshah ...	321,259	70,895	342,313	91,663	329,382	103,868
25	Larkana ...	782,926	212,307	901,141	266,348	804,068	217,507
26	Sukkur ...	421,298	64,645	517,243	103,597	416,941	83,475
27	Upper Sind Frontier ...	466,463	114,332	547,597	148,234	511,479	122,903
	<b>Total, Sind ...</b>	<b>3,527,862</b>	<b>806,762</b>	<b>3,858,713</b>	<b>1,042,627</b>	<b>3,623,911</b>	<b>983,342</b>
	<b>Grand Total ...</b>	<b>21,495,332</b>	<b>4,486,344</b>	<b>22,492,968</b>	<b>5,431,477</b>	<b>22,116,254</b>	<b>4,283,280</b>

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TABLE VI--PRICES  
1925-26

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TABLE VI—

Prices (prevailing at harvest time) of Staple Articles  
each district of the Bombay Presi

No.	District	Rate per rupee in					
		Jowari	Bajri	Wheat	Rice	Nachni (Ragi)	Gram
<b>BOMBAY PRESI- DENCY</b>		Seers.	Seers.	Seers.	Seers.	Seers.	Seers.
<b>Gujarat</b>							
1	Ahmedabad ...	8-19	6-50	5-00	4-50	.....	6-50
2	Kaira ...	.....	6-56	4-69	4-75	13-25	5-25
3	Panch Mahals ...	10-00*	6-00	5-00	4-00	.....	10-00
4	Broach ...	8-38	7-50	5-25	5-00	.....	6-50
5	Surat ...	6-88	6-50	4-88	3-69	.....	6-50
	<b>Average ...</b>	<b>8-36</b>	<b>6-61</b>	<b>4-96</b>	<b>4-39</b>	<b>13-25</b>	<b>6-96</b>
<b>Deccan</b>							
6	West Khandesh ...	7-69	6-00	5-25	4-50	.....	6-94
7	East Khandesh ...	7-00	7-19	5-56	4-25	.....	8-00
8	Nasik ...	.....	6-81	6-31	4-56	9-69	8-25
9	Ahmednagar ...	8-75	7-50	6-63	5-06	.....	7-69
10	Poona ...	7-38	6-88	5-13	4-50	.....	7-38
11	Sholapur ...	11-25	9-31	5-75	4-75	.....	8-13
12	Sabara ...	7-75	7-81	4-51	4-44	.....	6-75
	<b>Average ...</b>	<b>8-30</b>	<b>7-36</b>	<b>5-63</b>	<b>4-58</b>	<b>9-69</b>	<b>7-59</b>
<b>Karnatak</b>							
13	Belgaum ...	9-38	7-81	4-94	5-69	10-94	6-38
14	Bijapur ...	10-69	9-38	5-06	5-13	.....	6-88
15	Dharwar ...	9-50	7-69	5-94	5-94	.....	6-88
	<b>Average ...</b>	<b>9-86</b>	<b>8-29</b>	<b>5-31</b>	<b>5-59</b>	<b>10-94</b>	<b>6-71</b>
<b>Konkan</b>							
16	Thana ...	.....	6-56	5-06	5-69	.....	6-38
17	Kolaba ...	.....	.....	4-50	5-25	.....	6-50
18	Ratnagiri ...	.....	5-75	4-13	5-44	8-69	6-19
19	Kanara ...	5-94	.....	4-06	5-13	7-25	6-35
	<b>Average ...</b>	<b>5-94</b>	<b>6-16</b>	<b>4-44</b>	<b>5-38</b>	<b>7-97</b>	<b>6-08</b>
<b>Sind</b>							
20	Karachi ...	8-31	8-06	5-94	5-00	.....	7-63
21	Hyderabad ...	7-69	7-44	6-06	6-00	.....	6-88
22	Thar & Parker ...	.....	7-19	6-00	5-31	.....	5-06
23	Nawabshah ...	8-13	7-31	5-00	4-69	.....	9-00
24	Larkana ...	8-13	7-81	5-94	5-13	.....	8-00
25	Sukkur ...	6-13	8-31	6-38	4-00	.....	8-25
26	Upper Sind Frontier ...	9-06	8-75	6-44	4-50	.....	6-38
	<b>Average ...</b>	<b>8-24</b>	<b>7-94</b>	<b>5-97</b>	<b>4-92</b>	.....	<b>7-31</b>

Note.—In the case of Sind, rates for *mugdal* are shown in place of *turdal*.

\* For maize.

## PRICES

and of Fodder at the Headquarter Station of  
 dency (including Sind), during 1925-26.

seers of 80 Tolas				Price per Indian Maund of 3,200 Tolas		District	No.
Turdal	Gul	Tobacco	Cotton cleaned	Dry Grass	Jowari Kadbi		
Seers.	Seers.	Seers.	Seers.	Rs. a. p.	Rs. a. p.	BOMBAY PRESI- DENCY	
<b>Gujarat</b>							
4.28	3.00	1.00	1.13	2 6 5	3 3 2	Ahmedabad	1
4.75	3.51	2.00	0.94	.....	1 12 2	Kaira	2
4.69	3.44	1.00	0.81	0 13 10	.....	Panch Mahals	3
4.75	3.00	2.50	1.00	3 14 7	3 9 7	Broach	4
4.50	2.88	1.38	0.81	2 6 5	1 5 4	Surat	5
4.61	3.23	1.58	0.94	2 6 4	2 7 7	Average.	
<b>Deccan</b>							
5.31	3.50	2.00	1.00	2 5 9	.....	West Khandesh	6
7.00	3.00	2.00	1.19	1 5 10	2 6 5	East Khandesh	7
4.61	4.13	1.31	.....	1 5 9	.....	Nasik	8
5.06	4.38	1.50	.....	.....	.....	Ahmednagar	9
4.94	4.13	1.44	.....	1 10 3	1 10 3	Poona	10
5.06	3.50	1.00	.....	.....	0 14 8	Sholapur	11
4.94	3.81	1.31	.....	0 8 0	0 14 0	Satara	12
5.30	3.78	1.51	1.10	1 7 1	1 7 4	Average.	
<b>Karnatak</b>							
4.63	4.63	1.00	.....	0 6 8	.....	Belgaum	13
5.25	4.00	1.25	.....	.....	1 1 5	Bijapur	14
5.19	4.19	1.19	1.19	0 12 9	0 11 5	Dharwar	15
5.02	4.27	1.15	1.19	0 9 9	0 14 5	Average.	
<b>Konkan</b>							
4.63	3.63	1.94	.....	1 6 10	0 10 8	Thana	16
4.63	2.81	1.25	.....	.....	.....	Kolaba	17
5.50	2.75	1.38	.....	0 10 11	0 13 8	Ratnagiri	18
4.56	3.81	0.94	.....	.....	0 13 10	Kanara	19
4.83	3.25	1.38	.....	1 0 11	0 13 9	Average.	
<b>Sind</b>							
5.19	3.50	1.44	1.13	.....	.....	Karachi	20
5.31	3.69	2.00	1.31	1 3 0*	1 3 0	Hyderabad	21
5.00	3.50	1.00	1.38	1 13 5*	.....	Thal & Parkar	22
3.50	3.50	1.00	.....	0 12 3*	0 13 4	Naw. shah	23
5.00	4.13	3.00	1.19	.....	1 0 0	Larkana	24
4.68	4.25	3.19	1.13	.....	0 7 0	Sukkur	25
5.38	3.63	.....	0.81	.....	0 8 0	Upper Sind Frontier	26
4.89	3.74	1.94	1.16	1 9 2	0 12 8	Average.	

Note.—In Konkan, rates for rice-straw are shown in place of jowari kadbi.

\* For Bajri-straw.

*Report.*

Season and Crop — for the  
year 1925-26.

GOVERNMENT OF BOMBAY.

REVENUE DEPARTMENT.

Resolution No. P.—119.

Bombay Castle, 22nd November 1926.

Letter from the Director of Agriculture No. P.—11 dated 15th  
October 1926—Submitting the Season and Crop Report of the  
Bombay Presidency for the year 1925-26.

RESOLUTION.—Recorded.

By order of the Government of Bombay  
(Transferred Departments),

A. S. V. ACOTT,

Deputy Secretary to Government.

To

The Commissioner in Sind,  
The Commissioners of Divisions,  
All Collectors, including the Deputy Commissioner, Upper Sind  
Frontier,  
The Director of Agriculture,  
The Commissioner of Settlements,  
The Chief Conservator of Forests, Bombay Presidency,  
The Conservators of Forests, N., C., S. and Sind Circles,  
The Finance Department,  
The Public Works Department,  
The High Commissioner for India in the United Kingdom  
(by letter).



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ANNUAL REPORT OF THE DEPARTMENT  
OF AGRICULTURE, BOMBAY  
PRESIDENCY, 1922-23.

The year 1922-23 was on the whole one of prosperity, though the fall in the prices of most of the staple products of the Bombay Presidency, with the exception of cotton, has made it far less prosperous to the cultivator than it would appear at first sight, and though there was a large area in the southeast of the Presidency where the rain was very deficient and the crops consequently very poor. But the general standard of production was such as to give the methods of cultivation advocated by the Agricultural Department a real chance with, on the whole, satisfactory results. And, moreover, the conditions were favourable in most areas for the research and investigation which must form the real basis for future agricultural progress.

2. It becomes increasingly clear, however, that technical progress in agriculture is by no means an easy matter. All the obvious methods of increasing production by copying methods useful abroad, by trying varieties of crops found valuable elsewhere, by using systems of manuring which seem certain to yield very good returns, have either failed or yielded only partial success. When varieties of seed from other areas have been tested, it has generally been found that the local type was the best. When artificial manures have been used on the model of methods used in England and America, they have often, nay most frequently, proved unsatisfactory, either because they did not give the expected results or else because it was obtained at too great a cost. Such illustrations might be multiplied, and it has become evident that to solve most of our problems means facing them by rigorous scientific methods. Such methods are necessarily slow, but in the efforts at agricultural improvement apparently short cuts have generally proved fatal. And our experience has been that what at first was the longest way of tackling a difficult task has generally given in the end not only the quickest results, but the only results of value that have been obtained.

3. I will indicate the more important investigations now in progress, the results obtained in each of them so far, and the extent to which these have been applied in practice.

I.—*Agricultural Research and its Application.*

4. *Cotton.*—The most prominent work of the Bombay Department of Agriculture has always been on cotton, our greatest crop in point of value, and in several directions substantial progress has been made during the year under report. In the work of producing and extending the use of improved cottons, South Gujarat stands first in point of success. In the tract south of the Narbada river the pure strains of Navsari cotton seed first distributed widely in 1919 have now spread all over the area in question and are rapidly replacing the former mixed seed in use. Including the areas in the Baroda, Rajpipla and other States, seed for over two lakhs of acres were distributed by the Agricultural Department's organisation in 1922, and the character of the district as a producer of staple cotton has been almost re-established. It is now rare to find more than two to three per cent. of *goghari* (the inferior types previously grown) in any part of the area south of the Narbada. North of this river the seed has not proved so acceptable, as the ginning outturn of the *kapas*, though higher than that of most of the staple cottons hitherto, is lower than that of the mixed crop now usually produced, and it has been necessary to breed a new cotton, by hybridisation, to suit the tract. This has now, I think, been secured by the cotton breeder working on the Surat Farm, and another year will show certainly whether this is the case. The new cotton has the staple of the best Surat types, and a ginning outturn of over forty per cent.

In North Gujarat the position is equally promising though we have not got so far with the establishment of improved cotton types as in the South. As a result of a number of years' work at Viramgam and elsewhere, several selected types of *wagad* cotton have been established, in a pure condition, of considerably better staple and with a higher ginning outturn than those commonly grown. These are now being multiplied, and within a couple of years will be available on a large scale. This is one of the cases in which, having got so far, I am impatient to have seed for wide distribution, but we cannot hurry things very much, as there is only one crop a year, and the area under a particular cotton can only be multiplied by twelve times in a single season, if all goes well and the rainfall is satisfactory.

In Khandesh the work has been to improve the type of cotton now grown and especially to get something better in staple than the "N.R." cotton we have been distributing for a number of years, without sacrificing yield or ginning outturn. This has now been apparently secured by the Cotton Breeder at

Dhulia in certain strains of cotton isolated from a supposed cross between *bani* and *comilla* cottons made a number of years ago. These have been exceedingly well reported upon by the trade, and classed as staple cottons, while the yield and ginning percentage is practically as good as the best "N.R." Khandesh types. The seed is now being tested and multiplied on a larger scale, and should be capable of giving us commercial quantities in a couple of years more, with a staple a quarter of an inch higher than the ordinary Khandesh production. On the other hand, the search for better types in the ordinary mixture of cottons now grown in Khandesh has been very disappointing, and hardly any strains have been isolated of real value. The search for such strains is now to be carried much further afield, particularly in Central India.

Increase in yield of cotton is being sought by the people in Khandesh by the use of oilcakes, and particularly by castor cake as manures, which is rapidly increasing. This is interesting as it represents perhaps the first case in which there has been widespread use of concentrated manure on what is essentially a dry unirrigated crop in Western India. This is being pushed and a leaflet is under preparation in connection with it.

In the Karnatak the success of the Agricultural Department in producing improved types of cotton by selection has been in some ways greater than anywhere else. The "Dharwar No. 1" cotton, isolated by the breeders of the Department, is now rapidly replacing the ordinary Kumpta cotton in the Dharwar, South Bijapur, and South Belgaum districts. With the assistance of the Hubli Co-operative Cotton Sale Society and other similar sale societies improved seed for 65,000 acres are being distributed in 1923. This has a ginning outturn much higher than the local Kumpta cotton with an equal staple. Further progress has, however, been made with a series of still better types obtained by crossing the best of the Kumpta cottons with high ginning cottons from Central India and these which have equal staple with the best of the local types with much higher ginning outturn and better colour, are now being multiplied for distribution. Another feature in the improvement of Kumpta cotton is the question of cleanliness, for it is notoriously the dirtiest cotton in India. A clean picking campaign has been instituted this year, in co-operation with the Hubli Co-operative Cotton Sale Society, with considerable success, and I can see the likelihood of much improvement in the course of the next two years. I must also refer to the improvement effected so far in the American cotton grown in

Dharwar. The selected type we have evolved known locally as "Upland" or "Gadag No. 1" is rapidly becoming universally grown in this area, and in co-operation with the Gadag Co-operative Cotton Sale Society, seed for 63,000 acres is being distributed in 1923. We have further improvements in this cotton in hand, and we are on the one hand testing strains of American cotton received direct from America, and on the other endeavouring to obtain further improvement by crossing our best Dharwar-American types with others from America.

In Sind no further progress has been made in evolving better types of *deshi* cotton, as the so-called "27 W.N." cotton has proved its value and can now be distributed on a large scale. Peculiar difficulties have arisen in keeping this type pure in Sind, and the amount of reliable seed available is limited. Until sufficient seed is available to cover the tracts needing the cotton a local type known as "Bhitshah" seed is also being distributed but within a year or two enough authentic seed will be available to fill all demands, if we can only find means as we have done elsewhere to maintain its purity when it has entered into large scale cultivation. The improvement of American cotton in Sind, where the Punjab variety known as "F-4" has become the standard type in the Jamrao tract which alone is at present suitable for American cotton, has been taken in hand more seriously than ever before, and a large number of the best American types have been tested as a preliminary to crossing. Two of these "Webber No. 49" and "Durango" seem to be of peculiar value, and have yielded very high returns of cotton of staple of over  $1\frac{1}{2}$  inches. The final sanction to the proposal for building the Sukkur barrage and canals which will enormously extend the area suited for American cotton, has given a stimulus to this work, and it is very important that we should have a first class type ready for distribution when the water is ready for the land. American cotton can only be grown where there is a reliable water supply from the beginning of May at least.

So much for work in improving the types of cotton grown. The progress of cotton growing depends, however, also on the increases of yield by prevention of the losses occurring every year due perhaps chiefly to shedding of the bolls, to the attack of bollworm and to the attack of cotton wilt. Our workers at Surat and Dharwar in particular have tackled these problems, and though final conclusions have been reached, I may say that at Surat there is very great probability that the bollworm (in this case the "spotted bollworm") can be dealt with by means

of parasites which are now under study. Definite results will probably be available next year. So far as cotton wilt is concerned, we have discovered strains of cotton both in Gujarat and in the Karnatak which are very much more resistant to wilt than those now grown, and also a type from Burma (*wagale*) which seems almost entirely immune. Starting from these as a basis, it would appear to be only a matter of time before we can issue seed giving plants immune to the disease, and yet possessing all the other desirable qualities demanded.

Future work on cotton will be much intensified because of grants offered by the Indian Central Cotton Committee, and accepted by Government, for the investigation of four specific problems of cotton cultivation. These are as follows:—

- (a) Annual grant of Rs. 25,000 for three years at least for the investigation of the Physiology of Cotton Flower and Boll Shedding in Gujarat.
- (b) Annual grant of Rs. 15,000 for three years at least for the investigation of the Spotted Bollworm in cotton and the methods for its control.
- (c) Annual grant of Rs. 25,000 for three years at least for the investigation of Cotton Wilt in the Karnatak and the methods for its control and also for the further improvement of the Dharwar-American cotton in the same area.

The work to be undertaken under these grants is now being organised, and will be in full swing during the greater part of the 1923-24 season.

5. *Rice*.—Since the establishment of the Karjat Rice Research Station in 1919, work on this crop has been among the most important research activities of the Department, with results which have fully justified the expenditure. The primary work done there has been the isolation of pure strains from the *Kolamba* rice chiefly grown in the North Konkan, which while equal to the ordinary type in fineness have a materially greater yield. This particular variety of rice is grown on about 200,000 acres in the Kolaba, Ratnagiri, Thana and Surat Districts and any improvement made will, of course, be applicable over this area. The results have been remarkable and three strains have been isolated which give a very much higher yield than the ordinary seed and are suitable for the slightly varying conditions in the tract. These were grown on a large enough scale during the past year in cultivators' fields to test their capacity, with

the result that they gave respectively 27·5 per cent., 25·6 per cent. and 16·3 per cent. more yield than the ordinary types. They have already got a local reputation and are in demand. About 1,200 acres are planted with them in 1923, and we are organising their distribution to at least 10,000 acres in 1924 in the Panvel, Pen and Karjat talukas of Kolaba and the Kalyan taluka of Thana. The whole area should be covered within three or four years if the supply of the seed on a large scale can be organised and financed. This is, of course, only the beginning, and the plant breeding expert is now turning his attention to getting still better types by selection, or by crossing with high yielding coarse rices, with a view to getting the high yield of these varieties combined with the fineness of Kolamba strains.

The results have been so striking that Government has sanctioned during the year the extension of similar work in the *Mallad* tract of the Karnatak, in the South Konkan area, and in the rice growing tracts of Upper Sind. A special station has been established for this purpose in the Karnatak at Mugad near Dharwar, and the work there placed in the hands of Mr. S. G. Bhalerao, who has hitherto been the resident officer in charge of the work at Karjat. The work in the South Konkan will be conducted on the Ratnagiri Farm, under the close personal control of Mr. V. G. Gokhle, Deputy Director of Agriculture, Konkan. In Sind, the investigations are being done on the Larkhana Farm, and will be under the direction of Mr. K. I. Thadani, Cotton Breeder, with suitable assistance. In each case rigorous scientific methods are being employed and practical results, applicable on a large scale, may be expected in three or four years.

In the case of rice, side by side with the selection and breeding work already described, a very careful investigation is in progress regarding the cultural conditions which result in large yield. The results so far have cleared up many points. No cultural method, including manuring, has led to increase in the size of the ear heads in any particular type of rice, and any improvement in yield by cultural methods must therefore depend on the increase in the number of ear heads per acre. To do this, after much investigation, we find ourselves reduced to methods of manuring, and the exact methods of carrying this out, and their influence on the plant at each stage is the matter under special inquiry at present. A bulletin is now in the press giving a full account of the results of this work up to the present.



In actual practice the manuring of rice only makes slow progress. In the laterite area of the south Konkan and *Mallad* our results with bonemeal have been very remarkable and consistent,—the increases in yield obtained by applying 220 pounds of bonemeal per acre to the rice in the field have in many cases been from fifty to one hundred per cent. Despite this fact, the extension of the system is slow. A leaflet has been issued during the year, and intensive propaganda is in view. The figures given, it must be understood, are for the rice growing areas in the laterite regions; the method has given far less result in the remainder of the Konkan.

6. *Nagli* or *Ragi*.—The most important grain in the heavy rainfall tracts of the Bombay Presidency, next to rice, is *nagli* and in these regions it is grown over the upland areas. The crop is supposed to be an inferior one, relegated to poor land, but it remains the food of the poorer classes over very large areas. Experiments with a view to improve the yield by selection were taken up at a special research station at Hatkhamba near Ratnagiri two years ago, and have already yielded remarkable results. One strain has been isolated yielding four times the amount given by the local type, and about twelve strains which yield double. These strains have to be tried on a larger scale before we can speak with complete certainty, but I think there is little doubt that we shall have, for distribution, seed of *nagli* within two years, which will yield double that at present grown over between four and five lakhs of acres.

7. *Jowar*.—The Cotton breeders at Dharwar and Surat as well as the Deputy Director of Agriculture, Sind, have recently taken up the study of the Bombay types of *jowar* with a view to an increase in yield. In Sind little has been done except to make a collection of the local types at Larkhana, but at both the other centres mentioned considerable progress has been made in the isolation of promising pure strains from the best local varieties and it will only be possible to measure the likelihood of a big advance in the yield of *jowar* types in next year's report. The matter is, however, so important, for this crop covers more than eight and a half million acres in the Bombay Presidency, that Government have during the year sanctioned the provision of special graduate assistance in this investigation.

The yield of the *jowar* crop is annually reduced to an extent of probably at least fifteen to twenty per cent. by two diseases. The first of these is the smut disease, the second is the insect

known as the *jowar* borer. The first can be dealt with, in its most frequently occurring forms, by steeping the seed before planting in a solution of copper sulphate. During the past season a very energetic propaganda has been conducted, with the close co-operation of the officers of the revenue department, to get this treatment very widely adopted. The results have been that for the *kharif* crop of 1923, the seed for at least one and a half lakhs of acres have been steeped with perfectly successful results. A further campaign is in hand for the *rabi* crop, the results of which are not yet available. It is my ambition to make this treatment, which costs only one pice per acre, universal in the *jowar* area within five years. If this is done it will mean the addition of at least from five to ten per cent. of the crop of this grain.

The other great pest of *jowar* is the *jowar* borer, the severity of whose attack varies, but which rarely causes a loss, on the *kharif* crops, of less than five and often of more than ten per cent. This has been under investigation for the past three years at Surat, through the help of a grant made by the Sir Sassoon David Trustees. The study has carried us very much further towards a full knowledge of the pest, and has led to a certainty that the main source of its continuance is the fact that the pest hibernates in the *jowar* straw (*kadbi*), which is stored all over the country for fodder. Mr. T. N. Jhaveri, who has been specially in charge of this work, is now engaged in devising methods by which a large proportion of the hibernating insects can be destroyed, and the outlook is decidedly hopeful.

8. *Bajri*.—The question of the improvement of this crop which is the typical *kharif* grain grown in the famine areas, has been before the department for several years. The investigation is financed by the Sir Sassoon David Trustees, and the actual work is under the control of Dr. Burns. The inquiry is difficult, partly because so little is known of the botany and biology of the crop and partly because the flowers are usually cross fertilised and hence no pure types exist. Continued selection is, however, resulting in the production of types of high yield and apparent draught resistance. I cannot promise early results in connection with the production and distribution of types of high yielding draught resistant *bajri*, but we are undoubtedly getting nearer to this desirable consummation. In the meantime, I may call attention to the continued success of Akola *bajri*, when grown in Khandesh. Its distribution is very popular, and this simple transfer normally results in an increase of more than twenty-five per cent. in the yield.

9. *Wheat*.—Work on the improvement of the types of wheat grown has been carried on both in the Presidency proper and in Sind. In the former case it has been under the charge of Mr. R. K. Bhide, who has now got a number of pure strains of wheat suitable for the Deccan, with a much higher yield than the local types. These only need multiplication and this is now taken in hand. When obtained in sufficient amount they will be suitable for growing in the great wheat areas of the Ahmednagar and Nasik districts. Some quantity should be available for such distribution next year.

The variety of wheat known as "Pusa 4" continues to give excellent results in the Panch Mahals, and in North Gujarat generally. The organisation of the distribution of this seed is a very important part of the duties of our district staff in these areas. The quality and yield are so superior to the local varieties that I am informed that often no less than fifty per cent. more value per acre has been obtained by its use.

In Sind, however, the wheat crop is more important than anywhere else in the Bombay Presidency, and here we have a special farm near Jacobabad for the study of the crop and multiplication of desirable types of seed. The "Pusa 12" and "Punjab 11" strains of wheat still remain the best and most popular types, and the demand is so great that a large import of wheat seed of the former kind was arranged for from the United Provinces. Our own farm only yields enough seed to plant 1,000 acres, and so such import is necessary, especially in view of the fact that the recovery of seed from the growers has been found more difficult than in other parts of the Presidency. At the same time, in Sind we have proceeded also by isolating types from the best local wheat, and have secured some exceedingly good material for multiplication.

10. *Tobacco*.—In my last report I referred to the initiation of careful botanical study of tobacco at Nadiad (North Gujarat) with a view to the development and maintenance of the best and most suitable types of tobacco in that area. This has continued during the present year on the station belonging to the Nadiad Agricultural Association, the plan being to lay ourselves out primarily to produce the best pure types suitable for the local market. We have already isolated a number of different types, but it will be two more years before very definite results can be obtained.

11. *Sugar Cane*.—The long continued work on the Manjri Farm, in which the most economical methods of cultivation and types of cane have been investigated for a series of years.

has now borne fruit. All the details of the "Manjri method" have not proved acceptable to the people, but many of them are now in very general use, particularly in the newer Deccan Canal areas. The method of planting in rows, intercultivation by bullocks, use of sulphate of ammonia in combination with oil cake as a manure for top dressing, these and several other Manjri modifications of the cultivation in vogue, are now widely adopted. With regard to the general widespread use of Sulphate of Ammonia as a manure for sugar cane, it is interesting to recall that the actual entry of this material into the ordinary economy of the crop may be largely traced to a special grant of Rs. 10,000 placed at our disposal in 1919-20 by the Sir Sassoon David Trustees for the purpose of demonstration. Varieties of sugar cane tested at Manjri are now replacing the old type under special conditions, such as the *Manjav* cane for waterlogged land. The investigations at Manjri now consist chiefly of further tests of varieties, of trials designed to show how best to apply water, and in what quantity, and in attempts to reduce the cost of cultivation, and yet at the same time secure a good crop. The position of the sugar cane industry under the Deccan canals has very considerably changed during the past two or three years. The fall in the price of *gul* to very little more than pre-war prices will enforce economy in growing the crop which were hardly thought of a little time ago, and probably lead to a diversification of crops in these tracts, which will be ultimately all to their advantage. In the meantime the economies already worked out as part of the Manjri system are being pressed all over these tracts.

In view of criticisms made, of the findings of the Indian Sugar Committee, and of the recent fall in the price of *gul*, the work of the Manjri farm has been reorganised during the year, and the results will, it is hoped, meet the demands upon it as the central experimental station for sugar.

12. *Potatoes*.—We have spent a good deal of time and money during the last few years on the investigation of the difficulties of potato cultivation in the Deccan. These are now bearing fruit, and in the greatest potato tract, north of Poona, many of the recommendations made as a result of these investigations are now being widely adopted. The study of the *tambora* disease, the most important enemy of the *kharif* crop, has continued a stage further, and the dusting of the crop with sulphur is now recognised as a practical method of dealing with it, and is in demand by the cultivators, who are willing

to pay for it. Fumigation against potato moth is also taken up widely this year, when the attack of this pest has been particularly severe. Further investigations are now in progress in finding a more suitable type of seed potato. Some recently imported from Scotland seem to have great promise. Moreover, the Horticulturist (Mr. Cheema) has obtained some very promising types from potato seed which set three years ago at Ganeshkhind. Again as the question of satisfactory storage through the hot weather is vital to putting this potato industry in a satisfactory position further experiments are in progress in this direction, including an attempt to see if cold storage is applicable and economical under our conditions. The whole work on potatoes has for a number of years been largely financed by the Sir Sassoon David Trustees, and without their aid the work would probably never have been done.

13. *Cardamoms*.—I must again refer to the work done by Mr. D. L. Sahasrabudhe in the *Katte* disease of cardamoms, which seems likely to ruin the cardamom growing industry in North Kanara. He has cleared up the nature of the disease, and has elucidated the cause and the method of the attack. Whether the methods which he proposes for dealing with the disease on a large scale will have the effect of rehabilitating the industry, time only can show. This inquiry has also largely been financed by the Sir Sassoon David Trustees.

14. *Fruit Crops*.—During the year 1921-22, a special horticulturist was appointed in the person of Mr. G. S. Cheema, and he with a staff for investigation, teaching, and district, has been principally devoting his attention to the study of fruit and its improvement, as well as to the improvement of the marketing of fruit products. So far as the improvement of fruit types is concerned the matter is only in the very first stages. In the case of grapes, a large number of seedlings are being raised, which are growing luxuriantly and show large variations, but the time has not yet come to test their quality. Similarly an extensive crop of banana seedlings has been successfully raised in an attempt to develop new types. One of the very interesting results obtained during the year is the increase of yield in fig trees as a result of notching the branches, and this will be done on a large scale in 1923-24 in the gardens of fig growers of Poona. The diseases of citrus fruits, which are next to mangoes our most important fruit crop, have received a good deal of attention during the year. The orchards in Khandesh particularly are found to be very badly attacked with scale insects and the white fly, and a campaign of spraying is

proposed for the coming season. The moths which puncture orange fruits have been shown to be very common, but a very simple way of minimising the attack by handpicking the moth at night has been shown to the people, and is to be further demonstrated. But the most serious disease of oranges is the 'die-back' of the branches and even of whole trees which is a feature of most of the gardens in the Presidency, and this is now under careful study. It will, however, be some time before really reliable results can be obtained in this connection.

The question of the development of fruit cultivation in Sind has been seriously considered during the year, and definite proposals in this connection are now before Government.

15. *The Checking of Pests and Blights of Crops.*—I have already referred under previous headings to the work undertaken to investigate the disease and pests of cotton, of *jowar*, of potatoes, of cardamoms, and of certain fruit crops. Leaving aside the studies of minor crop pests, I must speak of attempts to check the damage done by the *Katra* caterpillar in Gujarat, by the *Koleroga* disease of betel nuts, and by the larger crustacean and vertebrate pests over very wide areas.

The *katra* caterpillar (*Ansacta moorei*) is one of the most important pests of ordinary cereal farm crops in Upper Gujarat and especially in the Panch Mahals. There the people look upon it in many areas as their principal enemy and it not frequently leads to the complete loss of the crop. We proved last year that it could be checked by dusting with a mixture of Paris Green and lime, at a cost not much exceeding Rs. 2 per acre, and the results have been confirmed over a large area during the present year. The trouble is now that the dust appears to wash off easily in rainy weather, but we have evidently the basis of a practical method which demands more careful study in the coming season.

The *Koleroga* disease of betel-nuts is one of the most serious blights of that very important crop in the Konkan and in North Kanara, and it has appeared very badly in the current year. It can be completely kept under control by spraying with the so-called Bordeaux mixture, which is a mixture of Copper Sulphate and lime. The demand for this treatment is increasing and is available now in two of the largest betel nut growing tracts to the extent that our staff can cover. It is so simple, however, that once a garden owner has seen it done, there will be no difficulty in getting a sprayer and doing it himself.

The various species of land crab are among the very serious pests of cultivation over much of the rice area, both in the Presidency Proper and in Sind, for these animals not only undermine and perforate all the field embankments but cut off the seedlings and even in some cases climb up the flowering rice plant and eat the head. Little has been hitherto known of the life-history and habits of the animals, which is an essential preliminary to dealing with them, but during the past two years very extensive observations and cultural experiments have been made on two of the principal species at Karjat, by Mr. P. V. Wagle, and before the end of the current year, I think the problem of dealing with them will have been to all intents and purposes solved.

With this latter I must also speak of the damage done by the field rat, particularly in Sind, chiefly to rice and also to other crops. In Lower Sind, in fact, its depredations are the most frequent complaint of the Zemindars. A preliminary inquiry into its habits has been made during the year under report and it is hoped that serious study can be done in the coming season. We know little of the habits of the animals under Sind conditions, but the fact that genuine plagues of field rats are of frequent occurrence, it is time that the whole question should be thoroughly studied.

One of the most widespread pests of all cultivation, especially in the tracts near the Western Ghats or near forest areas, as well as in the sugar cane areas is the wild pig. A Committee, with Dewan Bahadur K. R. Godbole, M.L.C., as Chairman and the Director of Agriculture as Secretary was appointed in February 1922 and has reported during the current year. Their study of the subject is a very thorough one, and their report is now before Government.

16. *Increase of Yield by Cultural Methods.*—In the famine areas the main problem is to make the most use possible of the rain which actually falls, and while no new principle has developed during the year, the application of the method of conserving moisture by repeated shallow hoeings is widening. In Sholapur, where it has been most successful before, the conditions were so bad in 1922 as to make even this method of saving the crops almost useless, but it was applied with success in the north-east talukas of the Ahmednagar district, and I was glad, a few days ago, to see the people of a village in the West Khandesh district speaking with enthusiasm of the system. The whole question of the retention of water in the soil, has, however, been made during the year the principal work of the Soil Physicist (Mr. V. A. Tamhane), and he has been provided with a place for the study and staff at the Manjri farm. Results:

from this study, and practical methods for their application may be expected within two or three years.

Last year I referred to my report to the very great success which has been obtained as a result of cultivation on ridges in the black soil of the Surat district. This has been amply confirmed in the year under report, and suitable implements have been found for making the necessary ridges. This method, which has resulted from twenty years of study at the Surat farm, promises to be a very great advance in south Gujarat, and energetic propaganda is being undertaken in connection with it.

17. *The Improvement of Implements.*—Though one of the very early improvements introduced by the Agricultural Department was the iron turnwrest plough for the black soil areas, and though this type of plough, of various makes, is still extending its use by leaps and bounds, yet other advances in implements have been few, and not very popular. A Committee was appointed by Government early in the year under report to consider how work in this direction can be speeded up and made more effective.

The following is a summary of the main conclusions of the Committee which have been accepted by Government:

“The designing of new and improved implements should be an important function of the Agricultural Engineer, working in conjunction with the Deputy Directors of Agriculture. Investigation in connection with implements other than ploughs is very necessary:

2. The production of working models should be arranged by the Agricultural Engineer at the Dapuri Workshops and funds should be arranged by the Agricultural Engineer's budget to allow him to do so.

3. Successful designs which promise to have an effective demand should be placed before all manufacturers, who are interested.

4. The propaganda required for the introduction and extension of the use of implements should be under the control of the Agricultural Department. Even in the case of the 9 inch plough, with which most progress has been made, propaganda and demonstration are still required.

5. Propaganda should be carried on by the territorial staff of the Agricultural Department, assisted by and in co-operation with the various local popular organisations including co-operative societies in the districts.”



There are many inquiries continually being made regarding the use of motor tractors in connection with land cultivation, and the results of tests extending over several years have been incorporated in a bulletin by the Agricultural Engineer now being prepared by the press. The fact is clear that motor cultivation can only be useful when the unit area of cultivation is twenty acres or more, and hence it is not applicable over most of the cultivated area of the Bombay Presidency. Moreover, many of the smaller types of tractor such as the Fordson are unsuitable for the black soil areas, though they are very useful in the alluvial country of north Gujarat or Sind. The possibilities of the heavier types of wheeled tractors and of the 'Caterpillar' tractors now on the market have been investigated, and final tests with the former will be made on a large scale in the coming season, both in Gujarat and Khandesh, where we are offering to plough land at a definite rate up to the limit of the capacity of the tractors used.

18. *Cattle Improvement.*—The work of the Agricultural Department in this direction has consisted in the establishment of standard herds, (1) of Kankrej cattle at Chharodi in Upper Gujarat and (with special reference to milking qualities) at Surat, (2) of Amrit Mahal cattle at Bankapur in the Dharwar district, (3) of Sindhi cattle at the Willingdon Cattle Farm at Malir near Karachi in Sind, and at the Agricultural College dairy in Poona. With regard to the Willingdon Cattle Farm, this has been transferred to the management of the Agricultural Department during the year and has been placed, like those at Chharodi and Bankapur, under the management of the Deputy Director of Agriculture for Animal Breeding (Mr. E. J. Bruen). These form the nucleus herds for the study and improvement of the breeds involved and in all the cases I may say that the standard of the animals is far higher than the average of the country. The breeds at Bankapur and Malir being new, have not yet reached the high standard of some of the older forms, but that is a matter of time.

During the previous year Government appointed a Committee to consider the question of cattle improvement and fodder storage in all its aspects, whose Chairman was Rao Bahadur G. K. Chitale, M.L.C., and whose Secretary was the Deputy Director of Agriculture for Animal Breeding. Its report is now received and is under the consideration of Government. The developments recommended are very extensive, and the whole matter will be placed before the Provincial Board of Agriculture before any final steps are taken.

19. *General.*—The research required for agricultural improvement is chiefly done in connection with various farms and research stations in the Presidency, and gradually these farms are becoming more and more devoted to the study of scientific questions. Leaving aside the farms specifically maintained as seed farms, the list of those now kept up and the particular purpose they are intended to serve are as follows. Beyond the purposes specified it must be understood that every station is a centre for agricultural information and for help to cultivators who ask for it.

I.—*Gujarat Division.*

Name of the Farm.	Special purpose.
(a) Surat Farm ..	(1) Breeding of Improved Cotton and <i>jowar</i> for Lower Gujarat and multiplying the seed of these. (2) Cotton Research Work financed by the Indian Central Committee. (3) Study of <i>jowar</i> borer. (4) Experiments on improvements in cultivation in the Gujarat Black Soil Areas. (5) Improvement and Maintenance of breed of Kankrej cattle developed as a milk breed.

Broach Farm is practically a substation of Surat for purposes (1) and (2) :—

(b) Nadiad Station ..	1. Breeding pure strains of tobacco suitable for north Gujarat. 2. Investigating the cultural difficulties of tobacco in the Kaira district.
(c) Virangam Station ..	1. Breeding of Improved Cotton for the Dholleras area.
(d) Dohad Farm ..	1. Wheat selection, breeding and multiplication for the Panch Mahals 2. Study of methods of cultivation and crops suitable under irrigation cultivation in the Panch Mahals.
(e) Amalsad Farm ..	1. Study of Red Rot of Sugar-cane in south Gujarat. 2. Introduction of varieties of sugar-cane not susceptible to red rot.

II.—*Khandesh and Nasik Division.*

Name of the Farm.	Special purpose.
(a) Dhulia Farm ..	1. Breeding of improved cotton for Khandesh and multiplying the seed. 2. Maintenance of pure supply of Spanish Peanut, Groundnut seed. 3. This farm also serves as the school farm for the Dhulia School.
(b) Jalgaon Farm ..	1. This is almost entirely a farm maintained for the testing, multiplication and growing of improved cotton seed for Khandesh.

III.—*South Central Division.*

(a) Manjri Farm ..	1. This is our main sugarcane research station, for investigating all problems connected with this crop in the Deccan Canal areas.
Baramati Farm is practically a sub-station of the Manjri Farm.	
(b) Kopergaon Farm ..	1. Station for sugarcane study in the Ahmednagar District. In this respect it is practically a sub-station of the Manjri Farm. 2. Fodder ( <i>kadbi</i> ) growing, shredding and baling station for famine purposes.
(c) Mohol Plot ..	1. This is maintained simply for the multiplication of cotton seed suited to the Sholapur District and for testing and showing methods of dry cultivation.

IV.—*Southern Division.*

(a) Dharwar Farm ..	1. Breeding of improved cotton and <i>jowar</i> for the Karnatak areas, and multiplying the seed. 2. Cotton research work on Cotton Wilt Disease and on the improvement of Dharwar-American Cotton financed by the Indian Central Cotton Committee. 3. Experiments on improvements in cultivation in the Dharwar area.
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The Mugad Rice Station may be considered as a sub-station of Dharwar for the study of rice improvement for the *mallad* tract.

Name of the Farm.	Special purpose.
(b) Gokak Farm ..	1. Study of sugarcane and other irrigated crops on the sandy soil of the Gokak Canal area.

V.—Konkan Division.

(a) Karjat Rice Station ..	1. Breeding improved rice for the North Konkan. 2. Study of the rice plant in all its aspects with a view to increasing its yield. 3. Study of land crabs as an agricultural pest.
(b) Ratnagiri Farm ..	1. Breeding improved rice for the South Konkan. 2. Experiments in new crops and improvements of cultivation in the South Konkan.

The Hatkhamba *varkas* station is a sub-station of the Ratnagiri Farm for the study of *nagli*, and obtaining improved types by selection and breeding.

(c) Kumta Farm ..	1. Study of rice problems in North Kanara. 2. Investigation of most suitable quick growing plants to form <i>soppu</i> manure.
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VI.—Sind Division.

(a) Mirpurkhas Farm and Mirpurkhas Seed Farm.	1. Breeding of <i>deshi</i> and American Cotton for Sind, and their multiplication. 2. Study and propagation of types of fruit (chiefly of citurs) suited to Lower Sind. 3. Study and improvement of improved implements for Sind conditions. 4. Study of water "duties" under Sind conditions.
(c) Larkhana Farm ..	1. Breeding of improved rice for Upper Sind and its multiplication. 2. Study of cultural problems of rice cultivation in Upper Sind. 3. Study of <i>jowar</i> varieties and their improvement. 4. Purification and multiplication of berseem seed.
(d) Jacobabad Farm ..	1. Breeding and multiplication of improved wheat seed for Upper Sind.

Name of the Farm.	Special purpose.
(e) Sukkur Farm . . .	This will probably be abolished during the coming year.
(f) Landhi Farm . . .	This has been converted into a sub-station of the Willingdon Cattle Farm during the year under report.

#### VII.—Cattle Farms.

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| (a) Chharodi Farm, Upper Gujarat.           | 1. Study and improvement of the Kankraj Breed of Cattle.  |
| (b) Bankapur Farm, Dharwar.                 | 1. Study and improvement of the Amrit Mahal Breed of Cattle.  |
| (c) Willingdon Cattle Farm, Malir, Karachi. | 1. Study and improvement of the Red Sind Breed of Cattle.<br>2. (Temporarily) Study and improvement of the Thar Parkar Breed of Cattle. |

#### VIII.—Agricultural College Section.

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| 1. Agricultural College Station. | This is the centre for most of the scientific research work of the Department.            |
| 2. Ganeshkhind Gardens.          | (1) Horticultural investigations.<br>(2) Breeding of improved wheat for the Deccan areas. |

#### II.—Demonstration and Propaganda.

20. As I have previously remarked, the one ultimate test of the success of a department of Agriculture, and of the whole of its research educational and other activities is whether the recommendations made are actually brought into practice, and have resulted in increase in the quantity or improvement in the quality of the material produced. As a rule, this will also naturally result in increasing the profit to the producers, that is to say to the cultivators, though this is not the case necessarily, and special organisation may be wanted to secure it. But I want again to lay down clearly that the one purpose of our existence as an agricultural department is the increase in the quantity or the improvement of the quality of agricultural produce, and the consequent increase of the profit to the cultivators.

21. In order to attain this end more completely, a good many changes in organisation were introduced in 1921-22 including a definitely closer co-operation between the Agricultural and the Co-operative Departments, the institution of Divisional Boards which control and the propaganda activities

of both departments and the definite adoption of a system of local development association for the carrying on of agricultural propaganda in areas which desire it. All these changes have developed during the year under report.

22. The Divisional Boards which were created as the result of discussions which took place at the Provincial Board of Agriculture in 1921 have now been working for more than a year in Sind, Gujarat, Khandesh and Nasik, the Deccan, the Karnatak and the Konkan with Kanara. Each of them consists of six members. Two, including the Chairman, are officials, namely, the Deputy Director of Agriculture, and the Assistant Registrar of Co-operative Societies, two are non-officials nominated by the Central Co-operative Institute and two are non-officials nominated by the Director of Agriculture, the nominations in each case being accepted by Government. The Board thus constituted is responsible for the policy of agricultural propaganda and for non-credit rural co-operation including the distribution of Government loans for the assistance of the latter, in the area assigned to them. Their actual duties were defined as follows :—

“ The Boards will control the portions of the Government grant for loans to Agricultural Societies now in charge of the Registrar of Co-operative Societies, and of the discretionary grants for propaganda purposes now in charge of the Director of Agriculture as distributed by these two officers among the divisions. The Boards will also advise on the application of the policy of the two Departments within the division, and will have power to call for any information and data required from the Assistant Registrar or Assistant Registrars and the Deputy Director of Agriculture. The proceedings of these Boards were to be considered by the Director of Agriculture and the Registrar sitting jointly and orders also issued by them jointly.”

All the Boards thus constituted have met regularly during the year under report. They have taken their duties seriously, and in several cases they have been most useful in bringing the Agricultural and Co-operative Departments into closer touch with public opinion. They have been particularly useful in the Karnatak, in Sind, in Gujarat and in Khandesh and Nasik, and as they become more established will be able to exert a more effective control of the work. The thanks of the Department is due to the non-official members, who have so kindly placed their knowledge and experience at the service of the Boards. In four cases the functions of the Boards have been enlarged during the year, and each one of the three has, after the addition

of two additional members representing cotton interests and the cotton trade, been established as Divisional Cotton Committees to advise Government regarding all matters concerned with cotton cultivation or trade in their areas. These cases are (1) Sind, (2) Gujarat, (3) Khandesh, (4) the Karnatak. The effectiveness and usefulness of their advice has still to be proved but I think it is certain to be valuable.

23. But the mere direction of a number of official propaganda officers by a Divisional Board, however effectively organised, will not be enough, and it was felt that the development of local initiative in small areas by cultivators themselves was essential to the rapid spread of agricultural improvements and to the organisation of their use. This meant the establishment of local agricultural associations of some sort. Now the success of such Associations in the past has been very varying, but it was felt that it was necessary to provide for (1) a limited area for each association, where the interests were likely to be fairly similar. This was provided by the taluka, (2) a definite interest by Government in the success of each association. This was provided by the offer of a subsidy of any amount up to Rs. 1,000 per annum (but not exceeding half the total expenditure) to each association, provided it satisfied certain conditions, (3) a condition that each such association should employ a paid demonstrator approved by the Agricultural Department for its work, and (4) a condition, likewise, that the annual programme should be approved and the subsidy recommended by the Divisional Board.

Under this scheme, eleven associations have been formed, and the subsidies paid to them before the end of June 1923. The talukas in which these have been established are as follows :— (1) Chorasi (Surat), (2) Pachora and (3) Jalgaon (East Khandesh), (4) Madha (Sholapur), (5) Satara, (6) Khed (Poona), (7) Dharwar, (8) Ron and (9) Gadag (Dharwar), (10) Chikodi and (11) Athni (Belgaum).

In addition to these associations in the following talukas have been approved by the Divisional Boards concerned and the subsidies will be paid as soon as the necessary conditions, particularly with regard to the presentation of a budget, are fulfilled :—(1) Walwa (Satara), (2) Gokak (Belgaum), (3) Sindgi (Bijapur), (4) Sirsi (North Kanara), (5) Hyderabad, (6) Hala, (7) Shahadadpur and (8) Tando Allahyar (Middle Sind), (9) Kambar, (10) Ghotki, (11) Larkhana and (12) Sukkur (Upper Sind).

The associations promise well. Only three of them have as yet completed a year of existence, namely Pachora (East Khandesh), Madha (Sholapur) and Chorasi (Surat) and these on a review of their year's work have done excellent work, and have certainly intensified agricultural propaganda in their talukas to a considerable extent. They have not, on the whole, done much in the direction of co-operative non-credit organisation in their areas, but that will come, as they get settled down to their work. Of these associations to which subsidies have been paid only one has definitely been unsatisfactory. The accounts of each association are audited by the auditors of the Co-operative Department when they are requested under the Co-operative Act, and by the auditors of my office when this is not the case.

Associations organised under this scheme will in all probability gradually replace those on a pure non-official basis which have previously existed. But we can never forget the good work which some of these have done in the past in various parts of the Bombay Presidency. In Khandesh they have been a very important feature of the organisation of agricultural improvement, and some of them will continue to exist in any case. Certain associations have been, and still are bearing at least the financial responsibility of vernacular agricultural magazines. The Deccan Agricultural Association has continued to bring out the monthly *Shetki* and *Shetkari* in Marathi. The Dharwar Agricultural Association has published the monthly *Vakkaligaru Vakkalitanama* in Kanarese and the Broach Agricultural and Industrial Association has continued quarterly the *Gujarat Agricultural and Industrial Quarterly* in Gujarati.

24. I must refer to the account by the Deputy Directors, which form appendices to the present report, for a detailed account of the propaganda work undertaken. The closer co-operation with the Co-operative Department is a continual stimulus to such propaganda in many areas, especially since the agricultural organisers of that Department now work under our control. There is a more active and energetic spirit abroad among our district workers and some of them have been remarkably successful, especially when the large areas each of them has to cover is taken into account. When I consider the progress made now, I feel that, in many parts of the Presidency and in Sind, there is a real awakening to the possible advantages of many of our proposals, which did not exist four or five years ago.

25. In Sind a change in organisation of agricultural propaganda has been made. In Middle and Upper Sind this has



been taken out of the hands of the Deputy Director of Agriculture, who thus becomes simply the controller of research and investigation so far as these areas are concerned, and placed in those of Khan Bahadur Azim Khan, Assistant Registrar of Co-operative Societies, who has shown special capacity for this class of work. He is responsible for this work direct to the Divisional Board. Moreover, it has been for the present concentrated in eight talukas (Ghotki, Sukkur, Larkhana, and Kambar in Upper Sind, and Shahadadpur, Halla, Hyderabad and Tando Allahyar in Middle Sind), where opportunities for immediate progress seemed greatest. The result so far has been good, and very substantial progress has already been made in these talukas since Khan Bahadur Azim Khan has taken charge. Agricultural propaganda in Lower Sind, and particularly in the Jamrao tract, remains as before under the direct management of the Divisional Superintendent of Agriculture (Mr. Gul Mahomed A. Rehman).

26. The propaganda of the Agricultural Department is done in part both directly and indirectly by means of publications, of which the following have been prepared and issued (or arranged for) during the year under report. Some of those announced in last years' report have also been issued during the year :—

*Bulletins.*

- |                 |   |
|-----------------|---|
| 1. Bulletin 110 | .. Year book of the Agricultural Department in the Southern Division (in English and Kanarese). |
| 2. Bulletin 111 | .. 'A Note on Well Boring (by Mr. W. M. Schutte).   |
| 3. Bulletin 112 | .. Improvement of Grazing Areas in the Bombay Presidency (by Mr. L. B. Kulkarni).               |

*Leaflets (with Vernacular Versions).*

- |               |  |
|---------------|--|
| No. 5 of 1922 | .. Prospectus of the Godhra Agricultural School, Godhra (in Gujarati). |
| No. 6 of 1922 | .. Increase in the yield of Rice Crop by Maas Selection of Seed.       |
| No. 1 of 1923 | .. Saving of Seed in Rice Cultivation in Kanara.                       |
| No. 2 of 1923 | .. The Sweet Potato Crop in the Konkan.                                |
| No 3 of 1923  | .. Sulphate of Ammonia; Precaution in purchasing this Manure.          |

No. 4 of 1923	.. The Tambara Disease of Potatoes.
No. 5 of 1923	.. Smut Disease of <i>jowar</i> and wheat.
No. 6 of 1923	.. Bone Meal as a Manure for Rice in the Southern Konkan.
No. 7 of 1923	.. Common Salt for Manure.

This does not include by any means all the publication activity of the Department. Most of the material in the Vernacular agricultural magazines referred to in paragraph 23 has been supplied by the staff, and articles have also frequently been contributed to the general press by many members of the Department. Further a large number of articles have also been written for the Agricultural Journal of India based on the work done in Bombay.

### III.—*Services Undertaken for the Public.*

27. Apart from the direct propaganda activities of the Agricultural Department, there are a number of services which it undertakes, which in most other countries are done by private agency, and which in future years may be undertaken here by such agency. Some of these services may be here referred to:—

28. *Seed Supply.*—The first of them is the organisation of the supply of pure seed. The present organisation of the supply of pure cotton seed is an example. The original seed is produced by our breeders and new freshly selected pure seed is provided by them in limited quantities every year. The amount is multiplied on our farms whether in Sind (Mirpurkhas), Khandesh (Jalgaon), the Southern Maratha Country (Dharwar) and Gujarat (Surat and Broach), until there is enough to sow an area say of from five hundred to two thousand acres as the case may be. This is then given out to cultivators or groups of cultivators to grow under the supervision of the department and the seed from the produce is either purchased by the department for further distribution at approximately cost price, or by co-operative or other agency under arrangements made with us. This means a large organisation, but until competent private or co-operative agency takes the matter off our hands it must continue.

I have described what is done in the case of cotton, but the same method must be followed in the case of all pure types of seed. As new pure improved types of seed are produced, a similar organisation will have to be created, of which the early stages will always have to be under our supervision. The stage when an elaborate agency is required has been reached

beyond what is needed for cotton, with wheat in Sind and with rice in the Konkan.

During the year we have imported new groundnut seed from America, as the stock under cultivation here has been getting more and more impure.

29. *Implement Depots.*—Another need, which was great a few years ago, is the establishment of depots for the sale and hire of implements, notably iron ploughs. As private and co-operative agency develops, they are gradually being closed or transferred, but we retain a considerable number notably in the Central Division.

30. *Water-finding and Boring.*—The demand for the services of the Mansfield water-finder in the trap area, to locate underground supplies of water and hence to find suitable sites for digging wells has continued. For the first time charges were made for the services of the man and machine, but the calls made for the machine have still been greater than could be attended to. Almost all the tests were made in the trap area, for which alone the machine appears to give satisfactory indications.

The second line of work is that of shallow boring. Almost all the machines belonging to the Agricultural Department have been in use, and though the work done by most of the machines is, I feel, not satisfactory, yet I hope that an improvement will be made in the current year. The administration of the boring work was taken out of the hands of the Agricultural Engineer in February last, and placed in the hands of the local Deputy Directors of Agriculture, the Agricultural Engineer remaining as technical adviser and for assistance in the case of break-downs. Moreover, a beginning has been made in placing some of our machines under local control, our engineers simply assisting when necessary. Thus the Kaira District Local Board has taken over several of our machines under an arrangement of this character. It would be desirable if this system could be extended, wherever we have a probability of efficient local management.

31. *Fodder Storage.*—The storage of fodder, whether *jowar kadbi* or grass on a large scale, and in some cases in a portable form, is a new thing in this country, but has always appeared to be a profitable as well as a useful operation in a country affected with famines of fodder, and hence with large changes in price from year to year. The principal work in this direction this year has been the continuance of the storage of shredded *kadbi*, in a baled condition, at Kopargaon in the Ahmednagar District,

and the result has been that in each of the recent famines considerable quantities of such *kadbi* have been available. No less than 3½ lakhs of pounds of first class fodder was supplied from the stores there during the 1920-21 famine in the Ahmednagar district. At present we have four lakhs of pounds of fodder in store there.

A scheme for the storage of large quantities of *jowar kadbi* fodder purchased and shredded at the very cheap centre of Karajgi in the Dharwar district had been partially proceeded with in 1921-22, but further progress was stopped in 1922 owing to shortness of money. The works have recently again been taken in hand, and the place will be ready in December 1923. It is hoped to store twenty-five lakhs of pounds of fodder in 1923-24.

32. *Supply of Premium Bulls.*—The supply of breeding bulls of first class type is one of the present duties of the Agricultural Department and is under the control of the Deputy Director of Agriculture for Animal Breeding. In the Gujarat tract these are derived from our own herd of *Kankraj* animals at Chharodi and in Dharwar we have now a similar supply of the Mysore breed from the newly established herd at Bankapur. In other tracts we have, as yet, to purchase the best animals that our experts can find for the purpose. The whole question of the future supply of first class bulls to cultivators have been under the consideration of the Cattle Committee appointed by Government and previously referred to. The demand for breeding bulls is practically large and insistent from the South of the Bombay Presidency.

#### IV.—*Agricultural Education.*

33. The Agricultural College at Poona continues to be very popular. There was a rapid increase in the number of students after 1919, which reached a climax in 1921-22, when there were 205 students in the College. This is really more than the equipment and staff of the College can cope with, and the number was reduced to 194 in 1922, and to 170 in 1923. This is probably about the number that the College is able to deal with, and an endeavour will be made to maintain this number. The demand for admission from other parts of India continues, but no properly qualified student from the Bombay Presidency has been refused admission. The present rule is to admit students from outside the Bombay Presidency only if there are vacancies after all Bombay demands are met. The short one year's course, which had been suspended in 1922-23, has been re-started

and judging by the class of men applying for admission, it promises to be very useful.

34. Dr. W. Burns has acted as Principal of the College during the year, except for one month when he was on leave, and his place was taken by Mr. B. S. Patel. During the year the services of Mr. S. L. Ajrekar, Professor of Plant Pathology, have been lent to the Educational Department.

35. The results in the University Examination in Agriculture were fairly satisfactory. Out of forty-five candidates who appeared for the degree in agriculture, thirty-eight passed. In the intermediate examination sixty-five students appeared, out of whom forty-eight passed, of whom three were placed in first class.

36. The following Agricultural Schools are now working and the number of students in each school is shown below :—

Marathi	..	{	Loni	..	49
			Jambul	..	25
			Dhulia	..	10
Kanarese	..		Devi Hosur	..	21
Gujarati	..	{	Godhra	..	28
			Surat	..	15

During the year the school in Sind was finally closed, as it was obvious that there was little demand for the type of education offered. On the other hand in response to strong local demand new schools were opened at Dhulia and Surat. At Dhulia, a local committee has been formed, which with the help of the District Local Board and the Dhulia Municipality, has undertaken to supply the whole cost of maintenance of the boys, and the school room accommodation also, if Government will furnish the staff and farm required for practice. A goodly number of boys have joined in the first year, and it remains to be seen how far a school on these lines will prove a success. At Surat a new school has been opened, with a subsidy of Rs. 2,500 per annum from the District Local Board, which uses the Surat Farm as the centre for the practical work of the boys.

All the old schools are now flourishing, and during the present year the training of teachers for a new stamp of rural primary schools has been added to their duties. The new type of primary schools, with an agricultural bias, demand trained teachers with a special agricultural training which for the time being we are attempting to give, with I think fair

success, at our agricultural schools. There are now four such teachers under training at Loni, three at Jambul, three at Devi Hosur, and five at Godhra. Four teachers trained at Loni in 1922-23 have now joined the schools to which they are to be attached.

*V.—Administration and Finance.*

37. The control of the Agricultural Department has been in my hands during the whole of the year under report. Of the other principal officers of the Department, I have to note with regret the final retirement of Rao Saheb M. L. Kulkarni, who was one of the most valued of our Deputy Directors of Agriculture. His connection with the Department is of many years' standing, and whether as Superintendent of the Dharwar Farm, Divisional Superintendent of Agriculture, or Deputy Director, he has been characterised by energy in work, and by success in propaganda. I may say that the development of the system of co-operative cotton auction sale in the Karnatak, which is an essential feature in the improvement of the types grown there, is very largely due to his work. We lose in him one of our most valuable officers. Mr. P. C. Patil, Deputy Director of Agriculture, South Central Division, who had been on study leave in America, returned during the year and resumed his duties.

38. Other changes in the senior staff of the Department were as follows :—

- (1) Mr. F. J. Master, my Personal Assistant, was on leave until November 1922, as the result of an accident. During his absence Mr. K. M. Pawar, Inspector of Agricultural Schools, acted in his place.
- (2) Mr. K. M. Pawar was allowed to go to the Kagal (Senior) State as Land Development Officer for the early months of 1923.
- (3) Mr. V. K. Kogekar, Divisional Superintendent of Agriculture, South Central Division, went on leave in September 1922 on the abolition of his post as a measure of retrenchment, with permission to retire at the close of his leave.
- (4) Mr. T. Gilbert, Deputy Director of Agriculture, Southern Division, went on leave in May 1923, and his place was taken by Mr. S. S. Salimath.

39. During the year the expenditure on the Agricultural Department amounted to Rs. 14,77,950 as against Rs. 19,50,254 in the year before. The difference in expenditure is due to the fact that while in 1921-22 there was a large and sudden increase due to revision of pay, in the year under report the budget grants were cut down by Rs. 3,36,000. This has inevitably meant a very careful examination of all items of expenditure and considerable economies were made without, I think, much sacrifice of efficiency. In certain directions efficiency has suffered, particularly in connection with the maintenance of machinery, implements and the like kept for hire. But the very large reduction in expenditure has not led to the loss of efficient work that I at one time feared it would. The receipts amount to Rs. 2,96,000 as against Rs. 2,68,000 in the previous year, so that the *nett* cost of the Agricultural Department to the public revenue has gone down by just over three lakhs of rupees from that of the previous year, and hardly exceeds that of 1920-21, before revision of pay became effective, in spite of large increase in the range of activity. As regards the Personal Ledger Account of Rs. 1,50,000 for the financing of seed, manure, implement supply and the like, Rs. 1,78,345 were advanced during the year, and Rs. 1,48,295 were recovered. The larger portion of the amount was employed in financing the supply of improved cotton seed in the Surat and Broach Districts.

40. Grants were received from the Sir Sassoon David Trust Fund, just after the close of the year, amounting to Rs. 34,832. These grants were made for the following purposes:—

1. Rs. 2,500 towards the cost of five vernacular agricultural schools.
2. Rs. 15,000 towards the cost of investigation of the difficulties of potato cultivation.
3. Rs. 1,000 being a final grant towards the cost of the investigation of the deterioration of cardamoms.
4. Rs. 3,000 towards the cost of investigations regarding the eradication of certain weeds.
5. Rs. 6,666 towards the cost of investigation of drought resisting high yielding strains of food crops, particularly *bajri*.
6. Rs. 6,666 towards the cost of investigations of the insect diseases of *jowar*.

These grants are of extreme value and have made possible several most important investigations, which could not otherwise have been undertaken.

41. In conclusion, I should like to record the hearty and unstinted work of the officers of the Department. The year was a difficult one, when expenditure had to be curtailed in many directions, but the loyalty of the men in charge of various divisions of the work has rendered it possible, in spite of this fact, for us to record a year of distinct progress towards the objects for which the Agricultural Department exists.

HAROLD H. MANN,

Director of Agriculture,  
Bombay Presidency, Poona.

November 3rd, 1923.



## APPENDIX A.

ANNUAL REPORT OF THE POONA AGRICULTURAL COLLEGE  
FOR THE YEAR ENDING JUNE 1923.

This is the fifteenth year of the existence of the College. No Bombay students have been excluded in favour of those outside the Presidency. The present rule is to admit men from outside the Presidency, only if there are vacancies left after all Bombay demands are met.

Plague started on the College estate in the third week of September 1922 and hence the College was closed at once. Several plague-infected rats were found on the estate and two deaths amongst the farm servants occurred. The opening of the second term was hence delayed till the 13th of November 1922, when sporadic plague was still going on in Poona. All the students and people on the College estate were inoculated and hence there was no further danger. Owing to the epidemic, teaching was hindered a great deal.

*Staff.*

Mr. J. B. Knight, M.Sc., Professor of Agriculture and Acting Principal, went on two years' leave from 16th May 1922. I worked as Acting Principal throughout the year except the month of April, when I was on leave. Mr. B. S. Patel, Professor of Agriculture, then acted as Principal.

Mr. G. B. Patwardhan, Assistant Professor of Botany, went on leave for four months from 1st June 1922 onwards. Mr. L. B. Kulkarni acted in his place.

Mr. B. N. Vakil left us on being relieved by Mr. G. S. Kulkarni, who returned from England on 1st October 1922, after completion of his studies there and resumed duty as Assistant Professor of Mycology.

Mr. S. L. Ajrekar, Plant Pathologist, left us in January 1923 to join the Educational Department as Professor of Botany, Gujarat College, Ahmedabad. He has now been transferred to the Royal College of Science, Bombay.

Messrs. D. L. Sahasrabudhe, R. S. Kasargode, J. P. Trivedi, G. S. Cheema and G. B. Patwardhan were on leave during the vacation. Their absence at this time did not interfere with the College work.

*Optionals.*

The Senior B.Ag. students (including Diploma students) elected optionals as follows :—

(a) Agricultural Economics, Land Development and Intensive Farming	..	..	..	37
(b) Advanced Botany	..	..	..	5
(c) Advanced Chemistry	..	..	..	4
(d) Stock breeding, Feeding and Management including Dairying	..	..	..	5
(e) Advanced Entomology	..	•	..	3

*Examinations.*

Of the forty-five candidates, who sat for the B.Ag. examination, thirty-eight passed.

Sixty-four students were sent up for the I.Ag. examination. Three of these passed with first class and forty-five with second class marks.

At the Final College Examination for the Diploma, five candidates were granted Diplomas. Two students appeared for the first year examination for the diploma and passed.

*Students.*

It has been the custom in the past to take a census of the College on June 30, that is, on the last day of the year under report and one month after the opening of the College Session. This is a convenient date, as by that time the population of the College has settled down. There are always a few changes thereafter, but for statistical purposes it would be difficult to find a more convenient date.

One would naturally conclude that when a man applies for admission to a college and sends in an admission form duly filled up, he means to attend that College. This perfectly reasonable supposition is, however, yearly falsified by our experience, and this year has created a record in the number of men who applied for admission, were formally admitted and then failed to come.

The position on June 30, 1923 was:—

Number of vacancies (in degree course)	..	75
Last year's first year failed men	..	16
New admissions	..	99
		<hr/>
Total therefore admitted	..	115

Of these the following did *not* join :

Last year's failed men	..	12
New admissions	..	42
		<hr/>
Total admitted but who did not join	..	54

Difference between admissions and number joining	..	61
Of these, after actually joining, the following left the College	..	8
Total left in the Class	..	53

(Of these, two men on account of special qualifications were transferred to the second year class).

By the time all information had been received from men who had been admitted and had not joined, it was too late, according to University Rules, to admit other men to take their vacant places. The University demands 70 attendances in each term.

In connection with these figures I would remark that this College is penalised by having to start so early as June 1, in order to make the most of the weather for agricultural operations. The Arts Colleges do not open till June 20 and it is not uncommon for men to come to us and then change over to the Arts Colleges when they find that they do not like our course. Such men are no loss, but the hardship lies in not being able to fill up the vacancies caused by these defections.

As to the men who never came at all, although they had signed admission forms, there is no doubt that some policy will have to be adopted whereby, without scaring away men, some money advance will be demanded as a security, to be forfeited if a candidate does not join, and without which there will be no registration. We have all along tried to avoid such advances, as they are difficult to collect and tend to prevent some men joining, but this year's experience leaves us no alternative.

There seems little doubt that some men, at least, fill up admission forms for more than one College and then at the last moment decide which they will attend. This has to be stopped. I should also mention that the majority of men who were admitted and did not join, did not take the trouble to inform me of their change of plans until they received telegrams from me. Even after this reminder several sent no reply.

#### *Short Course.*

This has been revived under a new form and a new name (Special Course). Men who wish one year's training mainly in practical agriculture with a small amount of training in all the allied sciences to enable them to grasp the principles underlying agricultural practice, are admitted to this course. Some of the work is done alongside students of other classes and some is done by themselves. For this course we admitted twelve men of whom seven failed to come. There are, therefore, now five in the class, including one Kumar from a State in Orissa.

#### *Post Graduate Students.*

Four men, graduates either of this or other Colleges, have been allowed to take up post-graduate study in special lines.

Details of all students for the last eight years appear below :—

Details of students.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.
(1) First year students ..	54	58	61	60	69	84	67	51
(2) Second year students ..	23	36	39	46	50	53	65	49
(3) Third year students ..	35	23	35	38	48	49	57	61
(4) Special one-year students ..	..	..	..	23	12	18	..	5
(5) Post-graduate students ..	3	7	2	3	4	6	5	4
Total ..	115	124	137	170	203	205	194	170

The statement below gives the localities from which our students are drawn :—

Locality.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.
Deccan and Khandesh ..	14	8	19	27	38	29	29	28
Southern Maratha Country and Konkan ..	44	50	42	49	52	53	56	46
Gujarat ..	29	36	36	43	40	38	34	33
Sind ..	9	9	7	7	6	7	2	6
Assam ..	1	1	1	3	1	1	1	3
Central India ..	3	1	3	..	4	2	2	3
Nizam's Dominions ..	4	6	6	8	7	6	4	5
South India and Ceylon ..	5	5	13	16	23	18	10	14
Burma ...	2	6	6	7	19	30	32	17
United Provinces ..	3	2	2	1	2	..	..	..
Berar ..	..	..	1	..	..	2	3	2
Bengal ..	..	..	1	4	7	8	6	2
Central Provinces ..	..	..	..	5	4	4	3	3
Nepal ..	..	..	..	..	..	1	1	1
Idar State ..	..	..	..	..	..	3	..	..
Madras ..	..	..	..	..	..	3	10	2
Ajmer ..	..	..	..	..	..	1	1	..
Udaipur ..	..	..	..	..	..	..	..	1
Travancore ..	..	..	..	..	..	..	..	1
Goa ..	..	..	..	..	..	..	..	3
Total ..	115	124	137	170	203	205	194	170

Classification of the students according to communities :—

—	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.
Brahmins ..	49	55	61	68	84	76	84	69
Marathas ..	4	4	6	16	20	21	21	15
Lingayats ..	3	2	2	1	5	10	7	4
Patidars (Gujarat) ..	4	10	13	12	7	5	4	7
Jains ..	..	..	..	8	4	1	2	2
Mahomedans ..	10	8	4	9	12	15	8	10
Farsis ..	15	12	7	5	5	2	3	4
Christians ..	1	..	..	7	18	21	20	14
Ceylon Students ..	..	..	..	6	7	2	2	..
Buddhists ..	..	..	..	7	9	16	17	12
Anavils (Surat)] ..	..	..	..	..	..	2	3	..
Others ..	29	33	44	33	34	34	23	33
Total ..	115	124	137	170	203	205	194	170

Further classification shows that out of 106 students from the Bombay Presidency (including Sind) 26 (or 24·5 per cent.) come from the four chief agricultural communities of the Presidency, viz., Marathas, and Lingayats in the South and Patidars and Anavils in the North.

#### *Courses.*

The main course is the three years' course open to students qualified according to the rules of the Bombay University.

The Principal may also admit a few other students to the course, and the successful candidates receive the College Diploma. The total number, 43, admitted in the last eight years bears the following proportion annually to the total number in the class :—

	Per cent.
1916—12 out of 54 equal to .. ..	22·2
1917—3 out of 58 equal to .. ..	5·1
1918—8 out of 51 equal to .. ..	13·1
1919—4 out of 60 equal to .. ..	6·6
1920—7 out of 89 equal to .. ..	7·8
1921—1 out of 84 equal to .. ..	1·2
1922—2 out of 67 equal to .. ..	2·9
1923—6 out of 53 equal to .. ..	11·3

As a rule students of the Presidency proper are not admitted under these special conditions.

#### *Scholarships.*

The allotment during the last eight years is as under :—

Locality.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.
Deccan .. ..	3	3	3	5	7	4	6	4
Southern Maratha Country.	5	7	2	4	4	2	6	3
Gujarat .. ..	2	3	6	3	1	2	2	5
Konkan .. ..	3	2	1	3	3	7	1	3

#### *Library.*

The Library now numbers 12,059 volumes, out of which 271 were added in 1922-23.

#### *Other Institutions.*

The other institutions mentioned in the report of 1920-21 continue to be used for the teaching of students.

#### *Employment Bureau.*

This College functions as an employment bureau for its graduates and has been able to put graduates and employers (whether Government or private) in touch with one another and thus secure employment for several useful men. It is hoped that this side of our activities will develop.

With regard to employment of passed men in the year 1922 the following is the amended statement. Those employed in 1923 up to date are also given below :—

Total Number—44—1922.		Total Number—38—1923.	
Agricultural Department,		Agricultural Department,	
Bombay .. .. .	4	Bombay .. .. .	3
Irrigation Department ..	1	Agricultural Department,	
		C. P. .. .. .	1
Private Farming .. .. .	8	State Service .. .. .	1
State Service .. .. .	8	Agricultural Department,	
		Burma .. .. .	8
Agricultural Department,		Not yet known .. .. .	25
Madras .. .. .	2		
Educational Department..	4		
Other Bodies .. .. .	3		
Not yet known .. .. .	14		
	<hr/>		<hr/>
Total .. .. .	44	Total .. .. .	38
	<hr/>		<hr/>

#### *College Gymkhana.*

This body continues to do excellent work. In the Inter-Collegiate Athletic Meeting of last year this College carried off several trophies and was runner-up for the Championship.

After much correspondence, the restoration of the playing field to its pre-war condition is now in progress. We have to thank Mr. Garland Craig of the Y.M.C.A., for his continued permission to use as a playing field the ground acquired by this Association.

The assistance of Mr. Garland Craig and Mr. Mane, Physical Instructor of the Y.M.C.A., in Poona, is also gratefully acknowledged for their help in organising games at the College. This applies especially to volley-ball, recreative games of the physical training type, and base-ball. This year we hope to start basket-ball and medicine-ball also. The great value of these group games which give the maximum of exercise to the maximum people in the minimum of space cannot be overestimated. The men enjoy these games thoroughly. As the games require no expensive outfit they are deservedly popular with all students. Men who do not play any other games are attracted by these group games.

The following cups have been presented to the College Gymkhana for competitions since last report :—

Cup given for tug-of-war by Mr. P. G. Dani, B.Ag., Superintendent of Modi Bag, in memory of his father.

Cup for tennis singles and two cups for tennis doubles presented by H. H. the Maharaja of Porbander. This generous donor also presented Rs. 500 for the improvement of the tennis courts.

Cup for runner-up of the College Championship, presented by Mr. Shaikh Mohiyuddin, B.Ag., Deputy Collector of the Panch Mahals.

The College platoon of the University Training Corps, during the Pashan Camp of the Corps in October 1922, carried off the Inter-Platoon Shooting Shield and one of our students won the prize for Battalion shot.

A Students' Botanical Society is the latest addition to the students' organisation of the College.

*College Veterinary Hospital.*

During the year under report the following processes have been increasingly employed with excellent results.

(1) Drenching cattle, horses, sheep and goat by nasal route by a single india-rubber tube.

(2) The new method of castration of the bovine male by Burdizzo's castrator.

(3) Gastro-intestinal lavage of the domestic animals with simple stomach.

The details of the working of the Public Veterinary Hospital for the year are noted below :—

Patients treated.	1920-21.	1921-22.	1922-23.	Remarks.
Total .. ..	2,045	2,419	2,714	
In-patients .. ..	515	614	400	
Patients treated on tour .. ..	162	176	69	
Out-patients .. ..	1,379	1,617	2,180	
Supplied with medicines .. ..	89	112	86	
Daily average attendance .. ..	39.49	41.67	39.25	
Do. In-patients .. ..	20.08	24.08	16.66	
Do. Out-patients .. ..	16.41	17.49	22.51	
Free patients .. ..	1,116	1,032	1,252	
Paid patients .. ..	929	1,099	1,278	
Agricultural animals .. ..	1,179	448	437	
Non-agricultural animals .. ..	866	1,603	815	
Castrations performed .. ..	69	99	63	Including caaponising.
Attendance on Rinderpest .. ..	40	10	6	
Do. Foot and Mouth .. ..	1	10	3	
Do. Black quarter .. ..	1	..	2	
Do. H. Septicæmia .. ..	..	1	..	
Do. on Glanders .. ..	..	1	..	
Do. on Epizootic Lymphangitis .. ..	..	1	..	
Do. on Fowl Cholera .. ..	..	1	..	
Do. on Pneumo-Pericarditis .. ..	..	1	..	
Inoculations performed .. ..	1,088	154	256	

(Signed) W. BURNS,  
Acting Principal.

Poona Agricultural College :  
Poona, July 19, 1923.

## APPENDIX B.

SUMMARY OF WORK DONE UNDER THE DEPUTY DIRECTOR OF  
AGRICULTURE, NORTH CENTRAL DIVISION, NASIK, 1922-23.*Staff and Organisation.*

(1) I have continued in charge of the North Central Division throughout the year under report. My permanent staff—as mentioned in paragraph 2 of last year's report—has remained unchanged. The transfer of a large section of the Agricultural Engineer's work, including boring, has increased my staff to the extent of a Mechanical Assistant and a Boring Overseer with their respective subordinate establishment. In addition, the commencement of the Vernacular Agricultural School at Dhulia, necessitated the appointment of a Head Master and Assistant Master for that Institution.

(2) The organisation of work in the Division was fully described in last year's report and during the past year, it has not been found necessary to make any radical change in that system of administration. It is noteworthy, however, that in both the sections "district work" and "Cotton," an ever-increasing amount of assistance from local non-official bodies in the Division is being received.

(3) The Divisional Board of Agriculture, N. C. D. (Nasik and Khandesh), which was established by Government last year, held four meetings during the year under report. It is gratifying to note that there was a hundred per cent. attendance at most of these meetings, and that very real and effective service was rendered by non-official members. The objects for which the Board was instituted, namely, the closer co-operation between the Co-operative and Agricultural Departments and the consequent increased ability of both to stimulate and assist local and non-official efforts at agricultural propaganda and improvement, are in a fair way to being realised. With simplified methods of procedure and with extended publicity, the potentiality of the Divisional Board as a real help to the cultivator will be greatly increased. Two new members, to represent the cotton trade and industry, have recently been appointed and have greatly strengthened the personnel of the Board. I give here the names of the members of the Divisional Board, N. C. D.

Deputy Director of Agriculture, N. C. D. (Chairman).

Assistant Registrar, Co-operative Societies, Bombay.

Assistant Registrar, Co-operative Societies, N. D., Surat.

Mr. B. R. Ransing—Dhulia, West Khandesh.

Mr. P. M. Bildikar—Pachora, East Khandesh.

Mr. S. B. Deshmukh—Pimpalner, West Khandesh.

Mr. A. V. Patil—Satana, Nasik.

Rao Saheb Rupchand Motiram, M.L.C.—Jalgaon, East Khandesh.

Rao Saheb Gulabchand Hiralal—Dhulia, West Khandesh.

(4) A Staff Conference was held at Nasik in April and was attended by all the senior members of the Department staff in the Division. The range of subjects was very comprehensive and included many matters of



great importance to the future development of the work of the Department in the Division. A manurial scheme, co-ordinating all manurial experiments in the Division, was drawn up, Committees were appointed to deal with the publication of a Divisional Agricultural Year-Book, and to investigate the means of reducing the book-keeping and clerical work of district officers and a definite policy of implement demonstrations was arranged. Apart from the actual results of the Conference, it was decidedly valuable as a means of interchange of ideas amongst the various members of the propaganda and expert staff working in different tracts of the Division.

#### *District Work.*

(5) During the year under report, the work of the District Agricultural Overseers in each district has, more or less, been confined to one or two talukas. This has been found necessary in order to minimise touring expenses and, in addition, talukas selected were those designed to come under the Taluka Development Association Scheme. Apart from these considerations, the policy of concentration of effort has met with much success. One of the most pleasing results, in the selected areas, is to be seen in the increase of non-official local interest and effort in the direction of agricultural improvement.

(6) *Experiments and Demonstrations.*—(a) *Khandesh.*—The manurial experiments on the cotton crop, designed to meet the shortage of farm yard manure were continued, and the use of castor cake in this connection is becoming widely popularised. During the last two years, the average increase in seed cotton per acre obtained from plots manured with 400 lbs. castor cake per acre amounts to 225 lbs. over unmanured plots. Owing to the peculiar distribution of the rainfall, the effect of good tillage on the outturn of cotton was very evident both on the Farms and on the plots arranged under the supervision of the Department. A manurial experiment on the irrigated wheat crop was arranged in four centres. One hundred and fifty pounds of sodium nitrate supplied by the Chilean Nitrate Company—was applied per acre. The manured plots gave an increased yield of 508 lbs. per acre on an average over the unmanured sodium nitrate, either applied alone, or in mixture with superphosphates, gave encouraging results on the chillie crop. Further investigation is however necessary. Good results have also been obtained this year through the application of mixed manures to onions.

The introduction of Akola *bajri* in place of the local variety in West Khandesh is extending and the increase in yield of grain obtained by growing the imported variety amounts to as much as fifty per cent. Potatoes were again tried, as a new crop, in both East and West Khandesh, but the season did not prove favourable for good yields. Demonstrations were held in connection with the successful experiments mentioned above, and were well attended by the cultivators. In addition numerous single object demonstrations of ploughing, chaff cutting, etc., were conducted by our staff and by the numerous Agricultural Associations in Khandesh. Over 100 villages were visited by the District Agricultural Overseers

and the advantages of Taluka Development Associations explained to a large number of people.

(7) (b) *Nasik*.—Ninety-nine experimental and demonstrational plots were laid down on cultivators' fields in Nasik district.

In the Girna Canal area, the acreage under sugarcane was 530 acres, as compared with 398 acres last year. Nearly half of this area is planted according to the wide planting system advocated by the Department. On the Kadwa Canal, the acreage of cane is 326 acres and would have been much greater, if the water supply had been larger. In both canal areas the use of sulphate of ammonia and castor cake as a manure for the cane crop is a general practice. These results are the outcome of experiment and demonstration by the Department in the cane growing tracts. Improvement has also been made in the system of cane cultivation on well and bandhara irrigation. A varietal test of sugarcane is being conducted at Kokangaon, Niphad taluka and useful information is being obtained.

The introduction of Akola bajri is now established and arrangements are being made for seed supply and extension.

Owing to the deficiency of *rab* material in Igatpuri taluka, the cultivation of the rice crop has been somewhat hindered. To remedy this trial was made of a dressing of 12 lbs. sulphate of ammonia per guntha of seed bed as a *rab* substitute. The results were very satisfactory and greatly appreciated by the cultivators. As an outcome of this, 100 cultivators in the taluka adopted this innovation and used 2,200 lbs. ammonium sulphate over an area of five acres of seed beds. Very much greater extension is anticipated next year.

Through the generosity of Mr. Jategaonkar of Belgaon, Nasik District, a five-acre plot under well irrigation has been placed free of all charge at the disposal of the Agricultural Department. This will be of great utility for experimental work in the Nasik District and a cropping scheme has been drawn up and put into effect.

Five large demonstrations were held in the district and numerous small ones of ploughs, sprayers, cane crushers, etc., brought these implements to the notice of the cultivators. Two demonstrations of *gul* preparation on the Poona furnace were well attended. The lack of Agricultural Associations in Nasik District makes the arranging and carrying out of such demonstrations more difficult to organize than in Khandesh.

(8) In concluding this part of the report, I may definitely say that, during the year, much advance has been made in building up local bodies upon the efforts of whom the success of such propaganda work depends. In order to reach the great majority of cultivators and to spread abroad information and education on agricultural matters, the work of the Agricultural Department must be supplemented by the willing efforts of private gentlemen, who are interested in improving the agriculture in their neighbourhood. Many such are forthcoming but still more are needed and I feel sure that, realising the vast improvements which can be effected, this help will be freely offered.

(9) *Implement and Seed Depôts.*—The Agricultural Department maintained ten Implement Depôts at selected centres in the Division and during the year under report and the receipts for hire of ploughs and other implements totalled Rs. 1,871-1-0. Last year's total was Rs. 1,551-10-0 and, 1918-19, Rs. 436-13-0; so it will be seen that much advance is being made in popularising new and improved implements amongst the cultivators. In addition, many Taluka Development Associations and Agricultural Associations in Khandesh possess a stock of implements of their own and hire ploughs, etc., out to their members at nominal rates. The officers of the Agricultural Department are always willing to give information and assistance to firms and private individuals who desire to take up this work as it is beyond dispute that the cheapest and most immediate means of agricultural improvement is to be found in thorough cultivation of the soil and good tillage, by means of improved agricultural implements. In addition, the scarcity of labour which is becoming more and more felt in the Division can only be met with the increased use of labour saving machinery.

(10) *Seed Manure and Implement Distribution.*—One of the principal services rendered to the public by the Agricultural Department consists of the supply of good seed, suitable manures and approved implements at reasonable rates to the cultivators. This branch of the work is extending very rapidly and it is pleasing to note that many private agencies are now taking part in it. In Nasik District, 232,580 lbs. of artificial manures to a value of Rs. 15,057 were distributed, with the co-operation of private agencies to the cultivators. In addition, two agencies in Malegaon Taluka have supplied agricultural material worth Rs. 12,000 to the sugarcane growers of that tract.

Excluding cotton seed, which is dealt with in a separate section, Nasik depôts supplied seeds to the value of Rs. 1,184-10-0. In the same district, the total value of implements, spares, etc., sold to cultivators amounted to Rs. 2,615-15-0, and Rs. 344-12-0, worth of insecticides, spraying materials were distributed on sale.

In Khandesh much of this work is undertaken by Development and Agricultural Associations but over Rs. 5,000 worth of agricultural material was supplied direct by the Agricultural Department.

(11) In many places throughout the Division, the cultivators are fully aware of the advantages to be gained by the use of good guaranteed seed, artificial manures and modern implements and in such places the demand for all those is acute. The necessity for demonstration and education in this respect has disappeared and instead the main requirement is co-operative organisation to facilitate supply. This fact is not being lost sight of as will be noticed from my report on the work and growth of Taluka Development Associations and Agricultural Associations in general.

(12) *Agricultural Association work.*—In last year's report, I mentioned the new scheme approved by Government, whereby it was hoped to utilize existing Agricultural Associations and create new ones to assist

in carrying on more intensive agricultural propaganda in the district with the taluka as a unit. The scheme was explained in several selected talukas in this Division and was received with enthusiasm.

In Khandesh, at the commencement of the year, there existed eleven Agricultural Associations more or less effective. Work was concentrated in five talukas and as a result, five Taluka Agricultural Development Associations have been formed, in Pachora, Jalgaon, Dhulia, Bhusawal and Raver Talukas. All of these have been recommended for registration by the Divisional Board, N. C. D., who scrutinize the applications. In Nasik District, an association was started in Satana (Baglan) Taluka and was also recommended for registration by the Board. Two of these Development Associations, Pachora and Jalgaon, have already received subsidies from Government.

All the Development Associations—and many of the Agricultural Associations—have engaged one or more fieldmen to carry on their work. Pachora Taluka Development Association employ an agricultural graduate and two fieldmen.

(13) As a result of this, agricultural propaganda and organization have received a great impetus in the Division, and much good work has been already completed.

Pachora Taluka Development Association have loaned Rs. 13,000 to members for land improvement schemes, have conducted 70 plough demonstrations and have laid down, with the assistance of the Department, numerous demonstration and experimental plots in the taluka. This body also distributed about 3½ lakh pounds of "N.R." cotton seed to its members. As may be imagined, the Association is proving a very active force in agricultural improvement in the taluka. In Jalgaon and Dhulia Talukas, much work has been undertaken by the Taluka Development Associations and their reports give very encouraging results.

Bhusawal and Raver Taluka Development Associations are of more recent origin, but they also have taken a large part in the propaganda for agricultural improvement in their respective areas. At a very nominal rate of hire, the abovementioned associations have collected almost Rs. 550 on account of plough hire among their members and have distributed on sale quantities of seed and manure.

The Agricultural Associations in other talukas have also contributed their share to the agricultural development of the Division and it is hoped will soon be able to assume the wider responsibilities and increased effectiveness of Taluka Development Associations.

(14) I may be permitted to mention here the necessity for enthusiasm and practical interest in the affairs of these Taluka Development Associations on the part of the officials and leading cultivators of the taluka. While Government is anxious and willing to act as god-father to these bodies, wherever and whenever they come into existence, it must not be forgotten that the real parental responsibility for their up-bringing and development rests with the local Managing Committee in charge of them.

(15) A very successful Conference of Taluka Development Associations was held at Pachora in June. Most of these bodies in the Division were represented and many matters of common interest discussed. It is hoped to make this meeting an annual one.

(16) *Special work*—(a) *Power Cane Crushing Plant at Sukene*.—At the request of Mr. Kondaji Patil of Sukene, the Department arranged the erection of a power cane crushing plant on his estate. The cost of preparing gul by the plant amounted to Rs. 3-5-4 per palla as compared with Rs. 4-5-0 per palla by the cattle-driven mill. Poona furnaces were also constructed. 812 pallas of gul were prepared and the quality was very good.

(b) *Demonstration Silo at Belgaum*.—This was again filled by the owner, 26,400 lbs. grass being put in at a cost of Rs. 92. 14,520 lbs. of ensilage was obtained.

(c) *Insect pests and Fungoid diseases*.—In addition to the supply of materials to combat insect pests and fungoid diseases, the district officers gave help and advice on this subject to many cultivators. Much trouble was reported on the wheat crop by rats and poisoning was undertaken.

(d) *Trial of Implements*.—Numerous trials of ploughs, etc., were conducted under varying conditions of soil, etc., in the district and reports submitted.

(e) *Miscellaneous work*.—The staff contributed many articles of agricultural interest to various magazines and newspapers.

#### *Farm Section.*

(17) In view of the fact that the claims of economy demand a certain amount of curtailment of this report, I do not propose to give a detailed account of the work which has been carried on during the past year on the Government Farms in my charge.

In accordance with the avowed policy of the Department, the experimental and demonstrational work, which used to form a large portion of the annual programme of the Farms, has now been transferred, under local and non-official direction, to the fields of the cultivators themselves. As a result, the Farms,—with certain definite exceptions—are utilized as centres, on which the work in the district is based. Their success will be judged, within limits, on the efficiency of their organisation and management as commercial concerns.

(18) *Jalgaon Farm*.—The principal object which Jalgaon Farm fulfils in the work of the Agricultural Department in this Division is the production of pure N. R. Cotton seed for distribution to registered seed growers, seed societies, Agricultural Development Associations, etc., and consequent extension in the district. In addition, the farm grows various other rotation crops on commercial lines, tests and reports on new implements and machinery, and conducts investigations into new systems of economic management, manuring, tillage, etc., before these are introduced into the districts.

*Cotton crop.*—During the year under report the sowing of the cotton crop was extremely late and was not completed till the 5th July. In this month, heavy rains hindered intercultural operations but every advantage was taken of fair intervals. A prolonged drought in August was not so damaging as might have been expected owing to careful tillage and the crop gave promise of a very good yield. However heavy rains in the middle of September, when the crop was in an advanced stage of growth, caused damage estimated at 25 per cent. of the outturn. Also more rain during November when the first picking was in progress, damaged the colour of the lint and caused irregular opening of the bolls. A good deal of loss was also caused by boll-worm but the effect of wilt disease was less than usual.

On the whole, the season, due to the peculiar distribution of the rainfall, was not a favourable one for the crop. The average yield per acre amounted to 485 lbs. seed cotton as compared with 666 lbs. in 1921-22. The total outturn of lint, amounting to 66 pallas, was sold by auction for Rs. 7,693-13-6.

As compared with 32,000 lbs. in 1921-22, the Farm supplied 25,708 lbs. of first class "N.R." seed to the Cotton Supervisor, for distribution this year.

*Other crops.*—The *kharif* crops of *jowar*, groundnut and *udid*, in spite of the vagaries of the season, did extremely well.

Fourteen acres of groundnut yielded an average outturn of dry pods per acre of 1,876 lbs., the average for the last five years being 1,198 lbs.

The *jowar* crop occupied 24 acres 19 gunthas and gave an average yield of 1,199 lbs. grain and 2,546 lbs. *kadbi* per acre. A six-acre block of the "Aispuri" *jowar* variety yielded per acre 1,647 lbs. of grain and 3,040 lbs. *kadbi*. This is a record for that crop on the farm.

The chief *rabi* crops, wheat, gram and coriander occupied acreages of 19 acres 17 gunthas, 3 acres 28 gunthas and 3 acres 29 gunthas respectively. The wheat crop was excellent and the average yield per acre of 1,247 lbs. grain and 1,644 lbs. *bhusa* was most satisfactory. On a four and half acre plot, the record yield for the farm of 1,448 lbs. grain was obtained. The gram crop followed maize and *sundhia* taken as a fodder crop in the *kharif* season. An excellent average yield of 938 lbs. gram per acre was harvested. Coriander yielded 539 lbs. average per acre.

*Implement Depôt.*—The farm implement depôt has fully maintained its popularity with the cultivators of East Khandesh District, and the stock available for hire cannot meet the demands. Twenty ploughs, including fourteen placed on the farm by Rao Saheb Rupchand Motiram, M.L.C., realised in hire charges up to the end of June, Rs. 657-2-0. In 1918-19 the receipts on this account were only Rs. 20-11-0 and last year Rs. 453-15-0 were taken.

Much of the credit for this work is due to the district workers who introduced these implements to the cultivators and who create the demand it is being found so difficult to satisfy. It is not easily understood why the makers and agents of agricultural implements, especially iron ploughs, neglect the opportunity of direct financial profit and advertisement which would undoubtedly result by their establishing such depôts in suitable centres in the districts. In addition to hire receipts, the Farm Depôts sold implements and spare parts valued at Rs. 4,570-1-3.

*Trial of Implements, Machinery, etc.*—For the third year in succession, the Wiard plough No. 124 was tested for uprooting groundnut and the results obtained confirm the previous opinion that it has no advantage over picking by hand. A winnowing machine constructed by Mr. G. V. Mistri of Dhulia was tested on the Farm and certain defects pointed out to the maker, who is having the necessary alterations made. When these are completed, the Winnower should prove useful in the districts. Several ploughs were put to a practical test on the Farm and reports and suggestions forwarded to the manufacturers.

*Experimental Work.*—Under this heading, may be included the manurial experiments conducted on the various crops of the farm. The trials of mahua cake *versus* castor cake as a manure for cotton have not yet reached a definite conclusion. Top-dressing with nitrate of soda on patches of the cotton crop where wilt disease appeared had no obvious results, but the experiment will be continued this year with varying quantities of the manure.

*Miscellaneous.*—The usual Farm Demonstration was held in October and was well attended. Over 600 visitors visited the Farm during the year under report. A scheme has been recently submitted to, and approved by, Government, whereby a post-graduate apprentice course in Farm Management will be commenced on Jalgaon Farm. About twenty requests for information as to the curriculum, prospects of employment after training etc., have been received, and it is anticipated that a selection of students for training will be made soon.

(19) *Dhulia Farm.*—Since the appointment of a Cotton Breeder for Khandesh and the opening of a Vernacular Agricultural School at Dhulia, the function of Dhulia farm has been changed and it is now intended to supply the following three requirements :—

- (1) Experimental station for the Cotton Breeder, Khandesh, for his scientific work on cotton or any other crop.
- (2) Area for the first stage multiplication of improved types of cotton produced by the Cotton Breeder.
- (3) Farm for practical training of boys attending Dhulia Vernacular Agricultural School.

The first of these has already been established and in a short time it is hoped that the work of the Cotton Breeder will be sufficiently far advanced to enable the work foreshadowed in the second requirement to be undertaken.

A commencement has also been made to utilise the Farm for the practice of the scholars attending Dhulia School and this function of the Farm is in course of being greatly developed. This report therefore will probably be the last dealing with Dhulia Farm in the accepted sense of a Government Farm and in future it will assume the dual role of a scientific station and an educational institution.

*Crops.*—The cotton crop occupied  $7\frac{1}{2}$  acres of the farm area, exclusive of the plot reserved for the Cotton Breeder.

As on Jalgaon Farm, improved tillage minimised the evil effects of the long drought in August and an average yield of 1,130 lbs. seed cotton per acre was obtained. This compares favourably with an average output per acre of 726 lbs. per acre last year. The lint fetched Rs. 120—126 per palla when disposed of.

*Bajri* (Akola) yielded 1,377 lbs. grain per acre. The drought affected the yields of the *til* and groundnut crops which were considerably lower than last year.

The farm orchard was continued during the year but it becomes more and more obvious that the situation and soil are not suited to successful fruit culture. Grape vines, figs, mangoes, and guavas were replaced by Mozambique oranges.

A number of Jamburi seedlings were raised and will be ready for budding next year.

In view of the fact that Rao Saheb Gulabchand Hiralal has offered suitable ground for a nursery near Dhulia, this type of work will be carried on there in future.

The *tarward* plots did not show strong growth and only one of them unpruned and manured with farm yard manure—was harvested. Seven and a half tolas of bark per plant was obtained.

*Implement Dépôt.*—The total amount received by sale of spare parts, etc., amounted to Rs. 1,795-9-0. Eighty-two iron mhôts were supplied to surrounding cultivators.

*Visitors.*—There were many visitors to the Farm during the year. The Honourable Mr. C. V. Mehta, Minister for Agriculture, paid a visit to the Farm in January 1923.

#### *Cotton Breeding Work.*

(20) The Cotton Breeder, Khandesh, continued his detailed study of these cotton types known hitherto as Bani-Comilla crosses which showed such promise last year. The object of his work was to determine the differentiating characters in each apparently pure strain of the hybrid plants and also to ascertain the gametic purity of the plants selected last year. Notes were taken on various botanical characters and on yield, ginning percentage and staple. As a result of this study, encouraging results have been obtained and the following note by the Secretary, Indian Cotton Committee, on samples submitted has been received.



" B XI 9 is much the best in staple and compares with Bardoli-Navsari cotton. B IV 50 is about equal to Dholleras. B XX 1 is rather better than B IV 50 and is second on the list. The above three cottons are staple cottons."

" B XX 27 is much shorter than the preceding three and is more of the Omras style but is still a nice soft cotton."

The strains of this cross have been reserved for future trials.

Six strains of "N.R." cotton, grown on Dhulia Farm, have been isolated and it is intended to make a detailed study of such of these as show extreme variation of a desirable nature. Also four strains of the constituents of the Khandesh cotton mixture known as "N.V." and two strains of that known as "N.V.M." are being further studied.

The future line of work lies in rigid selection and purification of the Bani Comilla crosses now available and the study of extreme variations of a desirable nature in *Neglectum* cottons, with a view to future crossing, if found necessary.

Some of the cottons, mentioned above, are being tried in the district on a small scale during the coming year in order to ascertain how they maintain their vigour of growth, etc., under different conditions of soil and rainfall.

#### *District Cotton Work.*

(21) The continued demand from Khandesh cotton growers for pure "N.R." seed has in no way diminished during the past year. On the other hand, owing to the adverse season, the supply available for distribution was considerably reduced.

*First class seed.*—During the year under report, the Jalgaon and Dhulia Farms together produced 27,500 lbs. of pure "N.R." seed for distribution. This is nearly 10,000 lbs. less than the production last year.

This first class seed was distributed to registered seed growers in Khandesh and Nasik (12,230 lbs.), Taluka Development Associations (9,400 lbs.), Registered seed growers of credit societies affiliated to Parola Guaranteeing Union (3,200 lbs.), and others (2,670 lbs.). It is gratifying to note that four Taluka Development Associations, as compared with two last year, have appointed their own registered seed growers and obtained first class seed from the farms.

The total amount of first class seed distributed is sufficient for 1,720 acres and, given a normal season, should provide second class seed for an area of about 30,000 acres next year.

*Second class seed.*—Last year first class seed sufficient for 1,531 acres was distributed to registered seed growers, seed unions and agricultural associations. During the present year, these agencies have produced 419,700 lbs. of second class seed for distribution sufficient for 26,230 acres. As a rule the Department engage to purchase all the seed grown by the registered seed growers but, as the grants for this purpose were inadequate, only 89,841 lbs. were purchased, stored, and resold. An equal

amount was disposed of through the agency of the Department acting as agent between the seed grower and purchaser and the remaining amount distributed by the seed growers direct. The seed unions and the agricultural associations disposed of their seed to their own members.

In the distribution of the second class seed, the policy of preferring to deal with co-operative bodies, such as agricultural associations, seed societies, co-operative credit societies, etc., has been adhered to. In this way, the further extension is facilitated.

In the past, the whole burden of the distribution and extension of N.R. seed has rested with the Agricultural Department and it has been found quite impossible on account of limited funds, etc., to make satisfactory progress. During the year under report an arrangement has been come to with the Dhulia Branch of the Co-operative Bank, whereby the Bank will purchase all the second-class seed produced by the registered seed growers of the department in West Khandesh, and distribute to its client co-operative bodies. The Bank also have under consideration a proposal made to them by me, that they should finance the purification and roguing of all or part of the cotton area grown by the institutions to whom they supply second class seed next year. The charges incurred would be recouped at the time of sale. Hitherto the Agricultural Department have been unable to control purity beyond the second generation, owing to lack of funds and staff. If the Bank accepts this proposal and it is found to work successfully, purity up to the third generation can be attained through the agency of similar co-operative institutions. This will mean a great advance in the extension of pure "N.R." cotton seed in Khandesh.

(22) In Navapur Taluka of West Khandesh district, Surat Selection No. 1 has given better returns than the local cotton. During the year, the Cotton Superintendent, Surat, has supplied 160,000 lbs. of selected seed to cultivators in this tract. Surat Selection No. 1 is also being extended into the western portion of Nandurbar taluka.

#### *General.*

(23) *Agricultural Education.*—During the year under report the proposal for the establishment of a Vernacular Agricultural School at Dhulia, made by West Khandesh Agricultural Association, was accepted by Government, and the school was opened by the Honourable Mr. C. V. Mehta, Minister for Agriculture, in January 1923.

Class room accommodation is provided free of charge in the King Edward Technical School, Dhulia, and practical training is given on the Dhulia Farm. A local committee was appointed to manage the board and lodging of the pupils and to collect subscriptions to defray these expenses from public bodies in the Division. The course of instruction covers two years and is largely practical.

As this is the first school of its type in the Division, initial difficulties have been met with but with increased experience, and, in particular with greater support from local bodies, agricultural associations, etc., the

school ought to make much progress next year. Increased facilities for practical training are being arranged and the type of education given should appeal strongly to the cultivating classes for whose benefit the school is maintained.

(24) *Boring work*.—It is too early to report intensively on this branch of the departmental work which has hitherto been in the charge of the Agricultural Engineer and was handed over to the Deputy Directors of Agriculture in February 1923.

Three machines have been allotted to this Division but, judging from the applications for bores received, this number should be considerably increased. Work done in the period under reports consisted of organising stores of tools, plant, etc., and in addition the following actual bores were made :—

Nasik District .. (1 Machine)—Five bores—Four successful and one incomplete.

Khandesh .. (2 Machines)—Two bores—both unsuccessful.

In Khandesh, the lack of success was due to the unfortunate breakdowns and to the great difficulty of obtaining coolly labour which caused much delay. It is essential that a set of fishing tools be supplied to this Division to enable the work to proceed without long and unavoidable stoppages. The three machines in the Division worked 96 days and bored 422 feet in all.

(25) The Mechanical Assistant, attached to this Division, commenced work in February 1923. He completed the erection of the cane crushing plant at Sukene and surveyed and reported on numerous river sites for the installation of pumping plants. In addition he paid visits to the Farms and attended to overhauls, repairs, etc., of machinery there.

(26) In conclusion, I would like to express my opinion that the work of agricultural improvement in this Division, has, during the past year, made much progress. The institution of the Divisional Board and the formation of Taluka Development Associations have aroused considerable local interest. The chief difficulty to be faced is lack of funds wherewith to extend work already in progress and to commence new operations. This difficulty may be minimised by co-operative effort and the Agricultural Department is paying particular attention to fostering such enterprises wherever the opportunity arises.

W. J. JENKINS,

Deputy Director of Agriculture,  
North Central Division, Nasik.

## APPENDIX C.

SUMMARY OF WORK DONE UNDER THE DEPUTY DIRECTOR OF  
AGRICULTURE, SOUTH CENTRAL DIVISION, POONA, FOR THE  
YEAR 1922-23.*Staff and Organisation.*

1. Rao Saheb M. L. Kulkarni continued acting as Deputy Director of Agriculture until the 1st of November 1922, and I resumed duty after my long absence on study leave in America, Japan and Java. There was no important change in the personnel since the last Annual Report was submitted.

*Sugarcane.*

2. *Situation of sugarcane industry.*—The sugarcane industry of the province (most of the cane is grown in the divisions for which I am responsible) is hit very hard. It was not unexpected; but due to the lack of experience and for want of timely warning the result was unavoidable. Moreover, in a country in which 90 per cent. of the population cannot read, people will not mind certain warnings. The Department of Agriculture has recently been insisting on diversification of crops on canals and on economic instead of excessive doses of manure without attracting much attention. On the other hand, a storm of criticism was raised especially on the question of using the moderate doses of concentrated manure to cane crop which we recommend.

The high prices of gul during the boom time permit the cane grower to apply heavy and costly doses of manure and to spend more on rent and labour. The boom also helped to increase the area, under cane on the canals from 15,210 acres in 1912-13 to 22,515 acres in 1920-21. The prices of gul rose between 1913-14 and 1921-22 from Rs. 17 or 18 to Rs. 40 and 45 per palla. Such a phenomenal rise has not occurred within the memory of man. The cultivators therefore went on with the increased expenses in anticipation of increased returns. The increased returns during the war and afterwards could be got only on account of the disturbed agricultural economy and the expectation of its continuance was not justified. The prices kept high up to July 1922 when they began to drop and went down to Rs. 20 per palla in the harvest season of the year under report (November 1922 and onwards). With the increased cost of cultivation it does not seem possible for the cultivator to make any labour income, much less any profit—if the prices go below Rs. 25 per palla. As a result of this, the cane farmer, especially on the canals, lost on the business during the year under report.

This has made the economic position acute and many have realized that it is not only the heaviest yield that controls profit, and that he has to revise his schemes according to circumstances. Many farmers have accordingly reduced the heavy doses of concentrated manures and are

now listening to the suggestions which are calculated to save labour and economise expenses.

3. *Propaganda work in Cane tracts.*—Through the Divisional Superintendent of Agriculture, Deccan Canals and his assistants, propaganda as well as experimental work was continued. The following is the short summary of the results :—

(a) *Deep Cultivation.*—For this work gallows and cockshut ploughs are found very useful. The depots of the Agricultural Department have stocked these ploughs. Some of the farmers have purchased these, but almost all now use some kind of turn wrest plough for opening their lands. In a test specially conducted the following results have been obtained :—

(a) Gallows plough 8,200 lbs. of *gul* per acre.

(b) C. T. plough 7,040 lbs. of *gul* per acre.

(b) *Wide Planting.*—Our recommendation is that cane should be planted at least three to four feet apart with a reduced seed rate (9,000 to 11,000 sets per acre). In most of the demonstration plots wide planting has given more *gul* than the check or local method plots.

(c) A *ridger* for making furrows (for wide planting) is coming fast in use. Through Messrs. Kirloskar Brothers a suitable ridger has been devised and supplied to the farmers.

(d) *Power crushing and improved furnaces.*—The work of the power crusher is demonstrated during the last five or six years, as a result of which over seventeen crushers are in use, by now, on the Godavari, Pravara and Nira Canals. The Mutha tract has so far three such crushers. As a result of our demonstration at Mr. Wadkar's farm near Poona, a demand for small power crusher is likely to increase. All those cultivators who own power crushers have adopted the multiple furnace which has been perfected by the undersigned with the help of Manjri Farm staff before some years.

(e) Use of Sulphate of Ammonia has become common now. The distribution of this manure at concession rates (in the year 1920-21) through the generosity of the Sir David Sassoon Fund is largely responsible for this rapid introduction.

(f) In the trial of selected and unselected sets the following outturns are got :—

Selected sets :— 9,520 lbs. *gul* per acre.

Unselected sets :— 8,200 lbs. *gul* per acre.

The increase is substantial and corroborates the view of the Java Planter who is very careful about his sets.

(g) *Study of Soil Conditions and Varieties of Sugarcane.*—“*Manjav*” and “*Red Mauritius*” varieties have been found to do better in water logged lands than the ordinary “*Pandia*.” It may

be noted that the good outturn of "Pundia" shown in the following table in a water logged area is due to the treatment advocated by the Department, *viz.*, light and occasional watering. It may further be noted that Pundia has given a larger number of canes though not as much *gul*. It is, therefore, likely that if a higher seed rate is given for Manjav, the yield of it may still be increased.

Trials to determine this will be undertaken.

Variety.	No. of canes.	Weight of canes in lbs.	Weight of Gul in lbs.	Remarks.
Manjav .. ..	22,400	112,400	12,240	In summer water level was within 1½ feet.
Pundia .. ..	24,600	106,600	12,000	

On good and dry lands (with the same seed rates) Pundia has been found to beat "Manjav." It is to be seen if a larger seed rate will help Manjav since the latter does not tiller much. It is found that Manjav does better than any other cane to fill in gaps as it is vigorous and makes up the growth rapidly.

A very interesting experiment was made by Mr. M. R. Uplekar of Baramati, in which he planted in July 1921 transplants of Pundia cane, in pits five feet apart. The soil was shallow and light, and the field being situated low received sub-soil percolation from the surrounding cane fields and from the canal. The crop had received per acre 30 cart-loads of Farm Yard Manure, 200 lbs. of Sulphate of Ammonia and 20 pallas of oil-cake. In the beginning the crop looked bushy and meagre, but it improved wonderfully after the rains of 1922. The average number of canes in each pit was 18 and the maximum 31. The crop stood for 18 months and was harvested in January 1923. The total weight of cane per acre was 83,998 lbs.

#### *Manjri Farm.*

4. This station was for many years under the control of the Professor of Agriculture but after the departure of Prof. J. B. Knight, M. Sc. on leave in May 1922, it was brought under the Deputy Director of Agriculture, S. C. D., Poona.

The work of the farm mainly consists of the study of manure and water requirements, cultural treatment, and trial of promising varieties of sugarcane. A separate report describing the experiments and interpreting results will be issued and hence important inferences only are recorded in this summary :—

- (a) The manurial experiments of previous years were continued. The phosphatic and potash manures even when given in adequate quantities (applied to the land before

sowing the preceding green manure crops of *sann*) again failed to show any advantage. The experiment has been repeated three times, and only once the complete manure gave higher tonnage. This is striking when it is noted that no farmyard manure or any oil-cakes or fish were applied to supply organic matter and nitrogen, but only *sann* green manure, with Sulphate of Ammonia as the only nitrogenous top-dressing.

- (b) *Gurhal* ash with its high potash content did however give promising results when oil-cake and fish were avoided, and only sulphate of ammonia was used as the top-dressing, and when *sann* green manure formed the only bulky manure used. This shows that if Sulphate of Ammonia be had cheaper per unit of Nitrogen than oil-cakes and fish, the farmer may advantageously apply *gurhal* ashes to the previous *kharif* crop. The three years' results show, on an average, an increase in the outturn of cane by as much as twenty per cent.
- (c) Experiments to see if the quantities of concentrated manure can be reduced below 150 lbs. of Nitrogen per acre, showed that by reduction from 150 lbs. Nitrogen to 100 lbs. Nitrogen per acre, a fall of as much as seven tons of cane per acre results in normal years like the one under report. A reduction up to 125 lbs. Nitrogen showed no decrease in outturn. The yield obtained in the cases of 150 lbs. and 125 lbs. Nitrogen was about the same, i.e., 44.5 tons per acre, while the 100 lbs. Nitrogen plot gave only 37.5 tons. The results indicate the necessity of caution in reducing manurial dressings. In the case of Baramati farm, tonnage and also the net profit have increased as the dose of Nitrogen in the top-dressing increased from 150, 200 and 250 lbs.
- (d) When trash is ploughed in as bulky manure, and if in the absence of late rains, the land is not watered after burying the trash, the cane crop grown on the land does not thrive well. This was clearly proved during the year, with a yield of only 25 tons of cane for this treatment as against the general average of about 40 tons per acre for *Pundia* cane on the farm. If trash is to be used, it should either be first rotted in a pit or the land given one irrigation after burying in the trash. In the case of farm yard manure tried at Baramati the tonnage increased with the increased dose but financially it did not pay.
- (e) *Reduction of seed rate.*—It seems possible to reduce the seed rate even upto 4,500 sets per acre with *Pundia* cane, provided great care is taken in selection and planting of sets as well as after-care and timely irrigation, etc. Early planting is essential to avoid the attacks of borer. The tonnage obtained in the

case of the 8,000, 6000, and 4,500 sets was 43·5, 45·3 and 47 tons respectively.

- (f) *Irrigation experiments.*—Irrigation experiments were planned to find out if cane is benefitted by irrigating it after it was earthed up, (a) on both sides of the cane row, or (b) on only one side and (c) whether it should be irrigated every turn (*i. e.*, once every ten days or every alternate turn, *i. e.*, (once in 20 days). The results are strongly in favour of irrigating cane, after earthing up, once every 10 days and on both sides (as is normally done). By increasing the interval to 20 days a loss was about 5 tons of cane per acre and by irrigating it on only one side the loss was 4·3 tons. The falls in yield are clearly due to reduced quantities of water applied.

A comparison of the water requirements of cane planted, according to the Manjri Method and the local method, showed that in the early stage of the crop, up to earthing up and at a time when the supply in the lake is limited, the former method required 24·36 acre inches. For the whole period of growth (12½ months) the Manjri method took 67·4 acre inches of water whereas the local method used up 75·61 acre inches (excluding 27·37 inches of rainfall in both cases). The experiment was carried for four years; two years being in favour of Manjri method and two in favour of local method. On the whole it can be said that if water can be controlled and given when required, about 12 per cent. of the water can be saved without detriment to the crop.

- (g) *Adsalya planting.*—Experience at Manjri corroborated by a trial by Mr. Upalekar at Baramati shows that if the whole of the area proposed could not be planted in time (say by February) the planting of the remaining area may better be delayed till the end of May and planted then as Adsalya to be crushed in November. Such a crop gets the advantages of two monsoons and gives heavy tonnage and generally better prices. One has however to note that a cultivator cannot accomplish planting of large areas of such crop, that he has to pay water charges for two years, and in the case land under the block system, his area is proportionately reduced. The heavy tonnage, better market and possibilities of spreading work, however, show opening for such modification of *Adsalya* cane.

- (h) *Trials of varieties.*—Amongst the early soft thick canes, "Red Sport", "D 109" and "Striped Mauritius" have continued to give good results. The first two look similar and have given 46·4 and 42·3 tons of cane respectively. The *gul* turned out was also hard and nice coloured.

Of the varieties tried since 1920 "White Transparent", "Waxy Red", "Java 100", "B 1528", "D 74" and "D 95" are very promising. These ripen in 11¼ to 11½ months.



Regarding hard canes some of the Coimbatore crosses might with advantage replace "Khadya" in the western parts of the Nasik District and in the Kolhapur State.

As regards the late (thick) canes last year's results at Kopergaon show that "Green Mauritius" and "Red Mauritius" which are said to rise in purity and tonnage till they are fifteen months old in their mother country, do not show increased purity. The tonnage increased but the cane gets very hard and the quality of *gul* suffers especially after the cane is fifteen months old.

#### *Baramati Farm.*

5. The study of water requirements (both as regards interval and quantity) and economic quantities of manure for cane is continued. It is found that in the Nira tract eight days' interval is advantageous in the early months of the cane crop, and that if the interval exceeds ten days there is a very material reduction in the yield. As regards actual quantity of water supplied, the yield increased with increased water up to an amount of 1.25 acre inches per annum, in addition to rainfall, when regular ten-day waterings were given. As regards manuring trials it is found that in the standard method the outturn and profit increase with the increase of nitrogen in top-dressing, while an increased quantity of farm yard manure with heavy doses of cakes in the local method has not given increased outturn. In the latter case, however, there are necessarily several variants, but it can be said that the practices (such as wide planting lower seed rate, and use of sulphate of ammonia with cake) in the standard method must have advantage over the local practice of close and thick planting and want of quick acting manures. In any case the standard method of cultivation developed at Manjri, has given a profit of nearly double that obtained by the local method at Baramati, on an equal outturn of cane the actual profits per acre being Rs. 534 in the former and Rs. 276 in the latter case.

#### *Kopergaon Farm.*

6. There are two sections of this farm namely (1) the fodder section which occupies 107 acres, and (2) the sugarcane section which occupies about 5 acres.

Fodder is raised and stored to help the farmer in times of scarcity and in that way the farm is serving a useful purpose. To grow fodder for storage in the heart of the sugarcane tract, where labour and manure is scarce, and water is costly, can hardly, however, be a paying proposition. The season for fodder growing was not favourable and the outturns per acre, in different seasons, were below normal, being about 3,894 lbs. of *kharif* and 2,724 lbs. of *rabi* fodder per acre.

*Sugarcane.*—The section is run more as demonstration and the outturn was good being 10,722 lbs. of *gul* per acre. Seven different varieties of

sugarcane were tried, "Red Sports" and "Manjav" stood first and second respectively. Last year "Manjav" was first. Further the local method of cultivation was compared with the standard and modified West Indies methods. The standard method plot gave 12,086 lbs. of *gul* per acre against 10,086 and 11,124 lbs. for the local and the modified West Indies methods respectively. Nitrate of soda with safflower cake has given better results as a top-dressing than sulphate of ammonia with safflower cake but this result is not in accordance with experience elsewhere in the Deccan. The trial will be repeated.

*Agricultural Organisation.*

7. *Divisional Board.*—This is the first year of the organisation of the Divisional Board, and its work being systematized. The following members constitute the Board:—

P. C. Patil, Esq., L.Ag., M.Sc., Deputy Director of Agriculture, Chairman.	
N. P. Bhagwat, Esq., M.A., LL.B., Assistant Registrar, Co-operative Societies, C. D., Poona.	
B. V. Jadhav, Esq., M.A., LL.B., M.L.C.	} Members nominated to represent Co-operative Societies.
R. M. Sane, Esq. ..	
Rao Bahadur G. K. Chitale, B.A., LL.B.	} Members nominated to represent agricultural interest.
M.L.C. V. N. Mutalik, B.A., LL.B. ..	

Four meetings were held and a good deal of business was transacted apart from the informal but useful discussions held. Apart from the meetings, considerable business was done by circulation of cases. The members have shown a fair amount of interest and it is hoped that they will do more in the coming years. The creation of this Board has added considerably to the administrative and office work of the Deputy Director of Agriculture and unless all the non-official members show more interest and make use of the Board, the advantages will not be commensurate with the trouble involved. Among other work the Board considered the constitutions of the Khed and Satara Taluka Associations and recommended a Government subsidy. Further it considered six applications for the registration of non-credit societies. Of these the Gul Sale Society for Poona tract, Potato Sale Society for Khed tract, Jowar Sale Society for Madha tract were prominent. Besides, there were some implement societies before the Board for consideration.

*Taluka Development Associations.*

8. (a) *Madha Taluka Agricultural Development Association.*—This was organised in March 1922. Membership during the year was 81. Out of the 38 Co-operative Societies in the taluka, 21 have joined the

Association. Government have given a subsidy of Rs. 1,000. During the year the Association held forty-five meetings in different villages of the taluka which were well-attended. At these meetings questions of agricultural interest were discussed and agricultural literature was read and explained. In addition to this, the Association tried to centre its activities on the following :—

- (1) Advantages of "Tals" in improving lands and conserving moisture.
- (2) Advantages of thin sowing in tracts like Madha where rainfall is very limited.
- (3) Dusting of chillies against Mirya disease and use of copper sulphate against smut of jowar.
- (4) Advantages of manuring sugarcane with cake and sulphate of ammonia.

The Association stocked "N. R." cotton seed and seeds of several kinds of vegetables and distributed among its members.

The Association is making good use of the Boring plant that is lent to the Madha Taluka Local Board.

The credit of the successful working of the Association is due to Mr. Bhutkar, the Agricultural Overseer lent by the Department and also to the President, Secretary and others closely connected with it. A passed Loni student is taken under training at the expenses of the Association who will soon relieve Mr. Bhutkar.

(b) *Khed Taluka Agricultural Development Association*.—This was organised in October 1922 and has at present about 247 members. Some of the Credit Societies also have joined the Association. An amount of Rs. 2,604-12-0 which was collected from the cultivation in Khed Taluka some years ago for holding an exhibition has been made over to the Association, and the Government subsidy has been paid. During the year the managing committee held ten meetings and 86 resolutions concerning the conduct of the Association were passed. The activities of the Association were centred on the following things :—

- (1) Formation of a Potato Sale Society : The work is progressing.
- (2) Distribution of manure of potato and onions.
- (3) Spraying the Potato crop against the *Mawa* and *Tambera* diseases.

In addition to the above, Mr. Gaikwad, the fieldman lent by the Agricultural Department, has brought to the notice of the cultivators several other matters pertaining to agriculture in his field talks. A passed Loni student is taken under training who will relieve Mr. Gaikwad.

(c) *Satara Taluka Agricultural Development Association*.—This was started in July 1922 and has 145 members for the present. The services of a trained fieldman from this Department have been lent to the Association for carrying on the propaganda in the taluka. Khan Bahadur Cooper, the President, is getting people interested. The activities of

the Association during the year under report were directed on the following main points among many others :—

- (1) Meetings were held at several villages and the advantages of the Association and of agricultural improvements were explained.
- (2) Implement demonstrations were given in several villages.
- (3) Freshly imported spanish peanut groundnut seed, as also Akola Bajri seed is distributed to the members.
- (4) The fieldman of the Association is bringing the value of methods of moisture preservation in soil to the notice of the members.

Preliminary work in starting a development association for Walva Taluka in Satara District is in hand.

9. *Co-operative Sale Societies.*—This work though very important has not made much progress in the past. Important though this work is, it is surrounded by so many local difficulties. With the help of the new assistant (the Agricultural Organiser) placed at the disposal of the Deputy Director of Agriculture, the situation of important industries is being studied and work of three pioneer societies, in three different staples, taken in hand and preliminaries carried out. The applications of these societies are sent for registration—

- (a) Gul Sale Society for Poona tract.
- (b) Potato Sale Society for Khed tract.
- (c) Jowar Sale Society for Madha and Mohol tract.

10. *Irrigation Societies*—(a) *Irrigators' Associations.*—The Irrigators' Associations for the Nira and Godavari Canals have maintained their activities. The Ekruk Tank Bagayatdars' Sangh has been started this year. These associations are formed by the Irrigators to ventilate their grievances.

(b) *Kolhar Irrigation Society.*—An Irrigators' Association is formed at Kolhar which is managing a distributary irrigating 93 acres of cane and 613 of other crops. It is carrying several other useful activities and is found very useful in pushing certain improvements in sugarcane cultivation.

(c) *Nangaon Pumping Society.*—Another society at Nangaon (Poona) is being formed with a view to manage the water lifted by Government Pumping Plant erected on Bhima River.

11. *Implement Societies.*—Four Implement Societies have been formed. Two of these are in the Satara District (Vangi and Vasi) and two in the Poona District (Talegaon-Dhamdhare and Ramwadi).

12. *Co-operative Farming Societies.*—One at Arjunsond (Sholapur) and one at Bhambora (Ahmednagar) are formed. The Deputy Director of Agriculture is not directly concerned with these though help is given when sought.

13. *Agricultural Engineering.*—Due to the devolution of the Agricultural Engineering section of the Department, the district work of the Agricultural Engineer including Boring is transferred to the Deputy Director of Agriculture. From the short experience of five months it can be said that it is a useful change, in the interest of the farmers, though it has added considerably to the administrative and office work of the Deputy Director. The staff lent, however, is not accustomed to serious and steady work.

In connection with boring it is found hard to secure carts from the applicants and even from the Mamlatdars when these have to be impressed for shifting the machines and necessarily several days work is lost. Moreover, except at Sholapur (city) concentrated work could not be got and hence shifting absorbs considerable time. It is also observed that of the number of enquiries only about half are finally registered with deposits. The experience of lending machines, wherever possible, to Taluka Local Board seems more advantageous. The machine lent to the Madha Tahuka Board is kept fairly busy. The following table shows the work of the Boring section done from 1st February 1923 to the end of June. It also shows the non-working days and the reasons for stoppage:—

Machine Number.	How utilized from 1st February 1923 to 30th June 1923.					Average work done per day.	Number of bores.			Number of feet bored.	Remarks.
	*Idle for want of				Working days.		Successful.	Unsuccessful.	In progress.		
	Coolies and carts.	Holidays.	Repairs.	Applications.							
17 Poona District.	38	11	..	28	93	4'-4"	1	1	1	295'-2"	
25 Satara District.	84	7	20	..	39	2'-8"	3	2	..	94'-5"	
8 Do.	74	9	24	..	43	6'-7"	2	1	..	291'	
28 Sholapur District	98	..	38	..	14	4'-4"	1	..	..	61'	
13 Sholapur with Madha Taluka Association	..	21	15	..	54	5'-8"	2	2	..	308'-6"	
..	..	..	..	..	243	..	9	6	1	1,050'-4"	

Difficulties are studied and attempts are made to overcome these and it is expected that better results can be achieved in future.

Regarding other mechanical works it has to be noted that for the most part both the mechanical assistants had to spend the major portion of their time at Manjri Farm in attending to the repairs of the power crusher which was not in a fit condition. Besides the work at Manjri and a few days work at Loni one assistant was working with Mr. Wadkar for 47 days as a driver of No. 44, Chattrnuga Mill which was hired to him. This work has made good impression on the farmers in the neighbourhood of Hadapsar. Besides two pumping sites were inspected and help was given to some of the farmers on Godawari Canal.

14. *Vernacular Agricultural School, Loni*.—In addition to the regular training of boys in the two classes five trained teachers were received for training as per Government Resolution. These teachers have now finished their course, and four new ones have been received. The resolution expects the Agricultural Department to coach these teachers in Agriculture and other subjects bearing on rural needs. Some of the subjects especially agricultural co-operation (including non-credit co-operation) is new and is just developing in this part of the country. To partly relieve the staff and also to equip them for this work, I take one hour a week when I go to inspect Manjri and Loni Farms. These lectures are attended by the teachers under training, the boys in the school as also the staff of the school.

There were 27 boys in the first and 22 in the second year, out of which 22 in the first and 22 in the second year passed. The following shows the castes of their parents:—

	1st year.	2nd year.
Marathas, Kunbis, etc. .. .. .	13	13
Brahmins .. .. .	12	4
Others .. .. .	2	5
Total .. .. .	27	22

Though the school is running for over 12 years and though the school is always nearly full, there is not much rush for admission. The reason seems to be more economic than the usefulness or otherwise of the training given. The holdings in this part are small and these do not afford enough scope for the trained farmer. The new experiment of introducing agriculture in primary schools, which holds great prospects will enhance the value of the schools of Loni type. In fact, Loni School has entered its additional and possibly its most useful field.

The following shows the value of produce grown, amounts remitted into the treasury, additional amount spent, total cost per boy, monthly cost of boarding per boy:—

Year.	Number of boarders.		Cost of produce grown on the farm.	Amount credited into Treasury.		Additional amount spent including pay of the establishment.	Cost per boy per year including pay of the establishment.	Boarding cost per boy per month.	Remarks.
	Boys average per year.	Teachers.		By the Head Master.	By the Director.				
1919-20 ..	33	..	Rs. 2,905	Rs. 966	Rs. 1,152	Rs. 14,915	Rs. 448	Rs. a. p. 17 0 0	
1920-21 ..	37.5	..	2,631	1,172	1,980	15,227.2	392	15 11 0	
1921-22 ..	44.6	..	2,794	940	1,892	16,121	359	13 6 0	
1922-23 ..	44.8	5	*4,077	1,389	2,086	14,706	340	12 1 6	

\* Subject to the Auditor's Verification.

15. *Distribution of Seeds, Implements and Manures.*—The following statement gives the details of the distribution of seeds, manures and implements, etc. :—

	Seeds.			Manures.		Implements.		Copper Sulphate packets.
	Quantity.	Rs.	a. p.	Quantity.	Value.	No.	Value.	
Sholapur ..	8,361	711	0 0	25,800	4,515	21	1,372	153
Satara ..	3,623	552	0 0	..	..	..	..	135
Nagar ..	27,931	3,977	0 0	..	..	201	11,171	150
Poona ..	111	172	0 0	5,150	504	9	270	169
Canal Tract ..	23,395	2,297	0 0	200,066	26,379	367	3,976	868
Total ..	63,421	7,709	0 0	231,016	31,398	598	16,789	1,505

The Noria or Bulsar *Rahat* is gaining popularity amongst the irrigators on the canal tract and the Divisional Superintendent has arranged for the supply of five such *Rahats*. The growing demand has encouraged the construction of such *Rahats* locally.

16. *Implement Depôts.*—The old depôts have done useful work of introducing iron implements, especially iron ploughs. The depôts supply spare parts also. When original work is done by the Agricultural Department, the Government Depôt is shifted to a new tract transferring the work either to Co-operative Society or to private enterprise. During the year under report, Depôt work at Shevgaon is taken over and largely expanded by Co-operative Implement Society at Shevgaon. The Agricultural Overseer, Ahmednagar, has managed this very tactfully. The total amount of hire charges collected during the year amounted to Rs. 3,047-12-9 chiefly in the Ahmednagar District.

	No.	
Canal tract	48	17. <i>Demonstration plots.</i> —For demonstrating the methods of proved value the marginally noted demonstration plots were laid out in the cultivators' fields. Large number of these plots were managed with the help of the members of the Kolhar Irrigation Society. The good results have attracted the attention of the people.
Sugarcanes ..	18	
Wheat ..	6	
Turmeric ..	10	
Other crops ..	14	
	48	
Poona District	6	
Nagar ..	29	
Satara ..	4	
Sholapur ..	4	

18. *Mohol plot.*—The work at Mohol was continued. The plot had yielded a good outturn of cotton last year, in spite of the long break in rains. The year under report was most unsuited for cotton. Monsoon broke late and rainfall was insufficient for sowing and good growth. There was very little rain fall in August, September and October and consequently hoeing could not help the crop much. Dry farming methods to be successful require a certain minimum rainfall, well distributed during the period of the growth of the crop and it is borne out by the evidence at Mohol. In the year 1921-22 though the rainfall was not

sufficient for cotton it was not as bad as in the year under report and so we could raise cotton last year successfully though other farmers failed. During the year under report all the case was of no avail.

The total rainfall of the year was 15·79 inches only : yet its distribution was comparatively better suited *rabi* crops and we could, with due care, get a better harvest of *jowar* than in the neighbourhood.

The following shows the comparative yields of plots under different treatments :—

Plot.	Cultivation.	Grain and Fodder per acre.	
		Grain.	Fodder.
1	Ploughed 4 times harrowed. 2 times hand hoed.	Lbs. 728	Lbs. 1,740
2	Unploughed 4 times harrowed. 2 times hand hoed.	650	1,680
3	Neighbourers' fields Harrowed. Hoed.	406	900

It will be seen that good cultivation of the farm has increased the outturn about 80 per cent. over the common cultivation of a neighbouring farmer. Ploughing, however, does not show sufficient increase to cover the cost of this operation.

19. *Demonstration and Shows.*—Twenty-seven small demonstrations were held during the year under report—twelve in Sholapur District, six in Satara, three in Poona, one in Ahmednagar, and five in Canal tracts. Of these Varur and Pandharpur were fairly large demonstrations. It is found that such small demonstrations are less costly and yet very useful. In the Central Provinces village meetings and field discussion are insisted upon. The district staff in South Central Division held field discussion but village meetings, except on occasions of demonstration, were rare. I am desiring the staff to hold such meetings in larger number when they are in the district. I personally had quite a large number of such discussion meetings.

20. *General.*—The usual district work is continued throughout the division. The increasing enquiries from the public and from the Government officials are promptly attended to. During the year under report several sugarcane mills were tested and number of articles contributed to the College Magazine and *Shetki and Shetkari* by the Deputy Director and his staff.

The staff has put in good year's work.

(Signed) P. PATIL,

Deputy Director of Agriculture,

Poona dated 27th August 1923.

S. C. D., Poona.



## APPENDIX D.

ADMINISTRATION REPORT AND SUMMARY OF WORK DONE BY THE  
DEPUTY DIRECTOR OF AGRICULTURE, SOUTHERN  
DIVISION, FOR THE YEAR 1922-23.*Staff and Organisation.*

1. Mr. Gilbert held charge of the office of the Deputy Director of Agriculture, S. D., till 16th May 1923 when he went on leave. I hence, assumed charge of this office only for the last few days of the year under report. The principle of organisation in sections each responsible through its head to the Deputy Director of Agriculture continued. Under retrenchment the post of the Divisional Superintendent was kept vacant from 1st September 1922. The strength of the District staff was however increased to a certain extent. Each District has during the year been under one Inspector responsible as a head of section to the Deputy Director of Agriculture. The Inspector of Agriculture, Dharwar District, has two fieldmen, one graduate working from the Haveri centre and the other non-graduate working from Gadag. The Inspector of Agriculture, Belgaum District, has also two fieldmen, one graduate with head-quarters at Chikodi and the other non-graduate at Bailhongal. The Inspector of Agriculture, Bijapur District, has one non-graduate fieldman with head-quarters station at Bagalkot. There was no material change in other sections.

2. The Boring staff and the Mechanical Assistant were transferred to the control of the Deputy Director of Agriculture from that of the Agricultural Engineer, Bombay Presidency, Poona, from 1st February 1923.

The Agricultural Organisers were also transferred to the control of the Deputy Director from that of the Assistant Registrar, Co-operative Societies, S. D., during the year under report.

On demand from the people, a separate officer for advice on the embankment of land was considered necessary and a graduate fieldman was selected from 1st September 1922 to study the subject and do this special work.

3. The Deputy Director was the Chairman of the Divisional Board the organisation of which was referred to in paragraph 3 of the last year's annual report through almost the whole of the year, and he conducted four ordinary quarterly meetings of that Board.

4. The work done by various sections will be summarised under the following heads :—(a) Experiments, (b) Propaganda, (c) Agricultural Education and (d) Miscellaneous.

*Experiments.*

5. Experiments were conducted mainly on Government farms—Dharwar, Gokak, Gadag, and Tegur, and a few in cultivators' fields.

6. *Dharwar Farm* is rising in importance mainly as a Plant Breeding station. The breeding work is steadily extending under Mr. Kottur and is becoming more useful to the public. In cotton, the cross between Dharwar No. 1 and Rosea which reached its fifth generation engaged his main attention. The results of his studies on the inheritance of some of the characters in this cross were submitted for publication. Up till the fourth generation, selection was based on three characters, *viz.*, high ginning, long staple and white colour. In the fifth generation the number of plants pure for all these three characters being found sufficiently large, 120 plants were selected specially for high yielding character. All these are derived from three plants of the second generation of the cross and seem to have a great future.

7. In previous years a small number of low ginning plants was traced in lines pure for high ginning. The cause of this discrepancy had not been found out. This year on detailed observations wilt was found to be the cause of it. On the same plant *Kapas* from affected branches gave a lower ginning percentage than that of healthy branches. Wilt seems to be a disturbing factor in the case of ginning percentage and further investigations on this point will be continued by Mr. Kottur.

8. *Wilt*.—The same plot which was infected last year was re-infected with wilt spores. Nine varieties were tried Kumpta, Dharwar No. 1, 2, 3, 4 and 5, *Wagale* (pure strain), *Bishur Jari* (not pure), *Rozi* (Nadiad) and a cross of Dharwar No. 1 and *Wagale*, and the number of plants attacked in each variety was counted. *Wagale* withstood the attack of wilt very remarkably, like last year. Dharwar No. 2 and Kumpta stood next but Kumpta fared better than Dharwar No. 2. This indicates that Kumpta cotton contains types which resist wilt better than Dharwar No. 2. Some resistant plants in Kumpta have been selected for further study. The susceptibility of Dharwar No. 1 cotton was proved. The first generation of the cross between Dharwar No. 1 and a pure wilt resistant strain of *Wagale* shows that resistance is dominant at least during the greater part of the growing period. Further observations will continue. The first generation of the cross between susceptible parents Dharwar No. 1 and Rosea has yielded plants more resistant than either parents. These will be tested further.

9. Observations on the cross between Gadag No. 1 and Sea Island Cottons continued. The Red Leaf Blight was very severe and many plants of the second generation of the cross succumbed to it.

10. Breeding work on *Jowar* consisted mainly in purification of some of the important varieties and selection in local varieties for yield, *Chavari*, *Nandyal*, *Bilichagan* (striga resistant) *Wagar Holgi*, *Gidgempu*, *Ranebennur*, *Fulgar white*, *Fulgar yellow*, *Handimasdi* (white grained) were pure and true to type. *Holgi* is an early variety and flowers at the end of September. If cut at this time it ratoons well and gives a good yield in the *Rabi* season. Selection for yield was done in *Fulgar yellow*, *Fulgar white* *Nandyal* and *Mahisal* varieties. In order to study the relation

between weight of grains and the length of rachis, measurements and weights of 500 individuals in Nandyal and Fulgar varieties have been recorded and the figures are being worked out.

11. A certain amount of selection in Local wheat was done on the basis of the number of spikelets per spike.

12. Other experiments conducted by Mr. Shevade, the Superintendent of the farm, were on crops, on manure, on cultures and on field embankments.

13. *Crop Experiments.*—Comparison between Dharwar No. 1 and Kumpta cotton was important. Dharwar No. 1 yielded less than Kumpta due to greater attack from wilt, but as it received better prices for *Kapas* fetched nearly the same net profit per acre. Dharwar No. 1 has a great future, if the wilt problem is solved. The attack of wilt is not so much in cultivators' fields as is on the farm and cultivation of Dharwar No. 1 is steadily extending. Comparison made between local and *Bansi* wheat is in favour of the former. The trial of Lucern as a dry crop for green fodder gave very encouraging results. 18,386 lbs. green fodder valuing Rs. 244 was obtained in six cuttings at a cost of Rs. 105 giving a net profit of Rs. 139 per acre. The trial of tobacco was encouraging and will be repeated during the next season.

14. *Manurial Experiments.*—Application of 10 tons farm yard manure per acre every second year to the *jowar* crop has given the best results and that of 15 tons per acre is found to be not paying. Crude night soil applied to a plot in 1914-15 at the rate of 20 tons per acre is still showing its effects on the *jowar* crop. Average results of the experiment of ploughing in farm yard manure versus spreading this manure conducted for the last eight years are in favour of spreading the manure.

15. *Cultural Experiments.*—Deep versus shallow tillage experiment in clean black land is in favour of the latter. Ditching is found to be better than ordinary ploughing once in two years. Experiments for eradicating *Striga lutea* were in progress and will take some time more before any recommendation can be made.

16. Dharwar farm besides conducting experiments continued to maintain an implement depôt and a workshop attached to it. In all, implements worth Rs. 3,096 were sold from the depôt. Mr. Shevade besides attending to farm duties continued to work as Secretary to the District Agricultural Association, Dharwar.

17. *Gokak Farm.*—Mr. Neginhal, the Superintendent of this farm, has worked mainly with a view to make the farm pay and conducted many useful experiments as well.

18. *Manurial Experiments.*—Artificial manure to the sugarcane crop was given with advantage in three doses instead of only once at the time of earthing up. Trash manure to the cane crop gave good results and needs recommendation to cultivators of cane in the Canal tract. Green manuring with gram in the Rabi season has given better results than that

with sunflower on the succeeding Maize crop. Ten tons of farm yard manure per acre to the Rabi Maize Crop was found to be more paying than the usual rate of  $7\frac{1}{2}$  tons per acre on the sandy soil of the Gokak Farm. Green manuring with *Sann* in the *Kharif* season was better than that with sunflower for the succeeding *Rabi Jowar* crop. Top-dressing paddy with oilcake manure at the rate of 10 to 20 lbs. Nitrogen per acre was found to be very paying and deserves recommendation to cultivators. Top-dressing turmeric with cake at the rate of 40 lbs. Nitrogen per acre in the form of oilcake, in addition to an ordinary dose of  $7\frac{1}{2}$  tons farm yard manure, has considerably increased the yield and net profits. Contrary to the experience on Dharwar farm, ploughing in farm yard manure has given better results than spreading this manure on the surface.

19. *Crop Experiments.*—In the trial of cane varieties, yellow Mauritius has attracted attention. It gives better germination than others in sticky and *Karl* soils. It is less attacked by borers, is more drought resistant than Pundia and its *gul* is better than that of Red Mauritius, and as good as that of Pundia. This variety has scope in sticky and *Karl* soils in the Gokak Canal tract. Dharwar No. 5 cotton has given better results than Dharwar No. 3 and its cultivation is likely to extend in the tract. Seed has been preserved for extensive trials in cultivators' fields.

20. The garden on Gokak farm has now become a paying concern. The method of slow irrigation and the concrete channel referred in the last year's annual report were prominent features in orchard management. The alkali land on the farm has considerably improved and has produced good crops of paddy and cotton.

21. Besides field experiments the farm undertook experiments on storage of *gul* and on methods of killing pigs and jackals. Maize silage was prepared after removing cobs with great profit. Six hundred bags of cake manure was sold from the farm depôt to the cultivators of the canal tract. The total sale proceeds of the depôt have gone to Rs. 5,100 which reflects credit to the farm.

22. *Gadag Farm.*—Experiments on the Gadag farm totally failed owing to failure of rains and there is nothing worth recording.

23. *Tegur Farm.*—The herd of cattle is now well established. The progeny of the new bull is better than that of the previous ones. All cross-bred bullocks have fetched a better price than country ones.

A good quantity of fodder was grown in *Kharif* season at a cheap cost. It is hoped that Tegur farm will soon be in a position to demonstrate the advantages of mixed farming in the *Mallad* tract where lands are lying waste.

Observations on grasses and methods of hay and silo making continued. The disease *Strongylus contortus* was traced by the Veterinary Assistant and all precautionary measures were adopted. Treatment with copper sulphate was found very valuable for keeping up the condition of cattle and for preventing the spread of the disease.

Sheep maintained on the farm did also fairly well but the number is too small to make the concern pay.

24. A Rice breeding station was established at Mugad at the close of the year under report. Many sites were inspected in different places and one was finally selected at Mugad, where important series of experiments in rice selection for the *Mallad* tract have been established.

25. *Experiments in cultivators' fields.*—The district staff conducted a number of experiments with bone meal and oilcake manure to the paddy crop, and oilcake and sulphate of ammonia to the sugarcane crop. The use of bone meal for the paddy crop is extending round Khanapur, and of oilcake and sulphate of ammonia for the sugarcane crop in the Gokak Canal tract and in Chikodi and Hukeri talukas of the Belgaum District. Trial of early varieties of groundnut was undertaken in three new places in the Belgaum District and in four in the Dharwar District. Cultivation of the Spanish peanut variety is largely extending in the Haveri taluka of the Dharwar District. *Bansi* wheat was compared with local in three places. Results at Aminbhavi in Dharwar District were good but elsewhere the crop suffered from want of rain. Trial of turmeric at Devi-hosur in garden land gave very encouraging yields and its cultivation is likely to extend in cocoanut gardens situated in the belt running from Hangal to Haveri in the Dharwar District.

#### *Propaganda.*

26. *Demonstrations.*—In all thirty demonstrations were conducted in Dharwar, forty in Belgaum and eight in Bijapur. Most of them were of improved implements, notably of iron ploughs, wheat-threshers, and the stone roller for threshing. A few were of cane crushing with the *Nahan* mill and *gul*-making on the Poona furnace and others were of standing crops in experimental plots in cultivators' fields above referred to. Many of the demonstrations were arranged in co-operative Union centres and along with co-operative conferences. Ploughing competitions were held in three places in Belgaum, two in Dharwar and one in Bijapur District. All demonstrations were followed by lectures on useful subjects and many included steeping *jowar* seed in copper sulphate solution. Exhibitions of agricultural produce were arranged along with Aminbhavi and Alur Co-operative conferences and with a Cattle Show at Aminbhavi.

27. A training class was arranged on Dharwar farm for Secretaries and members of the non-credit agricultural societies. A series of lectures on different subjects were given to them, and ploughing and handling of various other implements were also taught to them.

28. *Distribution of improved implements, manure and seed to cultivators.*—As a result of our experiments and demonstrations in cultivators' fields, the demand for improved implements (chiefly iron ploughs and *Nahan* mills), bone meal, cake manure and sulphate of ammonia is steadily increasing. After the close of the Belgaum depôt the Union Agency has captured the market for sulphate of Ammonia and Messrs. Gavade and

Shirgaonkar for Nahan mills. The Inspector of Agriculture, Belgaum, reports that Messrs. Gavade and Shirgaonkar sold 30 Nahan mills and that the total sales of implements and manures by these two private firms reached to Rs. 25,000 during the year. I have already stated in paragraph 23 that Gokak farm sold 600 bags of cake manure. Many local middlemen deal in this cake manure and bone meal. The business of hiring out iron ploughs is mainly taken up by Associations and Co-operative societies in the Dharwar and Belgaum districts and by middlemen in the Bijapur District. A new Government depôt was started at Bailhongal at the demand of the people, and the total sales of iron ploughs have reached to Rs. 1,048. The next step under contemplation is to start there a co-operative society during the next season. The Keatinge Implement depôt at Devi-hosur is doing very good work.

29. *Associations, Non-credit agricultural societies and Taluka Development Associations.*—Among old associations Dharwar District Agricultural Association continued to do good work of hiring out iron ploughs, and its Magazine is running but needs improvement. The Association completed its new building and got it opened by Dr. Mann, the Director of Agriculture, Bombay Presidency, Poona, with a Mango Show arranged inside the building. The Athani Taluka Association also did good work of hiring out iron ploughs and has undertaken boring work by purchasing a machine. This body has applied for registration under the Co-operative Act, and has changed its name to Taluka Development Association. Saundatti and Benadi Associations newly started for hiring out iron ploughs are steadily extending their business. All other old associations have remained inactive.

30. Co-operative non-credit agricultural societies started for supply of improved implements, seed and manure and for hiring out iron ploughs are in general slowly but steadily increasing their business. There are 37 such societies in all in Southern Division, 10 Implement, 20 seed and implement, 5 seed and 2 Manure societies. Among these, Hosriti seed and Implement society, Devi-hosur seed society and Belladbage-wadi Manure society are doing very good work. Others are yet slow in their progress but Mr. Patil, the Agricultural Organiser, reports fair and good hopes for many. Success of these societies, I think, largely depends upon educating the minds of cultivators to forecast their indents; otherwise the middleman has always his place and part to play. Now that the whole district staff will be in touch with these societies each in his own area, it is hoped that they will be able to improve them to a considerable extent. It is desirable that all business bodies be registered under the Co-operative Act, and attempts will be made to convert all small working old associations referred to in the above paragraph into co-operative bodies and to get them registered.

31. *Taluka Development Associations.*—The organisation of these associations was planned by Government and notified in the Press Note No. 2962, dated 21st October 1921, Revenue Department, and they have been started in the Dharwar, Gadag and Ron talukas of the Dharwar

district, Athani, Chikodi and Gokak talukas of the Belgaum District, and Indi Taluka of the Bijapur District. The District staff was busy in surveying the local agricultural needs of these talukas and preparing programmes of their work and budgets. Associations have approached the Director of Agriculture for Government subsidy and all except Gadag have approached the Registrar for their registration under the Co-operative Act. Dharwar, Gadag and Ron got their subsidy and commenced their work during the year. Dharwar Taluka Development Association did good work. Four ploughing and four steeping demonstrations were conducted in different centres. Boring work was undertaken. Intensive propaganda on steeping *jowar* seed was done in the area of the Aminbhavi Union. An Educational society at Garag and Mango cultivation society at Aminbhavi are being worked. Other associations have just appointed their fieldmen and commenced their work.

32. *Organisation and campaign against wild pigs.*—The villages in the *mallad* bordering the forest area suffer much from the attack of wild pigs to their crops so much so that the very existence of the people is being threatened out. No attempts to introduce agricultural improvements are likely to be successful there without organisation to fight out the pig.

Personally much of my attention was devoted to this subject. Four new co-operative fencing societies were organised in the Kalghatgi Taluka, and walls of the type of that already built at Mandihal but of bigger dimensions (3 feet at the bottom  $1\frac{1}{2}$  feet at the top and 5 feet tall) are being built. In three villages construction is nearly completed and in the fourth it is fast in progress. Attempts to induce all the people of a village without exception to join the scheme, fixing the exact line of fence to suit all, but to run as straight as possible and the question of dividing the estimated cost of fence among the members, took a great deal of my time and energy in organising these schemes. The estimated benefits of these schemes are immense but only experience will tell us how much will actually be realised. Many such schemes are under contemplation in Kalghatgi Taluka. Some western villages of Mundargi Petha also suffer much from the attack of wild pigs. There prickly pear has become the abode of pigs. A site at Tambargundi was cleaned of its pear growth during the year through an unregistered co-operative organisation, at nominal cost to individual cultivators but with great benefit to them. Mr. V. H. Naik, the Deputy Collector of that Division, took interest in the scheme and has helped it with a tagavi loan from Government. A campaign for removal of prickly pear from the whole of Mundargi Petha is under consideration and is being worked out, and this work against pig has been largely appreciated by the cultivating public.

33. *Organisation for steeping jowar seed.* in copper sulphate solution against smut through officers of the Revenue Department was planned in obedience to Government Resolution No. 6799, dated 19th February 1923, and demonstrations were held in all taluka centres by the District

staff. 29,000 copper sulphate packets in Dharwar District, 18,500 in Belgaum District and 12,000 in Bijapur District have been distributed. Further propaganda is in progress.

34. *Cotton work.*—Extensive trials of Dharwar No. 1 Cotton seed against Kumpta in nine places and Gadag No. 1 cotton seed against Dharwar-American ordinary in three places were undertaken. Results are on the whole in favour of the introduced improved types. Mr. Dharwarkar, the Cotton Superintendent, with the aid of his staff distributed farm seed as usual to seed-growers and controlled an area of 5,618 acres under Dharwar No. 1 and 7,136 acres under Gadag No. 1 cottons to raise seeds for general distribution. The total area under pure seed of known origin of the two introduced varieties estimated by the seed distribution done by sale societies and the Savanur centre was 38,980 acres under Dharwar No. 1 and 45,456 acres under Gadag No. 1.

Crop demonstrations were held in different centres and good propaganda was done through cotton staff and seed organiser to induce cultivators to sell their *kapas* through sale societies. Rao Saheb Shirhatti, Secretary of the Hubli Cotton Sale Society, undertook with the aid of our Cotton staff propaganda during the year in favour of clean picking of *kapas*, and worked hard on it. The propaganda was much hampered by unusual rains in March but has left a good impression on the minds of the cultivators. A good deal of cotton was picked clean, and prizes were awarded by the Hubli Cotton Sale Society, in whose auctions it received exceptional prizes.

The business done by various co-operative cotton sale societies runs as under :—

Name of society.	Number of dokras sold.	Value of cotton sold.
		Rs.
Hubli .. .. .	9,949	7,40,000
Gadag .. .. .	6,379	4,98,000
Bailhongal .. .. .	2,000	1,45,000
Dharwar .. .. .	1,030	72,000
Haveri .. .. .	810	58,000
Bagalkot .. .. .	215	15,000
Annigeri .. .. .	400	28,000

Hubli Society mostly dealt with Dharwar No. 1 cotton, and Gadag with Gadag No. 1. Other Sale societies sold mostly Kumpta Ordinary. In all twelve auction sales were held and grading work was done under the supervision of the cotton staff. On an average Dharwar No. 1 fetched Rs. 18 more per *naga* than ordinary kumpta, and Gadag No. 1 Rs. 40 more than Dharwar-American ordinary. The Cotton Superintendent estimates that an extra profit of Rs. 1,22,281 was realised from these auction sales. The success of auction sales largely depends upon improved types of cotton and it is mainly why in other centres than Hubli and Gadag the business is small. For general distribution during the



coming season the Hubli sale society has stocked 534,180 lbs. of Dharwar No. 1 seed at Hubli and the District Agricultural Association, Dharwar, has stored 120,000 lbs. at Savanur. The total quantity will suffice for 70,000 acres, nearly double the area that was sown during the year under report. The Gadag cotton sale society has stocked 363,793 lbs. of Gadag No. 1 cotton seed, almost equal to that stored during last season.

Mr. Shetti concentrated his attention mainly on the improvement of the Bailhongal Cotton Sale Society which met opposition from dalals and on the Haveri Sale Society which was newly started during the year under report.

35. *Other important Sale Societies.*—A Chillie Sale Society at Byadgi sold 4,858 maunds (of 80 lbs. each) of chillies worth Rs. 39,357. It is reported to have done good business but failed to follow some co-operative principles. A Tobacco Sale Society was started at Nippani and it has just commenced its operations. A Betel-leaf Sale Society at Hattimattur is being worked out.

36. *Cattle Breeding Societies.*—They are twelve in the Division, six in the *Mallad*, two on the bank of the river Krishna and four in the dry tract of Mundargi Petha along the Kappat Hills. The societies in Mundargi Petha have suspended their work owing to failure of rains while the rest are reported to be working fairly well. Good cultivators have appreciated the introduction of the Mysore strain of cattle, but management in societies is not yet very satisfactory. The necessity of castrating mongrels is not realised by the members. Mr. Tivari, the Organiser for the Cattle Breeding societies, has received applications for more societies but is asked to concentrate on improving the condition of those existing at present.

37. *Boring work.*—In all 18 bores were taken in the Division ; the following are the details :—

Name of district.	Successful.	Failure.	Rejected at owner's request.	Incomplete.	Total.
Dharwar .. ..	10	..	2	1	13
Belgaum .. ..	2	1	..	1	4
Bijapur .. ..	..	1	..	..	1
	12	2	2	2	18

Ten out of 18 bores were purely for agricultural purpose. The work was more or less stopped during rains. Out of 5 machines only 3 worked during the year. The total receipts amounted to Rs. 4,176 whereas the expenses came to Rs. 3,352. The number of applications for boring is increasing, but it is not possible with the present number of machines to cope with the

demand. It was suggested during the year that Local Boards should get men trained to work their machines. The Taluka Local Boards, Navalgund and Shiggaon, sent their men for training. A mechanic has been lent to the Athani agricultural association. Gadag and Hubli Taluka Local Board Machines were worked for a time under the supervision of Mr. Modak, the Boring Assistant, and their men were trained.

38. *Field Embankments.*—The special officer Mr. R. B. Mutalik-desai spent much of his time in studying the subject. He has prepared nine plans in the Dharwar District and nine in the Bijapur District. Execution of two of these schemes has been undertaken and that of the rest will begin after the rains. Some plans largely deal with prevention of surface erosion and conservation of moisture, while others offer problems of controlling fairly large nallas with a view to accumulate silt.

#### *Agricultural Education.*

39. The Vernacular Agricultural School at Devi-hosur continued to prosper under Mr. R. Y. Hulkoti, its Head Master. 22 students were on the roll, but one left in the middle of the second term. Applicants for admission were many, but rigorous selection was made with a view towards efficiency. A small laboratory is newly equipped and the elementary principles of some mechanical appliances which the cultivator is often required to deal with, are taught. Theory portions are commonly dealt with in class rooms for three hours between 12 a.m. and 3 p.m., while at other time of the day the students are made to work in fields with practical lessons on each operation. Each student is given fair practice in the workshop just sufficient to remove his dependence on the local carpenter or smith for petty repairs. He utilises his spare time in weaving and rope-making. Thus the students are practically busy in one or other works useful to them in their after life. During the year under review nine out of ten boys in the first year and eight out of eleven boys in the 2nd year have passed. The cost of educating a boy at the school came to Rs. 40 per mensem which is high indeed. This is because great many of the subjects which can be taught at a greatly reduced cost at the primary schools with slight additional training to the teachers there, are taught here by highly paid officers. The introduction of the proposed agricultural course into rural primary schools which is now being thought over will solve this problem.

#### *Miscellaneous work.*

40. Demand for fruit trees and for advice in fruit growing was large but could not be adequately met. Eight hundred mango grafts were ordered from Ratnagiri and distributed mainly round Dharwar. The Inspector of Agriculture, Belgaum, attended to renovation of ten dwindling gardens. The cultivators of the Southern Division know well how to grow crops, but are generally wanting in the knowledge of fruit growing. Here is the real field for work. A nursery and a trained mali are bad needs of the Division.

41. Enclosure against pig in the *mallad* and embanking against surface erosion which are the real needs of the cultivators in Southern Division have now been extensively taken up. The Registrar, Co-operative Societies, Bombay Presidency, kindly arranged to advance adequate loans to fencing societies and to individuals for embanking. He has ruled that applications for loans over Rs. 1,000 should be recommended by the Deputy Director. Most of the applications from individuals come from the Gadag division of the Dharwar District and the District Agricultural Overseer, Gadag, was very busy in inspecting fields of applicants and making designs and estimates. Common embanking schemes are difficult to be worked out but a few are under contemplation.

42. The duties of District Agricultural Overseers have now been so multifarious that each badly needs a *kamgar* under him for field work. I firmly believe that money spent on *kamgars* is well spent. Cultivators are slow to adopt improvements and *kamgars* selected from among them will play an important part in bringing out the desired progress. He will actually work with cultivators and get the advice of the Overseer acted upon.

(Signed) S. S. SALIMATH,  
Acting Deputy Director of Agriculture,  
Southern Division, Dharwar.

## APPENDIX E.

## SUMMARY OF WORK DONE BY THE DEPUTY DIRECTOR OF AGRICULTURE, GUJARAT DIVISION, FOR THE YEAR 1922-23.

*I. Staff.*

I was in charge of the Division throughout the year.

2. The organisation of the subordinate staff was the same as reported last year on page 42 of the Department's Report for 1921-22, except that there was no temporary Cotton Establishment and that the Boring Staff was added to this Division, owing to its transfer from the control of the Agricultural Engineer, B. P., Poona, from 1st February 1923.

3. An important feature during the year was the formation of the Gujarat Divisional Board representing the Agricultural and Co-operative Departments and including a majority of non-official members to control the propaganda work of both the Departments above referred to in the Division. By the introduction of this new scheme it is hoped to enable the local bodies to do much more active work for developing their local areas. For pushing on agricultural co-operative propaganda work the services of the Agricultural Organiser, Co-operative Societies, N. D., have also been placed from 1st November 1922 under my executive control.

*II. Experimental and Research Work.*

4. *Cotton Breeding at Surat and Broach.*—As decided last year, only the pure strain of cotton named 1027 A. L. F. was sown all over the cotton area of the Surat farm, and the resulting seed was distributed in the Athwa Group in the season for 1923-24. A comparative trial of this strain with the local cotton gives the following results :—

Variety.	Yield in lbs. per acre.	Ginning percentage.	Length of fibre centimeters.
Surti Local .. ..	570	35.1	2.2
1027 A. L. F. .. ..	613	37.0	2.8

The Millowners' Association, Bombay, reported the value of the improved cotton at Rs. 75 per *Khandi* more than the ordinary Surat cotton. This is satisfactory, but with a view to obtain better strains of cotton, the work on crosses mentioned in paragraph 6 of the last year's Annual Report was continued, and the results are exceedingly promising.

5. Preliminary observations were made by Mr. M. L. Patel, Cotton Breeder, South Gujarat, on the causes of shedding of flower buds and young

bolts. But the matter is so complicated and yet so important that the continuation of this work will be placed in future in the hands of special staff, the cost of the whole investigation being provided by the Indian Central Cotton Committee.

6. Certain selections of cotton made at Surat and considered suitable north of the Narbada were again tested at Broach during the year. The best of these (Cylindrical Boll I) gave the following results :—

Variety.	Yield in lbs. per acre.	Ginning percentage.	Length of staple centimeters.
Broach Deshi (Pure) .. ..	428	37·8	2·14
Cylindrical Boll I A. .. ..	461	37·0	2·4

The Cotton was valued by the Millowners' Association, Bombay, at Rs. 30 per *Khandi* more than ordinary pure Broach *deshi* cotton. The seed obtained at the Broach Farm from this during the year, about 2,260 lbs., was distributed to selected cultivators of the Broach District.

7. *Cotton Breeding at Viramgaum.*—The five strains of *Wagad* cotton mentioned in paragraph 11 of the last year's report were again under observation in the year under report and the characters that were observed were mostly constant. Their yield, etc., and valuations reported were as under :—

Name of strain.	Yield of Kapas in lbs. per acre.	Ginning percentage.	Valuations.	Remarks.
			Rs.	
1. Wagad, white flowered.	572	39·0	540	Good for 20's.
2. Wagad No. 4 .. ..	790	42·5	565	Best of all, good for 24's.
3. Wagad No. 8 .. ..	820	45·5	550	Good for 20's.
4. Wagad No. 12 .. ..	820	45·0	500	Good for 16's.
5. Wagad No. 14 .. ..	770	46·0	540	Good for 20's.
6. Wagad, Local (from Mandal).	818	41·25	520	Good for 16's.

From the above it will be seen that Wagad Nos. 4 and 8 are exceedingly promising. The spare seed of these strains was given to the leading cultivators for trial and multiplication.

With a view to compare and study the *Wagad* cottons grown in different localities, samples from Patdi, Jagudan, Viramgaum and Mandal were grown and the results mostly show that their average ginning percentage is 41 per cent. and they are mostly poor and short in staple. Almost all of these were valued by the firm at Rs. 520 as against Rs. 550 of Fine Broach and Rs 565 of Fine Viramgaum. Few selections from these show much promise.

8. *Jowar Breeding at Surat.*—The study of the *jowar* plant on systematic lines was undertaken during the year under report, and a special graduate is put on this work under guidance of Mr. M. L. Patel, Cotton Breeder at Surat. Preliminary work of selecting pure strains and studying characters of different strains of *jowar* varieties is going on and it is hoped to get promising results in this line of work as in the case of cotton, before very long.

9. *Tobacco Breeding at Nadiad.*—Tobacco is a very important crop in the Kaira district. A lot of work was done on it in the past on the Nadiad Farm, with a view to get a leaf similar to Havannas and other valuable types grown in America. The main efforts were made at introducing the curing processes in vogue in America and trying varieties of seeds from best known places. But unfortunately all the efforts came to nothing. The Director of Agriculture suggested to tackle this question from a different standpoint and suggested to study the local types in an intensive way from botanical and cultural points of view. Accordingly Mr. V. M. Majmudar was specially put in charge of this work from 1st June 1922 and he has begun the study of the tobacco plant in the Kaira district in a systematic way under the guidance of the Director of Agriculture, the Deputy Director of Agriculture and M. L. Patel, Cotton Breeder.

As mentioned in paragraph 38 of the last year's report, the Nadiad Farm was wound up and the Association plot at Nadiad taken up from the Nadiad Agricultural Association and turned into a Tobacco breeding station from June 1922. During the season, 52 pure plants from five representative different types of tobacco grown in the District, viz., (1) *Gandiu*, (2) *Pilliu*, (3) *Keliu*, (4) *Movadiu* and (5) *Shengiu*, have been isolated, and these will be studied from the various aspects of view for which tobacco is grown in the District.

One strain of tobacco from Pusa, viz., Pusa 28 was also tried along with the local varieties. Though not comparing favourably in yield this year, the strain seems to be superior in strength and colour. Further trials will be continued.

10. *Surat Agricultural Station : Cotton.*—Cotton seed sufficient to sow the farm area with selected strain of 1027 A.L.F. was obtained from the breeding branch. The total area under this crop was 72 acres and 10 gunthas ; and the average yield from this area was 480 lbs. per acre as against the average yield of 400 lbs. per acre in the surrounding villages of the Athwa Group. From this, 16,400 lbs. of pure seed was obtained for distribution in the Athwa Group villages.

*Jowar.*—The total area under *Jowar*, mostly *Perio*, was 65 acres 4 gunthas, and the average yield per acre was 799 lbs.

*Cultural Experiments.*—The experiments mentioned in paragraph 30 of last year's report were completed during the year under report and the results of the last seven years show that the yield of cotton increases by about 17 per cent. by dibbling the seed three feet apart as against sowing by drill two feet by one foot. This practice has now been

adopted on the farm and is strongly advocated and pushed in the district and the cultivators are adopting it largely. It may here be mentioned that there has been a wonderful evolution in the cultural methods of the District. Twenty years back the cotton and the *Jowar* crops in the District were sown very close. This was gradually widened on the Farm, and a wider spacing has generally been adopted by cultivators throughout the district with better results.

*Ridging Experiments.*—The experiments mentioned in paragraphs 31 and 32 of last year's report were put on a new basis to exactly determine the advantages of ridging with and without manure as compared with the ordinary flat system.

The increase in yield by sowing on ridges when no manure is applied is from 15 to 22 per cent. in the case of cotton, and 6 to 20 per cent. in the case of *jowar* grains while the fodder increases from 13 to 32 per cent. This is a fairly encouraging result, provided some method is evolved by which the preparing of ridges in the hot weather can be economically made. However this whole question is under investigation and it is hoped suitable methods will be evolved which will be within easy reach of the cultivators.

The principle of ridging is appreciated by the people as it ensures the young crop against water logging and the cultivators in the surrounding villages are adopting it as far as they can by the use of one paired implement. To encourage them Middle Buster ploughs worth Rs. 600 have been purchased by the Department, and propaganda is carried on to make their use popular. The striking advantage of ridge cultivation was demonstrated on the farm by the well established crop of the first sowings, when cultivators in some place had to resow their crop twice or thrice.

*Breeding Herd.*—The strength of the herd on 1st April 1923 was 94 as against 112 of last year, as 43 animals were sold off in public auction in the middle of February 1923. Cows Lehra and Budhi have yielded more than 3,000 lbs. of milk on an average of 10 years under observation. There were 34 births against 30 of last year and 9 deaths against 14. It is of special interest to note that the bull Devman has imported good milking quality to the present herd by increasing the average annual milk yield of his progeny by 489 lbs. The annual average of the mothers was 1,893 lbs. while their daughters by the above bull give 2,382 lbs. Similarly the bull Chavaria had shown his prepotence by increasing the milk yield from 2,228 lbs. to 2,710 lbs. The present bulls Kevdo and Deo are of known pedigree from good milkers, viz., Lehra and Pitambari whose average yield is more than 3,000 lbs. and their prepotence in milk yield in their progeny is awaited with interest.

11. *Broach Farm.*—The work on this farm is principally confined to evolving suitable types of cotton for the Broach District and the work is in progress as reported above under Cotton Breeding. Selection work on *rahi jowar* has been started a year ago and pure types are being isolated for testing and propagating the seed.

Nitrate of Soda was tried as a top dressing manure on cotton at the rate of 135 lbs. per acre and the results of this season are very striking. It gave 94 per cent. more yield this season as against 19 per cent. of the last year. It will be tested further to see whether the increase in yield remains constant and the cost of manure is covered by the increase in yield.

12. *Dohad Farm—Wheat Seed Selections and Multiplications.*—A cross of the *Wajia* and *Popatia* wheats has at last been isolated in a pure condition and the pure strains are being multiplied for seed purposes on a large scale. In comparative trials with other varieties this cross has continued to give a higher yield and the average increase during the last three years over the local *wajia* comes to 14 per cent. The seven strains of *wajia* selected in the past were under further observation and it has been ascertained that of these the three strains selected for the spikeless character are much better than the rest and it has been arranged to multiply their seed for general sowing.

Pusa-4 wheat was shown on a large scale on an area of seven acres of the farm for seed purposes. The average yield from this was 1,205 lbs. per acre and the whole of this seed was given over to the Co-operative Central Bank, Dohad Branch, for distribution. As a dry crop in good land the yield was 1,142 lbs. per acre. In the market Pusa-4 fetched a price 17 per cent. higher than the local *Wajia*.

*Wider planting of Maize.*—Two feet between the rows has given better results during the past five years than the local practice of sowing fifteen to eighteen inches apart, and the average increase during this period comes to 22 per cent. This system is now being demonstrated and adopted on a large scale.

13. *Amalsad Farm—Sugarcane.*—There was no red-rot of sugarcane during the year. Seven varieties were under trial of which (1) Striped Mauritius and (2) Red Sports were found promising. Almost all the canes of these varieties were distributed as seed to the cultivators. Striped Mauritius ripens earlier than Red Sports, but the Local Malbari ripens even earlier than the above two. The crop as a whole was good and the yield canes per acre varied from 70,000 lbs. to 90,000 lbs. The system of planting canes by preparing land in ridges and furrows is becoming popular.

The turmeric crop which is usually sown in beds was compared with that sown on ridges and the results were 12,920 lbs. of rhizomes per acre in the bed system as against 15,408 lbs. on the ridge system.

### III. *Agricultural Education.*

14. *Vernacular Agricultural School at Godhra.*—The school is now fully established, having completed its third year. Out of thirty-five applications for admission fifteen boys were selected and admitted. Thus



both the classes began with 13 boys in the 2nd year and 15 in the 1st year. According to caste and District they were represented as under :—

According to Caste—		According to District—	
	No.		No.
Brahmin ..	.. 1	Panch Mahals ..	.. 5
Dharalas ..	.. 11	Broach ..	.. 5
Patidars ..	.. 14	Kaira ..	.. 17
Gosai and Barot ..	.. 2	Ahmedabad ..	.. 1
	—		—
Total ..	28	Total ..	28

The staff, curriculum, and methods of practical training and of the school farm management were almost the same as those reported in past years, all the farm work being done by the boys themselves. The subject of handweaving as a secondary occupation was added this year.

The annual examination was held in April 1923 by Messrs. G. N. Desai, Divisional Superintendent of Agriculture, N. D., and T. M. Thakor, Superintendent, Dohad Farm, with very satisfactory results. Out of 13 boys that appeared in each of the 1st and the 2nd year, 12 and 11 boys respectively got through successfully.

A sum of Rs. 300 was received as a contribution from the District Local Board, Panch Mahals. The total expenditure of the school during the year under report was Rs. 9,341-9-6, consisting of Rs. 3,407-14-0 for pay and travelling allowance of Establishment; Rs. 1,895-5-0 for boarding charges of the boys; Rs. 2,661-10-0 for weaving and workshop materials and purchase of live-stock and implements; and Rs. 1,376-12-6 for other contingent expenses. The receipts of the school amounted to Rs. 196-13-2 as against Rs. 10-12-3 of the last year.

Agricultural training, both practical and theoretical, to the boys of VI and VII standards in the Dharala Boarding School which adjoins the Godhra Vernacular Agricultural School has been introduced since the year under report.

15. *Vernacular Agricultural Education in the Bhil Boarding School at Dohad.*—The new classes began with 6 boys in the 1st year and 9 boys in the 2nd year. The annual examination of these boys was held by Mr. J. G. Naik, Head Master, Agricultural School, Godhra, in March 1923. The result was satisfactory, 4 and 7 boys passing respectively.

16. *Vernacular Agricultural School at Surat.*—This has been recently started near the Government Farm, Athwa Lines, Surat, as a trial for one year from 24th June 1923. A sum of Rs. 2,500 has been contributed towards its expenses by the Surat District Local Board. A full report will only be possible next year.

17. *Introduction of Agricultural Training in Primary Vernacular Schools.*—With a view to introduce Agricultural training in Vernacular Primary Schools, as an experimental measure, 5 vernacular trained teachers have been selected, one from each District in Gujarat, and kept for training in a special Agricultural course, for one year at the Vernacular Agricultural School, Godhra, from July 1923.

18. *Publication of Agricultural Matters.*—The publication of the Broach Quarterly Magazine was continued as usual, 27 articles in all being supplied by the Agricultural Staff in this Division.

Mr. M. L. Patel has further supplied material on South Gujarat Cottons which will be published as a memoir on "Studies in Gujarat Cottons, Part II." The researches on Jowar Stem-borer by Mr. Jhaveri are also being compiled for publication as a memoir.

#### IV. Propaganda Work.

19. *Divisional Board.*—As mentioned before in paragraph 3 the whole propaganda work in the District is now conducted under the guidance of the Gujarat Divisional Board of Agriculture which held in all three meetings for the purpose during the year under report, on 19th June 1922, 3rd October 1922 and 19th March 1923.

Some of the main business was, (1) the passing of rules, budget and programme of work of the Chorashi Taluka Development Association started on 18th June 1922; (2) controlling the grants under Agricultural Experiments and Demonstrations and Shows allotted for propaganda purposes; (3) passing the quarterly summaries of work done and approving the programmes of work to be done by the propaganda officers of the Agricultural and Co-operative Departments; (4) recommending registration of six Cotton seed and Sale societies newly started in Broach District during the year; and (5) disposing of various questions brought before the Board by its members.

The Divisional Board has been constituted as a Divisional Cotton Committee by the addition of two representatives from the cotton trade. This joint working of the Gujarat Divisional Board of Agriculture and Divisional Cotton Committee will be begun from July 1923 and it is expected the Committee will be very useful in tackling the cotton problems of the Division and forming a joining link with the Indian Central Cotton Committee, Bombay.

20. *District Cotton Work.*—There has been no change in the organisation and policy as regards the improvement of cotton in the Surat tract, except that as desired by the trade the whole tract south of the Narbada river is put under one strain of cotton, viz., 1027 A.L.F., instead of two as in the past. Accordingly the cultivators of all groups were persuaded to grow 1027 A.L.F. During the year one new group constituting the villages of Vankaner, Afwa, Isroli and Siker was formed with the ginning centre at Bardoli. The total area under the control of the Department was 8,400 acres, and the cotton was ginned at the following gins :—

(1) Bamanshah Gin, Surat, (2) Messrs. Narandas Rajaram & Co.'s Gin, Sania, (3) Messrs. Whittle & Co.'s Gin, Bardoli, (4) Messrs. Tata & Son's Gin, Navsari and (5) Messrs. Dayabhai Ukabhai & Co.'s Gin, Sisodra.

The total quantity of *Kapas* ginned at these centres amounted to 66,120 maunds and the quantity of cotton (*Lint*) obtained from this was 1,072 Khandis (about 2,200 full pressed bales). The system of auction sales which worked so admirably well till last year, was not found suitable this season as cultivators preferred to sell their produce whenever they liked and did not care to wait for auction days. The merchants did not like the system as the cultivators did not part with their produce to the highest bidder when they considered the premium offered was less than that received in the previous years.

Again due to the wide spread distribution of pure seed during the past three seasons, the general quality of the produce of the district has improved very much. As merchants are able to obtain cotton of similar quality in the market, they are not inclined to pay the high premia which they used to give formerly. Under the circumstances the cotton was sold in the open market in 25 lots and the premium obtained varied from Rs. 15 to Rs. 30 per Khandi. Usually the consumers of such high class cotton are few; consequently sometimes in the market there is very little competition and the premium offered is not encouraging. It would be much better in the interest of the cultivators if a buying agency could be secured for purchasing the produce of the controlled area by paying a remunerative premium.

*Cotton Seed Distribution.*—The total quantity of seed purchased by the Department was 2,160,000 lbs. of which 1,680,000 lbs. were obtained from the controlled area and 480,000 lbs. of second class seed were purchased from reliable sources at Navsari and Maroli. The whole of the above lot was disposed of as under :—

	Lbs.
The Rajpipla State .. .. .	720,000
The Nawapura Petha Mahal .. .. .	240,000
The Baroda States (6 Depôts) .. .. .	282,000
British Districts (9 Depôts) .. .. .	918,000
Total .. .. .	2,160,000

Besides the seed distributed by the Department, an enormous quantity of seed was distributed by two gin-owners who ginned the farm *Kapas* separately and gave out the resulting seed to their clients.

This is the fourth year since these operations were started and the results so far obtained are very gratifying. Almost the whole tract is now under farm seed and *goghari* cotton does not occur to more than 3 to 4 per cent. in the district. Till last year the so-called "Selection I A

was distributed in the tract North of the river Tapti; but as it has been proposed to extend "1027 A.L.F." up to the river Narbada, it is necessary to carry on these operations for some years more yet, so that the whole area may be under one uniform strain, and it is hoped that with the passing of Cotton Transport Act the work will be more easy.

The quality of cotton produced in Ankleswar and Rajpipla has considerably improved and many large firms opened agencies there during the season for purchase of that cotton. Though the ginning outturn of farm *kapas* was low (2,640 lbs. of *kapas* required to produce 1 *khandi* of lint against 2,400 lbs. of the local), the rates obtained were so compensatory that the merchants were able to pay Rs. 5 more for the farm *kapas* to the growers. This applies even to Rajpipla cotton which has had a bad reputation hitherto.

In all Rs. 75,000 were advanced by the gin-owners to the cultivators as usual at 6 per cent. interest, and Rs. 1,04,000 were advanced by the Director of Agriculture from his Personal Ledger Account for financing the seed purchase and distribution operations. During the year two meetings of the local Cotton Committee were held for settling the ginning charges and discussing the proposed Cotton Transport Act.

21. *Agricultural District Work. (a) Demonstrations and Shows.*—During the year under report 15 big and small demonstrations and shows were held—two in the Surat District (including the Dangs), two in the Broach District, three each in the Kaira and Ahmedabad Districts, and five in the Panch Mahals. The successive demonstrations at Ahwa in the Dangs for the last three years have impressed enough on the minds of the Dangis and they have begun now to take an interest in introducing improvements in their methods of agriculture. The greatest difficulty for giving them constant advice and help from this Department was the want of a suitable fieldman who could stay permanently in the Dangs. To get rid of this hitch, a Bhil boy from Dohad has been specially kept for training at the Vernacular Agricultural School at Godhra from June 1923, who after completion of his training will be posted in the Dangs permanently for agricultural propaganda work.

(b) *Implement and Seed Depots.*—The depots at Godhra, Dohad, Jhalod, Kalol and Prantij were continued and the one at Aslali was closed in October 1922. The depot at Bulsar was reopened from 1st July 1922. Implements were issued free of charge for trial, resulting in a requisition for two C.T. 2 type ploughs. Implements and spare parts worth Rs. 216-12-0 were sold from the Aslali depot, while the hire charges earned by all the other depots amounted to Rs. 55-0-6 only.

(c) *Distribution of Seeds and Implements.*—Apart from the special organisation previously described for cotton seed in the Surat and Broach districts, various kinds of seeds were distributed from the different farms and by the District Agricultural Overseers, the total quantity of which

came to nearly 64,118 lbs. of which 35,267 lbs. were cotton seed, 6,160 lbs. wheat and 14,680 lbs. *San hemp* seed, and the remaining miscellaneous seeds of various kinds of groundnuts, vegetables and fruit trees. 133 implements mostly ploughs and their spare parts worth about Rs. 1,140 were distributed.

(d) *Demonstration Plots*.—The District Agricultural Overseers managed 203 demonstration plots covering an area of 260 acres on cultivators' fields to demonstrate various varieties of crops and methods of tillage recommended by the Department.

(e) *Measures to prevent Smut in Jowar*.—In all 6,020 packets of copper sulphate were distributed in the Division.

22. *Agricultural Co-operative Propaganda*.—In all there are eighteen Co-operative Non-credit Agricultural Societies in Gujarat; of these six are Co-operative Cattle Insurance Societies and the rest Co-operative Cotton Seed, and Sale Societies. The efforts of the Organiser are now chiefly directed to the formation of Cotton Sale Societies and during the year under report six new societies were registered of which three began actual working. It is hoped to put the remaining Societies in working order next season and efforts will be directed to the formation of new societies.

The Sonsak Co-operative Cotton Sale Society which is working since last four years has made admirable progress. It has now 220 members and during the past season it ginned nearly 1,100 *bhars* of *Kapas* and the value of lint and seed sold amounted to Rs. 3,15,000. The Islampur Society in Jambusar Taluka, though only registered this year, has been really working for three years and during the season under report it ginned nearly 1,000 *bhars* of *Kapas*.

23. *Insect and Other Pests*. (a) *Katra or Hairy Caterpillars*.—(*Amsacta moorii*).—This is a very destructive pest to young growing crops on the goradu soils of North Gujarat, and during the year under report efforts were made to control it at Dohad in the Panch Mahals District and at Anghadi in Kaira District by dusting the crop with Paris Green and lime mixture in the proportion of 1 in 20. Few caterpillars ate the dusted crop, but they left dusted area. The virulence of this pest lasts for nearly three weeks and as light showers which are very frequent during this period wash off the dust, this makes a difficulty, but as a protection the method seemed completely effective. These experiments are proposed to be further carried on next season, in order to see whether the necessity of frequent dusting can be removed.

(b) *Granary Pests*.—The use of Carbon Bisulphide as an insecticide for granary pests was demonstrated in some places in the District and about 20,000 lbs. of various sorts of seeds were treated. The effective dose for controlling these pests is one ounce of Carbon Bisulphide for 200 lbs. of seed.

(c) *Wild pigs and Jackals.*—About 800 packets of Strychnine Hydrochloride and White Arsenic were distributed throughout the Division for poisoning trials on wild pigs and jackals. From the available reports received it was observed that about 40 per cent. of the baits were swallowed by the wild animals and 95 per cent. of the animals who swallowed the baits died. The people who tried these baits generally report that the damage from these pests was checked and the result was satisfactory.

(d) *Jowar Stem-borers.*—Mr. Jhaveri, who is working as a Special Entomological Officer, continued his researches on these pests as reported in last year's report and the results of his researches are being compiled as a memoir for publication.

24. *Boring.*—According to the devolution scheme 14 machines were allotted to this Division and were taken charge of in February 1923. Of these one Musto Power machine and one Calyx Hand Machine have been lent to the Kaira District Local Board on certain conditions. So only twelve machines remained with the Boring Assistant of which one is a Musto Power machine, two Musto Hand and nine Cawnpore type machines. The Cawnpore machines are not efficient to work below 100 feet depth and as water level has gone very low borings have usually to be made deeper. Moreover, in Panch Mahals and Surat Districts rock is met with and work is handicapped as there are only three effective machines to work with. It is desirable to have more effective machines such as Musto patent and Calyx Drill, so that the boring work may be pushed on in Ahmedabad, Panch Mahals, Broach and Surat Districts where comparatively little work has been done in this line.

Owing to the recent flat charges rules passed by the Government, by which Rs. 5 per foot are to be charged in addition to the usual charges irrespective whether the bore is a success or a failure, the amount of work done during the year has been much less than was expected. It is hoped the new rules which are now proposed will give some relief to cultivators, although they feel even these rates more heavy than those of the Local Boards.

During the year under report 17 bores involving a total depth of 779 feet were undertaken; of these 11 were successful giving 25,000 gallons of more water; two were abandoned and one was a failure and 3 bores were incomplete. Two old bores which were choked up were cleaned and set right. There were no serious accidents in the working during the year.

25. *Mechanical Assistance to cultivators.*—One of the Mechanical Assistants hitherto working under the Agricultural Engineer was attached to the Gujarat Division from February 1923. His chief duties are to advise the cultivators in the erection and repairs of pumping and other agricultural machinery. Six applications for advice on the erection of pumps, etc., were received. He inspected two sites for pump erection at Tukwada and Vavli at the request of the owners and gave them necessary estimate and advice. There are a number of pumping plants

in working in North Gujarat, and it is hoped cultivators will be much benefitted by his advice. Steps are being taken to advertise this to the cultivators in the Division.

It was proposed to take the Case Tractor belonging to Messrs. Polson Manufacturing Company of Anand on hire by the Department for ploughing lands of cultivators in Broach District where there was a keen demand for the same. Before taking the Tractor on hire, Mr. Vaidya was asked to take its trials. After several repairs with great difficulty he was able to put the Tractor in working order in the beginning of July 1923. After the rains are over, the trial of the Case Tractor will be taken in the Surat and Broach Districts and if found suitable it is hoped private Agencies will take up the work.

Surat, 21st August 1923.

(Signed) BHIMBHAI M.,  
Deputy Director of Agriculture,  
Gujarat, Surat.

## APPENDIX F.

SUMMARY OF WORK DONE BY THE DEPUTY DIRECTOR OF  
AGRICULTURE, KONKAN, DURING THE YEAR 1922-23.*General.*

1. I continued to be in charge of the division throughout the year.
2. *Lines of work.*—The work of the year 1922-23 has proceeded and developed along the same main lines as in the past. The following are the most important features of any changes in the detailed organisation and equipment of those main lines.

Encouraged by the success achieved in evolving substantially higher yielding strains of *Kolamba* rice for the North Konkan at the Karjat Rice Breeding Station, breeding work for South Konkan has been taken up at Ratnagiri on the existing Ratnagiri farm since the end of the year under report.

The experimental work in rice and other subsidiary crops of rice lands on the Ratnagiri farm having been carried on to sufficiently conclusive results has been discontinued, it being contemplated to go further deep in the problems of the increase in the yield or bringing about an economy in rice cultivation at the Karjat Rice Research Station.

The administration of well-boring for cultivators was transferred from the control of the Agricultural Engineer to that of the territorial Deputy Directors of Agriculture from the 1st of February 1923.

3. *Staff.*—The strength of the superior technically educated staff of assistants stands as follows in comparison with the last year :—

	1921-22.	1922-23.
Research and Experiment	.. 8	8
Extension and Propaganda	.. 5	5
Agricultural Education	.. 2	1
	15	14

4. *Cost of the year's work.*—The following statement will furnish the information in abstract for each broad division of activities.

Class of work.	Establishment (pay and allow- ances).		Contingencies.		Total.	
	1922-23.	1921-22.	1922-23.	1921-22.	1922-23.	1921-22.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Research and Experiment ..	18,317	22,178	17,982	37,263	36,299	59,441
Extension and Propaganda ..	16,161	18,346	4,825	4,682	20,936	23,028
Agricultural Education ..	5,294	5,747	10,027	19,209	15,321	24,956
Direction and Superinten- dence.	17,310	13,204	1,796	1,995	19,106	15,192
Total ..	57,082	59,475	34,630	63,149	91,712	1,22,624



It will be seen that the total expenditure has been reduced down by over 25 per cent. as compared to last year. This is due to the abolition of the experimental farm and the Agricultural School at Alibag and retrenchment of contingent expenditure on the Ratnagiri and Kumta Farms by getting the demonstration part of cultivation on these farms done by cultivators as sub-tenants.

5. *Physical and other conditions influencing the agriculture of the year.*—The rainfall and season was not the most favourable. The most important characteristics which have affected the yields of rice, by far the most important crop of Konkan, more or less adversely, were, holding off of rain in the seedling stage and heavy falls on the ripe crops in the North Konkan, which sprouted and spoiled the grain. In Ratnagiri, sprouted seed sowings were delayed and subsequent heavy rains checked the growth and are supposed to have washed away the fertility of the fields resulting into decreased yields upto 50 per cent. Rain in September and October was quite insufficient except in below-ghat Kanara and was responsible for a part of the decrease in the yields. On the whole the net effect of the season was a decrease in the yield of rice by 20 to 30 per cent. over a normal year. Rabi season may be said to have been generally favourable.

In regard to pests and diseases, those worth a special mention as occurring in addition to the usual ones are, a mild attack of rice stem borer in Ratnagiri and a very severe attack and loss by *Koleroga* on betelnut in Kanara amounting to 50 per cent. or more. The wild pig trouble is on an increase in the Kolaba and also in parts of the Ratnagiri districts.

#### *Research and Investigation.*

6. *Researches into the increasing of yield or bringing about an economy in Rice Cultivation.*—The physiological factors which contribute towards making up the yield, and the best and the most economic ways to influence their best action have been under an intensive and exhaustive study at the Karjat Rice Research Station for the last four years. During the year of report, the rice work at the Ratnagiri and Kumta experimental farms was remodelled so as to afford data for verifying the most important points determined at Karjat under quite different sets of conditions of soil and climate representative of the laterite Konkan.

Judging of the results in respect of practical value, they corroborate the previous observations that there is not much room to increase the yield of the crop by modifying the cultural details such as age and robustness of seedlings at transplanting, number of seedlings planted per bunch, space allowed per bunch, degree of puddling, etc., and that the present practices of cultivators are very near those that could be recommended as a result of the research work; and that the principal and the most powerful means of increasing the yield lie in the direction of increasing the proper nourishment of the plant by either manuring or by adequate water supply and drainage.

In regard to manuring, the remarkable and ruling influence of the addition of nitrogen and insignificant effectiveness of the addition of

phosphoric acid in the form of mineral superphosphate on the trap soils may now be declared to be almost conclusive. On the laterite soils represented by Ratnagiri and Kumta, however, phosphoric acid in the more inert forms of bone-meal and rock phosphate show considerable effect, while nitrogen as sulphate of ammonia is altogether without any effect unless accompanied by farm yard manure at Kumta. The increase upto nearly doubling the crop with the addition of 60 lbs. of nitrogen in the form of sulphate of ammonia in the trap soils represented by Karjat is maintained. Similarly on the laterite soils represented by Ratnagiri farm the ordinary crops which have been about half of the average owing to unfavourable season, have been also doubled by manures supplying upto 100 lbs. of nitrogen in the form of *undicake*. On soils represented by Kumta, however, the increases have at most gone upto 50 per cent. even with large doses giving upto about 100 lbs. of nitrogen in the form of sulphate of ammonia in addition to farm yard manure, over the local treatment crops, which, unlike North Konkan and Ratnagiri receive a good quantity of leaf compost.

Comparing the various forms of manures in which nitrogen or the other plant foods could be supplied, although it has not yet been possible to make a comparison of all in several increasing doses, *rui* leaves and cowdung are nearly as effective as sulphate of ammonia at Karjat, bone-meal manure even in lower doses upto 4 cwts. and *rui* leaves upto 8,000 lbs. of green matter per acre have at Ratnagiri brought about increases of about 50 per cent. on low lands and nearly cent per cent. on the poor uplands, at Kumta bone-meal upto 6 cwts. per acre has been responsible for an increase upto 60 per cent. and 2 cwts. of rock phosphate, 25 per cent. The higher doses of these manures except sulphate of ammonia at Karjat give much less return quantity for quantity, and thus the higher quantities are not generally paying.

Water supply and drainage appear to be as powerful a factor in affecting the yield of rice, as direct manuring. If the yields of rice over a series of years under natural conditions in the results of the experimental farms in Konkan be examined, it is most striking that they have varied with very large margins amounting to 50 per cent. or more. The difference in water supply and drainage must be responsible for this. Investigations have been started since the year of report to clear up this very vital problem.

7. *Selection and breeding of higher yielding strains of rice for South Konkan.*—Encouraged by the success achieved in evolving substantially higher yielding strains of *Kolamba* rice for the North Konkan at the Karjat Rice Breeding Station, breeding work for South Konkan has been taken up at Ratnagiri on the existing Ratnagiri farm since the end of the year under report.

As a preparation for the first operation of obtaining a large number of individuals of known parentage, bulk samples have been collected from the various parts representing the Ratnagiri and Kanara districts constituting South Konkan, for being grown in the ensuing rice season.

8. *Remedial measures against rice land Crabs.*—The land crab is responsible for a very great direct and indirect damage in the North Konkan, and also in Sind, and the study of the pest and remedial measures against it has been taken up from the year under report as requiring the first attention amongst several other zoological problems of the Konkan. During the year under report, the number of species has been determined and identified and the seasons of activity and hibernations, the general habits of living, digging burrows and feeding, distribution under the various soil and climatic conditions also formed the subjects of investigation as much as could be done within the limitations of time and funds available. The nature and amount of direct and indirect damage done to the rice crop was estimated.

As regards remedial measures, nothing being known about the life history much could not be done in this respect. However experiments were made in the laboratory and some of the substances like slaked lime, lime carbide, crude oil emulsion, *adulsa* (*Adhatoda vasica*) leaves were found to be useful. Trapping young ones and pumping in the burrow, poisonous fumes of lime carbide and others were also tried in the fields without much success.

*Selection and breeding of higher yielding strains of Nagli.*—This work is being done at Hatkhamba, 10 miles east of Ratnagiri. The year of report is the second of taking up this work. A large number of individuals selected and marked out of a crop of bulk samples of the previous year as suitable material for further determinations and isolation were grown separately. All these were dealt with with the usual plant breeding methods and as a result about one dozen strains which have given 100 per cent. and over increased yield in comparison with one of the two varieties commonly grown locally have been discovered. Forty more strains, which have given yields between 60 and 100 per cent. more than the local seed, have also been kept for being repeated with a view to give a chance to any of them which might have failed through some environmental cause to come upto the standard of 100 per cent. and more yield during the last year but which may conspicuously come to the front in future. This work is thus exceedingly promising.

9. *Remedies against Blight disease of Onion.*—The appearance of this disease during the last some years after the successful introduction of this new and profitable crop in South Konkan is preventing its further extension and is also threatening its abandonment in the places in which it is already introduced.

The investigation of this disease and into remedial measures has been taken up for the last two years by the Plant Pathologist to Government in collaboration with the staff of this division. This year the disease has not been so virulent as in some years. Spraying with Burgundy mixture fungicide has had no beneficial effect, manuring with some readily available nitrogenous concentrate such as nitrate of soda to the seedlings

and the transplanted crop enabled the crop to resist the disease much longer than without, while a crop on burnt land on the Ratnagiri farm had hardly any disease. Planting in rows, although getting the disease, at the same time and of the same intensity as irregular and thick planting in beds, seems to help the earlier development of bulbs and to thus give a larger outturn per acre. Out of the several varieties tried, Goa is the most resistant, then coming Alibag and Palghar.

10. *Bone-meal manure for Vaingan (irrigated winter) rice in North Kanara.*—This was tried during the year by the Agricultural Overseer, Kanara, at six places on cultivators' fields. The results show on the whole that the manure benefits the winter crop as much as the *Kharif* crop.

11. *Comparison of bone superphosphate with raw bone-meal for rice.*—This was done on cultivators' fields at half a dozen places in Kolaba, Ratnagiri and Kanara districts. The superphosphate did not show any advantage over the raw form anywhere.

12. *Bone-meal as a corrective of salt affected sweet rice lands.*—One of the several applications of bone-meal manure for rice in the general propaganda by the Agricultural Overseer, Kanara, chanced to be on the above described soils, which resemble the *morik* character noticed at Shiroda in the Vengurla taluka of the Ratnagiri district. The corrective effect was most astonishing, resulting in an increase by 150 to 200 per cent. in a crop which without bone-meal manure dries up in patches and is stunted with very small ear-heads.

13. *Maskati variety of paddy for vaingan (irrigated winter), rice.*—This was tried on four cultivators' fields in Kanara, at three places it did better than the local kind with the additional appreciation for white grain for clean and par-boiled rice.

14. *Testing of the use of concentrated manures and new varieties of sugarcane in Kanara.*—A top-dressing of concentrated manures, such as sulphate of ammonia, fish manure and oil cake has been conclusively proved to be substantially profitable both on the Kumta farm and in the trials in the district.

In point of new varieties, the Kumta farm trials of the year put up the Red Mauritius by far the best. The " B.-208 " which stood superior to any others tried during the previous three years has gone down very much on the Kumta farm during this year. The trials by the Agricultural Overseer, Kanara, in the above ghat portions show that Red Sport is very promising, it ripens early, is soft for milling and gives a better coloured *gul* than *Red Mauritius*, the softness of this, however, gives it a certain disadvantage in that it is more susceptible to damage by jackals and pigs.

15. *Economising the cost of supporting sugarcane against lodging by the use of wire.*—Mr. V. S. Habbu, Superintendent, Kumta farm tried iron wire of 1/12 inch thickness stretched on vertical poles at every 50 feet to which standing cane is to be tied and found it to save the cost by half of that required by the local practice of using bamboos.

16. *Nitrate of soda and sulphate of ammonia for melons.*—These were tried by the Agricultural Overseer, Kolaba, near Karjat (Kolaba district)

in comparison with the local practice of giving fish manure, at the rate of 120 lbs. of each. Nitrate of soda could not compete with fish manure, but sulphate of ammonia did so most successfully in that it gave the same yield as fish manure but caused a saving of Rs. 45 per acre in the cost of manuring with fish (Rs. 75) even at this year's cheap rates for the latter.

17. *Nitrate of soda on garden crops of plantains, betelvine, etc.*—These trials were made by the Agricultural Overseer, Kolaba in private gardens in the Thana garden tract. Ten cwts. application in 12 monthly doses to betelvines fell short of the local manure by about 25 per cent. in the estimation of the owner, but with plantain the results were very remarkable. The total quantity of 5 cwts. of nitrate of soda and 1 cwt. of double superphosphate given in 2 monthly instalments at a cost of Rs. 100 produced no less a crop in quantity and quality than the local practice of manuring with 10 *khandis* of castor cake at a total cost of Rs. 300.

18. *Experiments in increasing the yield and profits from coconuts in Konkan.*—A study of the existing methods of cultivation has been made for publication. Common salt for manuring is being tested at Ratnagiri and Kumta for the last year. It is too early to draw any results. The Agricultural Overseer, Kanara has tried certain green manure plants in private gardens and found *Crotolaria striata* to grow to a height of six to eight feet and to give a good quantity and quality of green matter. *Teprosia* also does well and stands pruning but it is liable to wilt.

19. *Making holes for mango planting in laterite rock by farm dynamites.*—Trials on a private planter's land at Ratnagiri carried on a fairly extensive scale showed that with a charge of 5 cartridges (Nobels farm explosives 4" dynamite and gelignite) put in a slightly slanting bore nearly 3 feet deep, pits two to two and a half feet deep and equally wide could be formed after removing the blown up and shattered debris. These dimensions of pits were considered enough by the owner. The value of these pits for planting mangoes is further enhanced by the fact that compactness of the rock round the pits and at the bottom is shattered through, making the way easier for the penetration of roots. The cost came to about Rs. 2 per pit which compares favourably with Rs. 4 to 5 for hand digging one of 3 feet in all dimensions.

20. *Bourbon tree cotton on varkas lands in Ratnagiri.*—Plants growing luxuriantly and yielding a good crop of cotton are noticed in house yards almost everywhere in the South Konkan. A few trials on plantation scale made by some private gentlemen in the Ratnagiri district have met with partial success although they were eventually abandoned by the experimentors as they could not devote sufficient attention owing to other professions, in which they were engaged. There is, however, every reason for hoping that Bourbon cotton plantation may be a success in the laterite Konkan. A beginning has therefore been made on hill slope on the Hatkhamba *varkas* land Experimental Station during the year under report. The plants stood well and grew to a height of one foot by the end of the last monsoon, dropped their leaves in the dry season but have shooted again vigorously at the break of the next monsoon.

21. *Wheat in the North Konkan.*—This is being tried at Jambul under irrigation for the last two years. The year's results confirm those of the previous one that wheat is very much susceptible to rust in Konkan but that *khapli* variety does not get it to the same extent as *bakshi*. Pusa No. 4 which was tried in addition this year has been almost resistant and has given a fair crop of 1,100 lbs. per acre with 746 lbs. for *khapli* and almost a total failure of others tried.

22. *Tobacco on the Kumta farm.*—In the second year's trial of the Malbar varieties this crop has been subject to a leaf blight disease as against the first year's splendid success, necessitating further trials to arrive at definite conclusions.

23. *Jowar for fodder as a rabi crop in rice lands.*—This has been a second time found to grow well near Karwar.

24. *Algaroba.*—(*Prosopis juliflora*) as a fodder plant.—At the instance of the Director of Agriculture, Bombay Presidency, this plant has been tried at Kumta and Ratnagiri with special treatment. The seeds that germinated at each place are thriving well at Ratnagiri attaining a height of 6 feet, while at Kumta farm they are doing just fair.

25. *New fruit trees in coastal Kanara.*—Several new fruits are being tried. Oranges and *Musumbis* have been thriving well and the latter has borne the first crop of fruit. *Alphonso* mangoes have also commenced bearing since the fifth year after planting.

26. *Crops new to the Mundgod tract of the Kanara district.*—Cabbage, knolkhol, potato, onion, tomatoes, chillies, brinjals *karle*, *dadka*, *bhendi*, *gavar*, cucumber, sweet potato, groundnut, cotton vari, sesamum, tobacco, *chiku*, oranges, guavas, pomelo were tried. Most of the vegetables did well as should be expected. Kumta cotton grew well. Groundnut did fairly.

27. *Improvement of Manat lands of North Konkan.*—The year's work has confirmed the results of the previous years and has added nothing to them. The small improvements so far made not having met the practical appreciation by the people and on account of the general conditions of agriculture having been such that even all the good rice land cannot be properly cultivated, it would not be of any use to proceed on with these experiments. They have, therefore been closed by the end of the year under report.

28. *Improvement in Implements.*—The introduction of a bar share point in the Meston plough on the Kumta farm has been found to do better penetration and save the expenditure on the replacement of shares very frequently. The Deccan blade harrow has been now conclusively proved to be an effective and economical implement for preparing a puddle for transplanting rice. A smaller size (15 to 18 inches) of blade is necessary to suit Konkan cattle.

29. *Oven drier for drying the garden produce in Kanara.*—An experimental oven has been constructed out of stone and mortar at Killar in the Siddapur taluka of the Kanara district with suitable drying chambers. Plantains can be dried within 12 to 16 hours requiring about 50 lbs. of dry fuel (worth annas two), for a full charge of 1,200 plantains. Sun-drying

requires one week and no drying or transporting to market being possible during the rainy season the produce of that season almost goes to waste. Betelnut drying was also tried with success on the same machine. The oven as tried has, however still many defects, which do not give uniform heat at all places in the chamber. These will be remedied in further experiments. Mr. G. R. Hegde of Hirekai, Siddapur taluka is trying a steam heating drier with success on a small scale. He would be subsidised for carrying out further experiments.

30. *Best way of utilising bare minor forest areas for supply of leaf manure in Kanara.*—This is the second year of the experimental plantation made at Kumta. Local practices have been studied and recorded. About 25 species including quick growing shrubs as well as slow growing large trees have been planted and are growing. It is too early to say which would be the best in all respects. The Agricultural Overseer, Kanara, in his trials on cultivators' fields has found that *pithecolobium* seedlings grow fast attaining a height of 5 to 6 feet in three years and give good foliage.

The attempts to establish a *rui* plantation on *varkas* lands in Ratnagiri are proceeding. In addition to the cuttings being successful for this purpose, fresh seeds have been also found to germinate very well.

31. *Destruction of wild pigs and other wild animals by poisoning.*—Strychnine has been found very effective. To ensure killing within a furlong or two a dose of eight grains is necessary for a wild pig. The most successful bait for wild pig is fried bran in which balls prepared out of fried flour and *gul* about the size of a peeled betelnut with the poison introduced inside it through a hole to be made subsequently and closed with unpoisoned stuff, should be kept. The best bait for jackal is fish with poison introduced inside by splitting its mouth longitudinally.

32. *Protection of cabbage and knolkhol seedlings from flea beetles and other insect pests.*—Mr. P. V. Wagle, Entomological Assistant, Konkan has found that cruciferous seedlings which are so liable to devastation by insects can be very successfully protected by a screen of muslin cloth all round the seed-bed at a cost of Rs. 28 per acre, which will last for about four to five years. Similarly he has found that flea beetles on them can be successfully trapped and checked by drawing over the seed beds a tin channel pasted with a mixture of some thick oil such as *undi oil* (*colophyllum inophyllum*) and rosin at a cost of annas 12 for seedlings sufficient to transplant one acre.

#### *Extension Work.*

33. Extension work consists in bringing agricultural improvements to the notice and into the practice of agriculturists and giving such advice and help as will make the agricultural industry in general more profitable. This work is principally carried on through the itinerant district staff who are called Agricultural Overseers, assisted by Kamgars. The Agricultural stations also serve as standing centres of demonstrations or as centres for distributing improved seed, manures and implements.

The Divisional Board consisting of a majority of non-official representatives of agriculture and co-operation that was established for the Konkan Division at the end of the previous year directed and controlled the policy of the propaganda work. Three quarterly meetings were held for the purpose during the year.

The work in the Thana district had to be suspended as the incumbent of the post of the Agricultural Overseer was still on long leave owing to ill-health and no trained substitute was available. The work in the Ratnagiri district was similarly dislocated owing to the permanent incumbent being required to go on six months' leave on account of ill-health and his charge being temporarily held by quite a raw man, yet undergoing training. The work in other districts has continued unhindered by any such circumstances.

The propaganda of spraying against *Koleroga* disease of betelnuts and the organisation of non-credit agricultural co-operation and of well-boring for agriculturists in the Konkan Division have also been transferred to the control of the Deputy Director of Agriculture, Konkan, through the Divisional Board.

Efforts are being vigorously made to stimulate Taluka Development Associations in areas which are ripe and ready to take up the work of Agricultural improvement on their own shoulders.

34. The detailed items of improvements proved to be worth introducing, which have formed the activities of the year are mentioned below by each district, the sphere of operations which it has been possible to tackle being indicated in brackets under each district.

*Thana District.*—(Chiefly round Palghar and in the Kalyan Taluka).

(1) Improved strain of Kolamba Rice ; (2) Nitrate of Soda for onions ; (3) Silage. A full programme could not be undertaken owing to administrative difficulties.

*Kolaba District.*—(Chiefly Ulhas and Patalganda valleys).

(1) Stimulation of irrigation farming on the Tail waters of the Tata Hydro-electric works, together with all improvements possible ; (2) substitutes to meet the deficiency of rab for rice ; (3) Mass selected rice seed ; (4) Improved Kolamba strains of rice ; (5) Bone-meal manure for rice ; (6) Nitrate of soda for onions.

*Ratnagiri District.*—(Chiefly Ratnagiri, Sangameshwar and Devgad Talukas). (1) Substitutes to meet the deficiency of rab for rice ; (2) Bone-meal, fish and sulphate of ammonia manure for rice ; (3) Mass selection of rice seed ; (4) Deccan Harrow for Puddling rice fields ; (5) New profitable crops of sweet potato and kharif chillies on warkas land ; (6) Guinea grass on warkas lands ; (7) New and profitable crop of onions ; (8) Extension of sugarcane cultivation ; (9) Poisoning of wild animals doing damage to crops ; (10) Meston plough ; (11) Bulsar Rahat water lift and mot ; (12) spraying against mango hoppers ; (13) Improved breeds of poultry ; (14) Silage ; (15) Surti buffalo bull at Ratnagiri.



*Kanara District.*—(All over the district except Haliyal taluka). (1) Mass selection of rice seed ; (2) Bone-meal manure for rice ; (3) Mascaty variety of rice ; (4) Planting fewer seedlings ; (5) Red Mauritius variety of sugarcane ; (6) Use of concentrated manures such as Sulphate of Ammonia, Fish manure and Undicake for sugarcane ; (7) Wider planting and more efficient and economic tillage by sabul plough ; (8) Improved mills furnaces and Pans ; (9) Groundnut or maize and hakkal lands ; (10) Varri on hakkal and kumeri lands ; (11) Onion cultivation together with top dressing with concentrates ; (12) Tobacco cultivation ; (13) Guinea grass in gardens ; (14) Meston plough ; (15) Improved Rice Land Puddler ; (16) Use of undicake as manure instead of fuel ; (17) Pig proof wire fence. Poisoning of wild animals and organisation of communal watching for the protection of crops from wild animals ; (18) Silage in East Kanara ; (19) Surti buffalo at Kumta.

35. Methods of bringing these improvements to the notice and into the practice of agriculturists consists in inducing some leading cultivators at various places to try our recommendations on their fields with a guarantee if that there be any loss by our recommendation, it would be made up at Government cost. Very frequently the additional cost involved in our recommendation has to be incurred by the Government for the first time as the people are not willing to invest on anything until they have seen with their own eyes the economic advantages near their homes. Such plots and persons form the nuclei for bringing the results to the notice of others in the neighbourhood for which special occasions of explanations and demonstrations are arranged by the propaganda staff as much as possible. Preaching and propaganda is carried on by the Departmental propaganda staff in the neighbourhood of these plots, and more and more persons are induced to adopt the improvements. It requires great persistence and constant vigilance and attendance to get the recommendations carried out in the initial stages of the introduction of anything. The progress is necessarily very slow. Mere preaching or distribution of written matter cannot be of much effect beyond a preliminary preparation and all the time, at which there will be no occasion for ocular demonstration work, is devoted by the propaganda staff in carrying out the general propaganda. Enquiries are also received from the public to a certain extent by correspondence and to a small extent by personal visits which are replied to by correspondence. The volume of work done is indicated by the fact that there were 74 demonstration plots in Kanara during the year, 19 in Ratnagiri, and 23 in Kolaba during the year, which were in almost all cases the centre of vigorous work.

36. Striking progress has been shown during the year in the introduction of the following improvements. In Kanara Red Mauritius variety of sugarcane, improved sugarcane mills, Poona pans and furnace and onion cultivation have now taken a firm root after the last ten years' work so that there will be no going back in them. Bone-meal manure for rice and concentrated manure for sugarcane, which have been taken up recently, show a hopeful advance.

In Ratnagiri, sugarcane cultivation is attracting more and more attention of farmers as it is becoming evident to them that much higher yields and profits are possible by adopting improved methods of cultivation, manuring and manufacture. This as well as other improvements are not progressing in this district as well as in some others, on account of the uneconomic and excessively fragmented holdings also on account of the fact that labour in Bombay affords a far more remunerative and far less risky occupation than agriculture.

In Kolaba, there is reason to hope that the perennial supply of water from Tata Hydro-electric works in the Western Ghats would be more and more used though in very gradual steps. The improved strain of *Kolamba* rice has been put out on an intensive and comprehensive scale for the first time in the Karjat taluka and Khalapur peta, and the next annual report would give us an exact idea about its future.

In the Thana district, where work has only been possible by fits and starts on account of the lack of continuity of the staff, row and ridge planting of vegetables and use of labour saving implements for ridging and interculturing is the one achievement that has taken a hold.

37. *Arrangements to supply implements, manures, seeds and other articles.*—In order to meet the demands which are created as a result of the propaganda work for articles which are not an ordinary market commodity, the organisation of sale and hire depots and free agency work for arranging supply of others direct from the firms were continued. Bone-meal manure, sulphate of ammonia, Meston plough, Poona sugar boiling pans and sugarcane mills were the most important of the articles thus dealt with. Arrangements to supply denaturalised salt for manurial purposes duty free were continued. Government have fixed a rate of annas thirteen per Bengal maund for three years up to 1925-26 even though it may cause some loss in the transaction. The number of permits issued together with the total quantity of salt for each district during the year under report is given in the following statement.

Period.	Thana District.		Kolaba District.		Ratnagiri District.		Kanara District.	
	Number of permits.	Quantity issued.	Number of permits.	Quantity issued.	Number of permits.	Quantity issued.	Number of permits.	Quantity issued.
November issue .	1	Mds. 5	1	Mds. 10	23	Mds. 433	17	Mds. 177
April-May issue .	6	175	1	30	28	695½	26	221
Total for the year 1922-23.	7	180	2	40	51	1,128½	43	398
Total for the year 1921-22.	6	137	2	160	52	1,319	51	551

38. *Well Boring for cultivators.*—The organisation for well boring for cultivators has been transferred to the control of the territorial Deputy Director from 1st of February of the year. Six Musto patent hand machines and one Calyx power drill have been transferred. There was a certain amount of dislocation of work during the first month or two before the transfer operations were complete. Three of the hand and one power machines were allotted to the Thana district where there has been the greatest success and demand for well-boring, while one hand machine has been allotted to each of the remaining three districts in which boring is yet in an exploratory stage. The following is a resume of the work done from 1st February to 30th June of the year.

District.	Number of machines.	Total footage bored.	Number of bores completed Successful.	Unsuccessful.	Number of bores incomplete.	Number of bores cleaned.	Putting up hand pumps.
Thana ..	4	504	4	2	6	10	5
Kolaba ..	1	153	Nil.	1	1	Nil.	Nil.
Ratnagiri ..	1	80	1	Nil.	1	Nil.	Nil.
Kanara ..	1	57	Nil.	Nil.	1	Nil.	Nil.
Total ..	7	794	5	3	9	10	5

In Thana, in a belt within 10 miles from the sea coast springs capable of giving 2,000 to 4,000 gallons per hour are tapped from a depth of 60 to 100 feet; the bore in Kolaba is not yet complete; in the Khed taluka of the Ratnagiri district only 300 gallons supply at a total depth of 80 feet was obtained in the one successful bore and in the Kanara district, the prospects are yet uncertain, the rock (granite) to be bored being exceedingly hard and not having many fissures.

39. *Popularisation and introduction of Agricultural Improvements through Localised Non-official Organisations.* (a) *Old type Agricultural Associations.*—All except two of the old type Agricultural Associations continued to be on the list but did little work except in the Ratnagiri District with Ratnagiri, Sangameshwar and Dapoli as taluka branches and Sirsi and Honavar Taluka Agricultural Improvement Committee of the Kanara District which have tried to do something in respect of the items recommended as suitable to them. The work turned out even by the latter however lacks in comprehensiveness and a uniformly continuous and systematic policy. The reason is that people have no confidence and cannot be induced to contribute sufficient funds to employ paid trained men to carry on their propaganda.

(b) *Taluka Development Associations according to the new Government Scheme.*—In order partially to remove the difficulty referred to at the end of the foregoing paragraph and thus to stimulate local interest and effort the Government of Bombay sanctioned during the year of report a scheme

by which local non-official organisations, that would be formed in areas not extending over more than one taluka which may be regarded by the Agricultural Department to have sufficient improvements for introduction will be given from Government funds a subsidy equal to half the total expenditure but not exceeding Rs. 1,000 per annum.

Four talukas, Ratnagiri and Dapoli of the Ratnagiri district, Alibag of the Kolaba district, and Sirsi of the Kanara district applied during the year for the formation of the Taluka Development Associations under the Government scheme and the Konkan Divisional Board have recommended the recognition of the first three, and the application of the last being received late in the year will be considered in the meeting of the Board to be held in July. They have adopted a good programme and have applied to the Agricultural Department for the loan of trained men for their Shetki Kamgars' posts. The first of the Associations having been formed in January and others as late as April it is too early to know anything about their usefulness.

The propaganda staff (honorary as well as paid) of the Agricultural and Co-operative Department are stimulating other talukas where conditions are favourable.

(c) *Stimulation of Co-operation for promoting Agricultural Improvements.*—The Agricultural propaganda staff, are, side by side with individual persuasion, also on the look out for stimulating co-operative effort for promoting agricultural improvements. Some possibilities have been located and investigation and stimulation were carried on during the year, but none have yet resulted into actual formation to be mentioned in this report.

A special paid officer for stimulating, investigating and supervising agricultural co-operation for the districts of Thana, Kolaba and Ratnagiri, who was so long under the control of the Co-operative Department has been transferred since the year of report to the control of the Agricultural Department under the Divisional Deputy Director of Agriculture. A separate incumbent for the post was available from January. He has been able to achieve the following :—

- (1) Collaborating with the Agricultural propaganda staff in the formation of the Alibag Taluka Development Association and in the preliminary arrangements for the stimulation of ones for Mahim and Kalyan.
- (2) Formation of a Grain Bank at Chendhre (near Alibag), investigation into the possibilities of forming irrigation societies in the Alibag Taluka, out of which those at Goteghar and Chendhre are likely to materialize during the next year, and preliminary investigations into a Fencing Society at Bhisegaon (near Karjat).
- (3) Inspection of Irrigation Society at Awas (Alibag taluka) and Manure and Cattle Breeding Societies in the Thana district. These have been in a stagnant or even depressed stage. Most of them have been stimulated to a revival.

(4) Liquidation proceedings against two societies.

(5) As the incumbent is quite new to this line he had to devote a good deal of his time to a study of the literature and practices of co-operative improvement.

40. *Propaganda through publications.*—Leaflets in English as well as vernaculars for free distribution containing new successful results of the Konkan Division to be recommended, drawn up during the year are as follows :—

- (1) Increase in the yield of rice crop by mass selection of seed.
- (2) Cultivation of sweet potato in Konkan.
- (3) Saving of rice seed in Kanara.
- (4) Use of Bone-meal manure for Rice.

The results upto 1923 in regard to the researches in increasing the yield or bringing about an economy in the expenses of rice cultivation have been worked up for a Memoir of the Imperial Department of Agriculture under the authorship of Messrs. K. V. Joshi and M. V. Gadkari.

The translation of the " Book of the Mango " into Marathi was completed by Mr. V. R. Sabnis.

Notes and articles were contributed to the various Agricultural Magazines by the members of the staff of which the principal ones are mentioned below :—

Subject of note or article.	Name of author.	Where published.
(1) Monthly notes of agricultural operations for each of the four districts.	Deputy Director of Agriculture, Konkan, assisted by the Farm Superintendents and Agricultural Overseers.	<i>Shetki and Shetkari, Konkan Sheti Samachar and Vakkaliganoo Vakkalitanavoo.</i>
(2) Trapping of cocoanut beetle.	V. G. Gokhle, Deputy Director of Agriculture, Konkan.	<i>Agricultural Journal of India.</i>
(3) A note on destroying wild pigs by poisoning.	V. G. Gokhle and G. B. Pandit, Agricultural Demonstrators, East Kanara.	Poona Agricultural College Magazines and also in the vernacular magazines mentioned under (1) above.
(4) Six-monthly progress reports of the work in respective charges.	G. B. Pandit and P. V. Wagle, Entomological Assistant, Konkan.	<i>Konkan Sheti Samachar and Vakkaliganoo Vakkalitanavoo.</i>
(5) Interculturing sugarcane in Mundgod.	G. B. Pandit	<i>Konkan Sheti Samachar.</i>
(6) Work of Kirloskar plough at Mundgod.	N. R. Gokhle, Kamgar, East Kanara.	<i>Vakkaliganoo Vakkalitanavoo.</i>

Subject of note or article.	Name of author.	Where published
(7) Uses of Rice ..	K. V. Joshi, Rice Specialist	<i>Konkan Sheti Samachar.</i>
(8) Lessons useful for Konkan from agricultural practices of China and Japan.	Do. ..	<i>Do.</i>
(9) Profitable manure for cocoanut.	N. V. Hanmante, Agricultural Overseer, Kolaba.	<i>Do.</i>
(10) Improvement of the colour of gul in Kanara.	K. L. Hegdekar, Kamgar, Honavar.	<i>Vakkaliganoo Vakkal-tanavoo.</i>
(11) Flies and their relation to man.	P. V. Wagle ..	<i>Konkan Sheti Samachar.</i>
(12) Cultivation of lac ..	Do. ..	<i>Do.</i>
(13) How to protect cabbage and Knolkhol seedlings from free beetles, Grass-hoppers, etc.	Do. ..	<i>Agricultural Journal of Indian and Konkan Sheti Samachar.</i>
(14) Agricultural education of farmers.	J. N. Purandhare, Head Master, and Y. R. Lale, Assistant Master, Jambul Agricultural School.	<i>Marathi Shikshak and Konkan Sheti Samachar.</i>
(15) Saving of irrigation water to fruit trees.	V. S. Habbu, Superintendent, Kumta Farm.	<i>Poona Agricultural College Magazine.</i>
(16) Economy by the use of wire in the cost of supporting sugarcane.	Do. ..	<i>Do.</i>

*The Konkan Agricultural Magazine.*—The monthly Magazine in Marathi devoted exclusively to Konkan agriculture under the name "*Konkan Sheti Samachar*" commenced by Mr. Y. G. Gurjar of Alibag in the year 1917 and the editing of which was taken over by the Konkan Agricultural Department under the Editorship of Mr. V. L. Bhosekar, Superintendent, Ratnagiri farm, published very useful information for which Mr. Bhosekar and others who contributed and Mr. Limaye who published the same punctually deserve the best thanks.

#### *Agricultural Education.*

41. During the year under report there was only one agricultural school, namely, Jambul, near Kalyan, District Thana, for giving agricultural education of a primary nature through Marathi. The year under report is the sixth year of the school. The standards for admission and the course of studies remained the same as in the past.

The year opened with 25 boys, 20 in the second year class and 5 in the first year class. At the end of the year however there remained 20 students, 17 in the senior class and 3 in the junior class. Out of these

13 in the senior class and only 1 in the junior class passed in the examination.

The total expenditure of the school including teaching staff and free boarding expenses amounted to Rs. 13,017 and the total receipts to Rs. 3,830 as against Rs. 16,048 and Rs. 1,700 respectively of the previous year.

Out of 46 boys turned out successful from this school upto now 13 having just passed out have not settled in life yet; 7 are managing their own land, 7 are in service connected with agriculture, 4 are continuing ordinary secondary education, 13 are engaged in business other than that of agriculture and whereabouts of two are not traceable. Those that are engaged in farming have not as yet exhibited any striking development to justify their education at this school.

The school does not seem to be appealing as useful to the agriculturists, as in spite of propaganda done through the Revenue authorities and through the Head Masters of primary Marathi teachers of schools teaching fourth standard and above and through members of the propaganda staff of the Agricultural Department and the members of the Jambul Agricultural School staff taking special advertising and recruiting tours in the vacation and through demonstrations given by bringing to the Jambul School parties of primary school teachers with prospective pupils and guardians. There is still ignorance about the existence of and arrangements provided about the School expressed in certain quarters and it must be a matter of time to see if there would be any better response as the school would be better known in course of time by the propaganda methods already in vogue and by more and more students passing out and working in agriculture in villages.

*Personal.*

42. All the superior staff have worked faithfully and hard to the best of their respective abilities and capacities. Mr. P. V. Wagle, Entomological Assistant, even in his short period of work has shown himself out to be deserving inclusion in the list of special mentions.

V. G. GOKHALE,  
Deputy Director of Agriculture,  
Konkan Division.

## APPENDIX G.

SUMMARY OF WORK DONE UNDER THE DEPUTY DIRECTOR OF  
AGRICULTURE, SIND, FOR THE YEAR 1922-23.*Organization.*

1. There have been no new appointments during the year—but Khan Bahadur Azimkhan, Assistant Registrar of Co-operative Societies, has taken over Agricultural Propaganda in certain talukas, which will be referred to below.

The devolution scheme connected with Agricultural Engineering has also come into force in the course of the year. Under this scheme the Deputy Director has taken over the executive duties of the Agricultural Engineer, together with the subordinate establishment. The Agricultural Engineer, however, will advise in all technical matters.

*Season.*

2. The season of 1922-23 must be described as one of the best in recent years. The River rose timely, and a good level was maintained throughout the inundation season. There were no intermittent periods caused by temporary falls in the river level, and the inundation period extended well into October. At no time did the river rise very high, and hence areas which depend upon flood waters, did not receive quite so much submersion as is the case in many seasons, caused by a few days of very high river levels in August. The Jamrao and Mithrao canals worked very well in the *kharif* season, and the *rabi* supply was better than for many seasons, which was reflected by wheat sowings on a considerable scale.

The *kharif* rainfall, which is practically restricted to South Sind, was fairly normal, but the *rabi* rains which are such an important feature in the north of Sind, and which so greatly improve the *bosi* wheat, were much below normal, being hardly sufficient to be felt.

On the whole crops were good everywhere and there was ample fodder. The cotton crop is known to have reached 160,000 bales. Diseases and pests, however, were not absent. The Cotton crop in East Sind had a few bad weeks from boll-worm attack, and there was also a good deal of boll-rot. In certain parts of North Sind the rice crop suffered from "khas" sterility. Jowar on the other hand did not suffer much from either stem borer or "khas." There was a fairly widespread attack of wheat rust but the climatic conditions caused it to subside before the damage became serious. The rat pest on wheat and rice was considerable in places.

There was no frost and the potato crop in Sukkur taluka was excellent in consequence.

The health of the people was not very good. Malaria and a mild type of influenza were abnormally bad in East Sind, and this greatly impeded harvest operations. As regards prices, the general fall which



affected cereals including rice and wheat, did not extend to cotton. Cotton in fact commanded excellent prices throughout the season, rising to Rs. 17 per maund of seed-cotton (84 lbs.) and never falling below Rs. 12.

*Research and Investigation.*

*Cotton.*

3. The botanical work on this crop is in the charge of Mr. Thadani of the Provincial Agricultural service. The problem in Sind is two-fold—

- (1) The improvement of deshi cotton, which alone can be grown over the greater part of the cotton tract under existing irrigation conditions.
- (2) The production by hybridization or otherwise, of an American variety, suitable to the Jamrao tract.

With regard to deshi, this cotton is not considered by the Trade to possess staple, but it is in high favour, because of certain other characters which it possesses in greater degree than do other cottons of a similar type in India. These are (1) roughness and (2) brightness.

The Agricultural Department isolated a large number of strains some years ago, and recent work has consisted in eliminating all but the best and in increasing the seed of the latter. The best strain is known as 27 WN. Other strains which were still under trial in the year under report are noted in the margin. The WN strains all did well in the year under report. Number 14 WN in particular has a very high ginning percentage.

Selfed material of this group has been secured for further trial. The YN strains are midway between the WN and WB strains as regards earliness and yielding capacity, and hence it has been decided to reject this group, as also the WB group in which the strains are late and somewhat lower in yield than the WN strains.

The special advantages of these WN strains over ordinary deshi cotton are—

- (1) high ginning percentage
- (2) brighter colour
- (3) rougher feel
- (4) earlier and more even ripening.

In the year under report 27 WN again did very well. There was a block of 33 acres sown with this variety in May and June on the Seed Farm at Mirpurkhas and the average yield was 954 lbs. (*i.e.*, 12 maunds) of seed cotton per acre including plots attacked by wilt and damaged by "kalar" salts. The highest yield rose to 1,758 lbs. or 22 maunds pe

acre. In point of acreage yield, however, ordinary deshi is also capable of giving similar outturns under equal conditions, though the crop matures less evenly.

At Mirpurkhas this variety (27 WN) has been giving a ginning return of 16 seers of clean cotton per 41 seers of seed cotton, whereas Jamrao, deshi gives  $13\frac{3}{4}$  seers of clean cotton.

This cotton was ginned departmentally to provide pure seed for distribution, and the ginned cotton was sold to Messrs. Ralli Brothers who purchased it for Rs. 44-8-0 per maund against Rs. 39-8-0, the rate for Sind-deshi. That Firm reported as follows "This cotton is an exceptionally desirable type of deshi cotton owing to its great roughness and its very high class and we are of opinion that even if it were cultivated extensively in Sind, it would always find ready buyers at a substantial premium over the ordinary deshi quality."

4. The work on American cotton includes the maintenance of pure seed of the Punjab F 4 variety, and hybridization between this cotton and certain high class American cottons. The special merits of Punjab F 4 are :—

- (1) prolificness
- (2) earliness
- (3) relative resistance to red leaf blight—and general hardiness.

In point of yielding capacity it holds its own with Sind deshi and 27 WN, two very prolific cottons. On an area of  $5\frac{1}{2}$  acres at the Mirpurkhas Seed Farm the average yield was 1,008 lbs. of seed cotton, *i.e.*,  $12\frac{1}{2}$  maunds and there was a fair amount of kalar in the land. The best plot exceeded 20 maunds per acre.

As regards earliness it has been found that when this cotton is sown before mid-May, 90 per cent. of the crop is picked before the end of November. In the year under report practically the whole crop of F 4 was picked before the close of the month of November, the crop having been sown on the 21st to 24th April.

Selfed material has been obtained for providing the supply of pure seed of this cotton.

This cotton has a short fibre some  $\frac{5}{8}$ ths to  $\frac{3}{8}$ ths of an inch. Hence special efforts are being made to breed a variety possessing all the good characters of F 4, and in addition a staple of one inch or above. For this purpose a number of crosses were made in the year under report between F 4 and the marginally noted American cottons. The F 4 of the farm was ginned departmentally to provide pure seed, and the resulting ginned cotton was sold to Messrs. Ralli Brothers for Rs. 57-8-0 per maund—the rate for Sind deshi being Rs. 39-8-0 on the same day.

5. Of the several varieties of American cotton which are being grown at Mirpurkhas, mainly to provide parents in hybridization but partly on their own account, the two most promising are Durango and "Webber-49".

These have yielded at the rate of upwards of 12 maunds of seed cotton per acre, and have shown a fair amount of hardiness in this, the first year of acclimatization. The staple runs from  $1\frac{1}{2}$  to  $1\frac{1}{4}$  inches. These cottons were sown in the first week of May, and "Webber-49" appears to come very early to maturity.

6. Another promising cotton under trial at Mirpurkhas is Punjab 285. It was sown on a five acre scale in April in comparison with Punjab F 4. It has a staple of about one inch and appears to be a little later than F. 4. The average yield was 1,032 lbs. or nearly 13 maunds of seed cotton per acre against 1,008. lbs of F 4. The great bulk of the crop was harvested before the end of November, and the ginned produce was sold to Messrs. Ralli Brothers for Rs. 67-4-0 per maund against Rs. 57-8-0, the rate for Punjab F 4 on the same day. The best plot of this variety yielded 1,840 lbs. or 23 maunds of seed cotton per acre. This cotton does not appear to be quite so robust as F 4, but this year's results justify a more extended trial, and this has been arranged for with an enterprising zemindar.

Mr. Thadani's report deals in detail with all his work on cotton, and contains the results of valuable observations upon the incidence of diseases and upon the botanical characters of the several varieties of cotton with which he is dealing.

#### *Rice.*

7. Botanical work under Mr. Thadani is being conducted on this crop at Larkana. There are a number of varieties in cultivation in the North of Sind, but the three marginally noted varieties  
 Jajai Sugdasi.  
 Prong Sugdasi.  
 Kangani.  
 have been selected for improvement. These represent the most important types, and the bulk of the rice crop is raised from these varieties. At present work is concentrated on isolating pure strains and testing these among themselves. To begin with, 100 strains of each were selected, but these have been reduced by selection to 10 principal strains in each variety. Selection is being made with special reference to the characters which determine yield, such as tillering capacity, length and branching of earhead, freedom from sterile spikelets and weight of grain. A certain amount of selfed seed will be secured in each strain to maintain its purity until the inter-strain comparative tests have been completed. After this the best strain will be maintained by the usual methods, and seed multiplied for distribution.

8. The problem of sterility will be closely studied in connection with this rice breeding work. Mr. Thadani has observed that about 2 per cent. of the flowers of most of the varieties do not open at all, and of the open flowers a certain percentage give worthless grains. The total sterility due to these two causes acting together, occasionally rises as high as 32 per cent. of the total grain of the earhead—or even higher in individual plants.

Careful observations conducted in the year under report, show that rice fertilization takes place between the hours of 7-30 a.m. and 12-30 p.m.; and the most vigorous period is 10-30 a.m. to 11-30 a.m. The temperatures corresponding with these periods range from 86° to 99° F.

#### *Wheat.*

9. Work on this crop has been in progress for some years, and now there are a number of strains isolated from the best Sind varieties. These are being reduced by process of elimination. The two best known wheats in the North of Sind are Phundani and Thori and these are prolific varieties under good treatment—yields ranging up to 26 maunds or 2,080 lbs. having been obtained at Sukkur. Nevertheless the Department is recommending the public to go in for Pusa 12 which is also a very good yielder, and moreover it possesses certain other valuable characters in the high quality of the grain and in its immunity from rust.

In some villages it has been observed that Pusa 12 has been inclined to lodge. This is confined to the irrigated crop, and is probably brought about by the tendency to give the first irrigation too early. It is highly desirable to withhold the first irrigation from this wheat until it has had time to become well and deep rooted.

Among the red bearded wheats of Sind, cultivated in the south of the Province, it has been found that the F.S. type is the best, being both early and prolific. The former character is very important in the south of Hyderabad District where the climatic conditions are favourable to rust and the irrigation facilities are bad in the latter part of the season. In the Sindhi white bearded class a G.S. strain [36] promises to be very suitable for the Jamrao and Mithrao area, but here it will be in competition with Punjab 11 (an imported variety) which has been giving much satisfaction to Jamrao zemindars.

10. At the request of Mr. Howard a trial was given to seven other types of Pusa wheat which belong to his 50-series. These were grown in adjacent plots to Pusa 12 and Pusa 4. Several of these wheats are awned, whereas Pusa 12 and Pusa 4 are awnless, and it would be a great advantage if we could obtain an awned variety, possessing all the other good qualities of Pusa 12. The land at Jacobabad is not absolutely uniform, hence the results recorded below are not strictly comparable, but they give a good indication of the yielding capacity of these wheats. The yield figures are slightly increased owing to a soft threshing floor, and the weights recorded refer to unwinnowed wheat grain containing dust. These wheats were all sown in the third week of November and were grown by the "bosi" method, i.e., the standing crop was not irrigated.

Among the observations made it was noted that the bearded types possess brittle and slippery straw, which caused some complaints from the men handling and carting the produce, as they could not load the carts to their full capacity, and there was much tendency for the stuff to work loose and drop on the road.

It will be observed that the bearded types have not yielded so well as the awnless types.

Name of variety.	Yield of grain in lbs. per acre.	Description of grain.	Remarks.
P 50*	1,488	Good and heavy	....
P 51*	1,480	Do.	....
P 52	1,800	Lighter than above.	
P 54	1,232	Do. and thin	
P 55	740	Do. do.	Low yield due to effects of levelling land.
P 56	1,200	Do. do.	
P 12*	1,950	Plump and heavy	Those marked with an asterisk are awnless, while the rest are bearded.
P 59	1,394	Light-thin grain	
P 4	1,920	Plump and good	

None of the 50-series possess grain equal in appearance and size to that of P 12 and P 4. The most attractive of the 50-series in the field was No. 56. This is a strong upstanding wheat deserving of further trial, but there is no evidence that any in this series are superior to P 12. On the other hand P 4 is doing fully as well as P 12 on this farm.

11. A trial was given to the well known Australian wheat "Federation" in the year under report. This variety has done very well in the North West Frontier Province. It is a short strawed or semi-dwarf variety. The grain is bold, and the crop stands up well. The yield on two acres was 13 maunds 26 seers per acre. It has been decided that this variety is worth a further trial.

12. All the Pusa wheats and Federation come to early maturity at Jacobabad, and it has been decided that none of them should be sown before the 20th November lest they flower before the 10th February when there is still the risk of frost.

In the year under report there was an outbreak of yellow rust which attacked all the wheats except Pusa 12 and Pusa 4, but the damage was not serious as the disease subsided before it had spread beyond the leaves. Further details of work on wheat will be found in Mr. Thadani's report.

13. The arrangements for producing a supply of high quality pure wheat seed at the Jacobabad Wheat Farm for primary distribution have worked well.

The seed grown on this farm amounted to over 1,100 maunds (in 1921-22) and this was distributed in the year under report. This seed was carefully graded in a rotary screen, manufactured by Messrs. Penny

and Porter of Lincoln, and only Grade I seed was distributed—amounting to nearly 1,000 maunds, of which 800 maunds, was Pusa 12.

In 1921-22 the area on this farm under Pusa 12 (Cawnpore Stock) was 44 acres, and the average yield was 1,464 lbs. (18·3 maunds) per acre.

The 1922-23 crop was also good but the yield figures are not yet available—and will be reported in next report.

#### *Gram.*

14. Several improved varieties of gram evolved by Mr. Howard of Pusa, are under trial at Jacobabad. Some of these are very excellent yielders ranging round 20 maunds (1,600 lbs.) per acre. The white varieties (numbers 6 and 9) are rather late in coming to maturity, and are thus exposed to the damage caused by the hot westerly winds which set in towards the end of March.

Number 10, a red variety, appears to be about the best of the lot, as it is a good yielder and was valued at Rs. 4-2-0 per maund in the local bazar, while some of the other types (numbers 17 and 25) were valued at Rs. 3-7-8 owing to the dark colour of the grain.

#### *Berseem Seed Production.*

15. The cost of imported seed has been Rs. 40 per maund in recent years and as the seed-rate is 40 lbs. per acre, the cost of seeding an acre has been Rs. 20.

It is important in view of the future possibilities of berseem in Sind, to clear up the question whether good seed can be produced in Sind. Experiments at Mirpurkhas have not been very promising, but the climatic conditions in May when the crop is maturing, are very severe owing to the prevalence of strong hot winds.

In the North of Sind these winds do not prevail, and berseem seed has been successfully produced both at Sukkur and Larkana. An average yield of 240 to 200 lbs. or 3 to 3½ maunds of good seed per acre has been obtained at both places, and over 4 maunds have been obtained on certain plots.

It has further been observed that :—

- (1) A couple of cuttings of green fodder may be taken, before assigning the crop to seed, without prejudicing the outturn.
- (2) A crop intended for seed should be sown timely, *i.e.*, not later than Mid-October.
- (3) The crop should be amply irrigated till about Mid-April.
- (4) The outturn of seed can be increased by manuring the land with cattle dung, and this is recommended.

*Fruit.*

16. The question of exploring the possibilities of fruit in Sind is receiving the careful attention of Government. A scheme for placing the work on a sound basis has recently been drawn up by a Committee of the three officers noted in the margin. This Committee has pointed out the special advantages for fruit inherent to Sind, including freedom from disease. Thus the grape does not suffer from either mildew or anthracnose which devastate the Nasik gardens. There are none of the Loranthus parasites which are the curse of mango plantations in the Deccan, and of all fruit trees in the Nalgiris. The Citrus group are practically free from die-back which makes the cultivation of the Santra Orange (even at Nagpur) so unsatisfactory. These varieties of fruit grow well, look healthy and yield well in Sind.

The Deputy Director of Agriculture,  
Sind.

The Economic Botanist to the Gov-  
ernment of Bombay.

The Horticulturist to the Govern-  
ment of Bombay.

In addition, the North of Sind is peculiarly favourable to the date which has been grown in this tract since the time of Alexander. The fig is another fruit which does very well in Sind.

At the present time the limited supply of irrigation makes it difficult to extend the fruit area in Sind, but there are several centres up and down the Province which have acquired a considerable reputation for fruit: thus we have Shikarpur in the North, Tharushah in Central Sind and Hyderabad in the South. With the construction of the new canals associated with the Sukkur Barrage scheme, some eight million acres will come under the command of perennial flow irrigation.

It is clear that the facilities for growing fruit in Sind will then become exceptional.

17. The fruit industry naturally falls into two sub-divisions:

(1) fresh fruit

(2) dry fruit and products made from fruit.

In a country like India the best opening for the fresh fruit industry lies with those fruits which can be readily transported, such as oranges and grapes. The dry fruit industry on the other hand has a wide field, as it is free from the limitations inherent in the fresh fruit trade, in which the perishable nature of the produce demands early sale and prompt transport. The Committee consider that the most promising new lines of development for the dry fruit industry are the production of raisin grapes and lime juice (from sour limes). The Committee also recommend that the existing date industry be aided by organising the supply of good stock from Mesopotamia and elsewhere. These suggestions imply that it will be necessary to employ a scientific officer of Provincial rank to control and direct these horticultural investigations, and it is proposed that part of the Mirpurkhas Experimental Farm should be placed at his disposal, where he would work out the economic aspect of the problem. It is essential in the first place to investigate the yield per acre on a fairly large scale, of raisin grapes and limes, and also to ascertain the quality of the raisins and juice of the sour

limes, and generally to study all the essential points underlying the culture of these fruits and the preparation of their products. At the same time the market for these commodities would be carefully tested. In this way it would be possible to arrive at a definite conclusion with regard to the prospects of a fruit industry in Sind, and how it should be organized. This would be a most valuable piece of knowledge to place before the public when the country possesses reliable perennial irrigation.

18. In the meantime the work on fruit at Mirpurkhas continues on a small scale. In the year under report 1,600 young fruit trees were sold. These were chiefly oranges, mangoes and vines.

*Soil Fertility.*

19. This problem has received considerable attention at Mirpurkhas. Under the existing conditions in Sind, land is so much in excess of water that there is little pressure on the soil fertility. In the inundation canal areas land lies fallow for 2, 3 or more years. Even on the Jamrao area the canal is designed only to irrigate one-third of the commanded area in a year, but owing to much "kalar" (salts) rendering considerable areas difficult to cultivate, cultivation tends to be restricted to the sweet land, and much of this is cropped once in two years. Even so it is generally observed that the fertility is falling, and enterprising zemindars dress their land with silt or manure, so far as it is available.

In order to study this question several experiments have been conducted on the Mirpurkhas Experimental Farm. On one plot (B 7) wheat was grown continuously from 1908-09 to 1921-22, with three exceptions, and during the last five years of this period a green manure crop of sunn grown in the kharif season was ploughed in and the plot sub-divided into eight sub-divisions, of which four were given phosphatic manures in addition to the sunn. Nevertheless the fertility judged by crop yield fell to a minimum level, ranging from 2 to 4 maunds, during the last 10 years, against 13 maunds in 1909-10. Samples of the soil were taken in 1922 from the control sub-divisions which had received no artificial manures. The analyses of these are tabulated in the following statement :—

Constituents.	Soil samples taken from Plot B 7 of Mirpurkhas Experimental Farm.			
	I Surface layer of 6 inches.	II Subsoil layer of 6—14 inches.	III Subsoil layer of 14-22 inches.	IV Subsoil layer of 22 to 30 inches.
Loss on ignition .. ..	7.34	5.60	5.36	5.52
Lime .. ..	4.53	6.27	4.64	2.64
Nitrogen .. ..	0.16	0.15	0.09	0.08
Phosphoric acid .. ..	0.16	0.17	0.16	0.13



Owing to retrenchment the Agricultural Chemist to the Government of Bombay did not determine the potash—but this constituent is probably not a limiting factor to the fertility of this soil. The Agricultural Chemist's comments on these analyses, are "I think the soils sent by you are all rich in lime and very good in phosphoric acid. Numbers 1 and 2 are very good in nitrogen also, while numbers 3 and 4 are fairly good in that constituent." These analyses show that the cause of exhaustion is not lack of plant food, and this is confirmed by the absence of response to phosphoric fertilizers which have been applied every year to four of the eight sub-divisions of this plot.

20. These results confirm a general observation in the Jamrao tract. It has been noted that when wheat is grown for the first time an excellent crop may be expected, but if a second crop is taken 2 or 3 years later without manure then the yield is materially lower. The yields of other cereals also tend to fall away rather rapidly, while cotton on the other hand continues to give good returns. As the cause of this phenomenon is apparently not lack of plant food, the explanation appears to lie in the effects of irrigation upon the texture of the soil, damaging this and presumably reacting unfavourably on the bacterial life in these soils.

All experience goes to show that where the texture is improved or maintained—then a high level of crop yield may be counted upon.

This can be achieved in three ways.

- (1) by long fallows of several years.
- (2) by increasing the organic matter in the soil.
- (3) by applying canal silt.

The texture of the soil does greatly improve on land left fallow for a long period, even if it is not cultivated, but this is not a practical system where good irrigation facilities exist.

It is essential in such circumstances to adopt the second or third method. The third method is practised in many parts of Sind, especially in the north, where excellent silt can be obtained from the spoil banks of the inundation canals. The second method is to be recommended wherever good silt is not forthcoming. The supply of organic matter in the form of cattle manure, is however very limited, and the Department has been investigating alternative sources. For the purpose, however, of fixing and keeping in view, a standard of crop outturn to aim at, a three year rotation of cotton, wheat and bajri is being maintained at the Mirpurkhas Experimental Farm, in which an application of 5 tons per acre of cattle manure is applied once in three years. This provides for an intensity of 100, or one crop per annum on the land. Altogether six acres are devoted to this rotation, that is two acres to each crop. In the year under report, as may be noted in the margin, excellent yields of cotton and wheat were secured while the bajri crop was only moderate. The most successful alternative to cattle manure is the cultivation of berseem or

Name of crop.	Average yield in lbs. per acre.
Cotton ..	1,242
Bajri ..	664
Wheat ..	1,718

Egyptian Clover in the rabi season, as this crop has a penetrating fibrous root-system which greatly improves soil texture. This crop however can only be grown on a very small scale at present owing to the limited supply of irrigation. A piece of land on the Seed Farm at Mirpurkhas has been assigned to this method of providing organic matter to the soil.

Green-manuring with sunn is being investigated, but this involves the loss of a productive crop once in three years.

It has also been observed that Sawas (*Panicum Miliare*) adds a large amount of organic matter to the soil owing to its tillering and fibrous root-system, and this is being grown with good results on land infected with "kalar" salts.

#### *Implements and Machinery.*

21. This is a very important problem in Sind. At present there is no whole time Agricultural Engineer—but such an appointment would be fully justified in view of the scope for good work in this branch of Agricultural development.

The plough is of course the most important implement in Sind, and local experience shows that improvement must begin at the bottom. The wholesale introduction of costly iron ploughs can not be the first step as the purchase of such implements—costing some Rs. 40 to Rs. 50—does not harmonize with the capital available for investment in dead stock by the cultivator, who is either a khatedar or tenant. Such a man responds much more readily to a cheap implement which is within the capacity of his purse, and the draft of which is not materially greater than what his bullocks are accustomed to. Another very important consideration is that a cultivator does not wish to invest much money in an implement which he can only rarely use.

Irrigation is only available for land under crop or about to be sown—hence the time available for tillage operations, is short. Irrigation is not available for facilitating tillage operations on fallow land, and without it such land is generally too dry for iron ploughs, as only a narrow sharp pointed tine can penetrate the soil in a dry state, with bullock power. In parts of the rice tract the conditions are more favourable as there is sufficient moisture left in the soil for a few months after harvest to permit of an iron plough working satisfactorily.

These considerations do not rule out the more expensive implements, but they explain why the public do not care to purchase them out-right. The most promising line to follow in this connection is to establish lending depots, where the people can obtain the use of such implements for a few days at a time, when and as required, and for a small hire charge. The Department has been investigating this alternative in the Sukkur Taluka with promising results, *vide* paragraph 61 below, and steps are being taken to develop this system.

22. During the course of the year an improvement in the design of the Egyptian plough has been worked out. In the existing design an iron

bar to adjust pitch, passes through a slot in the beam. It has been found that this is a source of weakness, and by the new arrangement the beam is supported within a fork-shaped iron piece which permits of the same adjustment.

In some parts of the Province the people are showing a disposition to go in for a very light type of iron plough of the "Meston" class. At Jamesabad a local mistri has been manufacturing for some years an imitation of this plough (price Rs. 10), and his sales are becoming considerable, *vide* paragraph 49 below.

Messrs. Burn & Co., however, are prepared to supply ploughs of Meston type at Rs. 8 each (Calcutta delivery) if ordered in large consignments of 50 at a time, and the Agricultural Inspector, Middle Sind, thinks these will find a sale in Shadadpur taluka. Mention was made of the "Orient plough" in last year's report, as being very promising for Sind. In the year under report the plough has received the careful attention of Mr. Schutte, who has made a few alterations in the design. That Officer is now working upon these modifications, and he is also going carefully into the cost of producing such a plough in this country. He is very hopeful that such a plough could be produced and sold for Rs. 15. If this proves to be the case then there is certain to be an excellent field in Sind for these ploughs—as they are a distinct advance on the Egyptian and Meston ploughs. They have beams and handles similar to Indian ploughs and hence the people handle them more naturally than the Western plough. On the other hand they have a good range of depth in ploughing, and turn the soil over well. This plough will be preferred by many to the Rajah plough or its imitations. The latter however is a very good plough and is particularly useful in stiff land or land infested with grass, where it preserves its balance better than does any one-handled plough. For such work, and particularly for hire purposes, the Rajah plough should continue to fill an important place in the tillage needs of the Province. With regard to the imitation Rajah, called Sirdar plough made by Messrs. Kirloskar Brothers, the price Rs. 40 is not sufficiently low to facilitate a ready sale—and moreover the draft is greater which is a distinct disadvantage, as the Rajah plough itself is criticised on this ground.

23. After the plough the most useful tillage implement on stiff land is the Cambridge roller. Owing to the wide distribution of "kalar" salts in Sind, much of the land has a bad physical texture, and hard clods are produced in ploughing such soils. The ordinary samar or flat wooden beam makes very little impression on such clods. It is a common sight in many parts of Sind to see men breaking clods with wooden mallets. Messrs. Howard & Co. of Bedford have made a special roller, at the request of the Department. This is only 4 feet wide, and it is fitted with notched rings 16 inches in diameter. It can be drawn by one pair of strong cattle. This roller has been found most efficient on the stiff land at Mirpurkhas. One of these rollers has been demonstrated in the district and it has been greatly appreciated. Such an implement is very suitable for stocking in a hiring-out depot as its cost Rs. 300 is more

than an individual cultivator can be expected to incur. Mr. Schutte is investigating the possibilities of producing a cheap imitation of this roller in India.

24. For some years, the Department has been in search of a good drill which will do good work under Sind conditions. Cotton is normally sown broadcast, but line-sowing has been adopted on Government Farms, and this method has been demonstrated in the district for several seasons. Hitherto no really satisfactory drill has been forthcoming. The drills used in the Presidency on black soil, are of little use in Sind as the requisite tilth for these is more difficult to prepare. The drill which has been provisionally adopted, is simply an adaptation of the Marwari plough with a tube fixed behind. This is a one-coultured drill and it does work of fair quality, but it still leaves much to be desired, as regards regular sowing and reliability. In the year under report the Department imported an American cotton drill manufactured by Messrs. John Deere & Co. of Illinois. This is known as 236 Cotton drill. It cost Rs. 219-11-0 landed in Sind. This drill sows two rows at a time and the seed rate can be regulated through a wide range. This drill is fitted with disc openers which readily penetrate the soil, and these are much more suitable for this class of soil than the runner openers which offer too much resistance and in consequence get thrown out of the soil. Sowing is of course automatic, and therefore the seed is dropped regularly. On the whole this is a promising type of drill, but it is perhaps a little too complicated in gearing for the Sind cultivator, and the depth to which the seed is dropped, is not too easily regulated. The ideal cotton drill for Sind has yet to be designed, but this drill should form the basis of any new design which should be simplified, and a more convenient arrangement for regulating depth should be devised. The principle of disc openers should be retained.

For wheat sowing the Hoosier disc drill has given much satisfaction at Jacobabad. This machine is fitted with 12 discs, set 6 inches apart; but as the sowing has to be deep, alternate discs are removed and the remaining 6 discs sow six lines, one foot apart, which is the interspace in the case of the local method of drilling. This drill is worked by one strong pair of bullocks, but as the draft is heavy, it is found advisable to work a different pair in the afternoon. This drill sows an acre in an hour and a half, and the cost of sowing works out at  $6\frac{1}{2}$  annas per acre against 18 annas by the local method. Moreover the sowing is most regular and the quality of work much superior to that of the local method. This machine costs Rs. 470 in Bombay and is suitable for a big zamindar or for a lending dépôt. A smaller Hoosier drill has recently been obtained for trial. This machine costs Rs. 170. It sows five lines at a time—the space between the lines being adjustable. It has not yet been tested, but it appears to be built on rather too fragile lines.

25. The separation of grain from bhusa, after cereal crops in India have been threshed, is an old problem. Winnowing machines do this class of work in a very unsatisfactory manner, and in fact are not designed for this object. Messrs. Penny and Porter of Lincoln have co-operated

with this Department in producing a machine for separating jowar grain from bhusa. This machine consists of a rotary perforated screen with a strong blast from a fan. This blast is sufficient to blow the lighter bhusa over a vertical iron sheet while the heavier grain falls to the ground. This machine has not yet been perfected and is now receiving the attention of Mr. Schutte who is making certain modifications. This machine is operated by one man who turns the handle at the rate of 40 to 50 revolutions per minute. It appears that an output of some 600 lbs. of grain per hour will be possible. If Mr. Schutte succeeds, as he hopes to do, in showing that the modified machine can be made in India within Rs. 150 there is certain to be a very great demand for such machines.

26. The problem of improving upon the Crude Persian wheel for lifting water by bullock power, is still unsolved. In the year under report the Department has been testing an Aquatole (one foot width of chain), and the ultimate solution seems to lie in a cheapened design of Aquatole. As made in England, there is too much metal in it and the cost, Rs. 1,670, places it beyond the ordinary man's reach. It seems quite probable however that, while retaining the main features of the design, the materials of construction might be much less expensive. It is highly desirable that the possibilities of a cheap type of Aquatole should be fully explored.

27. At Jacobabad the Cletrac tractor has been giving satisfaction under the careful control of Mr. Barkazai, Farm Superintendent. The best ploughing work has been done with a furrow-plough. The available plough (P & O self lift) has only two bottoms, but in this soil it is clear that the tractor is underloaded and that it could very easily haul a three-furrow plough. This outfit was kept running continuously every day for three weeks and the following observations were made:—

- (1) A two-furrow plough requires one and a half hours to plough one acre.
- (2) The area ploughed in a day was 4 acres, but if time had not been lost in measuring fuel and water and making other observations—it would have been practicable to complete 5 acres.
- (3) The ploughing was "bosi" wheat stubble and the depth 6 inches—which was as deep was desired.
- (4) The consumption of snowflake kerosine oil was  $15\frac{1}{2}$  lbs. per acre.
- (5) Four gallons of water were put in the radiator and two gallons added in the course of the day.
- (6) The water air-clarifier requires about one gallon of water per two acres of land.
- (7) There were no stoppages caused by break-down.

## (8) The running expenditure per acre amounted to—

Item.	Amount.		
	Rs.	a.	p.
15½ lbs. snowflake oil .. .. .	2	9	0
5 ozs. of petrol .. .. .	0	2	0
1 lb. of lubricating oil .. .. .	0	5	0
¾ lb. grease .. .. .	0	1	0
½ lb. cotton waste .. .. .	0	1	3
Labour charges .. .. .	0	4	0
		3	6 3

If the tractor and plough be valued at Rs. 7,000, and if over head charges be calculated at the rates shown in the margin, then in a year containing 200 working days, the cost per acre would amount to Rs. 2-11-9 which when added to the running expenditure, amounts to Rs. 6-2-0. With a three-furrow plough which would cost very little more to run—the cost per acre would be reduced and should not exceed Rs. 5.

It is reported elsewhere, *vide* paragraph 61 below, that the public have been paying Rs. 6 per acre to the Department for ploughing their land with the Rajah plough. Hence there appears to be a definite opening for tractor ploughing in the North of Sind.

At Mirpurkhas tractor investigations have brought out the special value of the Norwegian harrow and the Orwell cultivator for preparing a seed bed for cotton, but it is advisable to have the land well ploughed up some months previously, if no ploughing at the time of sowing is to be done.

*Tillage and Cultural Operations.*

28. In Sind the usual method of sowing dry crops is to broadcast the seed after the irrigation water has dried up and cattle are able to walk over the land. In some cases a preliminary ploughing may be given. The seed is then buried by ploughing the land. This method, though very haphazard, has one important advantage. It provides for putting the seed into the soil with the minimum interval of time after irrigation. This ensures sufficient moisture for germinating the seed. In the kharif season the top moisture disappears with great rapidity under the influence of a strong sun and drying winds which characterise the Province. Hence it has sometimes been found, if much time is spent in preparing a fine seed bed, the soil moisture may recede too deep for a good germination, even when the seed is drilled well down. Hence the most successful method of drilling cotton at Mirpurkhas has been

to have the land ploughed up some months in advance. Then the field is watered when the sowing season arrives, preferably twice. The seed bed is then rapidly prepared by ploughing and clod crushing and sometimes discing, and then the seed is drilled without delay, preferably on the same day on which the first tillage operation after watering, is done. In this way the advantage, mentioned above as associated with the broadcast method, is secured.

29. The work at Larkana on ploughing rice stubble with an iron plough in the winter is being continued with good results. With regard to the investigations at Larkana on rice seed economy, good results with the reduced seed rate of 20 lbs. per acre continue to be got, but it has been observed that the seed rate must depend to some extent on the date of transplantation. It is observed that late sown rice must be transplanted more thickly than early transplanted rice, owing to the shorter period available for tillering and after growth.

30. The "bosi" wheat crop at Jacobabad was rolled with the Cambridge roller when a few inches high with excellent results. This had the necessary packing effect upon the soil and brought up the moisture, which was evident from the good colour which the crop assumed. Much interest was shown by the public in this operation.

#### *Irrigation.*

31. The investigations upon the "duty" of rice were continued at Larkana, and the results confirm those of last year that a duty of 40 can be expected, while there are indications that a duty of 45 may be obtainable.

32. At the request of the Irrigation Department a series of careful observations were made in the Nara valley, to elucidate the irrigation requirements of the local Ratria variety of rice. In the autumn months water is in great demand on the Jamrao and Mithrao canals for finishing the cotton crop and for sowing wheat, but the people demand water for Ratria rice, until the end of October or beginning of November. These observations were conducted at three centres so as to be representative of the Upper, Middle and Lower sections of the Mithrao canal.

The results have been carefully recorded and some of the chief points noted were—

- (1) Sowings were done between the 20th of May and end of June.
- (2) Flowering did not commence until the 6th to 12th October and was not complete until the 16th to 23rd of October.
- (3) The crop ripened from the 1st to 10th November.

In these circumstances it would seem necessary to provide irrigation for this crop at least, till Mid-October.

#### *Livestock.*

33. The Department has a small herd of Delhi buffaloes at Sukkur where the object is to breed bulls of a good milk strain. In several

parts of Sind, notably in Kamber Taluka of Larkana and in Shahbunder sub-division of Karachi district there are large numbers of milch buffaloes, many of them good milkers.

The Sind buffalo is not very definite in breed, but it belongs broadly to the Delhi type, and good bulls of the latter breed appear to be very suitable for grading up the Sind stock.

At Sukkur it is only possible to carry on this work on a small scale as the stock are stall-fed, and there is no grazing area apart from open jungle. The plan adopted hitherto is to keep the young stock of selected animals only and to send them to Larkana for rearing, after being weaned. There are at present 10 young bulls of various ages. The performances of a few of the animals are summarized below:—

Name of she-buffalo.	Serial No. of calf.	Dates of calving.	Yields of milk.		
			First 300 days.	Full lactation period.	Highest yield per month.
Makini .. ..	1	25th August 1918 ..	5,356	5,753	687
	2	6th December 1919.	6,712	7,454	940
	3	28th April 1921 ..	4,728	4,730	728
	4	1st April 1922 ..	5,499	5,559	875
	5	8th March 1923 ..	..	..	..
Mumal .. ..	1	10th July 1918 ..	4,433	4,504	568
	2	23rd August 1919 ..	5,630	6,219	656
	3	11th January 1921 ..	5,160	6,602	739
	4	27th May 1922 ..	6,297	6,956	776
Suhai .. ..	1	4th August 1918 ..	4,084	4,544	548
	2	2nd October 1919 ..	5,011	5,011	647
	3	2nd November 1920.	5,663	5,966	850
	4	9th March 1922 ..	5,826	6,126	865
	5	15th April 1923 ..	..	..	..
Miari .. ..	1	25th September 1918.	4,045	4,075	562
	2	9th October 1919 ..	4,413	5,652	518
	3	23rd April 1921 ..	3,357	3,357	668
	4	5th April 1922 ..	5,014	5,127	811

*Seed supply and extension of area under new or improved varieties of staple crops.*

34. In most parts of India little real difficulty seems to have been met with in extending the area under new or improved crops, once their merits have been recognised. Private seed farms and co-operative



seed Unions have been organised with comparative ease. Growers have co-operated with the Agricultural Department in the disposal of their cotton, so that the improved produce found its way in bulk to one or two, or at most a few large buyers, who in turn have stored and ginned it separately. Thus seed of improved crops has been rapidly multiplied in a state of fair purity, and the growers have been in a position greatly to extend the areas from season to season. A ratio of extension of 10 : 1 has been found practicable in some parts of India.

In Sind on the contrary much difficulty has been experienced in extending areas under improved varieties because of the seed not being forthcoming. There is in fact a remarkable leakage in seed due to several causes, some of which are described below. To take the case of cotton first, the following causes may be mentioned :—

- (1) Under the landlord and tenant system there are two parties to the cultivation of the crop. The landlord may be keen but his tenants careless; so that any gaps caused by faulty germination may be filled by deshi seed.
- (2) Advance sales in order to raise ready cash are common. Such produce is apt to get separated from that which is sold after maturity.
- (3) The produce is sold in dribbles in the village, either to petty dealers or commission agents of larger firms. These middle men buy a little here and a little there. In one village it may be the improved variety, in another the deshi, or some of both in both villages. The average purchaser finds it inconvenient to pack up and keep separate different lots of cotton. It suits him better to lump it all together when filling his gunnies. Moreover the petty men resell to other dealers, and thus the produce passes through a multitude of hands before being ginned. Unless each individual in this chain of dealers takes special precautions there is no chance for the improved variety remaining intact.
- (4) In certain ginneries owing to careless management the seed of improved varieties becomes mixed up, notwithstanding the efforts of the Departmental staff.

For these reasons the improved variety is either lost altogether or becomes so adulterated that the seed is not worth recovering. An example may be quoted. In the year under report some 265 maunds of seed of an improved variety of cotton was issued in East Sind, but only some 81 maunds were ultimately recovered from the produce, after much effort.

35. The remedy seems to lie in flooding certain selected villages with seed of the improved variety, so as to exclude all other seed, and to arrange with one or two large firms to make it their special business

to buy up the whole, or as much as possible of the produce in these villages, and to gin it separately. Before it is possible to flood a village with seed, that seed must be produced in considerable quantity under Departmental control.

For this purpose the Department has taken up an area of waste land commanded by the West branch of the Jamrao canal, in deh Chellaro, near to Dhoro. This land will be cultivated by the tenants of the Department under very close supervision. In this way the seed which is multiplied in the first instance on the Government Seed Farm at Mirpurkhas will be given a second multiplication at Dhoro. The seed from the Dhoro produce will be issued to one or more selected villages, so as to sow the area completely and allow a good margin for any resowings.

In the current season this scheme is being worked only in connection with an improved strain of deshi cotton, 27 W.N. If it works satisfactorily it can be extended to American.

36. Meanwhile the supply of pure American seed is presenting much difficulty. Messrs. Ralli Brothers who purchased most of the 1922-23 crop, reported that on the average it contained 13 per cent. of deshi and the best contained about 8 per cent. The demand for this seed does not declare itself till March when the state of the river determines the public whether to sow or not to sow American cotton. In the present season irrigation prospects were good in March and the Department endeavoured to import seed in bulk from the Punjab, but most of the Punjab seed is disposed of before this time, and it was only possible to import a small quantity of seed. In view of this experience it seems essential that the Agricultural Department should undertake the risk of importing 5,000 maunds of pure American cotton seed from the Punjab in December next so as to be able to meet the demand for seed in March 1924, if it arises. If it does not arise, then the seed can be exported. The risk involved would amount to about Rs. 5,000.

37. With regard to wheat seed, this has also proved difficult to recover. Even from a large seed grower it is rare that more than two to three times the seed issued to him is recoverable in practice, as his tenants receive half the crop and he keeps something for his own requirements. In north Sind some 1,700 maunds of Pusa 12 seed were issued in the year under report, but it is not now expected that more than some 3,000 maunds will be recoverable. This is partly because some of the seed has been issued in small lots for propaganda purposes. In this case also it seems essential rapidly to fill up a few villages, with this variety. When this is done it will be more practicable to organise the re-purchase of the whole surplus produce in these villages because the crop will be pure and there will be no need for special arrangements to obtain the produce of this man and reject the produce of his neighbour. In order to achieve this object of rapidly filling up a group of villages with pure Pusa 12 seed, it will be necessary to import a large consignment

of say 4,000 or 5,000 maunds from the United Provinces. Recent enquiries show that this will involve a loss which can be calculated. It is strongly recommended that expenditure to the extent of Rs. 5,000 be incurred for this purpose.

38. Finance is another aspect of the seed problem in Sind of great importance. In other Provinces where operations have become considerable, the financial organization has been mostly provided by Co-operative Seed Unions and Societies. Hitherto it has not been possible for the Co-operative Department to develop these Unions, and in their absence the only alternative is private enterprise, as the limit to which Government can go is soon reached. K. B. Azimkhan, Assistant Registrar, has been successful in inducing a large merchant of Tando Adam to finance cotton seed operations and a similar arrangement has been made with other merchants in the north of Sind to finance wheat operations—but this arrangement can hardly be regarded as final as those merchants are not philanthropists, and they cannot be expected to hold on to their wheat stocks with a falling market. Seed Unions seem essential for this reason and also to prevent any undue profits being made.

*Propaganda.*

(Organization.)

39. The Province was found too large for one Divisional Superintendent as this involved excessive railway travelling. Accordingly it has been divided into the marginally noted three divisions, and two agricultural Inspectors have been appointed, one in charge of middle Sind and one in charge of North Sind. These changes were effected in 1921-22, but the year under report is the first full year in which the scheme has been operative. This plan has worked well as the conditions and problems of these three divisions are fairly distinct. East Sind covers the area which in theory at least, receives perennial irrigation from the Jamrao and Mitharo canals. The cultivation of American cotton is limited to this area and the irrigation of field crops in the rabi season is confined to this tract, except the relatively small areas irrigated from wells.

Middle Sind covering Nawabshah and the non-rice talukæ of Hyderabad, includes the best deshi cotton cultivation and is characterised by "lift irrigation". In this tract there is very little rabi cultivation except along the river margin, where moisture has been stored from flood waters.

North Sind includes the finest rice tract in the Province. It also includes most of the "bosi" area, that is the land irrigated in the kharif season but not cropped till the rabi season, with wheat or oil seeds or gram.

Division.	Talukas.	
East Sind	{ Mirpurkhas. Jamesabad. Digri.	40. Within these divisions the Department is concentrating its work within the marginally noted talukas in order that it may be more intensive and sustained, as the staff available for propaganda is still very small.
Middle Sind	{ Hyderabad. Hala. Shahdadpur. Tando Allahyar.	
North Sind	{ Sukkur. Ghotki. Kamber. Larkana.	

The staff allotted to each of these divisions consists of one Divisional Superintendent or Agricultural Inspector and three Agricultural Overseers—the plan being that each taluka should, if possible, have one Agricultural Overseer.

41. Late in the year under report a further development in this organization took place. This consisted in combining Co-operative and Agricultural propaganda under the control of one officer. Khan Bahadur Azimkhan took charge of this combined work in Middle and North Sind towards the end of February 1923.

42. During the year under report Government constituted Divisional Boards of Agriculture for each important division in the Presidency including Sind. The Sind Divisional Board of Agriculture held its first meeting in August 1922, and it meets three times a year. The Board consists of two officials and four non-officials. The two officials are the Deputy Director of Agriculture and the Assistant Registrar of Co-operative Societies. The names of the four non-officials are noted in the margin. Two of these gentlemen represent Agricultural interests and two Co-operative interests. The Chairman is the senior official for the time being. The Board is intended to be a small compact businesslike body, and its primary function is to keep the work of the Department in accord with the wishes of the public. It concerns itself, in particular, with propaganda work both co-operative and agricultural. For instance, it scrutinizes the quarterly progress reports and programmes of the propaganda officers and approves of all expenditure incurred on such work. It gives special attention to promoting non-credit co-operation, and makes recommendations upon applications for loans for agricultural improvements under the Land Improvement Loans Act (XIX of 1883) and the Co-operative Societies Act. More recently there has been a movement to organise Taluka Development Associations. The object of such bodies is to organise the people of a taluka for the purpose of undertaking improvements which will benefit the taluka as a whole. Such bodies are expected to raise funds by subscriptions, donations and fees. Applications from such Taluka Development Associations for registration are submitted in the first place to the Divisional Board for approval. Government will also give grants-in-aid

Khan Bahadur Bautto.  
Khan Sahib Chakurkhan.  
Mr. Jamshed N. Mehta.  
Mr. Manohardas Kauro-  
mal.

to such Associations subject to certain conditions and to the approval of the Divisional Board.

Hitherto applications for registration have been received from eight Taluka Development Associations, and it is understood that these are being registered.

*The work of the year.*

43. Agricultural propaganda has been pushed on in each of the three divisions mentioned in paragraph 40 above, along the main lines described in paragraphs 25 to 28 of last year's report, and it will be convenient to refer to each division separately.

*East Sind.*

44. *American Cotton.*—Considerable progress was made in the year under report owing to the supply of irrigation being favourable, especially in the early part of the season (March-April) when sowings take place. The public are firmly convinced that American cotton to be successful, must be sown early; hence the area sown depends upon the irrigation conditions in March and April. Given good conditions in these months, it is quite safe to assume that the people of their own volition will sow a relatively large area under this cotton on the Southern Jamrao. In the year under report the exact area could not be ascertained but it was probably between 5,000 and 7,000 acres as the crop amounted to some 2,000 bales—against 3,000 acres estimated in the preceding year. This is the largest area sown under exotic cotton in one season since the Department began its efforts to introduce stapled cotton into Sind.

This fact is significant because the Department issued only a small proportion of the seed required to sow this area, and hence it may fairly be inferred that the people themselves took the initiative to obtain seed from any available source. Enquiries show that the chief sources of supply were—

Source of seed.	Amount of seed issued in maunds.
Agricultural Department ..	337
Jamesabad Factory of the Hon. Mr. Bhurguri ..	1,167
Mirpurkhas Factory of Messrs. Ralli Brothers ..	36

The variety sown was Punjab F4 and this is undoubtedly the most suitable American cotton for Sind under existing conditions as it rapidly matures—taking rather less time than deshi—and releasing autumn irrigation for a *rabi* crop like wheat. This is obviously a very important economic character. It, moreover, is less susceptible to damage from

red leaf blight than other American cottons. This cotton, however, would never have been taken up by the people unless it had proved a good yielder. It is undoubtedly prolific and compares very favourably with local deshi which is also very prolific. If sown in good time it yields fully as much seed cotton as deshi, while under specially favourable conditions the outturn is very high, *e.g.*, in Kathri locality Ghulam Nabi Bozdar picked 65 maunds (80lbs. per maund) of seed cotton from an area of  $3\frac{1}{4}$  acres.

This cotton commanded a premium of 2 annas on the rupee for seed cotton over deshi. In this connection it may be pointed out that trade competition is hardly sufficient to ensure this premium as purchases are made very largely by one Firm, Messrs. Ralli Brothers. Fortunately this Firm takes a very long view, and has decided to buy all American cotton offered to it at this premium in order to encourage its cultivation, in the belief that such encouragement will ultimately react to the benefit of the Firm. Messrs. Volkart Brothers have recently opened a factory at Mirpurkhas and are also showing much interest in this cotton.

45. It may safely be said that the area under this cotton would have risen to some 15,000 acres in the current season (1923-24) if good pure seed could have been secured. Unfortunately the local supply of seed is most unsatisfactory. As pointed out in paragraph 36 above, Messrs. Ralli Brothers reported that the American cotton purchased by them contained on the average 13 per cent. of admixture, and that the best samples contained 8 per cent. admixture. At the suggestion of the Agricultural Department Messrs. Ralli Brothers exported most of this seed.

It is probable that pure American seed in bulk will continue to be difficult to secure in Sind under present conditions, because it is not practicable to oust deshi completely so long as the irrigation supply in March-April is doubtful. Both cottons will continue to be grown side by side. Of course certain growers will take special precautions to keep their American crop pure, and the Department succeeded in obtaining upwards of 600 maunds of seed from the produce of such men. The procedure adopted was inspection by the staff of the Agricultural Department, who registered those zemindars whose crops were pure and who had had their crops "rogued". A list containing

Source.	Quantity in maunds.	
Mirpurkhas Seed Farm 1922-23 stock ..	46	these names was supplied to Messrs. Ralli Brothers who kindly stored the seed cotton separately and arranged for its separate ginning. This seed was then taken over by the Department at Rs. 3-8-0 per maund. Altogether the Agricultural Department provided 1,021 maunds of seed for distribution in 1923-24, as noted in the margin.
Mirpurkhas Seed Farm old stock ..	123 $\frac{1}{2}$	
District purchased through Messrs. Ralli Brothers ..	577 $\frac{1}{2}$	
Imported from Punjab ..	225	

This however was only sufficient to meet a fraction of the demand which revealed itself in March, when it became known that irrigation facilities were promising.

The Department at this time endeavoured to meet part of this demand by importing seed from the Punjab, but March is too late in the season to undertake these operations as the seed of the previous crop is disposed of before this time.

A purchase of 50 tons of seed, however, was actually made on behalf of the Department, but it had to be rejected before taking delivery as it was found to be inferior and damaged from heating.

In future it would seem advisable to purchase seed in the Punjab in November-December as suggested in paragraph 36 above.

46. *Improved deshi cotton*.—The improved strain of deshi cotton isolated by the Department is known as "27 W.N." Seed of this cotton is available in small quantity. Altogether 346 maunds (including 75 maunds supplied to Middle Sind) were distributed in the year under report, of which about 100 maunds were issued to co-operative societies for propaganda purposes. The balance was issued to the marginally noted zemindars for the purpose of multiplication. It was hoped that these growers would be the source of a large supply of seed for the following season, but in practice it was found very difficult to secure pure seed from them for various reasons detailed in paragraph 34 above.

Name.	Village.	Quantity in maunds of seed.	ing 75 maunds supplied to Middle Sind) were distributed in the year under report, of which about 100 maunds were issued to co-operative societies for propaganda purposes. The balance was issued to the marginally noted zemindars for the purpose of multiplication. It was hoped that these growers would be the source of a large supply of
Mr. Rochiram Tahilsing ..	Kathri ..	25	
Haboo Kamgar ..	244 Deh of Mirpurkhas taluka ..	6½	
Mr. Tirithdas Manikram ..	Digri ..	20	
Syed Md. Hussain Shah ..	84th Mile Jamrao ..	10	
Lakha ..	Deh 110 Mirpurkhas ..	6	
Syed Bandaishah ..	Deh 215 of 84th Mile Jamrao ..	10	
Babu Ghulam Mahomed ..	Daulatpur ..	10	
Lala Ramdittamal ..	Daulatpur ..	16½	
Mr. Valiram Sachanand ..	Sinjhor ..	10½	
Sind Reclamation Co. ..	Tillashah ..	20	
Babu Ghulam Mahomed ..	Deh 21 of Sinjhor ..	20	
Mian Shahbux ..	Deh 129 Mirpurkhas ..	10	
Mr. Tilockchand ..	Tando Adam ..	15	
Mr. Manohardas ..	Nawabshah District ..	5	
Mr. Bulchand ..	Do. ..	5	

seed for the following season, but in practice it was found very difficult to secure pure seed from them for various reasons detailed in paragraph 34 above.

The Divisional Superintendent of Agriculture was, however, successful in recovering 81 maunds of seed from the produce of fields in which special precautions had been taken to prevent mixture. In this case the growers agreed to sell their produce to Messrs. Ralli Brothers, who in turn kept it apart for separate ginning.

47. *Wheat Seed*.—The variety which has met with most popularity on the Jamrao canal is Punjab 11. This is a tract full of trees which harbour large numbers of birds, hence an awnless variety like Pusa 12

is not in favour. Punjab 11 on the other hand is awned and is a good yielder. In the year under report 738½ maunds were distributed; out of this quantity 405½ maunds were issued to Co-operative societies. The demand for seed was very strong and the Department could have distributed some 4,000 maunds of seed if it had been available. The irrigation facilities were satisfactory, and the yields obtained with this wheat were very good, and the public are now very keen on securing seed of this variety.

48. *Implements.*—Nothing has met with more approval than the Egyptian plough. This is a very good plough for use in conjunction with irrigation and its merits are fully described in leaflet No. 1. It has long been established in Mirpurkhas taluka and it is spreading into Sinjhor, Jamesabad and Digri talukas and also part of Nara valley. The Department is now giving special attention to arranging with local mistries to take up the manufacture of these ploughs. The procedure adopted is to give a small advance to a mistri for the purpose of making and stocking a few of these ploughs. These are shown to customers and when disposed of the advance is recovered. In this way a demand springs up and the mistri deals with future orders without financial assistance. An important feature of this work is not insisting upon sticking rigidly to the exact specifications of the plough. If it is more convenient to use a bent pole of babul wood instead of a straight piece of jarrah wood then this is permitted, provided there is no important departure from the essential design of the plough. By this means the price of the plough can be kept very low not exceeding Rs. 4 to 5.

In this way orders for Egyptian ploughs are dealt with direct by the mistries who make them, and the Department distributes only a limited number. Thus direct purchases are now estimated at about a couple of thousand ploughs per annum.

49. Among the Punjabi colonists there is a tendency to go in for a light iron plough. The type which appeals to these people is a local imitation of the Meston plough. These are being made by a mistri in Jamesabad. The Agricultural Department is encouraging this man and co-operating with him in the sale of his ploughs. Between March and June of the current year orders for upwards of 100 of these ploughs were obtained, and the ploughs supplied, the purchaser making direct payment to the mistri.

This local made plough appears to be more satisfactory than the Meston plough manufactured by Messrs. Burn & Co. of Calcutta because the parts of the latter plough break readily, being made of cast iron; whereas the local plough is made of wrought iron which does not break although it may wear-out somewhat quicker.

It is anticipated that the modified Orient plough mentioned in paragraph 22 will meet with much favour among those who now favour this imitation Meston plough.



50. In connection with the popularization of these implements

Name of Taluka.	Name or No. of village.	Number of demonstrations conducted.	the propaganda staff have conducted a large number of village demonstrations. These are summarised in the margin. These demonstrations have been well attended and have created a good deal of interest. Discussions were held and in many instances, the visitors satisfied themselves by handling the implements themselves. These demonstrations led to a good sale of
Jamesabad ..	299	1	The Department however sold 55 Egyptian ploughs and a couple of dozen steel shares, and [a few other implements.
	265	2	
	309	2	
	307A	2	
	279A	1	
Digri ..	153	1	
	151	1	
	150	1	
	149	1	
	154	1	
	155	1	
	Kangro	1	
	148	1	
	158	1	
	170	1	
	179	1	
	Tando Jan Md.	3	
	195	1	
190	1		
307	1		
Mirpurkhas ..	Chandia	1	
	Khial and 285	2	

Egyptian ploughs, which were dealt with directly by the local carpenters. The Department however sold 55 Egyptian ploughs and a couple of dozen steel shares, and [a few other implements.

51. *Improved cultural methods.*—The most important piece of work under this heading is the sowing of cotton in lines. The advantages of this method of cultivation over the broadcast method have been fully explained in leaflet

Taluka.	No. or Name of village.	Area operated upon in acres.	No. 27. It enables intercultivation to be done by bullock power whereas at present this operation is a very formidable manual operation in the cultivation of cotton. For this purpose demonstrations were conducted in the
Mirpurkhas ..	128	120	No. 27. It enables intercultivation to be done by bullock power whereas at present this operation is a very formidable manual operation in the cultivation of cotton. For this purpose demonstrations were conducted in the
	126		
	125		
	127		
	129		
	244	6	
Sinjhora ..	21	28	No. 27. It enables intercultivation to be done by bullock power whereas at present this operation is a very formidable manual operation in the cultivation of cotton. For this purpose demonstrations were conducted in the
	19		
Digri ..	Tando Jan Md.	13	
Jamesabad ..	Jamesabad.	16	

marginally noted villages. In connection with such work it is necessary in the first instance to provide from the Department a trained driller and pair of cattle, as the work requires a fair amount of skill. It is satisfactory to note that much of the area drilled in villages 128, 126,

125, 127 and 129, in the year under report, was done by the cultivators themselves as a result of departmental teaching in previous years. This drilling method of sowing cotton is particularly recommended for the lighter classes of soil and where the land is free from kalar salts.

52. Another cultural improvement which the Department is advocating is the cultivation of wheat by the "bosi" or semi-bosi system. This is the common method of cultivation in north Sind, but was not practised on the Jamrao until the Department demonstrated it. The method consists in storing moisture in the soil from kharif irrigation, so as to enable the wheat crop to be grown in the rabi season, without any irrigation to the standing crop. The system demands careful tillage so as to produce a fine mulch of dry soil which conserves the moisture in the soil below it. This method can be recommended wherever the soil is sweet and free from kalar salts, and it is obviously a very valuable method in a tract where rabi irrigation is precarious, as is the case on the Jamrao canal area. This method of course involves a greater effort in the form of more labour, but certain progressive zemindars are taking it up, notably Syed Sher Shah in villages 279 and 279A of Jamesabad taluka and in village 226 of Mirpurkhas taluka, and Ghulam Nabi Bozdar in village 244 of Mirpurkhas taluka. In the year under report these villages had from 25 to 30 per cent. of their wheat sown by this method. Zemindars are in the practice of giving their wheat crop on the Jamrao area as many as 5 or 6 irrigations if water is available. By adopting the bosi method of sowing this irrigation can either be wholly dispensed with, or the irrigations reduced to one or two according to the quality of the soil.

53. Another improvement is the introduction of gram on to the Jamrao tract. This crop is hardly known but it has been proved at Mirpurkhas that fair crops can be raised on sweet land. It is recommended as a substitute for wheat where irrigation is precarious, as it is grown on moisture conserved from the kharif season as described above, and the standing crop is better not watered on fine grained alluvial soils, such as prevail in this tract. As a result of propaganda a small area has been cultivated with this crop.

#### *Middle Sind.*

54. This area was organized as a separate division for propaganda in the year under report. For the present purpose, the area includes the Nawabshah and Hyderabad districts, but work is almost wholly concentrated within the cotton tract of these districts.

Apart from cotton the distinctive features of this tract are—

- (1) the irrigation is mostly "lift", supplied by numerous inundation canals which flow from June to September. The only exception is the Fuleli canal which is perennial;
- (2) there is a fine tract in the north of Nawabshah where wells abound, and much wheat is cultivated thereon;

- (3) the margin of the Indus river is cropped with wheat and other rabi crops according to the sailabi method, *i.e.*, the lands are under flood waters during the inundation season.

This tract is almost a virgin field for the Agricultural Department, as it has been very little touched in the past. An important feature of the conditions, is the very short period available for sowing crops. Sowings can not be started till June as the canals begin to flow about the end of May. On the other hand experience shows that cotton sowings to be fully successful, must be completed in June, and if possible early in June. Hence the lands have to be prepared in advance by dry ploughing and at sowing time it is essential not to waste time with elaborate tillage operations. Cultivation in the dry season demands an implement with a sharp penetrating share or tine, hence at present the scope for iron ploughs is more restricted than in east Sind where irrigation is available for a large part of the year.

55. The first operation undertaken in this division, has been to popularize an improved variety of deshi cotton (27 W.N.). About 6,000 lbs. of seed was supplied for this purpose, and out of this some 4,000 lbs. was given out in small lots to the khatedars of Hathri and adjoining villages. As this was the first season, each grower sowed only a fraction of his holding with this seed in order to satisfy himself as to the merits of the variety. At first those khatedars who are very critical, were inclined to disparage this cotton, but later in the season after watching its behaviour in the field, they became very favourably impressed with it. They noted that it was profuse in branching and bore a large number of bolls. At the time of picking the Department bought in some of the produce with the object of re-issuing the seed in the current season (1923). Altogether the area sown with this cotton was estimated at 130 acres.

56. In this division cotton seed grown in the neighbourhood of Bhitshah, a village in Hala Taluka, has a high reputation. This cotton consists of the same mixture of types as the rest of Sind deshi, but there has been a practice in this centre for banias to purchase specially picked seed-cotton and to gin this and sell the seed at a premium of 100 per cent. or more over the price of ordinary deshi seed. In detail the arrangement is as follows.

Pickers are engaged by zemindars to pick their cotton on the share system, generally 1/20th part. The bania then arranges with the pickers to pick separately the best opened bolls, and the zemindar allows the picker to take his 20th share from these specially well-opened bolls. In return for his trouble the picker who sells his share of the produce to the bania receives an additional price over the market rate, amounting to 3 or 4 pice per seer.

This special practice exists only to a limited extent in some half a dozen villages round about Bhitshah, and the total quantity of hand-ginned seed thus obtained is estimated to amount to some 1,000 maunds per season.

In the year under report and until the available seed of 27 W N is much multiplied, the Department decided to undertake the wider distribution of Bhitshah seed. This operation has been greatly facilitated by an arrangement with a local merchant who agreed to finance all the operations, so that all the Department had to do was to control the distribution without handling the cash.

Mr. Lokeram, the then Agricultural Inspector, drew up the conditions with the merchant and these may be summarized here :

- (1) The seed is to be obtained from Bhitshah locality.
- (2) The seed is to be taken only from the second or third picking—this eliminates the seed of late pickings which may have been damaged by cold weather.
- (3) The seed is to be taken from the seed-cotton specially picked by the pickers as described above.
- (4) The seed is to be hand-ginned.

According to these conditions, 250 maunds of seed have been secured—priced at Rs. 7 per maund against the rate of Rs.  $\frac{3}{4}$  for ordinary deshi. In addition another 1,200 maunds of seed obtained from Bhitshah, but ginned in the factory (with the machinery worked slowly) have been secured—priced at Rs. 5 per maund.

These two rates of Rs. 7 and Rs. 5 are the rates to be recovered from the public by the merchant. A thousand maunds of Bhitshah seed has also been supplied to East Sind.

57. Towards the end of February this Division passed into the control of K. B. Azimkhan, with Mr. Abdur Rehman as Agricultural Inspector. During the concluding months of the year the Agricultural staff were engaged in controlling the issue of the cotton seed referred to above and in addition conducted an active campaign in popularising agricultural implements. Village to village demonstrations were organised in over 60 villages in the marginally noted four talukas which have been selected for intensive agricultural propaganda. These demonstrations led to the sale of large numbers of ploughs, which was facilitated by credit given by the Co-operative Societies, but these operations will be reported upon by K. B. Azimkhan,

*North Sind.*

58. This division is also practically a new field for agricultural propaganda, as it has not been possible to give much attention to this tract until the year under report. Mr. Jaffurali held the charge throughout, until relieved by Mr. Lokeram at the end of February. This Division includes the districts of Larkana, Sukkur and Upper Sind Frontier and is very important. The main features are :

- (1) There are upwards of 5 lakhs of acres under transplanted rice.

- (2) There is a large area under "bosi" wheat, *i.e.*, wheat grown on moisture stored from the kharif season.
- (3) Jowar occupies a large area in the kharif season.
- (4) Several of the canals are fringed with lands devoted to excellent garden cultivation.

59. As the Department has made more progress with wheat than with other crops, seed of wheat was selected as the main item in the propaganda programme. Some 1,758 maunds of wheat seed was available for distribution, of which 1,565 belonged to the Pusa 12 variety. Upwards of seven hundred maunds of the latter was the produce of the wheat Farm at Jacobabad, and the balance had been purchased from seed growers. All this seed was distributed—about 616 maunds of Pusa 12 being located in the Sukkur Taluka.

The Pusa 12 seed produced on the Jacobabad wheat Farm in 1921-22 was distributed to the persons noted below in North Sind and 100 maunds was sent to Middle Sind.

Arrangements have been in progress since March to recover as much seed as possible from these growers and also from those who have grown this wheat pure from seed supplied from the general district grown seed which was reissued last autumn. In particular, special efforts have been made to recover all such seed produced in the Sukkur Taluka where the Department is engaged in intensive propaganda :

Name of seed grower.	Name of Taluka.	Quantity of seed supplied in maunds.
Uinalkhan Bicharji ..	.. Sukkur ..	50
Wadero Amir Bux ..	.. Do. ..	150
Gokulmal of Khahi ..	.. Do. ..	25
Syed Kutabali Shah ..	.. Do. ..	50
Wali Mahomedkhan of Gossarji ..	.. Do. ..	30
Pir Mahomed Khan ..	.. Do. ..	25
Nanumal of Gossarji ..	.. Do. ..	15
Hussainali Khan ..	.. Do. ..	2
Abdul Karim Khan ..	.. Do. ..	2-14
Husanand Bulchand of Jogan ..	.. Shikarpur ..	40
K. B. Dur Mahomedkhan ..	.. Garhi Yaseen ..	40
K. S. Chakarkhan ..	.. Kandhkote ..	20
K. S. Dilmuradkhan ..	.. Jacobabad ..	200
Kaiserkhan of Nasirabad ..	.. Do. ..	30
Wadero Nabibux of Akilpur ..	.. Do. ..	2-20
Abdul Khaliq ..	.. Thul ..	7-20
Total ..		689-14

60. This is a very fertile taluka in which excellent wheat is grown, much of it rotating with market-garden crops. Such lands are well suited to a wheat like Pusa 12 which responds to good treatment. From all accounts this wheat has given much satisfaction to the grower, and there is now a clear course for the rapid spread of it. It is hoped that practically the whole taluka will specialize in this wheat and serve as a seed-supply source for the north of Sind. Although every effort is being made to

recover as much seed as possible for next season's sowings, still it is not anticipated that more than 3,000 maunds will be purchasable. The most effective way to fill this taluka with Pusa 12 wheat would be to make a large import of seed from the United Provinces, of say 5,000 maunds of seed. This suggestion is now receiving consideration. In the meantime K. B. Azimkhan, Assistant Registrar of Co-operative Societies, has been successful in arranging with local merchants to purchase the Sind grown Pusa 12 wheat, and to store it and issue it next autumn to the villages selected by the Department.

If this scheme works successfully it will save Government both the labour of handling the seed and the financing of the operations.

In the season under report there was a general outbreak of yellow rust which attacked all local wheats but Pusa 12 remained immune, and this valuable character has been fully recognised by the growers.

61. The second piece of work undertaken in this Division has been the demonstrating of improved implements.

Village to village demonstrations have been conducted by the Agricultural Overseers. One party made an itinerary in the Sukkur Taluka from the 1st December to mid-February, visiting eleven villages. Fairly long halts lasting several days were made in each of these villages. The implements demonstrated were light iron ploughs including the Rajah and Sirdar. In these villages valuable crops are grown including areas of sugarcane and market-garden crops, and apart from canal irrigation in the kharif season, there are upwards of 2,000 wells. Hence there should be an opening for ploughs of a superior type. As a result of these demonstrations sales of ploughs and chaff cutters to the value of Rs. 678 were effected. The most suggestive development, however, was the disposition of the people to hire these implements, or even to pay so much an acre for ploughing. The Department with a view to testing the field in this direction agreed to plough land with the Rajah plough at the rate of Rs. 6 per acre and there was an interesting response to this offer in the marginally noted villages. Altogether 14 acres of land were ploughed and Rs. 79 recovered in charges. This indicates the line which should be taken in this locality and it is proposed to organise sub-depôts where implements will be hired out, as well as a few stocked for sale.

Rahuji.  
Gossarji.  
Jahan Khan.  
Napar.  
Miani.  
Khahi.

62. Another piece of machinery which the people took great interest in was a small iron sugarcane mill. Crushing is done in a very primitive manner, similar to the method adopted for crushing oil seeds. Mr. Jaffurali, the Agricultural Inspector, soon sold nine "Hathi" mills worth Rs. 1,182-8-0. He also adopted the system of hiring, and found it quite easy to recover 8 annas per day rent for a small mill. In one case a rent of Rs. 44 was recovered on a "Hathi" mill for a month and a half's hire. It is estimated that the iron mill crushes a maund of cane at a cost

of 4 pice, whereas the cost by the local method is reckoned at 15 pice. Extraction by the local method is only 52 per cent. against over 60 per cent. by the "Hathi" mill.

The people however are not quite satisfied with this type of mill as there have been some breakages, and the Department is engaged in finding out a stronger mill. The Chattanooga mill (Number 12) costing Rs. 340 is found to be rather too heavy, as the cattle are on the small side.

63. The Poona furnace and gul making method was demonstrated in the Sukkur Taluka in December by a couple of trained men from Poona, and the quality of the gul met with much approval. The marginally noted Hindu khatedars have adopted this method and have built furnaces and purchased pans. The people realize that there is a great saving in the cost of preparing gul by the Poona method. It is estimated that a maund of gul prepared by the local method costs Rs. 2-11-9 while the cost by the Poona method is only 6½ annas, while the gul obtains a premium of one rupee or over per maund.

Drilling Jowar Seed. 64. The staff in this division has also been able  
Rice seed economy. to give some attention to the marginally noted  
Winterploughing of rice works.  
land with iron ploughs.

65. At the end of February this Division was taken over by K. B. Sukkur. Azimkhan, and Mr. Lokeram became Agricultural  
Ghotki. Inspector, and since then, work has been con-  
Kamber. centrated in the four marginally noted talukas.  
Larkana. Most of the time of the staff has been occupied in  
recovering seed for next season's sowings and in making arrangements  
for kharif demonstration operations.

T. F. MAIN,  
Deputy Director of Agriculture.

## APPENDIX H.

## SUMMARY OF WORK ON AGRICULTURAL PROPAGANDA IN NORTH AND MIDDLE SIND, JANUARY TO JUNE 1923, UNDER THE ASSISTANT REGISTRAR OF CO-OPERATIVE SOCIETIES, SIND.

1. In accordance with Government Order No. 5805, of 10th January 1923, the following eight talukas were assigned to me for carrying on intensive agricultural propaganda work :—

North Sind ..	..	{ Ghotki. Sukkur. Larkana. Kambar.
Middle Sind. ..	..	{ Shahadadpur. Halla. Hyderabad. Tando Allahyar.

North Sind.	I took charge of my new work on
1 Agricultural Inspector, Mr. Lokram.	20th January 1923 and with the
3 District Agricultural Overseers.	marginally noted staff set out to
Middle Sind.	execute the propaganda programme
1 Agricultural Inspector, Haji	which mainly was to—
Abdul Rahman.	
3 District Agricultural Overseers.	

- (1) Popularise and distribute approved varieties of seed.
- (2) Popularise and distribute approved agricultural implements.
- (3) Propagate modern methods of farming.
- (4) Organize taluka development associations with a view to facilitate the execution of the above activities.

2. *Seed supply and distribution of wheat.*—In September last I was offered the agricultural propaganda work at Poona and on my return immediately proceeded to Upper Sind and took to distribution of Pusa 12 wheat which was known in the Agricultural Department to be of very superior quality. About 800 maunds were for the first time distributed in Sukkur, Ghotki, and Pano Akil talukas, and about 200 maunds in Middle Sind. The zamindars were at first hesitating to introduce the seed in their fields as they were quite ignorant of it before. During the course of its germination and growth, however, the following properties came to light, viz., that—

- (1) It is rust resistant.
- (2) It ripens earlier.
- (3) It is more delicious than local varieties.
- (4) It is denser in substance.
- (5) Being superior in quality it naturally fetches higher value.



The zamindars, therefore, appreciated the seed very much, and are not willing to part with it even though a premium of annas 5 to 8 per maund is offered to them. Out of the produce of 1,000 maunds of this quality distributed by me among the zamindars during last Rabi a greater portion went to Haris in Batai, some portion has been retained by the zamindars as seed, and some they consumed as food. The usual practice about financing of Pusa 12 seed was to purchase it departmentally at harvest time and sell it out to zamindars in the sowing season. This practice was of a very complicated nature, as it involved too much account keeping by the Department and correspondence. Besides if the prices fell the Government had to sustain loss. I therefore negotiated with a Sethia of Sukkur (Seth Tilokchand) who agreed to purchase and store Pusa 12 wheat and distribute it in the ensuing Rabi under orders of the Department. At Ghotki and Jacobabad also I made similar arrangements with local zamindars. So far about 2,000 maunds have been purchased and stored in addition to the quantity available at our own agricultural farms.

Last year, experience has shown that it is very troublesome to sow patches of 12 Pusa wheat in scattered dehs and among small khatedars. Apart from the difficulty of supervising these crops, there follows a greater difficulty of collecting the seed dues and the multiplied seed. I have, therefore, decided this year to distribute large quantities of Pusa 12 among big landholders or at any rate in big compact areas so that supervision, collection of dues and the multiplied seed may be comparatively an easier business.

To supplement the available quantity of Pusa 12 in order to meet the total requirements of this year, I had intended to send down a departmental officer to the United Provinces with a view to negotiate direct importation, but the quotations of United Provinces are nearly double those of Sind. I am afraid, therefore, that this year I shall have to rest content only with that quantity of wheat as may be raised locally and from the agricultural farms. If the quantity of Pusa 12 reserved by the zamindars themselves to be used as seed during the next *rabi* is also taken into account, the quantity of seed available for next *rabi* would come to 5,000 maunds nearly.

3. *Cotton*.—Two varieties of cotton seed were distributed for this *kharif* season, *viz.*, 27 W.N. and the "Bhitshah" seed. Of the first quality only about 300 maunds were available in the whole department, of which 100 maunds were given to me and 200 were utilised in the Dhoro Scheme. A greater portion of the quantity given to me was distributed among co-operative societies in the Hatri Union. The area sown with this seed has since been cursorily watched. Germination on the whole is only fair, resowing of patches being necessary in several places. So far the stand is even and full in better class of soil. The entire cost of seed has been recovered and credited to the department. A little mixture of about 1 per cent. American cotton has been found in this crop which is being weeded out at once, under the supervision of the Department.

The Bokhro disease was universal on the germinated cotton of all sorts and 27 W.N. did not escape the evil. The zamindars at first endeavoured to resow the patches with ordinary seed but the Department had to put in great efforts to stop the malpractice.

*Bhitshah Cotton Seed.*—Bhitshah cotton is a variety of reputed cotton in Sind. The ginneries pay a premium of Re. 1 to Rs. 2 per maund over this variety.

It has a ginning percentage of about 40 and yielding qualities higher than the ordinary Sindhi cotton. The 27 W.N. variety not being available for supply I made arrangements with Seth Radhkishen Kundomal, a big Sethia of Tando Adam of Shahdadpur Taluka, to finance and supply this seed. The department undertook to inspect that the seed cotton used for ginning was from the selected picks of "Bhitshah" crops and that the ginning was regulated at proper speed to avoid breakage of seed. After ginning the seed, it was further sifted of dust and other impurities. Indents for this seed were collected and distribution undertaken by my staff. About 2,000 maunds of Bhitshah seed were in all distributed in four of the cotton growing talukas, viz., Halla, Hyderabad, Tando Allahyar and Shahdadpur. The germination from this seed has been excellent, and zamindars who have sown it have expressed both written and oral satisfaction. Apart from having better germination the zamindars report to have effected much saving in the seed rate. Usually they put 40 to 70 lbs. per acre but 20 to 25 lbs. of machine ginned Bhitshah have been found to give sufficiently thick stand of the crop, and only 12 lbs. of hand ginned Bhitshah were put in an acre with equally good germination.

In several cases seed was delivered at the zamindars' villages or at Railway stations nearest to them. Seed depôts were also opened at taluka headquarters for retail sale. When germination reports of the first consignment got abroad there was a great rush for the seed and the stock was exhausted immediately.

*American Cotton.*—An area of about an acre has been for the first time tried near Tando Allahyar with the American cotton. It is doing well so far. The required seed was obtained from Mirpurkhas.

4. *Indents for other seed.*—Zamindars round about the town of Hyderabad have come to realise that Berseem fodder is a paying crop and following indents have been obtained for it. The price of the required quantity is generally recovered in advance and remitted to the Deputy Director of Agriculture as under :—

			Lbs.	Rs.
(1)	Mr. Mangharam D. . . . .	.. .. .	400	200
(2)	R. B. Rijumal Thadani . . . . .	.. .. .	40	20
(3)	Mr. Jagtiani . . . . .	.. .. .	400	160

			Lbs.	Ra.
4.	Diwan Kishenchand A.	..	320	160
5.	Mukhi Harkishendas	..	120	60
6.	L. H. Richards, Esq.	..	80	No advance.

Inquiries for Lucerne and guinea grass seed have been received and suitably attended to. Arrangements for the supply of hot and cold weather vegetable seeds to the suburban gardens have also been made.

5. *Demonstration of Improved Implements, their Manufacture and Distribution.*—Village to village demonstrations were held with the Rajah, Orient, Monsoon, Meston, and the Egyptian ploughs. In all about 100 villages and hamlets were thus touched during the period. Moreover 8 big central demonstrations at the headquarters of all the 8 talukas assigned to me were organised, wherein our implements were worked side by side with the local ones. Our ploughs with the exception of the Rajah and the Monsoon worked by ordinary pair of bullocks in the soil chosen by the zamindars proved superior and commanded high appreciation in the end. On the whole the Egyptian plough has been universally accepted by the people and as a result of these demonstrations indents for these ploughs were pouring in a large number and 465 were actually sold during the period.

Negotiations were, therefore, entered into with firms at Hyderabad and Sukkur to manufacture these ploughs and other improved implements. The carpenters of the firms were trained in the manufacture of these implements and the firms were given all conveniences and instructions from time to time as to measurement of several parts and the kind of wood to be used. These works are from time to time supervised to see that their outturn is satisfactory, as regards workmanship, material, daily output, etc.

Besides the Egyptian plough a demand has been created for several other implements, viz., scrapers, clod crushers, drill tubes, ridging boards, Meston ploughs, etc. Owing to poor inundation this year just at the sowing time some flow areas stopped receiving water, when our hand Archmedian Screw lift came to the aid of the cultivator. This is very handy water lift, easy of fixture and transport, giving about double the quantity lifted by a local Hurla. It is worked by hand. Working demonstration in these are going on and enquiries about them are pouring in. Several zemindars request the lift to be experimentally worked on their own fields. Owing to want of funds, however, it has been possible to do this only in very few places. In spite of that orders for nearly one dozen of these screw lifts were received which have since been executed. Other orders are coming in and the screw lifts are in the course of construction.

6. *Practical demonstrations in improved methods of farming.*—With a view to bring home to the agriculturists the superiority of improved

methods of farming I secured plots from zamindars in the various talukas and arranged for their cultivation with the following results :—

(a) *Drilling demonstration in cotton.*—In all more than a dozen plots had been secured on private fields in Middle Sind to show drill methods, but owing to poor inundation only 10 plots of area varying between 1 to 2½ acres were actually organised and drilled in talukas Hyderabad, Shahdadpur and Tando Allahyar. The seed drilled in all cases was 27 W.N. except about 1½ acres in plot No. 1, which is sown with hand ginned “ Bhitshah ” for comparison sake. We had to contend with many difficulties in going through the programme of the above demonstration plots, scarcity of water being the most unsurmountable one. With every fall of the river the water courses ceased to run and consequently water from the plots was cut off. Besides we had to do two resowings in almost all the plots as the germination of 27 W.N. was not very satisfactory, the seed supplied to me being mostly of a poor quality.

Apart from drilling the above plots directly by the Department, trained staff assistance was also rendered to other big zamindars, who put about 5 to 10 acres of land each under drill-method by their own labour either trained or supervised by the departmental staff. Inter-culturing of the drilled plots has already commenced.

(b) *Practical demonstrations in rice cultivation.*—About ten plots were secured from zamindars in Larkhana and Kambar talukas for demonstrating each of the following improvements in the rice cultivation, Larkhana and Kambar being chiefly rice growing talukas :—

- (a) Reduced seed rate *versus* ordinary seed rate.
- (b) Earlier transplanting *versus* ordinary transplanting.
- (c) Bengal variety *versus* local varieties.

Each of these points may be dealt with as under :—

(a) There are about 68,000 acres under rice cultivation in Kambar taluka and about 54,000 in Larkhana taluka. The average seed rate is 1 maund per acre but our department demonstrated with ½ the quantity. Results so far are favourable and would be finally known when the crops are harvested.

(b) The advantages of earlier transplantation of seedlings have been fully brought home to the agriculturists and may be briefly summarised as under :—

1. The course of the Indus being notoriously capricious earlier transplantation ensures the crops against a premature fall or sudden diversion of the river.
2. It offers even distribution of labour regarding sowing in nursery bed, transplanting, harvesting, etc.
3. It assures better yield and better prices.
4. It enables earlier crops and thus liberates the soil in time for dubari (2nd) crop.

(c) The distribution and plantation of the Bengal variety is a pretty new introduction. The results have to be marked when the crop is actually harvested, but Mr. G. M. Isani, Deputy Collector and a big zamindar of Garhi Yasin taluka, claims for it that (1) it yields much higher than all the local varieties of rice, (2) it is delicious like the *Sugdasi*, (3) it requires only 5 seers per jireb, *i.e.*, only one-quarter the ordinary seed rate to its profuse tillering capacities.

7. *Combat with crop pests.*—Several inquiries regarding cotton pests have been received and general precautionary or available remedial measures have been suggested to the zamindars. Any extended programme of work in this direction cannot at present be executed for want of funds, or known methods of combating the diseases.

Complaints of rats doing damage to onion and wheat fields were received from several places. Help in the shape of supplying poison and demonstrating its use was immediately rendered. The zamindars have expressed great gratification.

8. *Taluka Development Associations.*—With a view to facilitate the work of intensive agricultural propaganda, Taluka Development Associations have been deemed to be very useful organisations. I have, therefore, organised eight such institutions, one for each of the eight talukas assigned to me. The following five of them have recently been put into working order while the remaining three are still engaged in collecting funds. Their actual work would, so to say, begin from the next cultivation season: 1, Kambar, 2 Ghotki, 3 Larkhana, 4 Tando Allahyar and 5 Shahdadpur.

AZIMKHAN,  
Assistant Registrar, Co-operative  
Societies, Sind.

## APPENDIX I.

WORK DONE UNDER THE PROFESSOR OF AGRICULTURE, POONA,  
DURING THE YEAR 1922-23 JUNE 30TH.*Staff.*

1. I remained in charge of the office of the Professor of Agriculture throughout the year. Mr. K. S. Kulkarny, B. Ag., Lecturer in Agriculture and Superintendent of the College Farm, was on leave for a month and 12 days during the summer vacation. No substitute was employed during his absence. There were no other changes in the staff.

*Agricultural College Farm.*

2. *Area of the Farm.*—Upto the end of the year under report total area of the college estate stands at 248 acres. The actual area under cultivation is however about 110 acres, the rest having been occupied by college and the farm buildings, roads and area unfit for cultivation as well as by the Modi Bag gardens. An amount of extensive development work has been taken up and embankments big and small have been put up wherever it has been felt protection was necessary to prevent scouring and washing off of soils and to reclaim areas cut up by big and small streams. This will add considerably to the value and usefulness of the land in course of time and fit the areas treated for cultivation. A piece of garden land of about 32 acres is yet under the process of acquisition. This, when acquired, will be a very good asset and help the teaching work a good deal.

3. *Health of the Estate.*—Except for the appearance of plague the general health of the estate was on the whole good. During the epidemic all inhabitants were inoculated and everything went safe except for two deaths amongst the farm labourers, one having been inoculated too late and the other having escaped it altogether.

4. *The Season.*—The season was on the whole precarious. The total rainfall from June to November was 15·70 inches. After that month there was no rain at all that one could call as helpful except for a few showers (1·38 inches) in March which did more harm than good to cotton and other standing crops. Sowings began on the 30th of June and there was continuous wet weather for more than a month and a half and this was particularly troublesome from the point of view of inter-tilling. Then from 24th August to 9th October there was a continuous dry spell of over a month and a half and it was a very trying time for most crops. But this served extremely well to demonstrate to the students the importance and effectiveness of thorough tillage. This very long dry spell had, however, its effect on Jowars which were greatly handicapped at the time of flowering and this reflected a good deal in the outturn of grain. Cottons and other crops, however, kept quite well. The rainfall that came on the 9th November, however, proved extremely helpful to cottons and for the *rabi* crops but did considerable

damage to Bajri, Jowar and other crops which were all ready for harvest or harvested. *Rabi* crops grew well only to be again spoiled by the very untimely rain in March about the time of harvest.

5. *Teaching.*—The staff on the Agricultural College Farm have had their hands quite more than full with the college teaching and the farm management besides.

There has been a radical change made in the cropping for the year 1923-24 for Senior B. Ag. students. A number of crop varieties mainly of Jowar, cottons, and wheat were being grown so far for demonstration. But many of the varieties were found unsuitable for the conditions obtaining in Poona, and hence they used to be non-profitable. The varieties, therefore, have all been limited to the object lesson area and the main cropping has been restricted to such crops and varieties as do grow well under the conditions obtained here. Some useful and convenient rotations have also been fixed in the light of past experience. Effort has been made to manage the crops on economic lines. The results are closely watched with interest. It is expected also, on getting the new area of about 35 acres of garden land near by, to institute a section of the farm run purely on commercial basis. The change in the present area coupled with the scheme in the new area to be acquired will, it is hoped, be a great help to the students to get practical insight into commercial management of a farm.

Junior students did not have their own individual area but learned all the farm operations by a set of exercises on an area set apart for them. This season each student is allotted 2 guntha plot of cotton as *kharif* crop and 2 guntha of onion as a *rabi* irrigated crop and students will get the outturn of their plots for themselves. This will induce them to take real interest in their work.

6. *Other Work.*—The farm has been always called upon to act as central bureau by farmers from various parts especially in the matter of supply of improved implements and seeds. This, specially the distribution of implements, had a severe check in recent years during and after the war owing to very high prices. Prices have now fallen down a good deal, though yet far above pre-war prices. This part of the farm activity has shown an increase during the year under report. As regards the supply of seeds considerable work has been done in supplying seeds like *sann* hemp, fodder jowars, cotton seeds, groundnuts and orders for seeds of vegetables, lucerne and so on, have been directed to proper and reliable agencies.

*The Agricultural College Dairy, Kirkee.*

7. Messrs. S. M. Patel, B.Ag., and H. Ezekiel, B.Ag., were on deputation to Palghar as Joint Managers of the Infant and Public Milk Supply and Co. Dairy Farm, Palghar, and the former returned to his duties here on 16th November 1922. Mr. S. M. Patel was on leave from 18th April to 14th May during the year. No substitute was employed.

I am glad to note that the pressure of Manager's duties was greatly relieved by the return to the Dairy of an already experienced hand, Mr. S. M. Patel, with an increased experience of management at the Palghar Dairy Farm.

8. *Dairy Herd.*

STRENGTH AND VALUATION.

Class of animals.	Strength	Valuation	Strength	Valuation
	on 1st April 1922.	on 1st April 1922.	on 1st April 1923.	on 1st April 1923.
		Rs.		Rs.
1. Cows .. .. .	30	6,370	43	9,200
2. Cow breeding bulls .. .. .	5	615	2	300
3. Cow heifer calves .. .. .	30	3,850	30	2,850
4. Cow bull calves .. .. .	24	1,790	20	1,450
5. Buffaloes .. .. .	56	9,960	64	11,135
6. „ breeding bulls .. .. .	3	210	2	160
7. „ heifer calves .. .. .	48	5,380	53	4,270
8. „ bull calves .. .. .	2	100	6	140
9. Bullocks .. .. .	19	840	26	1,810
10. Horses .. .. .	2	285	2	250
Total .. .. .	219	29,400	248	31,565

9. *Breeding.*—The herd consists of Sindhi cows and Gujarat buffaloes (Surati).

The breeding of certain strains of Sindhi cows is continued and we find Zankar's strain is giving promising results and the other strain of Begum was also under observation but the results did not come to expectation as shown below.

<i>Zankar.</i>			<i>Begum.</i>		
3,117 lbs. average of 14 years.			2,379 lbs. average of 11 years.		
Changuni	<i>Sire</i>	Battasha.	Beatrice	<i>Sire</i>	Daulat.
3,741 lbs.			2,310 lbs.		
7 years	<i>Dam</i>	Zankar.	2 years	<i>Dam</i>	Begum.
			8 months.		
Chrissie	<i>Sire</i>	Daulat.	Betsy	<i>Sire</i>	Pitambara.
3,590 lbs.			884 lbs.		
2 years			1 year		
11 months	<i>Dam</i>	Changuni.	3 months	<i>Dam</i>	Begum.
Amy	<i>Sire</i>	Pitambara.	Belle	<i>Sire</i>	Gopia.
3,894 lbs.			1,444 lbs.		
1 year			in five		
11 months	<i>Dam</i>	Changuni.	months	<i>Dam</i>	Begum.
Clarissa	<i>Sire</i>	Housha.			
3,316 lbs.					
1 year					
3 months	<i>Dam</i>	Changuni.			



The other strain that we are now building up by line breeding from the sire line that is Housha is that of Barabara and her daughters.

Barabara 3,888 lbs. 2 years 7 months	Sire	Housha.	Barshi 1,421 lbs. in four months	Sire	Shivaji.
	Dam	Cassandra. 1,106 lbs. 2 years.		Dam	Barbara.

Though we have lost Housha at the age of 16 years still we have bulls from his blood and one King Arther aged 2 years from Housha and Amy (Zankar's strain).

The average performance of some of the other high yielders for the period under observation is as follows :—

Names.	Year under obser- vations.		Average annual yield of milk.	Remarks.
	Years.	Months.		
<i>Cows.</i>				
1. Susan .. ..	1	..	3,921	Home bred.
2. Aurelia .. ..	4	..	3,764	" "
3. Rebecca .. ..	1	2	3,751	" "
<i>Buffaloes.</i>				
1. Louise .. ..	4	3	4,419	Home bred.
2. Rhoda .. ..	1	7	3,801	" "
3. Sajani .. ..	17	..	3,200	Purchased with mother.
4. Mehsana .. ..	1	..	4,030	Purchased.
5. Abu .. ..	1	..	3,966	"
6. Deesa .. ..	1	..	3,580	"

The annual production of milk and the price realised per 100 lbs :—

Year.	Total milk pro- duced.	Total fed to cal- ves.	Total Sale.	Money Realised.	Price per 100 lbs. milk.
	lbs.	lbs.	lbs.	Rs.	Rs.
1921-22 .. ..	199,212	22,297	176,915	24,432	13.81
1922-23 .. ..	249,009	14,513	243,496	49,269	21.01

In 1922-23 the milk yield has increased by 19.89 per cent. over the previous year and the money realised per 100 lbs. has also increased by 52 per cent. over the previous year. The cost of milk production works out to annas 3 pies 5.5 per pound of milk.

11. *Fodder Production.*—The dairy possesses 338 acres of land at the Manjri Kuran and the college dairy, out of which only 130 acres are under cultivation. Out of the 45 acres cultivated area at the college dairy 17 acres were cropped thrice, 13 acres twice, 11 acres once, and 4 acres were under guinea grass. The average yield of fodder per year is 22,329 lbs. green per acre on the above area. The cost of production per 100 lbs. green fodder is 9·04 annas as against 12 annas in the previous year.

*Statement of Fodder Production at the Dairy, Kirkee.*

Kind of crop.	Total acres during the year.	Total yield during the year.	Average yield of green fodder per acre during the year per crop.
	A. g.	Lbs.	Lbs.
Maize .. .. .	63 36	573,163	8,939
Nilwa .. .. .	6 37½	155,237	22,199
Shalu .. .. .	7 18	86,274	11,576
Oats and peas .. .. .	3 17	65,378	19,088
Guinea grass .. .. .	3 36	102,443	25,497
Carrots .. .. .	.. 20	14,000	28,000
French bean .. .. .	1 33½	8,320	4,528
Total .. .. .	87 38	1,004,815	11,424

The old Kuran area of about 26 acres that was given away to Manjri Sugarcane Farm for sugarcane in 1919 is returned in the beginning of June 1923. It is therefore expected that in future there will be no need for purchasing fodder, but on the contrary we hope to build up some reserves of fodder storage.

The reorganisation scheme for working the Dairy on commercial lines has been successful as can be seen from the following figures.

Year.	Expenditure.	Receipts.
	Rs. a. p.	Rs. a. p.
1922-23 .. .. .	58,449 1 0	61,340 12 0

This leaves a profit of Rs. 2,791 on the year besides paying for the teaching requirements at the college which are estimated to cost Rs. 4,600.

The Manager Mr. Baluch, and the Senior Assistant Mr. S. M. Patel, deserve credit for carrying out the details of the scheme.

The question of running the Dairy for profit, however, is not yet finally settled. It will require a few years' careful working to make it really a profitable concern.

B. S. PATEL,  
Professor of Agriculture.

## APPENDIX J.

REPORT OF THE WORK OF THE AGRICULTURAL CHEMIST FROM 1ST JULY  
1922 TO THE END OF 30TH JUNE 1923.

During the year under report I was in charge of the Office and Laboratory of the Agricultural Chemist to the Government of Bombay, Poona, except the period between the 5th of April and the 25th of May when I was on leave and Mr. N. V. Kanitkar, M.Ag., B.Sc., held charge of the post.

2. The work under me may conveniently be divided into five sections for report. They are—(1) Analytical Work, (2) Investigation work, (3) Teaching at the Agricultural College, (4) General supervision of the Manure Laboratory attached to the Union Agency and (5) Water-finder work.

*Analytical Work.*

3. The number of samples received during the period under report is given below.

	Government.	Private.	Total.
Soils .. .. .	377	95	472
Waters .. .. .	313	63	376
Manures .. .. .	75	92	167
Feeding Stuffs .. .. .	85	48	133
Fruits and Vegetables .. .. .	40	3	43
Cocanuts and Coconut cakes .. .. .	....	69	69
Oils .. .. .	11	....	11
Gul .. .. .	....	1	1
Dairy products .. .. .	4	36	40
Miscellaneous .. .. .	36	64	100
	941	471	1,412

In addition to these, 30 samples of sugarcane juice, 40 samples Megass, and 20 samples of Gul were analysed for the Manjri Experimental Farm.

4. The Government samples analysed show the work which the Laboratory is doing to help workers in the other branches of the Department in their investigation, thus helping although indirectly in solving the various problems the Department is working at.

5. The real test of the success of the Laboratory as supplying a public need is best shown by the use which the public make of this laboratory. A large number of samples are received from the actual cultivators and from men engaged in industries depending on agriculture. Usually the number of samples received fluctuates between 350 and 450. In the year under report there were 471 samples received.

6. The character of most of the samples was just the same as in former years. The majority of the soil samples from private persons were from

lands that do not yield the usual outturn or have degenerated in recent years. The water samples in most cases were for determining the salts to find out if the waters were in any way injurious for irrigation. In the year under report as many as 92 samples of manures were received from actual cultivators and manufacturers. In the last year's report it was pointed out that many times the manures were adulterated. It is, therefore, a good sign that the people are beginning to feel the necessity of getting their manures analysed before using. Nowadays there are several mixtures on the market sold as fertilisers for sugarcane. Many of these are mixtures of oil cakes and ammonium sulphate. Oil cakes and ammonium sulphate in mixture form excellent manures for sugarcane but the samples on the market at present usually contain only 5 to 6 per cent. nitrogen. Many of the safflower or *kardi* cake samples received were from undecorticated seed. This material contains about 2.5 per cent. of nitrogen while the cake from the decorticated seed contains about 6 per cent. nitrogen. The agriculturists should note this in buying the *kardi* cake. A sample of guano received from a firm in Bombay contained 27.8 per cent. of phosphoric acid.

7. Many of the grasses found in the Bombay Presidency were analysed in former years, but it was found that some important ones were left out. These, about 13 in number, were analysed at the request of the Economic Botanist.

8. At the instance of the Director of Agriculture spear grasses from Bankapur and Chharodi Farms, from the mal-lands of Sholapur and Satara and also from Tegur were analysed. It seems from the results obtained that these spear grasses of the various places are not the same in their food value.

9. Samples of *kodra* seed were received in connection with their poisoning effects and it seems, from the importance of the crop, that it should be taken up by the Agricultural Department as a special problem for study.

10. Some grasses reported to have caused night blindness in bullocks were analysed and were also examined by the mycologist to find out if there was any fungus attack. These grasses were old and had in some cases deteriorated in their feeding value but there was no poisonous material developed. Three years ago similar complaints were received about the grasses causing night blindness in horses. All these complaints seem to be due to want of nutrition in the foods. The horses actually recovered their sight when the rainy season had sufficiently advanced, as they then received green grass. The only remedy in such cases is to feed a small quantity of green material to the animals.

11. A sample of artificial ghee received showed that it was animal fat with a small quantity of oil to give a slight yellowish tinge to the material so that it may look like ghee.

12. The Economic Botanist is trying experiments to find out a suitable method to destroy the lantana, which has become a very bad pest in some forests. In one of his experiments he poured sodium arsenate

solution in a hole made at the base of the stem and then plugged the hole. The plant so treated withered and died in about a week. The roots, stems, branches, and leaves were analysed to find out how the poison spread. It was found that the poison spread all over the plant.

*Investigation Work.*

13. A short report of the chemical study of soils and waters in connection with the red rot disease of sugarcane at Amalsad which was reported last year as completed has been published.

14. A report of the chemical work done in connection with the preparation of *gul* from cocoanut palm juice has been written and sent to the Deputy Director of Agriculture, Konkan, for being included in his publication on cocoanut palm juice.

15. A note of the work on the utilisation of the mowhra flower refuse after distillation has been written and will soon be published.

16. The work done in studying the various changes in the chemical constituents of the rice plants at different stages has not yet been written out but the results will soon be put together.

17. As indicated in the last year's report experiments in connection with the manuring of the rice crop were taken up. They will be repeated in 1923-24 to confirm the results already obtained.

18. The work in connection with the improvement of the cardamom crop is continued by Mr. G. M. Bapat under the Sir Sassoon David Trust Fund. The special feature of the work during the period under report was the study of the life history of the protozoa found in the soils and the relation of these protozoa and their excretion to the badness of the soil.

19. Mr. N. V. Kanitkar, Acting Assistant Professor of Chemistry, is carrying on his village survey work to study the economic condition of the villages. This year he had taken up the study of Posari village near Karjat.

20. Two new problems have been taken up. One to study the changes in the nitrogen content of the soil in connection with the cotton growing experiments which are being carried out at Surat. The plants grown on the ridges do better than those grown on flats. It is intended to find out whether this difference has anything to do with the changes in the nitrogen contents of the soil. The second problem is to find out whether the soils in the Deccan are able to recuperate their nitrogen contents and if so what conditions are most favourable for such recuperation.

*Teaching.*

21. I was responsible for the teaching of Geology and Chemistry to all the classes of the College. The teaching work has become very heavy in recent years, but I am glad to say that every one of the teaching

staff in chemistry section is carrying on some research work in addition to the teaching work of 20 to 22 hours a week.

*Manure Mixing Factory.*

22. According to Government Order No. 7790, dated July 27th, 1918, R. D., a Chemical Laboratory is attached to the Union Agency with a view to encourage the use of manures by preparing mixtures of manures for the various crops. Mr. V. N. Gokhale, B.Ag., B.Sc., was in charge of this Laboratory during the period under report.

23. The analytical work done in this Laboratory includes soils and manures sent by the Union Agency in their usual dealings as also the manure mixtures which they prepared. The total number of samples analysed was 73 and may be classified as follows :—

Soils .. .. .	14
Organic manures including oil cakes ..	23
Mineral manures .. .. .	13
Artificials .. .. .	7
Manure mixtures .. .. .	16
	73

Mr. V. N. Gokhale's services were utilised for College teaching work during the month of June.

*Water-Finder Work.*

24. For a long time it was a practice to depute one of the assistants from the chemical Laboratory to work with the water-finder machine for about 8 months in a year and to appoint a substitute during this period to work in the place of that assistant. A special sanction was every year obtained for this temporary appointment. But during the last two years the temporary post was not sanctioned and the work was done at great inconvenience to the Laboratory where there is a regular rush of samples for analysis.

25. Last year it was settled to try and find out whether the demand for the water-finder remains even when a charge is levied for the use of the machine. During the year under report a fee of Rs. 10 for the first two days and of Rs. 5 for every succeeding day was charged. When the machine was used for wells of non-agricultural type charges for travelling also were made. Even with the fees charged it must be said that the calls for the water-finder were more than could be attended to.

26. The year under report could not be fully utilised for water-finder tests. There were rains in November and part of December and the work was started one and half month later than usual. Then again in March and April the assistant in charge of the machine was held up at several places on account of the cloudy weather.

27. In all Rs. 286-2-0 were received as charges for the water-finder work. The following table gives a clear idea about the work undertaken.

Name of the District.	Number of villages visited.	Number of persons or institutions.	Number of spots tested.	Number of spots where indications of water current were given.
Ahmednagar .. ..	1	1	4	1
Belgaum .. ..	1	1	4	1
Bijapur .. ..	3	2	15	3
East Khandesh .. ..	1	1	4	1
Kolaba .. ..	1	1	6	....
Nasik .. ..	3	4	17	1
Poona .. ..	11	10	56	8
Ratnagiri .. ..	1	1	5	....
Satara .. ..	3	3	15	3
Thana .. ..	1	1	5	1
Total .. ..	26	25	131	19

28. I am glad to say that all the assistants under me worked satisfactorily.

D. L. SAHASRABUDHE,  
Agricultural Chemist, Bombay Presidency,  
Poona.



## APPENDIX K.

## WORK DONE UNDER THE ECONOMIC BOTANIST FOR THE YEAR 1922-23.

1. Dr. W. Burns, Economic Botanist, was in charge of this work throughout the year, except for the month of April, 1923, when he was on leave and Mr. G. B. Patwardhan acted for him. Mr. G. B. Patwardhan, Assistant Professor of Botany, was on leave for three months and nineteen days and Mr. L. B. Kulkarni acted for him. Mr. D. V. Narayanayya was confirmed as Assistant Economic Botanist with effect from 1st March 1923. Mr. W. V. Joshi, B.Ag., was appointed to act as Assistant Economic Botanist, vice Mr. Narayanayya, confirmed, who was working in the vacancy caused by the deputation of Mr. R. K. Bhide, as Plant Breeding Expert, from 1st March 1923.

*Education.*

2. The Economic Botanist and his teaching staff were, as before, responsible for the botanical side of the teaching of degree and special students. In the final year five men took Advanced Botany and Horticulture as their special subject and three of these passed. One student (a graduate of this College) was sent by the Cochin State for further botanical training. One graduate now on the staff of another College in Poona has been doing work for his M. Sc. thesis under the direction and advice of the Economic Botanist. One graduate belonging to the Department returned for instruction in the technique of measuring the thickness of tobacco leaves (a process required in tobacco breeding). Another graduate has been utilising the Botanical Section for special work on the internal structure of various parts of the coconut plant.

The students of the present final year (1923-24) have on their own initiative organised a students' Botanical Society.

*Information.*

3. During the year 456 specimens were identified in the Herbarium and 69 enquiries of all kinds were dealt with.

*Research.*

3-a. *Canal Weeds.*—The study of these weeds in the Mutha and Nira canals, in wells and tanks, and in cultures in tubs, has been continued. Among the interesting results of the year's work are the following:—

1. It has been found that several of these weeds have peculiar perennating organs, hitherto undescribed, which enable the weeds to tide over dry seasons, buried in the mud. Such organs, however, are formed only where the drying is gradual as in the case of a tank or well from which water slowly evaporates or is taken off. They do not form during the rapid emptying of a canal at a closure.

2. An experiment lasting from January to June 1923 was carried out to see whether by growing *Potamogeton perfoliatus* (the worst canal weed) in different conditions in tubs, we could get any indications

of the conditions favourable to weed growth. The four sets of conditions given were :—

Tub 1. Gravel substratum and silty water.

Tub 2. Gravel substratum and clear water.

Tub 3. Silt substratum and silty water.

Tub 4. Silt substratum and clear water.

Six plants were planted in each tub.

The siltiness in tubs 1 and 3 was maintained by stirring the water once every two hours during the day. In all tubs the water was changed every other day in order to approximate to canal conditions. The dry and wet weights of the total weed growth in each tub were taken in June 1923 with the result that the tubs stood in the following order as to luxuriance of weed growth :—4, 3, 1, 2.

It will be noted that the plants with the silt substratum grew better than those in the gravel substratum. Of the two tubs with the silt substratum that with the silty water grew less strongly than that with the clear water, while in the case of the tubs with the gravel substratum, the plants did better in silty water than in clear. The one point clear, therefore, is that silt suits the plants better than gravel to grow on, while the evidence as to the effect of silty water is conflicting. The experiments have been re-started in order to get further information on this important point.

3. Study of the Mutha Right Bank Canal during closures indicates (a) that at each cleaning mostly only the above-ground parts of the weeds are removed and the underground portions left to propagate themselves.

(b) that the more thorough the cleaning during a closure, the longer does it take for the weeds to recover.

(c) that the thorough weeding of the gravel substratum near the dam itself has very considerably reduced the growth of weed there.

(d) a steady level in the canal is more favourable to weed growth than a fluctuating discharge.

4. The study of the actual percentage in silt from the Nira and the Mutha canals from samples sent during the year gives no indications of any kind. The siltiness in these fluctuates most unaccountably and with wide ranges.

The question of canal weeds was discussed at the Bombay Engineering Congress in November 1922 when the Economic Botanist was invited to attend. The difficulty in arriving at a conclusion in this matter is due to the fact that so many factors act on the weed simultaneously and that it has so far not been possible to devise, on a sufficiently big scale, an experiment which shall eliminate all but one variable factor. The factors are many but the following are some of them :—Light penetration of water as affected by depth and silt ; amount of silt as affected by amount sent down, by velocity, and by the nature of the canal bed and its section ; nature of the silt, whether fine and colloidal or coarse and large-grained ;

infection by certain species and not by others ; and so on. The Economic Botanist can deal with this matter only on a laboratory scale. What it really needs is experiment on a canal scale, and until the Irrigation authorities are willing to arrange and finance such experiments we shall not get much further forward.

4. *Seed Testing*.—From all sources, the number of seed samples received for testing during the year was 90. Of these 2 were for identification alone. Of the rest 38 were grass seeds and the rest crop plants. The majority of the samples were from Government Agricultural stations.

The experiment to test the longevity of crop seeds is being carried on as described in last year's report. So far there has been no marked drop in the germination capacity of any of the crops under investigation.

5. *Safflower*.—The collection of twenty-two pure lines of safflower received from Mr. A. Howard, Imperial Economic Botanist, was grown in three places during the year. Full notes were made on the physiological and morphological points of interest shown by these plants. Self-fertilised seeds were collected for the continuance of the lines in the following year and certain crosses were made. Out of the 22 varieties two appear to be heavy yielders. The yield per plant in No. 6 was 48 grammes of seed and in No. 7 it was 56 grammes. The third in order of merit yielded 18 grammes. Nos. 9, 11, 13 and 16 gave no yield. From the point of view of germination No. 1 did best, giving 58 per cent. and Nos. 17, 18 and 19 gave 50 per cent.

6. *Grass Investigators*.—The research on the improvement of poor grass land is financed by the Sir Sassoon David Trust. The enclosed area at KALAS continues to develop. Valuable perennial grasses have taken firm hold of the more hilly rocky areas and the tussocks of these are gradually covering the whole of the poorer ground with the concomitant exclusion of spear grass. In the lower levels the best wild fodder grasses locally known as Marwel, and scientifically as *Andropogon annulatus* and *Andropogon caricosus*, have established themselves to the absolute exclusion of all poor grasses. Burning, cutting and grazing having been absolutely prevented, there is annually the addition of a considerable amount of humus to the soil. There is still a period of two years to run before our lease of this ground expires. At the end of the period we shall be in a position to state exactly what can be expected in the way of fodder from this type of land when protected. There are thousands of acres of such uncultivable land in this neighbourhood and their improvement and exploitation so as to give the maximum of cattle food is a matter of considerable importance. The usual accurate botanical record of the changes in the vegetation of the KALAS area is being continuously kept. Work at Sirur has been given up as the rainfall there is too precarious. In other directions, however, the work of the research has been expanded. The committee in control of this work has been reconstituted and strengthened, and there is now complete co-operation between the Deputy Director for Animal Husbandry and the Economic Botanist, with the assistance of the Soil Physicist, all under the direction of the Director of

Agriculture. The first main point of expansion has been the inspection of the lands of Panjarpoles and Gowrakshans at the invitation of the authorities of these institutions. In many cases we have been able to make useful suggestions and in some cases there have been put at our disposal facilities for carrying out these suggestions. Notably at Kandivlee near Bombay, have measures been taken to increase and improve the yield of grass, and next year we hope to report considerable progress in this and similar spots.

The Director of the Vaccine Institute in Belgaum has also kindly put at our disposal two acres out of his paddocks in order that we may investigate the grass-producing capacity of both rich and poor soil there.

Similar experiments have been laid down at Bankapur, and wherever we are allowed to put our suggestions into practice.

The idea of all these experiments is—

- (1) to see what the land will produce if given a chance,
- (2) to devise a scientific system of rotation of grazing and rest whereby the maximum amount of fodder with the least damage to the herbage may be obtained. Such methods have been devised and put into action with great profit in America and such methods are similarly applicable here.

The plots of poor land in the Government House compound which were improved by us from November 1915 to November 1st, 1922, and were thereafter returned to the authorities for general grazing, have been observed in the year under report. The broad facts are :—

- (1) Spear grass (*Andropogon contortus*) has not succeeded in making its way back into improved areas.
- (2) The perennial good grasses introduced by seed into the areas have continued and increased their growth.
- (3) With two exceptions the annual grasses have disappeared.

The rains of 1923 will be a crucial season for these plots as they will be if subjected to trampling and grazing during the growing season and the plots stand up to this we may consider the treatment a complete success.

7. *Weeds*.—The research on the eradication of the weed Laval, (*Cyperus rotundus*) also financed by the Sir Sassoon David Trust, is nearing completion. The whole of the investigation and its results will be published in a memoir now in preparation. The method employed in this work was to study the life-history of the plant carefully by laboratory methods before planning any field experiments. This method has been fully justified. It has been found that though the plant produces seeds, these are not the main means of reproduction. In the most favourable conditions, namely, atmospheric humidity of 90 per cent. saturation, temperature of below 85° F. and monsoon conditions generally, only 1.5 per cent. of the seeds germinate and many of the seedlings die. We have, however, studied the development of seedlings into complete plants, and although the percentage of seeds that germinate is small, the total seed production in infested fields is so large that it is essential by cultivation to prevent seed formation.

The main means of reproduction is by underground tubers, and we have investigated carefully the conditions that affect the formation and germination of these tubers. The first act of the seedling is to form a tuber thereby assuring itself of a base for action. Later on, chains of tubers are formed in lower levels, some spreading horizontally and a few going deep, the latter apparently to function as the final bases for renewed growth in the case of continued drought in the upper layers. The maximum production of tubers occurs in the second foot from the surface. Experiments were made by artificially planting tubers three feet below the surface. Several of these reached the surface by the expedient of sending their reserve material ahead, forming a new tuber at a higher level and from this new starting place restarting growth. We have proved that the common method of hand weeding which means only the cutting off of the aerial parts is futile. It is an endless task, as it never by any means kills a sufficient number of the tubers to clean the area. The number of green shoots on the surface is not necessarily an indication of the number of tubers in the soil, and ten shoots may indicate anything from 50 to 350 tubers below ground. The green shoots can be killed by watering twice a week with a 2 per cent. solution of common salt, but this method has the effect of making the ground unfit for crops, so while it might be useful on a polo ground or a tennis court it would not do for agriculture. The conclusion is again reached that the tubers must be attacked directly, and this means turning them up by implements and exposing them to the sun. This year we have made experiments in incubators to test the effect of different temperatures on tubers exposed to heat in paper dishes and when covered with earth. The extraordinary vitality of the tubers then indicated itself, for it was found that a temperature of 104° F. for about a fortnight was required to ensure a high percentage of deaths. Our field experiments indicate that exposure for ten days to the heat and light of the sun when the shade temperature is from 90° to 104° F. also kills the tubers. Another method of attacking the tubers is to cover the ground so that the plant does not get a chance to grow; this can be done by piling actual rubbish, like cotton stalks, or by using a thick cover-crop. Our general indications are that a combination of ploughing and exposure in the hot weather, with cover (either dead or alive), will rid a field of this pest and that continued cultivation thereafter will keep it so. In addition to the practical points cleared up a considerable mass of knowledge of pure scientific value has been recorded from this intensive study of one species.

8. *Bajri Investigation.*—This is another of the researches financed by the Sir Sassoon David Trust. From the reconnaissance made in the Bajri districts 64 plants were got that seemed to be more drought resistant than their neighbours. The seeds from all these were grown in such a way that their pedigree could be easily recognised and in all 2,000 plants were obtained. Every single plant of the 2,000 was carefully studied and records kept of all its important characters. From this investigation several points have become clear:—

1. Bajri is in a very hybrid condition. Scarcely one of the original earheads gave a uniform progeny.

2. Taking the factor of hairiness, there are three recognisable groups
  - (a) those entirely hairless,
  - (b) those with hairs at the base of the leaves only,
  - (c) those hairy all over sheath, base and leaves.
3. Careful correlation studies show that the hairless ones are on the whole bigger plants with a smaller death rate and higher yield, and that, as hairiness increases, so do the size and yield decrease and the death rate increase.
4. There are, however, individuals which possess hairiness and also large yield. As we think that hairiness is probably associated with drought resistance we are giving special attention to the progeny of these hairy high-yielding individuals.

The sowings of bajri at fortnightly intervals throughout the year were continued. The following are the results :—

In the case of sowings made from mid-June to the end of August plants reach a height of one foot in  $5\frac{1}{2}$  weeks, begin to flower within 6 weeks, and finish half their flowering in eight weeks from sowing. In the case of sowings made from September onwards, these periods gradually lengthen till they reach their maximum in the case of sowings made in the end of December. For January and February sowings these maxima are maintained. They are eleven weeks for one foot of growth, twelve weeks for the first flowering, and eighteen weeks to finish half the flowering. From and including March and onwards the periods decrease until they again reach their minimum in June. These figures clearly indicate that the optimum time for sowing bajri is in June, July and August.

So much for the study of the plant ; but since we are dealing with the question of drought resistance, we have also devoted a good deal attention to the matter of the environment of the plant. Our efforts in this connection are directed to getting numerical expressions for :—

- (1) the water-extracting power of the air,
- (2) the water-delivering power of the soil.

To estimate (1) we have fitted up a small meteorological station with the usual thermometers. We have also done a lot of work with the adjustment and standardising of atmometers, which are instruments designed to read directly the evaporating power of the air. From Dr. Burton Livingston, who did the pioneer work on these instruments in America, we have got a set of six of his own standardised instruments and it is hoped with this equipment to get a satisfactory answer to the first question.

To estimate (2) is a matter of greater difficulty as so many factors are involved such as the size and nature of the soil particles, soil temperature, humus, rainfall and so on. We have shown conclusively the unsatisfactory nature of one method recommended by another scientist and have improved on this. The method is now under trial and something of the kind will eventually give us the thing we want. We shall thus have the debit and the credit sides of the plants water account and can say with what balance it can get along.

The above type of work is indicative of a trend in botany and other biological sciences whereby greater accuracy is demanded, coupled with mathematical expression of results.

9. *Eradication of Lantana*.—At the instance of the Director of Agriculture some investigations were made on methods of killing Lantana. It was found that a solution of sodium arsenite injected into the stem killed the plant rapidly. The roots and branch tips, on analysis, yielded indications of arsenic, showing that the poison had gone all through the plant.

Our next step was to invent a method of rapidly injecting the poison and to this end we experimented with both solid and hollow chisels, neither of which were satisfactory. We are at present rather balked but hope to get on again when this small obstacle is removed. We shall also have to discover some poison other than arsenic which is too dangerous to human life and too easily put to criminal uses to employ on a large scale.

#### *Potatoes.*

##### 10. *Potatoes*.—(1) *Tamera Disease and its Treatment*:—

Approximately fifty acres of potato were sprayed or dusted against this disease in the rainy season of 1922. The results were in all cases successful. So much was this the case that the villagers of Donda, an out-of-the-way village in the Khed Taluka, sent us in a petition to come and spray their crop against the disease. We calculate that the outlay of Rs. 10 per acre on spraying will save Rs. 60 in yield. Taking the saving as only Rs. 30 net, so as to allow for poor years, bad cultivation, unfavourable market conditions and so on, and assuming the area under potato in the Poona district to be 5,000 acres, out of which we may assume on the average 2,000 acres affected, then the saving annually would be Rs. 60,000 to the cultivator. It is hoped to make the process of spraying with lime-sulphur-wash popular and self-supporting. To this end a leaflet has been prepared and distributed, and further demonstrations are being carried out in 1923.

A comparison of dusting sulphur by simple methods and more complicated machines, with spraying lime-sulphur-wash is in progress.

##### (2) *Varietal Trials*:—

Twelve excellent Scottish varieties, represented by four pounds of seed potatoes each, received from the well-known Edinburgh firm of Dobbie and Son were received and planted in the rains of 1922 and the succeeding cold weather season. These varieties did amazingly well. This is in distinct contradiction to previous experience in this part of India with Scotch varieties. These varieties are being grown on to study their behaviour in later generations. In addition, certain British varieties received *via* Bangalore were also tested. All were fairly good. Of the whole lot of varieties numbering 21, only 10 were retained for further trial so as to reduce the number of varieties to be handled and to weed out at once those whose performance was unsatisfactory.

None of these varieties proved Tamera-resistant.

(3) *Storage*—

Potato tubers of the same origin were stored in three lots :—

(a) in cold storage in the cold store at the Crawford Market, Bombay, in a temperature of 36°F. to 40°F.

(b) in the storage house of the Union Agency situated on the College Farm temperatures from 75°F. to 90°F.

(c) in a heap according to the cultivators' methods in the village of Peth, temperature from 68° to 77°F.

The potatoes in cold storage kept perfectly. Moth present in such potatoes did not develop and died. The potatoes when taken out were not allowed at once to be taken into high temperatures and when planted germinated satisfactorily and gave good plants.

The potatoes stored according to method (b) suffered 3·2 per cent. loss from diage and 12·7 per cent. loss from rots.

The potatoes stored according to method (c) suffered 3·1 per cent. loss from diage and 13 per cent. from rots.

There is, therefore, a future for cold storage of seed potatoes during the hot weather in India.

(4) *Miscellaneous* :—

A study of the flowering and seed setting of the potato is in progress. A pedigree plot is maintained at Peth.

11. *Herbarium*.—The Herbarium was maintained in its usual efficient condition. 231 mounted specimens of plants were received from the Forest Botanist, Dehra Dun. We are arranging to send some of our duplicates in exchange.

12. *Publications*.—The Economic Botanist and his staff were responsible for the following publications during the year.

Dr. W. Burns, Economic Botanist—Two papers presented to the Indian Science Congress, Lucknow—

(1) The Ecology of Grassland.

(2) Variation in *Andropogon annulatus* and *Andropogon caricosus*.

Mr. L. B. Kulkarni, Assistant Economic Botanist—Two papers were presented to the Indian Science Congress held at Lucknow—

(1) Further change of Sex with andromonoecious. Type of Papaya.

(2) Germination of Grass seeds.

Mr. D. V. Narayanayya, Assistant Economic Botanist, and

Mr. S. B. Ranade, Assistant Botanist—

(1) Perennating organs in Aquatics.

Mr. W. V. Joshi, Assistant Economic Botanist—

(1) Leaflet No. 4 of 1923, Tambara disease of Potatoes.

(2) Colour Deterioration of Potatoes, in the College Magazine.



Mr. T. R. Khadilkar, Demonstrator in Botany—

- (1) Paper sent to the Indian Science Congress at Lucknow on the growth of hypocotyl of *Dolichos lablab* as recorded by Farmers' Auxanometer.

Mr. S. B. Ranade, Assistant Botanist—Two papers sent to the Indian Science Congress, Lucknow—

- (1) A Gall of Morphological interest on *Acacia Catechu* Var. *Sundra*.
- (2) *Cyperus laevigatus* as a soil indicator.

Mr. S. V. Godbole, Assistant Botanist—Some criticisms on Mason's methods of determining directly the physiological humidity of the Soil. (Journal of the Indian Botanical Society.)

W. BURNS,  
Economic Botanist.

## APPENDIX L.

ANNUAL REPORT OF THE WORK DONE BY THE PLANT BREEDING  
EXPERT, POONA, IN THE YEAR 1922-23.*Staff.*

1. I held the charge of the office of the Plant Breeding Expert to the Government of Bombay, Poona, throughout the year. Messrs. S. G. Bhalerao and N. M. Nitimargi, graduate assistants, were in charge of the Rice and Wheat Breeding Stations at Karjat and Kirkee respectively.

*Rice Breeding.*

2. The rice breeding work at present in hand consists of selection and study of strains of *Kolamba* rice, the most popular variety in the North Konkan, at the Karjat rice breeding station.

3. *Season.*—Though the monsoon started a little late this year, still when it started, the rainfall was almost continuous throughout the growing period of the crop. As a result the tillering was somewhat checked owing to want of sunshine and break in the rains. Besides, at the time of harvest it rained rather heavily for about a week and the crop was damaged in many cases owing to its lodging and getting spoilt by contact with mud. Thus the grains had either shed or begun to germinate and the harvested crop had a poor milling quality as the grains are prone to breakage when wetted after ripening.

4. *Method of Work.*—It was thought desirable this year to avoid as far as possible anything that might interfere with the normal behaviour of the plants either in the seed beds or in the fields as it was noticed that any advantage or disadvantage gained by any seedlings in the seed bed due to uneven spacing, exposure, or the like, is generally maintained to the last in the field. Similarly any advantage or disadvantage obtained in the field interferes with the normal behaviour of the plant.

So in the statistical study of such plants the frequency curves of their various characters are not as nearly normal as they should be. Hence this year not only were the seeds of single panicles sown equidistant in the trays like last year but they were also sown closer together, and around them a few rows of additional seeds from another sister panicle were sown in the same way, so that the central stock of seedlings forming the proper culture should all be under uniform advantage of space, exposure, etc. They were afterwards transplanted as the proper culture, the seedlings in the outside rows being used to form one border row on each side of the culture and two rows at each end. Any gaps in the rows caused either by death or by insufficiency of seedlings were also filled up with plants raised as rings in the trays such being marked to separate them from the main culture. The cultures were grown in four different series termed respectively (1) Intensive study, (2) undisturbed, (3) comparative and (4) extensive. In the intensive study series single seedlings were transplanted 9 inches apart in the rows and the rows were placed 18 inches apart. The undisturbed series was also transplanted with single seedlings but the distance between plants was 6 inches in the row

and the rows were 12 inches apart. The undisturbed series was grown with about 500 plants in each culture to have an independent idea of the yield per plant obtainable when the cultures were left undisturbed till the time of harvesting.

5. *Items of work.*—The principal items of this year's work were (1) to get a further confirmation of the purity or otherwise of the strains studied last year, (2) to determine the purity of some new strains taken up for detailed study this year, (3) to test again the yielding capacity of last year's strains and (4) to get an idea of the yielding capacity of the new strains. This is not the place to describe the characters of individual strains, but I have confirmed the purity of last year's selected types, and added others to those which are definitely pure. Eight new selections of Kolamba rice, moreover, were taken up this year for various characters as follows :—No. 3 for resistance to lodging, No. 113 for good tillering and for possessing some distinguishing character in the form of its very short awns or tips. Nos. 121 and 164 as coarse grained samples with good yields the latter being also intermediate in ripening ; Nos. 134 and 153 for having fine grains the latter being also intermediate in ripening ; No. 179 as an intermediate maturing and fine grained sample. Of these all except Nos. 113 and 179 were found to be pure.

Of the previous selections No. 42 resembling the Ghudya type of the Kolamba rice has continued to give over 25 per cent. better yields as compared with the average sample grown round about Karjat. It has been in great demand from the cultivators who have seen its performance. No. 72 has yielded nearly as high as strain No. 42 and may be equally useful. No. 6 has yielded less as compared with these above owing apparently to low tillering though it has the heaviest panicle in our lot. No. 35 which is definitely a fine grained sample resembling the *zinya* type which is expected to yield less than the coarse grained samples or the ghudya types, has actually yielded 8 per cent. better than the coarse samples of the Karjat cultivator. Had it been compared with an ordinary sample of the fine type obtainable in Thana to which it more closely resembles it might have shown still greater superiority as the comparison then would have been quite proper. Strain No. 32 which is also a fine grained sample like No. 35 has yielded even better than No. 35 and we can expect to get about 11-12 per cent. increase from it over the coarse samples of Karjat. No. 45 comes last among the lot. Its greatest disadvantage is its greater percentage of straw and chaff. Nos. 79 and 110, the early strains of our lot, continue to be so as regards period of growth and proportionate yielding capacity as last year though strain No. 110 yields somewhat less than No. 79.

These are my most promising selections, but there are many others with special qualities of their own, which are being retained for future use on account of these qualities.

6. *Some Noteworthy Features of the Selected Strains.*—No. 42 has always stood high in point of yield. Though it has a moderate tillering capacity still the tillers are mostly fertile. The plants do not run to leaf even if they are grown in fields which generally bring about that result in the

ordinary samples. This has been verified by some cultivators to whom the seed had been supplied and the Rice Specialist also found the same to be the case in his highly manured plots. Thus it seems to offer itself for further improvement by manuring. It can be planted closer without much risk of crowding. It has less sterility and is less affected by Smut than any other strains. It has a medium size of grain. From rough milling tests it may be said that the proportion of grain to husk is comparatively high though it may require a bit more polishing owing to its colour which is not clear white as is obtained in other types. No. 72 is nearly similar to No. 42. It has a bigger earhead but a lower tillering. No. 134 which is a fresh isolation, has a good tillering though from this year's observation it seemed that many of the tillers do not come to maturity. The size of the panicle is satisfactory and the grain much finer than in Nos. 42 and 72. In yield it seems to stand higher than any of the fine grained types on hand. It has less vegetative growth and hence might not run to leaf though it would require further testing. Nos. 32 and 35 belong to the fine grained type. No. 32 has a better tillering while No. 35 has a better and more compact earhead, though it is more prone to smut trouble. The former has a low straw production and might be benefited by manuring. Both of these being fine grained can command better prices in the market than the coarse grained samples. No. 79, an early strain, is getting popular in the Kolaba District and is grown on lands which used to grow inferior non-kolamba crops. Having a finer quality of grain than the non-kolumbas it can command higher prices as was evident from this year's transactions. No. 164 is perhaps finer than No. 79 and can also yield better as it takes three weeks more for ripening. It is also a better substitute for the non-kolumbas as regards yield and quality. No. 153 has a finer grain than No. 164 though the time of maturity is the same. Both are approximately similar in yield. The fineness of No. 153, however, will command better prices. No. 121 is perhaps the best in yield of the whole lot, but unfortunately it has a coarse grain which will detract from its quality and will not be able to command good price. No. 104 is a very late sample having the best tillering by virtue of its lateness. The yield is comparatively high but its grain size medium. It requires much water and does not lodge nor shed the grains. It can be recommended for fields containing water for a very long time in the season.

7. *Yields of the selected strains on the fields of the cultivators.*—We have been able to get fairly reliable records of yield from a number of cultivators, who grew our selections, side by side with the ordinary local seed. The following are the yields obtained by them on their own lands.

*Yields obtained.*

Mr. G. V. Medhi—	from Vengaon Strain No. 35	27·5	per cent. more.
Mr. S. G. Joshi—	from Pinglas     "     "     42	26·2	"     "
Mr. B. D. Nimkar—	from Pali         "     "     42	24·8	"     "
Mr. N. D. Marathe—	from Karjat     "     "     79	16·3	"     "

In some cases it so happened that the late rains spoiled the harvest and the crop was damaged considerably.

*Yields of the selected strains obtained on the farm.*—As already stated before, the samples obtained from the neighbouring cultivators had been grown under uniform treatment as regards spacing of bunches and number of seedlings per bunch. Averaging the results of the yielding capacity of these samples and comparing the same with No. 42 it was found easily to surpass their yields by about 25 per cent.

8. *Rice Committee Meeting.*—The Rice Committee met at Karjat on March 2nd to consider the work of the year 1922-1923. The following were the findings of the committee.

“Rice strains Nos. 35, 42 and 79 which were grown on cultivators’ fields in 1922 have given enough seed for 1,100 acres in 1923. The results show, when compared, an increase of 27·5 per cent., 26·2 per cent. and 24·8 per cent. on the local Kolamba late types (strains Nos. 35 and 42) and 16·3 per cent. on the local Kolamba early types (strain No. 79).”

If this be taken as correct, it means that if the 150,000 acres now under Kolamba rice in the North Konkan were to grow the selections now made and ready for distribution, it would mean the addition of 23,900 tons to the yields of rice and increased money value of production equal to over twenty-two lakhs of rupees.

#### *Wheat Breeding.*

9. The breeding work on wheat has been designed to provide types of both dry and irrigated wheat suited to Deccan conditions. The breeding station is located on the Ganeshkhind Gardens, Kirkee, while the Agricultural College Farm, Poona, is used for the trial of certain classes of selections.

10. *Cultures sown and history of crops.*—From the results obtained last year nineteen pure strains were grown this season both for further determination of their purity by taking plant to plant measurements and notes of their various characters and for noting their yield on an extensive scale. Two wheat samples obtained from local cultivators and one of Pusa 4 kindly supplied by the Imperial Economic Botanist were also studied for comparison of our selected strains with the cultivator’s seed and with the standard variety Pusa 4. Thus altogether 20 strains were studied in detail this year including Pusa 4. The cultivator’s samples were only useful for noting their yields per plant as they were all found to be more or less mixed.

Fortunately there was very little trouble from the surface grasshoppers and stem borers this year; and the soil fungi *Rhizoctonia* and *Fusarium* were also not very troublesome. The cultures had a good stand till after flowering, *i.e.*, the last week of January when the black rust *Puccinia graminis* began to make its appearance. Gradually it became so widespread that not a single strain escaped its attack. The attack was very severe in the first half of February. From the table given below it may be seen that in the beginning of this period the conditions were favourable for the rust attack, the temperature going high at day time and falling low at night. It is believed that the heavy rains in November and high

temperature and cloudy weather during January and February were responsible for the attack of rust.

Month.	Week.	Temperature.	
		Maximum.	Minimum.
January	1st	78.7	47.0
"	2nd	83.5	55.8
"	3rd	81.1	56.1
"	4th	85.1	56.0
February	1st	88.7	55.7
"	2nd	84.9	55.5
"	3rd	84.7	56.0
"	4th	83.0	57.7

Thus although we had no trouble from rust previously, the damage due to it this year was very great indeed and the yield was thereby much reduced. The attack was more severe in the case of dibbled cultures than in the case of drilled cultures. Similarly the cultures sown on the dry area at the College Farm suffered less or not at all while those on the irrigated area at Ganeshkhind Botanical Gardens suffered a good deal.

11. *Detailed plant to plant study.*—It was not possible to measure all the important characters of the grain that were thoroughly studied last season, and we had to remain satisfied with the study of the following characters only, viz., height of plant, total number of tillers, length and breadth of the flag, date of flowering and the length of earheads. Yield per plant and other grain characters could not be studied plant to plant for two reasons. In the first place the grain development was not good owing to rust attack and secondly showers of rain also spoiled the plants in the end of February and March. The yield per plant was arrived at by noting the yield obtained from the whole culture and dividing it by the total number of plants in it. Frequency distribution regarding the other characters were worked out and the mean, mode and coefficient of variability noted for each. From the study of the frequency distribution of these characters and from the general observation of the reproductive characters it is believed that the strains are not only pure, but they would also have proved to be of sufficient economic value to justify their selection if they had not been affected by rust at the Ganeshkhind Gardens. This can also be seen from the results of their yield actually obtained on the College Farm on an extensive scale in comparison with that of the standard variety Pusa 4.

12. *Comparison with Pusa 4.*—On the whole the frequency distribution of the characters studied have been quite satisfactory in the case of every strain as compared with Pusa 4 which was treated and worked out similarly. The frequency distributions of this year were very nearly normal and showed a very great improvement over those of last year as there was a much larger number of plants available for study, there were fewer gaps in the cultures and the border effect had been left out of consideration.

13. *Rust resistance*.—During the whole course of the work on wheat no rust had ever appeared before and we had no certainty about the rust resisting capacity of the selected strains. And although it has to be confessed that none of the selected strains appeared to be very highly rust resistant under the present conditions, still many of them have shown some capacity to resist the rust attack. These strains are :—Nos. 103, 162, 167, 186, 200, 228, 237 and 278. The strains worst attacked with rust were 157, 168, 171, 210, 212 and 345 ; of these Nos. 168 and 171 are the early strains. They were equally affected with *Alternaria* trouble both at Ganeshkhind Botanical Gardens and at the College Farm, though they had no trouble of that kind last year. However, they not only showed a great difference in the degree of rust attack in the cultures grown at Ganeshkhind Botanical Gardens and those at the College Farm, but even different cultures of these strains grown in different plots of Ganeshkhind Botanical Gardens also showed appreciable difference in the degree of rust attack. It is believed that with a drier seed bed and with normal conditions of weather during flowering and grain formation they would have escaped the rust trouble. As it happened this year their grain was quite in the milk stage when the rust attack was very severe and hence their yield has been very badly affected. Pusa 4 was also attacked with the black rust and more especially in the dibbled cultures, but not to that extent which would be likely to reduce its yields appreciably.

14. *Certain selected strains*—(a) *New Khapli strain*.—The new *khapli* strain with the *kala kusal* characters which had been isolated had split up last year and various types had been isolated from its progeny. These types were grown this year separately to study their behaviour. One of these types appears to have bred true since all the plants in the culture were alike in respect of all their characters. Fortunately it has manifested an extraordinary power to resist the attack of black rust under the present conditions. In fact it was the only line that had almost entirely escaped the rust attack. Whether this was due to its late flowering will have to be determined in course of time though it may be said that another strain which had flowered later than this did show an appreciable amount of rust. The *khapli* strain with the *kala kusal* characters had been maintained so long with the idea that it might prove to be rust resistant ; it seems to have actually been so this year. The multiplication of this pure apparently very highly rust resistant type will be one of the future items of work on this station.

(b) *Bright seeded strains*.—Strain No. 52 with bright green leaves and bright coloured seed was grown this year as it had given rather good yield last year. In spite of the rust trouble it has given satisfaction as regards yield this year also. It would be worthwhile to breed rust resistance into it if possible by crossing with a suitable strain.

(c) *Waxless strains*.—The waxless Nos. 157 and 284 did not give satisfactory results regarding yield this year. They were both badly affected with *Alternaria*, the former being also very badly affected with rust.

(d) *Kala Kusal types*.—From the Kala Kusal types No. 278 was tried and its yield was found satisfactory.

(e) *High yielding strains*.—Of the good yielders of last year Nos. 210 and 212 were very susceptible to the rust attack and hence they suffered much as regards yield. The rest of the strains Nos. 186, 200, 162, 167, 224, 228, 237 mentioned last year have behaved well in spite of the rust trouble.

15. *Wheat Cultures at the Agricultural College Farm*.—The twelve cultures grown on an extensive scale here were the following :—Nos. 162, 167, 168, 171, 186, 200, 210, 212, 224, 228, 237 and 103. Each of these was grown in six different plots which differed more or less in the nature of the soil.

The strains were grown here as a dry-crop for which the monsoon was favourable as there had been about 4 inches of rain just after sowing. There was no great trouble from any fungoid diseases or insect pests except in the case of Nos. 168 and 171, which showed a premature drying up of the leaves due to *Alternaria*. Rats had also damaged the crop to a certain extent when the earheads were being filled up.

The results in yield of the various selections with Pusa 4 as a comparison were as follows :—

Strain Number.	Yield per acre calculated from the average of all repetitions in lbs.	Yield per acre calculated from that obtained from one in good soil in lbs.
103	1459·8	1878·8
162	1319·3	2158·0
167	1144·7	1416·8
168	1252·5	1509·2
171	1124·2	1386·0
186	1098·5	1447·6
200	1031·8	1509·2
210	1010·2	1324·4
212	1016·4	1355·2
224	1244·5	1817·2
228	1047·2	1602·6
237	1096·4	1670·8
Pusa 4	....	1540·0

It cannot be denied that these figures are exceedingly promising and it seems probable that if these various strains can be so multiplied as to cover the wheat area in the Deccan with in each case the most suitable type it will mean an increased money value each year of between fifteen to twenty lakhs of rupees.

In conclusion I have to place on record my appreciation of the good work done by Messrs. S. G. Bhalerao and N. M. Nitimargi and the manner in which their assistants helped them in the same.

R. K. BHIDE,  
Acting Plant Breeding Expert.



## APPENDIX M.

REPORT OF WORK DONE IN THE PLANT PATHOLOGY SECTION  
DURING THE YEAR 1922-23.*Staff.*

1. Mr. S. L. Ajrekar, B.A., held charge of the post of the Plant Pathologist till the 27th of January 1923, when his services were transferred to the Bombay Educational Department. The post since then has not been filled up but has been held in abeyance and the Plant Pathologist Section has been temporarily placed under the control of the Economic Botanist pending further orders from Government.

Mr. G. S. Kulkarni, M.Ag., Assistant Professor of Mycology, who was on deputation in Europe for study, returned and took charge of his office on the 3rd October 1922, relieving Mr. B. N. Vakil, M.Sc., who was acting for him. Mr. S. A. Jamadagni, Koleroga Fieldman, was transferred in May 1923 to the establishment of the Deputy Director of Agriculture, Konkan Division.

The services of Mr. J. D. Ranadive, B.Ag., which were placed at the disposal of the Plant Pathologist by the Potato Committee for assisting in the Mycological work in connection with the Potato Research, were terminated in September 1922 as the funds which were provided by the Sir Sassoon David Trust could not be obtained for further study.

*Research.*

2. *Potato*.—One of the objects of the writer's deputation to Europe was to visit Italy to study the potato industry with a view to submit proposals for the improvement of the crop in the Bombay Presidency. Accordingly, soon after return from deputation, on the knowledge gained by studying the potato trade and cultivation in Italy, a report was submitted to Government regarding the steps to be taken for the improvement of potato crop in the Presidency. It may be said that the whole question of improvement of potato cultivation is now well in hand under the control of a Committee of which the Director of Agriculture is the President and the writer is one of the members. The work is being pursued with the object of (1) finding and maintenance of high yielding potato; (2) the checking of diseases, and (3) the best method of storage.

The results of the last year's work on the potato rots have been worked up into three papers and are submitted for publication.

Description of the four most commonly occurring potato rot fungi (two *Fusariums*, *Sclerotium Rolfsii* and a species of *Sclerotium*) have been prepared and their temperature relations studied.

3. *Cotton Wilt*.—The work on this has been carried on as outlined in the last year's report, in collaboration with the Cotton Breeders, S. D. and N. D., the main object being to discover or evolve a resistant variety. Inoculations are made in the field and in pots and the results worked up

at the end of each year. The following is a tabular statement of the results of the plots at Dharwar.

Name of Cotton.	No. of plants at the commencement of the experiment.	Plants killed by wilt completely.		Plants partly affected.		Total.	
		Num-ber.	Per cent.	Num-ber.	Per cent.	Num-ber.	Per cent.
1. Kumta Ordinary	419	65	15.5	104	24.8	169	39.1
2. Dharwar 1	534	304	56.7	100	18.7	404	74.1
3. " 2	414	84	20.2	44	10.6	128	30.8
4. " 3	424	310	73.1	12	2.8	322	75.9
5. " 4	250	174	69.6	20	8.0	194	77.6
6. " 5	344	260	75.5	15	4.3	275	79.8
7. Wagale	431	18	4.4	5	0.6	21	4.0
8. Bishnur Jari	162	35	21.6	58	35.8	93	56.1
9. Rozi	212	161	75.9	15	7.0	176	82.9
10. F. of Dharwar 1 × Wagale	125	6	4.7	40	32.0	59	36.2

"Wagale" has withstood the attack of wilt remarkably well like last year. "Dharwar 2" and "Kumta ordinary" come second to "Wagale", but "Kumta ordinary" has done better than "Dharwar 2" this year. It indicates that as we are using the same Kumta seed once introduced on the farm some years ago natural selection of resistant types is going on in that seed. It also indicates that Kumta cotton contains types which resist wilt better than "Dharwar 2". A number of resistant plants in Kumta have been therefore selected to test this object.

The first generation of the cross between "Dharwar 1" and a pure wilt-resistant strain of Wagale indicates that resistance is dominant at least during the greater part of the growing period.

*Susceptibility of Broach Deshi plants, Nos. 4, 5 and 6.*—Pot culture experiments were conducted at Poona to test the above varieties of Broach cotton to *Fusarium* wilt with the following results.

Variety.	No. of plants grown.	No. of plants wilted.	Per cent. of attack.
1. Broach Deshi plant 4	8	8	100
2. Broach Deshi plant 5	9	5	55.1
3. Broach Deshi plant 6	10	Nil.	Nil.

It thus shows No. 6 is completely immune to wilt.

4. *Leaf spot and Blight of Onion.*—A study of this disease was continued. Inoculation experiments show that the fungus, a species of *Alternaria*, is a wound parasite. In one experiment, out of the six wound inoculations three were successful. In another experiment five out of seven were fruitful. High temperature and humidity were found to be necessary for the spread of the disease. Infected plants show the disease in a week.

Field experiments were conducted at the Kumta and Ratnagiri farms. Experiments at the Kumta Farm were inconclusive as the disease did not appear to any appreciable extent, but those at Ratnagiri indicate that Goa and Nandore varieties of onions resist the disease to a considerable degree. The application of sodium nitrate in small doses at intervals, combined with *rab* treatment, appears to be beneficial to the crop and the application of Burgundy mixture has no effect in checking the disease. The experience of two years of this disease has been, that the disease could be controlled by the following methods:—

- (1) Proper selection of the seedlings.
- (2) Low seed rate.
- (3) Application of sodium nitrate in small doses at intervals to the crop.
- (4) *Rab* treatment of the soil.
- (5) Growing resistant varieties such as Nandore and Goa.
- (6) Growing crop by the row method rather than by the bed method.

5. *General observations on crop diseases.*—(a) The study of the Mango inflorescence blight has shown that, though hoppers are the constant associates of the trouble, a mildew is also concerned. Preliminary observations made in the important mango tracts (Ratnagiri and Dharwar) indicate that mildew is as important as the hoppers and in some cases it is the sole cause of the blight. It has also been ascertained that this fungus is considerably responsible for the dropping of the tender fruits. Heavy mists in the early mornings followed by cloudy weather which are generally considered to be the causes of blight, induce the mildew to grow very rapidly. Investigations hitherto made justify action against the disease and it is therefore intended to start operations in the coming season. (b) A group of obscure diseases on which some data have been collected is what are called the mosaic diseases. These diseases have been the subject of much investigations abroad and consequently a vast amount of literature on them is available. But in India no study of them has been made. Many of our crop diseases which were not understood hitherto seem to come under this Mosaic category. The *Katte disease* of cardamom which is being investigated by the Agricultural Chemist seems a typical case of Mosaic. Instances of this disease have been noticed in the chillie and tobacco crops. In the former, the affected plants get the leaf curl and in the latter the plants get stunted and the mottling of the leaves is highly pronounced. The potato and tomato crops are also subject to this disease. This year a severe infection of mosaic disease was noticed in the *mogari* crop (*Raphanus sativus var caudatus*) at the Agricultural College Farm, Poona. There is no doubt that mosaic diseases do exist in the Bombay Presidency and to some crops a considerable amount of damage is done by them. (c) An attack of an *Alternaria* fungus was noticed in the wheat breeding plots at the Ganeshkhind Botanical Gardens. The fungus grew on every part of the plants, stem, leaves, glumes and awns and interfered considerably with the yield of the crop. (d) *Betel-vine wilt disease.*—A great many complaints and enquiries received regarding this disease, especially from the Dharwar District, led to the necessity of making a preliminary survey to

ascertain the seriousness of this disease and the possibilities of dealing with it. The disease is found in a good many gardens in the tract but is more serious at Savanur, where the betel-vine cultivation is very highly intensive. A *Fusarium* fungus is always associated with the roots of the wilted plants. (e) The life history of an interesting rust (*Uromyces Aloes* (Cke) P. Magn) on *Aloe vera* has been worked out and a paper on it has been sent to the Indian Botanical Society. This fungus is a useful addition to the teaching collection as it can be easily cultivated whenever required for class demonstration. (f) The field experiments on the smut (*Ustilago Eleusinis* Kulk) of *nagli* or *nachani* (*Eleusine coracana*) were again carried out at Malkapur with a view to see whether the smut was seed-borne or not. No smut appeared in the plot sown with seed infected with smut spores, nor in the plot sown with treated seed. These experiments which are being conducted for the last four years therefore go to show that seed treatment with copper sulphate is not useful since the smut is not seed-borne. (g) The results of spraying experiments conducted at Nadiad against the mildew disease of *jiru* crop (cuminum) were inconclusive as no disease appeared in the crop.

6. *Routine and Propaganda.*—The number of specimens of plant diseases that arrived in the Laboratory for examination from the public or from the department was 114. The following are new or not recorded previously in the Presidency.

- (1) *Alternaria* Sp. on wheat.
- (2) *Helminthosporium* Sp. on tobacco.
- (3) *Acrothesium* Sp. on jowar.

The spraying campaign against the *Koleroga* or *Gal* disease of *Arecca* palms was conducted in the Honavar Taluka of Kanara and in the Dapoli Taluka of Ratnagiri District. A special point of interest in connection with this year's spraying campaign was the successful attempt to remove from the minds of the betel-vine growers the impression that the Agricultural Department was more anxious to push the spraying treatment than the growers themselves. This impression was perhaps due to some garden owners having received the treatment free of cost for several successive years in the past. This year the policy of not giving the treatment free except for the first trial was announced and rigidly adhered to, and although the work was started, owing to bad weather, rather late in the season the results achieved were undoubtedly encouraging.

The success of this year's campaign is to be measured not so much by the number of trees sprayed as had been the custom to do in the previous years as by the number of garden owners who were found willing to pay for the treatment. The number of trees sprayed was 9,905 as against 13,810 of last year, but the sum recovered for treatment given was Rs. 97-0-11 as against Rs. 24-9-7 of last year. This showed that the spraying treatment was appreciated by the people in spite of the several obvious difficulties of the methods. Further evidence of this appreciation was found in an article published on this subject in the "*Kanara Leader*" of October 17th, 1922, by the garden growers, praising the efficacy of the treatment.

This work has been carried on for the last ten years by the Plant Pathologist's section. From the coming year, the work has been transferred to the Deputy Director of Agriculture, Konkan Division, with a view to having a much wider and more effective extent of spraying propaganda.

7. *Teaching*.—The courses in Plant Diseases and Mycology for the B. Ag. degree was given.

8. *Publications*.—The following papers were submitted for publication during the year :—

(1) Relative Responsibility of Physical Heat and Microorganisms for the Hot Weather Rotting of Potatoes in Western India, by S. L. Ajrekar. This has been accepted for publication by the Agricultural Adviser to the Government of India.

(2) The Problem of Potato Storage in Western India, by S. L. Ajrekar. This was read at the 1922 Lucknow Science Congress.

(3) The Relationship of the Species of *Fusarium* causing Dry Rot and Wilt of Potatoes in Western India by S. L. Ajrekar and M. N. Kamat. It has been accepted for publication in the "Agricultural Journal of India."

(4) A Note on the Life History of *Uromyces Aloes* (Cke) P. Magn. by S. L. Ajrekar and B. R. Tonapy. This paper was read at the Indian Botanical Society Meeting at Lucknow, 1922.

(5) Potato Cultivation in Italy, by G. S. Kulkarni. This was read at the 1922 Lucknow Science Congress.

G. S. KULKARNI,  
Assistant Professor of Mycology.

## APPENDIX N.

ANNUAL REPORT OF THE WORK DONE BY THE SOIL PHYSICIST TO THE  
GOVERNMENT OF BOMBAY, POONA, FROM JUNE 1922 TO JUNE 1923.

1. The work of my branch is mainly divided into two sections, viz. (1) Research and (2) Teaching. Help is also given to other branches of the Department who need it for the solution of problems in those branches. At the Tobacco Research Station, Nadiad, for instance, it was found that on a particular plot tobacco plants did not grow well unless they were irrigated at shorter intervals, than on other adjacent plots. The soils from both these plots were sent to me for examination and it was found out that a larger amount of water was rendered inactive by soil particles in one plot than in the other, owing probably to more accumulation of colloidal material in that plot and hence, few days after irrigation, the roots of tobacco plants were unable to extract sufficient amount of water for the proper growth of the plants.

*Research.*

2. As explained in my last year's report research work in my branch is so directed that it may be useful in keeping down, as far as possible, famine in food grains and fodder in districts of scanty rainfall. Research on soil from Mohol (in Sholapur District) was therefore undertaken last year and continued during the year under report with the object of finding out the means of increasing the water holding capacity of the soil, of making it retain moisture for a longer time and delivering it to the plant when needed.

It was found last year that the maximum water holding capacity of the soil could be increased by the addition of organic manures, such as farm-yard manure, fish manure, etc., as well as mineral manures, but as mineral manures for dry farming are of doubtful value inasmuch as most of them increase the osmotic pressure of the soil solution and thus render the entrance of water into the roots of plants more difficult, further work on mineral manures was postponed to a later date when more time and assistance would be available to find out which of the mineral manures would be more suitable.

It is, however, not enough if only the maximum water holding capacity of the soil is increased. The water absorbed by the soil must be gradually made available to the roots of the plants. This meant that soil should be supplied with organic colloids which should gradually change into non-colloidal material so that the extra amount of water which would be held by the colloidal material and rendered inactive in the beginning should be gradually made more and more available as colloidal material changed by gradual decomposition into a non-colloidal matter. It was thought that these conditions would be satisfied by studying the decomposition of green manure in the soil.

3. Soil from Mohol was, therefore, treated with one per cent. (0.25 per cent. dry matter) of green manure, chowli-Vigna Catiang and sufficient water added to wet the whole of the soil completely. It was then allowed

to dry and the first sample of soil was taken twelve days after the addition of the green manure. Soil was again wetted with sufficient water and allowed to dry. Second sample of soil was then taken after twelve days. This process was repeated and fresh samples of the soil were taken at an interval of twelve days for over a period of three months. The samples of the soil were then tested for (1) maximum water holding capacity, (2) added water rendered unfree, (3) water held by the soil against a particular centrifugal force. The results obtained are very promising as the following figures show.

Sample.	Maximum water holding capacity.	Added water failing to freeze per cent. (Bouyoucos method).	Water retained after centrifuging (3,000 revolutions per minute).
1	2	3	4
Untreated Mohol soil .. .. .	82.76	56	40.51
Sample No. I (12 days after adding green manure) .. .. .	90.60	74	41.95
Sample No. II (24 days after addition of green manure) .. .. .	89.37	100	40.61
Sample No. III (36 days after addition of green manure) .. .. .	87.50	100	40.71
Sample No. IV (48 days after adding green manure) .. .. .	86.80	86	40.74
Sample No. V (60 days after adding green manure) .. .. .	82.73	88	40.90
Sample No. VI (72 days after addition of green manure) .. .. .	....	78	40.78
Sample No. VII (84 days after adding green manure) .. .. .	....	76	40.88
Sample No. VIII (96 days after adding green manure) .. .. .	....	72	40.83

These figures are very significant. The figures in the second column show that the maximum water holding capacity of the soil is increased by about 8 per cent. within 12 days after the addition of green manure. It then gradually falls down to its original level about 60 days after the addition of green manure. This indicates the possibility of increasing the inherent capacity of the soil (apart from keeping the soil porous for the proper penetration of rain water) to store rain water for nearly two months. It remains to be seen how advantage can be taken of this property actually in field practice.

Figures in the third column show that the power of the soil for holding water more firmly or its retentive capacity for water can be greatly increased within about a month after the addition of green manure. After about a month it gradually gets less and less but even after 96 days it does not fall as low as it was before the addition of green manure. This means that for full three months and more the retentive capacity of the soil can be maintained at a higher level.

Figures in the fourth column show that the power of the soil to hold water against a particular centrifugal force is increased by about 1.4 per cent. twelve days after the addition of green manure, but this small increase also mostly disappears in a few days.

If we were to compare the power of the roots for extracting water from the soil particles to the centrifugal force, forcing out water from the wet soil we might say from figures in the fourth column that the water-delivering power of the soil is not materially changed, so that the increased amount of water as shown by figures in the second and third column will not be held against the force of the roots coming in contact with the soil particles.

4. So far the results of green manuring obtained by Laboratory methods are hopeful. How far they can be utilised in field practice and how far the provisional conclusions drawn from them are correct will be seen only when experiments are done actually in field. In near future experiments will be done in the field also and the utility of the Laboratory experiments will then be further tested.

#### *Teaching.*

5. Teaching Soil Physics to the students of the Intermediate Agricultural Class formed a part of my duty during the year under report. Students' practical work in the Laboratory is efficiently carried on by Messrs. H. M. Desai, B.Ag., and B. P. Deshpande, B.Ag.

#### *Staff.*

6. During the year under report I had no trained assistant to help me in my scientific work. But during the coming year one graduate assistant and one non-graduate fieldman are being appointed and with their help I hope to make more progress.

V. A. TAMHANE,  
Soil Physicist, Bombay Presidency, Poona.



## APPENDIX O.

SUMMARY OF WORK BY THE DEPUTY DIRECTOR OF AGRICULTURE  
FOR ANIMAL BREEDING, FOR 1922-1923.

1. Mr. E. J. Bruen held charge of the duties of the Deputy Director of Agriculture for Animal Breeding for the year. He acted as Secretary to the Committee appointed by Government to investigate and make suggestions regarding the cattle breeding industry and fodder reserves of the Presidency. Plans and estimates were prepared in consultation with the Imperial Dairy Expert for two large Dairy concerns to supply milk to Bombay City and at the same time to prevent indiscriminate slaughter of good milch cattle as at present prevails owing to the method now employed to supply Bombay with milk. All private and co-operative cattle breeding societies were visited and advice given where possible. A scheme was drawn up and accepted by the Khandivalee Gowrakshak to improve the institute and bring it into line with other scientific Breeding and Dairy Farms.

2. During the year four very successful Cattle Shows were held. It is very encouraging to see how these shows are being recognised as centres for teaching and demonstrating the value of good cattle, as in Dharwar District alone some six shows were held by different Co-operative Bodies. These shows have been fairly liberally supported by the District Local Boards and private persons. Special credit is due to Rao Saheb S. S. Mangsoli and Mr. S. K. Wodeyar, Mamlatdar of Athni, for the keen interest displayed and the great help rendered in Athni, Taluka.

3. During the last quarter of the year Government were pleased to hand over cattle breeding operations in Sind to this Department. This includes the Willingdon Cattle Farm for Sindhi cattle.

4. Government now have breeding farms for the Kankrej, Amrit Mahal, Sindhi and Thar-Parkar breeds of cattle. There are still the Mhaswad and Tapti Khillari, the Krishna Valley, Dangi and Gir breeds to be provided for. A very big demand has already been created for Mhaswad Khillari bulls. Unfortunately it is getting very difficult to procure good bulls of this breed, those that have been put out were bought in Native States.

5. All the members of the staff have worked very well and great progress has been made especially in the Central and Southern Divisions. Very little head-way has been made in Gujarat and the demand for bulls is not nearly as great as it might be, considering the very large field open to this work.

6. The work under the Deputy Director of Agriculture for Animal Breeding is divided up as follows :—

(1) Production and Experimental Work on Stud Farms.

(2) Propaganda and village improvement.

7. *Production and Experimental Work on Stud Farms.—Northcote Cattle Farm, Chharodi.*—Mr. M. M. Desai, B.Ag., held charge of the Northcote Cattle Farm for the year with Mr. B. B. Jamaspjina, B.Ag.,

as Assistant Manager of a portion of the year and Mr. M. G. Patel as Assistant Manager for the remainder. Mr. M. M. Desai and his staff have worked well throughout the year.

The monsoon was fairly good. During June about 4.81 inches of rain was recorded. The early part of July was dry giving time and opportunity to sow a greater portion of the fodder crop. During the last week of July 7.92 inches of rain was recorded, the total rainfall for the year being 28.29 inches in a total of 32 days. The even distribution of the rain was very beneficial to the fodder crops.

The hay crop was a very average crop except for the low-lying areas where the water stagnates and spoils the crop, the total hay harvested amounting to 10,46,768 lbs. The actual cost of the hay when stacked worked out at Rs. 4-9-5 per 1,000 lbs.

In addition to the hay crop last year's experiment in growing the high yielding Surat varieties of fodder *jowar* were continued. The season being peculiarly good for fodder *jowar* all the varieties sown made very rapid growth. The growth of the *Sholapuri*, *Perio*, and *Sundhia* varieties was so rapid and rank that a great deal of the crop was lost owing to its lodging. All that portion that paid to harvest was collected and the remainder was grazed for one month by 400 head of cattle at night. An attempt was made to collect seed from a portion of the crop, owing, however, to the damage done by birds, only sufficient for the use of the farm could be obtained.

*Sundhia* was grown as a hot weather crop and gave good green feed during the summer; it is not, however, a commercial proposition in this tract owing to the high cost of preparing the land and of irrigation. The land having been heavily manured the previous year only, a portion on which *Sholapur jowar* was grown was manured at the rate of 20 carts of farm-yard manure per acre. There is now no doubt that given a fair year and good manuring, fodder crops can be grown to advantage in this tract. The actual profit varied from Rs. 50 to Rs. 70 per acre.

Two small plots were sown to sunflower in the kharif season. The land received no particular attention, and no manure was given this year. The last year the area was sown to *Sundhia jowar* and *rabi val* and castor: these crops were manured to the extent of 33 carts per acre of farm-yard manure. Both plots were sown in the third week of July at the rate of 40 lbs. per acre with the Surat wheat drill at 18 inches apart. A small portion was reserved for seed. An attempt was also made to sow sunflower in the *rabi* season when the crop yielded 5,950 lbs. of green fodder per acre, provided it was away from large shade trees. Where trees were near, it failed. In the kharif season it yielded, however, 25,000 lbs. of green fodder per acre and gave a handsome profit.

During the year 494,762 lbs. of silage was made and the three *pucca* silo towers on the farm were filled with this material, as well as five *cutch* us.

8. *Live Stock at the Chharodi Farm.*—During the year several experiments were conducted on the Farm. The absence of housing, tying and proper feeding arrangements makes these experiments very difficult.

but experiments are in progress regarding the value of bran as a food stuff for *Kankrej* cattle, the value of clothing cattle in connection with milk yield under Upper Gujarat conditions, the correlation of the local methods of judging cattle with the western system and the cost of raising cattle in Gujarat.

The breeding operations on the farm continue, much improvement has been noticed from the use of the pedigree bulls now heading the herds. During the year seventy-seven cattle were cast and sold, the purchase of these animals being restricted entirely to actual breeders. Butchers and traders were excluded. The tract has gained to the extent of these animals.

The milking experiment is particularly encouraging. From the milking herd, the following strains have been selected :—

Name and number of the animal.		lk yield.		Remarks.
		Lbs.	ozs.	
1.	Hirali No. 130	2,034	4	During a period of 12 months.
2.	Todor " 72	1,618	8	Do. do.
3.	Surjam " 123	1,514	8	During a period of 8½ months.
4.	Lilor " 135	1,567	12	Do. 7½ "
5.	Sabarmati " 116	1,343	4	Do. 12 months.
6.	Mojoli " 215	1,277	8	Do. 9½ "
7.	Chanothi " 271	2,079	8	Do. 12 "
8.	Lachor " 42	1,321	12	Do. 11½ "
9.	Manchhi " 229	1,179	8	Do. 8 "
10.	Padol " 361	1,347	12	Do. 9 "
11.	Todor " 124	2,422	4	Do. 8½ "
12.	Putli " 227	1,058	0	Do. 6½ "
13.	Khajan " 272	1,264	8	Do. 6½ "
14.	Reshum " 122	2,627	0	Do. 3½ "

The yields are very good considering the conditions under which milch cattle are maintained at Chharodi. Cow No. 14 in the above list (Reshum) unfortunately aborted but with all this she yielded her highest yield in her flush being 29 lbs. 8 ozs. per diem.

During the year previous the milk was sold as milk, during the current year a separator was installed, the result being that the farm made Rs. 147 over and above last year's return, besides the calves had the benefit of the separated milk which they lost when the milk was sold as whole milk.

During the year under report the farm was fairly free from epizootic diseases. Foot and Mouth Disease occurred during August. The preventive measures taken by the Farm Manager soon helped to eradicate this disease. The year under report is one of the first years during which rinderpest had not made an appearance. Whether this is due to the climatic conditions prevailing or to the fact that the cattle were inoculated by the serum simultaneous method the year previous, it is difficult to say. The death-rate has considerably dropped due to better feeding and the casting of old animals. During the year the farm put out two buffalo-bulls and nineteen cow bulls on the premium system.

10. *Finance of the Chharodi Farm.*—During the year the farm accounts show a loss of Rs. 21,617 as against Rs. 33,633 of the year previous. This loss is chiefly made up of loss in difference in realisation on cattle sold to book value, a loss of Rs. 2,250 on petty construction and repairs, a loss of Rs. 1,000 on the revision of prices of all dead stock, and the valuing of all farm produce to cost price. It is very difficult to make this side of agriculture a profitable business and particularly so at Chharodi, which depends on its revenue to the season. The raising of good pedigree stock is expensive and at present the people do not realise the value of good pedigree stock.

11. *Cattle Breeding Farm, Bankapur.*—The farm was managed throughout the year by Mr. A. B. Gadagkar, G. B., V. C.

The rain broke in June and for the first month good rain fell but unfortunately a long break during July and August put back the grass and forage crops considerably. However, the rains were good and timely enough to give fair results.

During the year, 2,40,000 lbs. of hay was harvested at a total cost of Rs. 667-10-3. 72,000 lbs. of green grass was converted into silage, this helped considerably during the hot months of the year.

The farm consists of an old fort, consequently there is practically no land available for cultivation. Two small plots were cleared of debris, and brought into fit enough condition to grow *jowar*. The two plots measuring about two acres produced 19,028 lbs. of green fodder which was converted into silage. A very satisfactory second crop was obtained which was fed to the cattle green. Efforts are being made to level and bring under cultivation some more land.

With regard to the herd of Amrit Mahal cattle, I am pleased to say that during the year under report the farm was once again free from disease. The only deaths recorded were of four small calves killed by a panther. The strength of the farm at the end of the year was 145 animals of all classes or an increase of ten on the previous year. During the year twelve animals of all classes were sold and seven bulls were put out on the premium system. During the year thirty-three male and female calves were born.

The farm is as yet not fully equipped for experimental work, and it is encouraging to see that in the second year of its working the farm has been in the position to put out seven bulls on the premium system.

The farm is still very short of housing for man and beast. It was originally intended that the farm would keep and maintain 20 head of cattle, buildings were accordingly arranged for this number. The strength of the herd as will be seen is now 146 and is likely to increase. A shed to house these animals and likewise accommodation for workmen are urgently required. The farm has pulled on by erecting cheap temporary buildings, which have up to the present met our requirements and now even this space is inadequate. The farm still obtains its water supply from a three-inch bore hole by a pump worked by hand power and it requires a mechanical water lift with storage tanks.

The farm held its first cattle show with very encouraging result. The Collector and Captain Meherban Nawabsahab of Savanur were present together with most of the leading gentlemen of the district.

On the whole the Bankapur farm has made very good progress both in the live stock and in reclaiming the land. It was many years before Chharodi Farm was able to produce suitable bulls to be of use to the improvement of cattle but it is satisfactory to be able to report that Bankapur Farm has made a very fair start in its second year. The Amrit Mahal breed does exceedingly well in this tract and I feel that we are now producing as good cattle at Bankapur as is being done in the indigenous home of the breed.

12. *Willingdon Cattle Farm, Pihai—near Karachi.*—Cattle breeding operations in Sind were taken over from the Civil Veterinary Department in February 1923. This includes the Willingdon Cattle Farm at Pihai.

The Willingdon Cattle Farm has consisted of about 820 acres of rough grass land, a few acres of which were cultivated on the farm. It has a large well from which irrigation and drinking water is pumped by a four-inch centrifugal pump.

The breeding herd consisted of the following pure Sindhi stock :

Bulls	..	..	..	6
Youngstock bulls	..	..	..	3
Bull calves	..	..	..	16
Draught bullocks	..	..	..	2
Cows	..	..	..	22
Heifers	..	..	..	12

During the months of February and March 1923 the whole farm area was fenced, cattle byre and store room erected. The following cows were purchased. Sindhi cows—10, Thar-Parkar cows—4, Thar-Parkar bulls—1.

The object of this farm is to establish a strain of high milk yielding Sindhi or Red Karachi cattle, suitable to the tract, at the same time keeping in view the draught requirements of the tract. A small herd of Thar-Parkar cattle has been placed temporarily on this farm. The Thar-Parkar is a hardy high milk yielding breed, the male stock of which are good draught cattle. This excellent breed fills a very necessary demand for the Central and Lower Sind, and should be in great demand in future both in Sind and in Central India.

13. *Propaganda and Village Improvement.*—This work is divided into three areas termed the Northern, Central and Southern Division, each division being under a Divisional Inspector of Cattle Breeding. The work of these officers consists in visiting all the villages in their tract, where lectures are delivered on the improvement and care of cattle and on the conservation of fodder in the form of hay, *kadbi* or silage. To induce the people to use good stud bulls, good bulls are purchased in consultation with persons desirous of taking a bull and these given on a liberal premium system.

During the year the grant for this purpose, Rs. 2,500, was exhausted, the demand being very brisk. All bulls given on the Premium System were inspected. During the year the following bulls were given out on Premium System :

Northern Division. . . 19 Kankrej Bulls, and 2 buffalo bulls,  
 Central Division. . . 7 Mhaswad Khillari bulls,  
 Southern Division. . . 6 Amrit Mahal and 1 Krishna Valley bulls,  
 or a total of 33 bulls, or nine bulls more than the year previous, were put out.

During the year in the three Divisions over 500 villages were visited by the Divisional Inspectors.

Four well attended Cattle Shows were held by the Department. The following statement will show how popular such shows are getting.

	Cattle attending.		
	1920.	1921.	1922.
Northern Division, Chharodi, Kankrej breed..	100	403	634
Central Division, Mahud Budruk, Mhaswad Killari .. .. .	....	180	400
Southern Division, Bankapur, Amrit Mahal..	....	....	209
Athni, Krishna Valley .. .. .	....	....	1,985

These activities have reaped wide-spread results in most of the villages in which this department is now working. The villagers have purchased pure-bred cows discarding their scrub and mongrel bulls. The castration of mongrel bulls is also on the increase, several villagers in the Dharwar District offering all entire bulls for castration since Premium Bulls have been stationed in their villages. The placing of good bulls in villages has been a hard business as it is an entirely new business, the people relying on bulls dedicated to temples to do the necessary services.

However, from the results obtained from bulls put out, the people are beginning to realise the benefits of using good pure bred bulls. Unfortunately, the demand far exceeds the funds devoted to this business. Greater progress could be made if the maintenance charge of Rs. 4 which is inadequate were raised to Rs. 10 and if Government increased the budget under this head.

14. *Staff.*—Most of the staff have worked well during the year. The clerical staff have had a very busy year with the Cattle Committee and for a greater portion of the year have worked with one man short. Mr. V. K. Gokhale and Mr. Y. K. Phadke have put in yeoman service and with all the extra heavy work have kept the office upto date.

E. J. BRUEN,  
 Deputy Director of Agriculture  
 for Animal Breeding, Poona.

## APPENDIX P.

ANNUAL REPORT OF THE AGRICULTURAL ENGINEER FOR THE  
YEAR 1922-23.

I held the charge of the office of the Agricultural Engineer to Government during the year under report in which a great change in the general nature of the work, administration and finance has been effected as a result of the recent Devolution Scheme passed under G. R. No. 5427, R. D., of 1st December 1922. The executive control of the most of the branches in Agricultural Engineering including boring, pumping, cane crushing, etc., has been distributed to the six divisions in the Presidency. The transfer of a number of machines, considerable grants and a big staff has also been effected. Each division now under a Deputy Director of Agriculture is thus equipped with a mechanical assistant, a boring assistant, a boring mechanic and two or three boring mukadams according to the number of boring machines allotted. Another change is in the general administration of the Agricultural Engineer's workshops and stores which has been effected according to G. O. No. 3515, R. D., of 16th January 1923, the idea being to restrict the work carried out at my shop to a minimum, dispensing with the extra muster roll employees and the temporary establishment entirely and limiting the activities of the department to advisory, experimental and research work. The department has in addition to look to the inspection of boring and other Agricultural machines transferred to the different divisions, advise in technical matters, act as a resource in case of accidents and breakdowns, control the pumping plant at Nangaon, supply estimates, drawings and designs for various agricultural schemes after visiting the sites, undertake erections of new plants like the Karajgi, etc., work the famine sets in case of necessity and experiment with tractors and other agricultural implements.

2. The bringing of the Devolution Scheme into force took up considerable time and energy, consequently I am unable to show very much progress in the general activities of the Department, as the change was actually effected from the 1st of February last and most of time from the end of last monsoon when all the executive works are usually slack has been spent in making preparation for the proposed transfer of men, grants and material. I am, however, giving below a brief history of the work done during the year under report before and after the Devolution Scheme.

3. Although inquiries for agricultural machinery are on the increase, requests for actual purchase or erection are very few indeed as the prices of machinery have not as yet reached the normal. There were, however, two pumping plants fixed, one in Thana district at Koregaon for Mr. K. T. Karulkar of Umbargaon consisting of a 10 B.H.P. oil engine and a four inch pump on the river Varoli, and the other in Surat at Lawacha for Mrs. Sardesai consisting of a 16 B.H.P. Tangye engine and a three inch Ruston centrifugal pump on a well recently bored. The first plant is owned by the cultivator himself while the second is a Government plant hired out to the lady at a cost of Rs. 450 per annum.

4. No inquiry has matured in cane crushing, ginning, etc., but there is a general cry for motor tractors and similar labour and cattle saving devices. The case tractor and the Grand Detour plough have ploughed about 40 acres of land in Khandesh in spite of one or two serious break-downs which kept the work at a standstill for many days. The steam ploughing tackle from Ranabennur was given on hire to Sardar Maha-boob Alikhan of Savanur for a sum of Rs. 3,000. The Sardar experimented with the deep plough intended for Karnatak for eradicating *Hariali* weeds and also the other implements such as Cultivator, the shallow plough, the Disc plough, and the Zigzag harrow. Although he had the assistance of some of the departmental hands given on deputation for carrying out the work and training new men, still the expenditure was slightly more than what was expected. The Sardar is, however, anxious to have the tackle on hire again for the next year which is sufficient proof of its usefulness. The motor plough cannot be said to have arrived at the stage of perfection as yet and I shall require some little time to give a correct opinion of its utility when compared with cattle power. There is, however, very little chance of success until individual holdings are increased in size or co-operative societies come forward to manage such concerns.

5. The power baling plant at Karajgi had to be left incomplete for want of funds. The storage shed, the machinery shed and the foundations for the machines are completed and the remaining work will be taken up as soon as funds are available. I hope, however, to run the plant by December next and I shall deal with the entire scheme later on in my next report.

6. The pumping plant at Nangaon fixed on the river Bhima for experimental purposes is greatly appreciated by the *rayats* and Government has recently been pleased to increase the perennial irrigation from 45 to 60 acres. But there is a demand for further increase in the area under perennial irrigation and although the plant is partly duplicated it is not possible to consider the proposal unless the plant is completely duplicated.

7. The object of the Devolution Scheme is to increase the quantity of work by more effective and timely supervision. It is to be seen how far this aim is attained and we shall be able to say something next year when the Divisional Officers have conducted the work for one complete year. There are two new boring schemes before Government. One is the exploratory boring and the other famine boring. The object of the first is to test the possibilities of water as a preliminary measure to sinking a well. The bores intended for this will not exceed a depth of 50 feet. The second is intended as a recourse in times of heavy drought. Although both the schemes are costly in capital expenditure still they are very useful and essential in the interest of the *rayats*.

8. There is often great difficulty in obtaining a trained man to work a boring machine at the present time as this line of work is entirely new. The difficulty will be more pronounced when carrying out the above two schemes and hence a class for training candidates in boring at the shops, similar to the one for training oil engine drivers, is essential.



9. This year I had an opportunity of staying in Sind for more than six weeks, during which time most of the machinery has been inspected and several agricultural implements tested with a view to modify them to suit the local demands. Ploughs such as the *Raja*, the Monsoon, the Egyptian and the Orient, etc., were tried on different soils under various conditions and the Orient was found to be the most efficient and suitable to meet all demands. Its cost, however, is very much in excess of the Egyptian plough, the latter being commonly used in Sind and it is only possible to advocate the Orient implement when the cost is considerably reduced. I am going into the details of this to see how cheaply it can be manufactured and I am confident I can reduce it by half. The Cletrac tractor did excellent work at the Jacobabad Farm where the soil is very light and the combined operations of ploughing and sowing at one time were a great success.

10. The oil engine class has been held at the workshops for cultivator students and I think this course will go far to solve the problem of getting trained men to drive small power plants and run them successfully.

11. This year my office was removed to Barrack No. 13 in the College compound and this is the fifth shifting since 1913. The stores which were arranged in another barrack behind the College were also removed to the shops after the Devolution Scheme was sanctioned. This shifting business is very expensive, troublesome, and leads to breakage of furniture in transit, displacement of goods and at times the losing of papers, etc. A proper office building and store house is the only solution to avoid such trouble and unnecessary expenditure.

12. The enquiries received during the year under report are as under:—

1. Pumping ..	..	..	..	20
2. Cane Crushing ..	..	..	..	5
3. General ..	..	..	..	43
4. Boring ..	..	..	..	70

Number of acres ploughed in Khandesh by tractor plough is 40 acres and 10 gunthas.

Number of students trained in the oil engine driving class is 12.

The number of bores made by the department until the date of the transfer of work, i.e., 1st February 1923 is 14, details of which are as under:—

Name.	Place.	Taluka.	Depth.	Result.
<i>Ahmedabad District.</i>				
1. Calico Mills ..	Ahmedabad ..	Daskroi ..	223'	Incomplete.
2. Mr. Somabhai Sankalchand ..	Dholka ..	Dholka ..	63'	6,000 gallons per hour.
3. Mr. Ambalal M. Mali ..	Madalpur ..	Daskroi ..	95'	Successful.
4. Mahant Baldeodas ..	Dakore ..	Thasra ..	19'	In progress.
5. Mr. Ashabhai Chatoorbhai ..	Kabudthal ..	Daskroi ..	140'	Successful.

Name.	Place.	Taluka.	Depth.	Result.
<i>Broach District.</i>				
6. Mr. Khudabax N.	.. Ankleshwar ..	Ankleshwar ..	24'	In progress.
7. Mansuklal P.	.. Vedach ..	Jambusar ..	75'	In progress.
<i>Surat District.</i>				
8. Mr. P. V. Bhaladwalla..	Pardi ..	Pardi ..	96' 6"	Successful.
<i>Poona District.</i>				
9. Bhandarkar Research Institute.	.. Poona ..	Haweli ..	100'	250 gallons P. H. Successful.
10. Do.	.. Do. ..	Do. ..	125'	In progress.
<i>Thana District.</i>				
11. Mr. Moreshwar T. Desai.	Malad ..	Salsette ..	27' 6"	In progress.
<i>Belgaum District.</i>				
12. Mr. K. H. Huijolkar ..	Ainapur ..	Athni ..	175'	In progress.
<i>Dharwar District.</i>				
13. Mr. Chapsi Parbati ..	Hubli ..	Hubli ..	159' 6"	Successful.
14. Mr. Ramangouda Udagawdar ..	Hulkoti ..	Gadag ..	111'	In progress.

13. For some years now I have been swamped by administration detail and my real duties such as the designing, experimenting and development of the technical side of Agricultural engineering have had to take second place. Since the sanction of the Devolution Scheme, however, my duties may be summarised as below, to experiment with pumps, water lifting devices for agricultural purposes, assist cultivators requiring pumping plants as hitherto, investigate the possibilities of pump irrigation from rivers and plan schemes both for Government (famine and general) and for private land owners, to erect power baling plants, and the like belonging to Government, to act as consultant and inspecting officer in all the boring work and to make a special study of agricultural implements. The above are as a result of the Devolution Scheme my specific duties and I hope next year to have some real progress to report on the design and manufacture of agricultural implements and the working of power machines throughout the Bombay Presidency.

14. During the year under report a complete stock taking and rearrangement of all machinery and machine parts has taken up a considerable portion of the time of my best men. The famine sets are being thoroughly overhauled and grouped so as to be ready the moment they are required.

15. I am pleased to say that my staff has worked well and is thoroughly reliable.

W. M. SCHUTTE,  
Agricultural Engineer to Government,  
B. P., Poona

## APPENDIX Q.

*Annual Report of the Horticultural Section for the year 1922-23.*

1. On 30th July 1923 the Horticultural section will complete its two years of existence in the Agricultural Department. In addition to last year's programme of research and the usual advisory work, teaching and other routine duties, fruit improvement work in Sind and district nursery work in the Presidency and foreign enquiries have offered a heavy task for the members of this section. In fact no where would retrenchment measures have been so keenly felt as by the Horticultural section where advisory and research work has increased by leaps and bounds and funds cut down to a minimum.

*Staff.*

2. There is no change in the staff of the Horticultural section except the appointment of Mr. G. B. Deshmukh as a Graduate Fieldman in the Ganeshkhind Botanical Gardens, Kirkee, and transfer of Mr. V. V. Dongre from the Plant Breeding Expert's establishment to this section.

*Grants at the disposal of the Horticulturist.*

3. (1) Office of the Horticulturist, including the District Horticultural Officer .. .. . Rs. 575  
(2) Ganeshkhind Botanical Gardens.

Year.	Sanctioned budget grants.	Expenditure.	Receipts.
	Rs.	Rs. a. p.	Rs. a. p.
1920-21 .. .. .	13,300	13,261 8 9	3,847 15 1
1921-22 .. .. .	17,415	12,414 13 4	7,542 3 8
1922-23 .. .. .	9,475	9,128 7 2	5,413 13 6

*(3) Modi Bag, Poona.*

Year.	Sanctioned budget grants.	Expenditure.	Receipts.
	Rs.	Rs.	Rs. a. p.
1920-21 .. .. .	5,000	5,000	.....
1921-22 .. .. .	14,875	14,826	378 9 3
1922-23 .. .. .	6,808	6,808	1,233 11 3

*Investigation.*

4. The activities of the section in investigation are distributed within various branches of the Horticultural section as suggested in the previous report. Want of Laboratory apparatus mentioned and scarcity of

travelling allowances have been keenly felt both in our investigation and advisory work. At any rate various branches of this section have always co-operated and thus have greatly substantiated the progress of the work. Three research papers have been accepted for publication in the Agricultural Journal of India, as will be seen from the accounts given below.

5. *Laboratory investigations.*—Laboratory investigations are mostly confined to the study of fruit juices such as pomegranate, lemon, orange, toddy, *jambhul* and *kashew*.

*Pomegranate juice.*—Local pomegranates have been found to contain as much as 14.6 per cent. of sugar, with soft seeds. Observations bring to light that differences in sugar contents, colour and quality of seed are mostly due to seed variations and this crop could be immensely improved by selection and subsequent vegetative propagation. The juice of the local pomegranate preserves well for about one year and promises a good business as has been found in various discussions with the juice-dealers both in Bombay and Poona. Sour pomegranate contains 4.60 per cent. of acid. Bottled juice is a good relish for table use.

*Lemon juice.*—There are four distinct types of *kagdi* lemons. The acid contents and taste of *kagdi* lemon compare favourably with foreign types. The acid contents of *kagdi* lemon growing in the Konkan, Maharashtra and Gujarat are identical and the average acid content is less than with most foreign types. The juice keeps well and opportunities for lemon cultivation and development of lemon juice industry in the Presidency are great. At present 1,58,294 lbs. of lemon juice is imported into India.

*Jambhul.*—There are two kinds of *jambhuls*. The wild variety is not very tasteful for fresh use. It is sharp in taste. It contains as much as 17.35 per cent. of total sugars and 1.21 per cent. of acid. The juice of the cultivated variety contains an average 12 per cent. sugar. This juice has been found to stand any amount of rough handling. Its taste is temptingly good and its colour is attractive and most economical when compared with other juices in the market. Its juice when pasteurised at 65°C for 35 minutes, keeps well in store. Fermented juice has got a deep red colour and is quite thick. *Jambhul* grows in abundance over very large areas in the Bombay Presidency.

*Packing improvements.*—Early in 1923 at the request of Mr. Manakchand Kishandas of Utran special demonstration in picking and packing of oranges was given to the workers. The use of measure rings in picking helped to cut down the daily labour to about 10 per cent. and proper grading and packing brought four annas more per basket as compared with other packages in the market of Delhi.

*Mangoes in cold storage.*—Our first experimental despatch of mango fruits in cold storage was sent to England in the year 1922. All fruits reached London in sound condition. Several boxes were kept in the cold storage (40°F. temperature) at the Crawford Market, Bombay. *Pairi* mangoes are found to keep well for seven weeks. Cold storage fruits keep in saleable condition for five days in the month of July at Poona.

Of course the range of temperature variation is small. Unripe mangoes stand cold storage temperature very well but under normal atmospheric conditions lose colour of the skin soon after they are taken out of the cold storage and allowed to ripen.

*Drying of Figs.*—Local figs contain 17 per cent. sugar. They are not fertilised. Still they have been successfully dried for commercial purposes without any loss of flavour. They are bleached in sulphur for ten minutes first and by exposure to sunshine, they dry up to one-third of the original weight in about five days. Such produce has been much appreciated by people. Drying is one of the means which can regulate the fig-supply in the market and ensure better prospects for the fig growers.

6. *Investigations in the Ganeshkhind Botanical Gardens, Kirkee—Grape.*—The progeny of high yielding vines marked as a result of selection has not borne any fruit as yet.

Partial self-sterility is noted in Pandhari Sahebi. Partially self-sterile types could be greatly improved by cultivating them side by side with perfectly self-fertile types. An effort to develop new varieties which would give better yield and resist climatic conditions better than existing types is steadily improving. All seedlings grown from naturally fertilised seeds and hybrids are growing luxuriantly and show considerable variations in their vegetative growth.

Raisin grapes for Sind have been imported from Kabul and the United States, Department of Agriculture. Shikarpur Municipality have offered facilities to undertake such trials in their own gardens for the benefit of the people in Sind.

*Root exposure.*—Further tests confirm that in grapes the influence of root exposure on the formation of fruit bud is not very marked. Root pruning seems to be useful for crops where wounds heal comparatively quickly.

*Die back of orange.*—Results of experiments are now available. Trees revive but the rate of revival is not very economical. As die-back of orange is the commonest trouble in the Presidency and is likely to remain so, as it is due to the soil conditions so characteristic of the Presidency. The only recommendation which this department can make at present is to advise orange growers to get their sites examined before planting trees. Results are being compiled to throw full light on this subject.

*Packing of mango plants by post for long distances.*—A paper by Mr. P. G. Joshi, Superintendent, Ganeshkhind Botanical Gardens, Kirkee, on this subject has already been accepted for publication in the Agricultural Journal of India, Pusa. Grafts, after hardening, can be packed in boxes with soil and sent by post to over-sea dominions covering forty-eight days journey in living condition.

*Rice improvement.*—A paper on this subject is submitted by Mr. P. G. Joshi, Superintendent, and it has been forwarded for publication in the Agricultural Journal of India at Pusa (*vide* No. A.-5174 of 7th July 1923 from the Director of Agriculture). Square sowing method of rice

seedlings in Konkan gives as good yield as transplanting and the cost of cultivation is much minimised.

*Potato seedling raising.*—A good deal of work on this line is on record. The life of seedlings is prolonged by successive transplanting to make them bear tubers. The maximum weight of a tuber borne by Green Mountain seedlings is about 1.5 ounces. Seeds from Italian tubers growing in the Gardens have been collected and their progeny is under test.

*Banana seedlings.*—An extensive crop of banana seedlings has been successfully raised. So far as vegetative growth is concerned there is very little variation. They are not yet of an age to bear fruit. This is an effort to develop new types.

In addition to these main lines of investigation work other activities in hybridizing types of guavas and developing new types of guavas, roses and some other plants are in hand.

7. *Investigation in the Modi Bag—Stock experiments.*—Differences in vigour and growth in the progenies of individual wild mango trees have been observed to be very prominent in our experiments. Characters which combine a good stock are still undefined.

Eir lemon stock has been preferred to common *jamburi* stock for citrus fruits by many expert propagators. Eir lemon seed has now found a way into commercial nurseries, a step which justifies more than enough the economic value of our work in this direction. Results will be submitted for publication soon. Our stock of plants of *jamburi* are also marked and the productiveness of their progeny is under observation.

*Notching.*—A paper on notching by Messrs. Cheema and Gandhi has already been accepted for publication in the *Agricultural Journal of India, Pusa*. Notching helps to start growth of dormant buds and consequently gives good shape to the plant, and increases yield. Notching will be done on a large scale in the year 1923-24 and its influence on the yield of fig trees will be demonstrated to the fig growers.

*Oiling of figs.*—This operation which is so freely practised in Southern France has been observed to hasten maturity of Poona figs to about two weeks. Hastening the maturity of figs without giving even the least injury to the plant (as in the case of local practice of root exposure), is a matter worth consideration. Details as to the method of oiling the fruits and the subsequent influence of oil in hastening the maturity are being worked out.

*Seedless Papaya fruits.*—Seedless condition of papaya fruit is due to lack of cross pollination. Seedless fruits could be produced by bagging female flowers of certain trees but the size of fruit is greatly reduced. There seems to be a correlation between the number of seed and the size of fruit.

*Vegetable improvements.*—(a) Potato:—Large number of new types have been developed as a result of seedling raising. Report of the fourth crop has already been made and the results seem decidedly promising. (b) Tomato:—“Greater Baltimore” and “Bonny Best” varieties are

superior in quality to our country type but inferior to it in yield. Pure lines of all types are being developed to test the influence of selection on yield and to furnish reliable material for hybridization.

8. *District and Advisory Work.*—During the course of last year 300 enquiries are recorded. All enquiries have been dealt with, and whenever for want of investigation enquiries could not be disposed of experiments have been undertaken.

The greatest difficulty which has been felt in improving fruit cultivation in the Presidency is due to unreliable nursery and seed business. This difficulty has been recognised by the public on many an occasion as could be seen from the increasing demand for opening district nurseries for the benefit of fruit growers. This district nurseries scheme is already under trial for the last 14 months at Kolhar (Ahmednagar) where growers have considered it a valuable achievement on the part of the Horticultural section and where villagers as well as school boys have taken an equally keen interest to learn propagation work. In addition to the budding of Citrus stock and grafting of mangoes, a considerable number of wild *jujube* trees have been budded by our people. Four teachers of the Urdu school at Kolhar deserve credit for their sincere co-operation with us. The extension of this district nursery system will be of immense value in increasing fruit output in the Presidency of Bombay.

Requests for starting nurseries have also been received in this branch of the department. One from Dharwar and another from Sangamner, but for want of hands to take up the work the request could not be fulfilled. The request of the District Agricultural Association of West Khandesh to start a nursery in that district could not be fulfilled on account of various reasons, but a private cultivator at Nachankheda in East Khandesh has started a nursery of fruit trees, and this Department has supplied him with stocks, plants and other material. This arrangement is economical to the department and fulfills the object of the Agricultural Association.

Apart from this 10,936 fruit plants have been distributed free of charge to public schools, hospitals and to other correspondents, who have expressed a keen desire to give them a trial in new tracts at their own expense.

The District Horticultural Officer, who is exclusively an advisory officer, has spent fifty-seven days out in the districts to solve the difficulty of the growers on the spot. In addition to this our sincere and genuine efforts to demonstrate to the people the method of destroying mango borers, spraying against citrus scale fly insects, preparing estimates for commercial orchards, and propagation of Naval oranges for free distribution in the Presidency are undoubtedly worth mentioning.

There is a considerable loss in orange gardens due to a moth which punctures the fruit at night time and does considerable havoc in the crops which ripens in the rainy season. In certain cases the loss is as heavy as 30 per cent. The moth was so far absolutely unknown to the

cultivators. Considerable work was done in the last year's rainy season at Rahuri and certain other places. The remedy is only hand picking the moth at night time. The expense is about 8 annas for the whole season and personal trouble of catching the moths at night time. The moths concerned chiefly are various species of *Ophideres* and *Nyctipao*. When a puncture has been made by these species the juice is often sucked also by *Annua coronata* and *Ophiusa tirrhaca* and two more species of *Ophiusa* so far not indentified. Work on these pests will be continued in this season also. During the year under report a class in elementary Arboriculture was held in November and December last to which four students attended.

Mr. H. P. Paranjpye's book in Marathi on fruit crops is almost printed out and the book will be ready for the public in about a month.

Mr. H. V. Gole of Nasik has also written a book in Marathi on Grape cultivation and will also be available, to the public in about a month. These two books will be useful to the public in solving their difficulties in horticultural matters.

9. *Work in Sind*.—Considerable attempts have been made to explore possibilities of fruit culture in Sind. This work was undertaken at the request of the Director of Agriculture, Bombay, Poona, in connection with the request of the members of the Sind Zamindars' Association. The results of our investigation are already submitted to the authorities. It needs no further emphasis that a very large part of Sind is eminently suited to the cultivation of Dates, Raisins, Lemons and Figs.

G. S. CHEEMA,  
Horticulturist to Government,  
Bombay, Poona.



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\*In the Press.

*Annual Report.*

Report of the Department of  
Agriculture, Bombay Presi-  
dency, for the year 1922-23.

GOVERNMENT OF BOMBAY.

REVENUE DEPARTMENT.

Resolution No. P.—51.

Bombay Castle, 25th March 1924.

Letters from the Director of Agriculture No. A.—8200 dated 3rd November 1923 and No. A.—1152 dated 12th February 1924—Submitting a copy of the Report of the Department of Agriculture, Bombay Presidency, for the year 1922-23.

RESOLUTION.—Cotton research occupies the premier place among the activities of the Agricultural Department. As a result of these activities in the Gujarat tract the pure strains of Navsari cotton have now spread all over the area south of the Nerbudda and the percentage of Goghari is reduced to two or three. The department is now concentrating on selection 1027 A. L. F. The total area of this cotton under the control of the department was 84,000 acres during the year. 21,60,000 lbs. of the improved seed were purchased by the department and disposed of to cultivators. The notifications and rules under the Cotton Transport Act have recently been brought into force in this area with a view to prevent the import of inferior cotton into the area for mixing. It is hoped that the Agricultural Department with the co-operation of the people and the help of the Cotton Transport Act will soon be able to make the tract of country between the Nerbudda and the Par rivers famous for the quality and purity of its cotton.

2. Government regret to observe that inspite of the great expansion of the area under improved seed the work of distribution of the seed has not been taken over by co-operative agencies to any great extent. The special attention of the Director and the Registrar of Co-operative Societies should be drawn to this point and they should be requested to report to Government what obstacles there are to the growth of co-operative cotton sale societies like the Sonak and the Islampur and how they can be removed. Their attention should also be drawn to the arrangement reported by the Deputy Director, N. C. D., under which the Dhulia Co-operative Bank has taken over the purchase of the seed grown by registered cultivators and its distribution to co-operative bodies. Government would like to see this arrangement extended to all areas where the distribution of seed has progressed beyond the stage of departmental management.

3. In the Southern Division the success of Dharwar No. 1 has been assured. Improved seed for 65,000 acres was distributed through co-operative societies during the year. The Cotton Transport Act has been applied to the Kumta area also, as it was found that inferior cotton from long distances was being imported by rail into Hubli, Gadag and other places for mixing.

4. The problem of cotton in Sind has now assumed great importance owing to the starting of the Lloyd Barrage works. A Committee has been appointed to consider the whole question of agricultural development in Sind to meet the new conditions created by the Barrage. The special difficulties of Sind regarding the supply of improved seed of staple crops have been described by the Deputy Director. The department has taken up an area of waste land on the Jamrao canal to multiply improved seed. Government are also giving financial assistance to import seed from outside the province but ultimately the people will have to form co-operative organizations of their own for the purpose.

5. Generous grants have been made by the Indian Central Cotton Committee for the investigation of four specific problems of cotton cultivation as mentioned by the Director. The solution of these problems or any of them will add considerably to the wealth of the cotton growers.

6. The important experiments carried out by the Plant Breeding Expert at the Research Station at Karjat have borne fruit. The improved strains isolated by him, particularly No. 42, have been proved to yield over twenty-five per cent. more on the cultivators' fields than the ordinary variety hitherto grown. About 1,200 acres were planted with the improved seed in the year under report and distribution over 10,000 acres is being arranged for the current year. It remains now to organize and finance the wholesale distribution of the improved strain throughout the area of 20,000 acres in the Northern Konkan which grows this variety of rice and Government trust that this will be achieved with the help of the Co-operative Department.

7. Investigations on other staple crops like Jowar, Bajri, Nagli and Wheat are in progress. In the case of the last the Plant Breeding Expert is reported to have evolved pure strains with a higher yield than the local types, suitable for the Deccan. They should be tried on the cultivators' fields and if successful, their large scale distribution should be organized. The isolation of similar strains for Jowar and Bajri will take time, but Akola Bajri when grown in Khandesh is reported to have given much higher yields than the local types and is in great demand. The most important practical work on Jowar during the year has been the organization of a campaign for steeping the seed in copper sulphate solution against smut. The campaign was conducted with the help of the Revenue Department and Government are pleased to learn of its success. It is hoped that efforts will not be slackened but intensified hereafter so that the treatment may become universal within a few years.

8. As regards the research work of specialists other than the Plant Breeding Expert, no striking practical results have been achieved as yet. Government recognize the importance of time in the case of scientific research, but it is essential that the work should be directed into the right channels in pursuance of a well defined policy so that time and energy may not be dissipated in numerous aimless pursuits. Government have decided to retain all the specialist officers against the advice of the Retrenchment Committee, but it is necessary that the Horticulturist and the Soil Physicist should show that their investigations are tending towards some practical results even if none have been achieved so far so as to justify the retention of their posts. Government consider that the work of the Soil Physicist should not be confined to the laboratory and regard his work at Manjri as a move in the right direction.

9. In the case of the district staff Government consider that an increase in the number of fieldmen and graduates is necessary for propaganda work, but until the financial situation permits the increase, they would urge the advisability of concentrating the staff on a few selected Talukas on activities specially chosen by the Deputy Director as suitable to the tract rather than dissipating their efforts in a number of directions over the whole district. Government are pleased to note that numerous demonstration plots were laid out on the cultivators' fields. They regard this as the right method of demonstration and would like to see it being made use of more extensively in all the divisions.

10. It is highly gratifying that the Divisional Boards and Taluka Development Associations have made a very promising beginning. They can rely upon the cordial support of Government so long as they are willing and able to help themselves and serve as centres of agricultural and co-operative development within their areas. Government would urge upon all Taluka Development Associations the advisability of getting themselves registered under the Co-operative Societies Act and developing the co-operative as well as the agricultural side.

11. The report of the Cattle Committee is under the consideration of Government. The establishment of new farms and extension of existing ones is mainly a question of funds. Some Gōwrakshans have responded to the offer of co-operation on the part of Government and provision is being made in the budget for financial help to such bodies. Government have also sanctioned an annual grant to the Shirpur Agricultural Association for maintaining the Tapti-Khilari breed. The amendment of the Cattle Trespass Act on the lines suggested by the Cattle Committee is engaging the attention of Government.

12. The Agricultural College has turned out a good year's work. A new Agricultural school was opened at Surat during the year.

13. It is hoped that the Agricultural Engineer will be able to achieve some tangible results in the developing and improvement of agricultural implements and the working of power machines now

that he has been relieved of a good deal of routine administrative work. Several Deputy Directors report a good demand for iron ploughs for hire. This work may be taken up on a large scale by Taluka Development Associations and Co-operative Societies. The advisability of establishing implement depôts in suitable tracts may also be brought to the notice of makers and agents of agricultural implements.

14. Government emphasized the importance of boring in their review of the administration report last year. They regret to notice that the progress made in the year under report has been very poor. The charges for the use of boring machines have been revised and reduced by the orders in Government Resolution No. 7074 of 17th September 1923 and Government have undertaken to bear the cost of supervision, interest, depreciation and repairs. The Director is requested to report what hinders progress in this direction and to suggest remedies. The advisability of entrusting the work to local bodies on the same terms as those sanctioned for the Kaira District Local Board should be considered. Government propose to sanction a grant of Rs. 34,000 from the Famine Insurance Fund for purchase of new power machines and adaptation of old ones and intend to concentrate efforts on two selected Deccan districts liable to famine.

15. No branch of the activities of Government is fraught with the possibilities of greater benefit to the masses of the people than the work of the Agricultural Department. The Director and his staff realize this and Government desire to accord their thanks to them for their labours.

By order of the Government of Bombay  
(Transferred Departments),

A. R. DALAL,  
Deputy Secretary to Government.

G. R. No. P.—51, R. D., dated the 25th March 1924.

To

The Commissioner in Sind and the Commissioners of Divisions,  
All Collectors including the Deputy Commissioner, Upper Sind  
Frontier,  
The Director of Agriculture,  
The Registrar of Co-operative Societies,  
The Superintendent, Civil Veterinary Department, Bombay  
Presidency,  
The Superintendent, Civil Veterinary Department, Sind and  
Rajputana,

The Principal, Bombay Veterinary College,  
The Private Secretary to His Excellency the Governor,  
The Director of Public Health,  
The Director of Information,  
\*The Municipal Commissioner for the City of Bombay,  
\*The Agricultural Adviser to the Government of India,  
\*The Secretary to the Society for the Prevention of Cruelty to  
Animals,  
\*The Government of India,  
\*The High Commissioner for India in the United Kingdom.

\* By letter.

No.                      of 1924.

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## INTRODUCTION.

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I will introduce this report with a few remarks upon certain important features in the present agricultural economic situation.

First and foremost the cotton crop continues to be the main source of agricultural wealth to the Province and owing to the sustained high prices which have prevailed during and since the War, there is much prosperity in the principal cotton tracts. A case was recently brought to my notice in the Karnatak where the gross income of a village amounted to Rs. 10 lakhs in the year under report and the income of one individual amounted to just under one lakh, *viz.*, Rs. 95,000. It is important to point out that this does not represent the gross value of the crop produced in the village itself but it largely reflects the business acumen of the actual growers of cotton in that village who bought up standing cotton crops in adjoining villages after correctly appraising the weather signs of the season, *e.g.*, the absence of unfavourable winds.

On the other hand the sugar industry is going through a period of depression. The Deputy Director, S. C. D., draws attention in his annual report (*vide* Appendix D) to the critical position of that crop. During the War the beet sugar industry which previously contributed about half the total sugar production of the world, was completely dislocated. In consequence of this and also in response to the increased demand for sugar during the War, the cane sugar industry entered upon a period of prosperity. Since the conclusion of the War the beet industry has largely recovered and the sugar supply of the world is abundant

while the purchasing capacity of the people in most countries has fallen—hence there has been a slump in sugar values which has not been associated with a corresponding reduction in cost of production which has risen greatly in this Presidency. In the year under report the sugar cane grower was faced not only with an unfavourable season but with a very poor market, the price falling at one time to Rs. 18 per palla of 250 lbs.

Thus many growers have incurred a loss on their sugar cane crop and tenants are demanding a reduction of rents while some have actually run away. It is anticipated that there will be a considerable contraction in the area under sugar cane in the current season (1924-25) amounting to perhaps 10 per cent. on the Deccan canals. This Department is, therefore, giving special attention to the problem of reducing the cost of production, more particularly through the reduction of the heavy applications of costly artificial manures which could be economically adopted in the years of prosperity.

Another important fact, revealed by statistics, is the loss of efficiency in recent years of the wells used for irrigation. The figures are somewhat disconcerting, but it is recognised that the efficiency of most of our wells ultimately depends upon the performance of preceding monsoons and there is reason to anticipate that the recent very heavy rains in Gujarat will materially contribute to the recuperation of the underground sources of water supply.

ANNUAL REPORT OF THE DEPARTMENT  
OF AGRICULTURE, BOMBAY  
PRESIDENCY, 1923-24.

The activities of the Department resolve themselves into the following divisions:—

Research.	Service.
Propaganda.	Education.
Organization.	Statistics.

RESEARCH.

The Department is conducting research in several directions. The most developed research is that which deals with the improvement of the varieties of the Staple Crops, and chief attention has hitherto been concentrated upon Cotton, Rice, Wheat, Jowar, Sugarcane and Groundnuts. Much investigation has also been devoted to the problems underlying crop production, notably cultural methods and manuring. A great deal has been done in the Engineering branch which deals with implements and machinery. Horticulture and Live stock are receiving special attention, each under the direction of an Imperial Service Officer, and finally Plant diseases and insect pests continue to be a very important feature of our Research programme.

*Staple Crops.*

2. *Cotton.*—There are five principal centres at which research on this crop is in progress, namely, Dharwar, Surat, Dhulia, Viramgaum (near Ahmedabad) and Mirpurkhas. Improved strains have been introduced into general cultivation from all these centres except Viramgaum where the work is still in an early stage of development.

In the Dharwar area which, for the purposes of this Department, coincides with the Karnatak embracing the three districts of Dharwar, Bijapur and Belgaum, the cotton interest measured in terms of acres is approximately 1½ millions of which the Kumpta variety covers over one million and the Saw-ginned Dharwar American about half a million acres.

The Department is introducing an improved strain of Kumpta known as Dharwar I which was sown on an area of 75,000 acres in the year under report and the net gain to the cultivator is estimated at Rs. 5 per acre. Similarly the Department is introducing an improved type of Saw-ginned Dharwar American, and the improved strain is known as Gadag I which was sown on an area of 65,000 acres in the year under report and the net gain to the cultivator is estimated at Rs. 13 per acre.

In the Surat area which coincides with the tract lying between the Narbudda River on the North and the boundary of the Surat District on the South the Department is introducing an improved strain known as 1027 A. L. F. This variety is now extensively grown throughout the whole of this tract. The total area under the control of the Department for seed purposes was 9,146 acres, and the premium obtained for the lint was Rs. 20 to Rs. 25 per kandy on a basis of Rs. 300.

In the Dhulia tract which coincides with Khandesh and Nasik where the cotton area runs to  $1\frac{1}{2}$  million acres the Department is introducing N. R. cotton (a selection out of local). It has not hitherto been found possible to keep track of the area sown with this cotton which must now be very considerable and widespread, but the amount of seed issued from the Government Seed Farm at Jalgaon was 31,360 lbs. in the year under report.

In Sind a similar strain of N. R. cotton known as 27 W. N. is being introduced but the area is still small.

3. So much for actual introductions, but the Department is aiming at producing still more superior strains. Thus at Dharwar there is a very promising cross between Kumpta and Roseum. This hybrid has been found to yield well. It also possesses a high ginning percentage and a staple substantially over one inch. A special feature of this cotton is the colour of the fibre which is much whiter than the local Kumpta cotton. Multiplication of this strain has just been commenced. Another valuable hybrid at this station is a cross between selected Kumpta (D1) and Wagale, a Burma wilt resistant cotton. This hybrid is still in an early stage but shows signs of resisting wilt.

At Dhulia the Department has produced a highly promising hybrid (BXX27) between Bani and Comilla cottons

which, while possessing a high ginning percentage, has a much superior fibre to that of N. R. cotton. Similar cotton breeding operations are in progress at Surat, Viramgaum and Mirpurkhas.

4. *Rice*.—Improved strains of rice are being produced at the following breeding stations, Larkana in Sind, Karjat and Ratnagiri in the Konkan, and Mugad in the Karnatak. The work, however, has progressed only at Karjat to the stage when seed of improved strains can be issued. In the year under report there was sufficient seed of strain No. 42 (a Kolumba selection) to sow 10,000 acres. This strain is medium fine grained and a good yielder and is suitable for cultivation in Thana and Kolaba Districts.

5. *Wheat*.—Work is in progress at Jacobabad in Sind and at Poona in the Deccan. Pusa 12 continues to give good results in Sind, where it has now been grown by the public for some years, but there are certain improved strains of Phundani and Thoree (local varieties) which are very promising and which under certain conditions may prove more suitable than Pusa 12.

The work at Poona is intended to serve the Deccan districts including Khandesh and the Karnatak; and it has progressed to the stage when seed of promising strains is being sent out for confirmation in various tracts. Several of these have done well in the trials conducted during the year under report at Dharwar in the Karnatak, Jalgaon in Khandesh, and Dohad in the Panch Mahals.

6. *Jowar*.—Work on this crop has only recently been initiated at the following centres, Dharwar, Surat and Larkana. Some promising improved strains will be available for introduction next year.

7. *Sugarcane*.—There is a central research station for this crop at Manjri near Poona. The average results obtained in a four years comparative experiment at Manjri, show that several varieties have done very much better than the Standard Pundia variety. Thus the yields of "Red sport" and "D—109" have averaged from 40 to 50 per cent. more produce per acre than Pundia whether we take stripped cane or gul (raw sugar) as the criterion.

On the Godavari Canal tract "Manjav" has given the best results, which illustrates the importance of confirming

varietal trials on each important canal before advising the public.

8. *Groundnut*.—Work on this crop has been very successful in Khandesh where the area has risen from 4,100 acres in 1912-13 to 1,06,044 in 1922-23 largely owing to the introduction of the Spanish peanut variety by the Department of Agriculture. This variety is an early maturing variety and can be grown on rainfall without irrigation. This crop is also receiving special attention at Dharwar.

*Special Research Schemes.*

9. In addition to the foregoing there are a large number of special research schemes most of which are financed from outside sources. The most important of these are :—

Description of Scheme.	How financed.	Cost.
Cotton Boll Shedding Scheme at Surat.	The Indian Central Cotton Committee.	A grant of Rs. 25,000 per annum for three years, in the first instance.
Cotton Boll Worm Scheme at Surat.	Do. ...	A grant of Rs. 15,000 per annum for three years, in the first instance.
Cotton Wilt-disease Scheme at Dharwar.	Do. ...	A grant of Rs. 25,000 per annum for three years, in the first instance.
The Lavala-weed Scheme at the Agricultural College.	The Sir Sassoon David Trust Fund.	A grant of Rs. 13,000 spread over three years. The whole is used up.
The Improvement of Grass-lands Scheme at several places.	Do. ...	A grant of Rs. 15,000 spread over three years, spent and an additional grant of Rs. 5,000 now asked for.
The Potato Seed-supply and Storage Scheme at Poona.	Do. ...	A grant of Rs. 20,000 received in two instalments spent.
The Drought Resisting Strains of Bajri Scheme at Poona.	Do. ...	A grant of Rs. 20,000 spread over three years. Balance Rs. 645.



Description of Scheme.	How financed.	Cost.
The Cardamom Disease Scheme in Kanara.	The Sir Sassoon David Trust Fund.	A grant of Rs. 7,000 spread over three years. Balance Rs. 120.
The Jowar Stem-Borer Scheme at Surat.	Do. ...	A grant of Rs. 20,000 spread over three years, of which Rs. 13,332 received. Balance Rs. 2,800.
The Agricultural Implement Scheme at Poona.	Do. ...	A grant of Rs. 10,000 spread over three years, of which Rs. 3,333 received. Balance Rs. 1,773.
The Mango Improvement and Marketing Scheme in the Konkan and Karnatak.	Do. ...	A grant of Rs. 15,000 proposed to be spread over three years, of which Rs. 5,000 asked for from the Trustees.
The Die-back Disease of Citrus Trees Scheme in the Deccan.	Government ...	Rs. 500 sanctioned from the grant for Agricultural Experiments.
The Tobacco Breeding Scheme at Nadiad.	Do. ...	Rs. 3,672 sanctioned from the grant for Agricultural Experiments.
Dry Farming Scheme at Manjri near Poona.	Do. ...	Rs. 2,000.
Canal Weed Scheme at Poona.	Do. ...	Financed by the Officers carrying on the schemes from the grants at their disposal.
The Nitrogen Recuperation Scheme of Deccan Soils at Poona.	Do. ...	Do.
The Potato Fusarium Disease Scheme at Poona (which is associated with the General Potato Improvement Scheme above).	Do. ...	Do.

There is not space in which to discuss these Schemes separately or in detail, but they are at all stages of development. Thus Dr. Burns' work on Lovala Weed is complete and is now being published as a Memoir while the Implement Scheme has only just been commenced.

10. The chief features in the organization of these important research schemes are :—

(1) The work is directed and controlled by a Committee of Agricultural Officers having special knowledge of the subjects.

(2) A whole-time staff is allotted to each scheme, the senior officer being competent to conduct independent or semi-independent research.

(3) Many of the personnel are engaged temporarily for the period assigned to the particular research scheme.

(4) A time limit is fixed and this is to be extended only if the progress of the research is considered satisfactory and the ground could not be covered in the time available.

This organization appears to be a distinct advance in the procedure of the Department, especially as regards the whole-time staff. In the past for want of sufficient staff, officers have had to diffuse their attention over too many activities so that rapid progress could not be made in any direction. This cannot happen now where the work is financed by independent bodies like the Indian Central Cotton Committee who carefully watch the progress of their schemes. The three research schemes undertaken on behalf of this Body have been well launched in the year under report and the officers in charge of each have already an excellent record of progress to their credit. Some of the charts based on data worked out by them are very illuminating.

#### *Crop Production.*

(Cultural and Manurial.)

11. Perhaps the most interesting advance in cultural treatment has been made at Surat where experiments with Ridge Cultivation have been in progress for some years. This is a tract where the land is very flat and the soil of a heavy description, and during periods of heavy rainfall it has been observed that the crops get a set-back. The average results obtained during the past two years on the Surat Farm show that the yield of cotton has been increased by 15 to 23 per cent. by simple ridging and intercultivation and by 41 per cent. by ridging followed by deep intercultivation associated

with a dressing of 10 tons of farm yard manure per acre. Similar results were obtained with jowar where the increases were 23 per cent. from simple ridging and intercultivation, and 24 to 31 per cent. where manuring was associated with ridging.

The cultivators are very keen to adopt this new method of cultivation provided some cheap method of making the ridges in the hot weather, can be devised. It is believed that tractor cultivation may prove very useful in this connection, and a Case Tractor has recently been secured for the purpose. In the meantime, however, suitable bullock-drawn implements are being supplied by the Department, and 285 acres were thus prepared by one-pair implements in the surrounding villages in the year under report. Implements to the value of Rs. 1,579 have already been disposed of by the Department for this purpose.

12. As regards manures the value of castor cake for cotton is becoming more widely recognized, and there is now a strong demand for this fertilizer in Khandesh where the Department distributed some 60 tons, worth Rs. 10,000, in the year under report. The most economical dose appears to be 300 lbs. per acre. Bone meal is giving good results on rice in Belgaum District, where the use of this fertilizer is steadily increasing in the Khanapur Taluka.

In sugarcane production the main problem is the supply of nitrogen. Experiments at Manjri show that in addition to the ordinary heavy dressing of farm yard manure containing 200 lbs. of nitrogen the outturn can be progressively increased by top dressing with artificials (chiefly sulphate of ammonia and safflower or castor cake) applied in three doses up to another 300 lbs. of nitrogen. The exact quantity to apply, therefore, depends upon the price of gul (raw sugar). Owing to the recent slump in the price of this product it is economical to reduce the total quantity of nitrogen, *vide* para. 7 (2) of Appendix D.

13. As regards irrigation of sugarcane the recent experience of this Department in its investigations on the Manjri Experimental Station, indicates that we shall have to modify our views somewhat upon the optimum water requirements of this crop. Hitherto it was generally considered that 75 acre-inches (plus rainfall which is very little) were adequate to produce a full crop. The Deputy Director

of Agriculture, however, publishes figures under para. 7 (5b) of his report, *vide* Appendix D, which show that the crop has increased proportionately with the irrigation applied, to 125 acre-inches.

#### *Agricultural Engineering.*

14. *Implements.*—The iron plough continues to gain in popularity. The Department has now put out 11,000 ploughs in the Dharwar area and this is only a small fraction of the total number in use. In this respect the pioneer work of the Department has been ably seconded by the private enterprise of Messrs. Kirloskar Brothers who started manufacturing ploughs in a very small way about 15 years ago, and their works now turn out some 200 per day. These ploughs have spread far afield and two of the best markets are the Nizam's Dominions and the Berars. The most noticeable recent progress in this Presidency has been (1) in Athani Taluka of the Belgaum District, where there are now some 5,000 iron ploughs and (2) in Khandesh.

15. The Agricultural Engineer is now paying special attention to the design of implements. In particular he is engaged in designing a cheap type of iron plough for Sind and an improved type of winnowing machine for Khandesh. Other implements receiving special attention are clod crushers and seed drills. In the latter case he is attempting to replace hand feeding by a simple device, in the country seed drill.

16. *Machinery.*—In this sphere the Agricultural Engineer has been chiefly engaged in investigations connected with tractor cultivation, power pumping and machinery for shredding and baling jowar kadbi at Karajgi where the Department is organizing a famine fodder reserve.

#### *Horticulture.*

17. This important branch of the Department has not been developed to the extent which seems desirable. The Department now has an Imperial Service Horticulturist with a small staff, including a District or touring Assistant.

It appears essential to provide this section with a well equipped Central Research Station. This station already exists in the Ganeshkhind Botanical Gardens, but the general facilities provided there appear to be inadequate. The canal

water supply is not very dependable, and parts of the garden are too high to receive this irrigation. It seems essential to provide a good pumping plant which will guarantee a satisfactory supply of irrigation throughout the year from the adjoining river. Then the grant must be increased and made proportionate to the importance of the work to be undertaken.

18. There are several most promising lines of work already in progress which should be continued and developed including :—

- (1) work on Figs,
- (2) work on Mangoes,
- (3) work on the juices of certain fruits, such as Jhambul (*Eugenia*, *Zyzygimin Jambolana*) and Pomegranite (*Punica Granatum*),
- (4) the drying and canning (not yet undertaken) of fruits, and
- (5) the supply of first class reliable fruit stock to the various agricultural stations as well as to the general public.

19. Detailed proposals have been recently submitted to Government regarding the steps which should be taken to encourage fig cultivation in the Maharashtra. Recently there has been much clamour for assistance in mango cultivation, and there appears to be a very great field for this fruit in the Mallad tract of the Karnatak, where it grows splendidly and where pig make crop cultivation a very precarious business.

In Khandesh also there is a fruit awakening among the people. Thus Rao Saheb Gulabchand of Dhulia has placed part of his garden at the Department's disposal for opening a nursery. A Horticultural Fieldman is now stationed there and has commenced work on citrus fruits (lemons and oranges). Again Mr. Maneckchand Kisonadas of Utran in East Khandesh has planted an area of 120 acres with oranges and lemons and intends to manage this orchard on business lines.

In Sind there are great possibilities for :—

- (1) dates,
- (2) raisin grapes, and
- (3) lemons for juice.

In nearly all of these directions Mr. Cheema has some work in hand, but, if the best is to be got out of his labours it will be necessary to strengthen his budget and laboratory resources. For example as regards the study of fruit juices the following problems require deeper investigation involving better facilities :—

- (1) Preservation of colour.
- (2) The value of condensed juices.
- (3) Packing and packing materials.

*Live Stock.*

20. The Bombay Presidency is rich in live stock. There are at least half a dozen really good breeds of cattle within her boundaries, and the preservation and improvement of these valuable breeds, has received an impetus through the report of the Cattle Committee presided over by Rao Bahadur Chitale, which was issued during the course of the year. At the present time the Department possesses three Cattle Breeding Farms as follows :—

- |   |                               |
|---|-------------------------------|
| I. The Willingdon Farm<br>near Karachi.                         | For the Red Karachi<br>breed. |
| II. The Northcote Cattle<br>Farm at Chharodi<br>near Ahmedabad. | For the Kankrej breed.        |
| III. The Bankapur Farm<br>in Dharwar District.                  | For the Amrit Mahal<br>breed. |

In each case the object is to build up a first class herd of pure bred cattle with the object of supplying pedigree bulls for distribution in the appropriate tracts.

The following table tabulates the distributions in the year under report :—

Division.	No. of premium bulls issued.								Total No. of premium bulls for each Division.
	Dangi.	Kankrej.	Tapti Khillari.	Mhaswad Khillari.	Amrit Mahal.	Buffalo Bulls.	Mestie rams.	Sindhi Bull.	
Northern Division	8	11	1	...	...	3	...	...	18
Central Division	...	...	...	3	...	...	...	...	9
Southern Division	...	...	...	...	5	...	2	...	7

21. Now that there is an Imperial Service Officer in charge of Live stock operations, it is anticipated that these operations will rapidly develop, and a special feature is being made of annual shows in the vicinity of these Farms to stimulate interest in cattle breeding. These shows have been very successful and there is no doubt that the people of this Presidency are genuinely interested in the improvement of cattle. It is hoped that funds will soon be forthcoming for establishing similar Farms for the other principal breeds, but in the meantime an effort is being made to exploit a few of the best Gaorakshahs for this purpose. The conditions are that a certain number of approved cows shall be set aside and mated with a premium bull supplied by Government and that a competent manager shall be maintained. Arrangements on these lines have been made at Kandivli and Mulund in the Thana District.

#### PROPAGANDA.

22. The whole Presidency with very few districts excepted, is now covered, though thinly, by an Agricultural Propaganda Staff. These officers are called District Agricultural Overseers, and these are one or two per District. Most of these Overseers have kamgars, trained coolies, to assist them. During the year under report the chief activities of these officers have been :—

##### A. Demonstration of,

(1) Improved strains and varieties of staple crops upon cultivators' own fields.

(2) Artificial manures such as sulphate of ammonia for sugarcane and castor cake for cotton.

(3) Implements.

(4) Improved cultural methods, *e.g.*, sowing cotton on ridges in the Surat area.

(5) Methods to combat diseases and insect pests, *e.g.*,

(a) Copper sulphate treatment of jowar seed as a preventive of smut disease.

(b) Poisoning hairy caterpillars which in certain seasons work great havoc upon young crops in North Gujarat.

B. Lecturing upon the subjects mentioned above with the aid of magic lanterns and illustrations. Thus in the North Central Division there were 70 such meetings in the year under report.

C. Advisory work with local bodies.

23. This work is somewhat hampered by the smallness of the grants available for incidental expenditure in connection with the miscellaneous duties of the Agricultural Overseers and also because the Travelling Allowance grants are decidedly too low. Thus it is hardly possible to keep these propagandists working at full pressure.

#### ORGANIZATION.

24. This branch of Agricultural Development has received special attention in recent years. In 1919 a Provincial Board of Agriculture was created which meets once in one to two years. Its functions are deliberative and advisory and it has been the means of bringing about the appointment of two Committees whose important reports were published during the year. These were—

(1) The report upon the damage done by wild animals,

and

(2) The report upon the improvement of cattle in this Presidency.

In 1921, Divisional Boards of Agriculture were constituted for each Division. These are small compact bodies which meet quarterly and exercise a close control over all current work in the districts, of the Agricultural and Co-operative Departments. Their recommendations are submitted to a Joint Board consisting of the Director of Agriculture and the Registrar of Co-operative Societies. Most of these Boards have done good work during the year, and their advent is a distinct advance in the organization of agriculture in this Presidency.

In 1922, Government decided to create Taluka Development Associations in selected talukas. The object of these associations is to provide a local agency for introducing improvements recommended by the Department and generally to promote agricultural advancement. These are useful bodies and have great potential value but the weak point in



their organization is their financial resources, with which I have dealt in para. 43 below. The total number of these Development Associations is now 38, as shown in detail in Appendix A.

25. The most important development in agricultural organization in the year under report has been the introduction of the Government of India Cotton Transport Act. Under this Act, six areas have been notified in this Presidency as follows:—

Karnatak.	Gujarat.
Dharwar area.	South Surat area.
Bijapur area.	Surat area.
Bagalkot area.	Ankleshwar area..

The operation of this Act has already done great good by excluding the importation of inferior cotton into certain areas whose cotton was losing its identity owing to wholesale mixing. Formerly some 20,000 bales of inferior cotton were imported into Hubli market in the Dharwar area, which is about a third of the cotton handled in this market; that has been stopped and the reputation of Hubli (Kumpta) cotton has been largely restored in the Bombay market where the mills are readily taking it up again.

In 1923, some 29 lakhs of lbs. of inferior seed-cotton were transported southwards over the Narbudda Railway bridge for mixing with superior cotton in the Surat area. This has been stopped with great benefit to the growers of superior cotton. The margin in price between Navsari and Broach cotton has consequently widened from Rs. 100 to Rs. 150 per kandy. Some inconveniences to trade have been revealed but it is hoped that by readjusting boundaries and through licensing all reasonable complaints will be met.

26. Non-credit Co-operation continues to receive very earnest attention and the Agricultural Officers are co-operating closely with the Co-operative Department in this respect. Several Deputy Directors of Agriculture have been giving special attention to this work. The progress of this type of co-operation is perhaps the most real measure of the success of the whole co-operative movement. In the long run it probably has deeper significance upon the prosperity of the Agriculturist than has the credit section. It is, however,

much more difficult to organize and make successful, but the Cotton Sale Societies in the Southern Division at Hubli and Gadag are very encouraging.

The former did business in the past season (1924) to the extent of 21,000 docras (1 docra=336 lbs.) which represents 20 per cent. of the entire seed-cotton brought into this the most important market in the South of the Presidency.

These Societies, however, still sell cotton in the unginced state and thus the produce of the cotton grower continues to pass through middlemen before it reaches the mills or the exporters. The problem to solve is how to put the cotton produce of the cultivator on the Bombay market in the form of lint, and this is receiving the careful attention of these Cotton Sale Societies.

Other promising branches of the non-credit movement are:—

(1) Implement Societies to which some reference has been made in para. 29 below.

(2) Irrigators' Societies for the special purpose of making joint representations to the Irrigation Department.

(3) Gul Sale Societies one of which at Poona was recently registered by the Registrar of Co-operative Societies, and did business to the extent of 1,250 cart loads of gul (raw sugar).

#### SERVICE.

27. The chief direct services which the Department is rendering to the public are in connection with the—

(1) Supply of seed, implements and manures  
and

(2) the boring of wells and design of pumping installations.

The Department has also begun land improvement work in the Southern Division through one of its existing staff while a Land Development Officer has quite recently been added to the staff of the Department.

28. Under the supply of seed the Department has built up a somewhat elaborate organization. Thus in the Surat

area the area under the control of the Department was over 9,000 acres which provided  $1\frac{3}{4}$  million lbs. of seed, all of which was purchased and distributed without loss. In the Dharwar area the Department controls the seed of Kumpta Cotton grown on an area of 5,000 acres in and around Sherwad near Hubli, while there is a similar arrangement for American Cotton at Hulkoti near Gadag, and 38 depôts were opened for the distribution of this seed. In Sind where maintaining improved cottons in a state of purity presents peculiar difficulties the Department has taken up a large piece of waste land in Chellaro village on the west branch of the Jamrao Canal. This is run on Zamindary lines, *i.e.*, the land is let out to tenants on the share system, one-third of the produce being the Department's share and two-thirds the tenants' share. The Department has thus complete control over this crop and arranges for its sale in consultation with the tenants. In this way the whole produce is sold off to a reliable firm who agrees to gin it separately and return the seed to the Department. In the year under report the area under cotton was 242 acres and the produce realized Rs. 28,143. The Department after meeting the cost of laying out new water channels realized Rs. 5,000 which after meeting the salary and travelling allowance of the manager still left a credit balance of Rs. 1,136. The good seed obtained amounted to 73,440 lbs.

29. The chief service this Department renders to the public under implements is through the organization of implement depôts. One of the largest of these depôts is at Shevgaon in the Ahmednagar District. This is not a Departmental depôt but is controlled by a Society which has received the special attention of the Agricultural Overseer with good results. It has now applied for registration under the Co-operative Societies' Act. The capital of this Society is Rs. 10,000 out of which about Rs. 4,750 have been collected. During the past two years it stocked over 100 ploughs for hire purposes and earned Rs. 3,428 from 500 cultivators during that period.

It is satisfactory to note that this Depôt work is now passing out of the hands of the Department into those of Societies and private individuals, and this movement has recently received a great stimulus owing to Messrs. Kirloskar Brothers reducing their prices for iron ploughs by nearly 50 per cent. owing to competition.

30. As regards Boring this work is now in the hands of the territorial Deputy Directors and the following table summarizes the work done in the different divisions of the Presidency in the year under report:—

Division.	Number of Boring Machines.		Successful bores.	Unsuccessful bores.	In progress.	Total number of bores made.	Remarks.
	With this Department.	Total No.					
1. Gujarat ...	5	7	19	4	6	29	Excluding 4 rejected.
2. N. C. D. ...	3	3	8	12*	...	20	* Unsuccessful and in progress.
3. S. C. D. ...	6	6	50	11	...	61	...
4. S. D. ...	5	5	36	11	3	50	Excluding 9 rejected.
5. Konkan ...	7	7	21	13	6	41	...
6. Sind ...	1	1	...	...	...	...	...
Total ...	27	29	135	51	15	201	

In addition to the 27 boring machines actually on hand, two machines are lent to the District Local Board, Kaira, and 8 Cawnpore machines are under adaptation for exploratory work.

31. Progress in boring has not been quite so satisfactory as is desirable, and recently comprehensive suggestions have been submitted to Government for putting this work on a more satisfactory basis. It seems essential to reduce the cost to the cultivator and to increase facilities by adding substantially to the number of machines in stock which is only 27. Another important point which has been recognized is that all machines should be power-driven and action is being taken to convert all hand machines into power units.

32. Under land development the Special Officer prepared 34 bunding schemes during the year, mostly in the Dharwar and Bijapur Districts, and a deposit system has now been introduced to restrict the application to *bona fide* cases. Construction is now in progress in the case of 11 of these schemes. Although bunding has been practised by the

people for generations, it is found through the surveys made by this Officer that the designs are generally very defective owing to the bunds being constructed across the contours. Already the advantages of having the alignments laid out by an officer working with a dumpy level are becoming recognized.

#### EDUCATION.

33. The Poona Agricultural College which is affiliated to the Bombay University has entered its sixteenth year of existence and it is now perhaps the best known Agricultural College in the East. This is perhaps due to the fact that the policy of this institution has been less to turn out practical farmers (for which purpose separate training is provided) than men fairly highly educated in the sciences associated with Agriculture; and in addition to this, the facilities for studying the different branches of Agriculture are perhaps wider than what are available at other similar institutions, thus there is an Imperial Service Horticultural Officer. Hence perhaps the most interesting feature about this College is the cosmopolitan character of the student population. Dr. Burns has given some interesting figures bearing on this point in his Annual Report, *vide* Appendix B. We find in fact that students are drawn from such distant parts as Burma and Ceylon, the United Provinces and Goa, the Nizam's Dominions and Mysore. Similarly the distribution of caste and race is very striking. There are Brahmins, Marathas, Lingayats, Patidars, Jains, Mohamedans, Parsis, Christians and Buddhists.

In these circumstances and because social life and sport are specially cultivated by the Principal, this College must exercise a potent unifying influence upon Young India.

34. During the year under report this College was well patronized and the number of students on the roll was 173. Each of the principal divisions of the Presidency was well represented and 23 per cent. of the students from the Bombay Presidency came from the four chief agricultural communities, *viz.*, Marathas, Lingayats, Patidars and Anavils.

At the final examination for the B. Ag. examination in March 1924, 55 passed out of 68. Of these one secured a first class, and the rest a second class.

35. The other educational work undertaken by this Department, consists of the 6 Vernacular Agricultural Schools, of which there is nothing special to report, but it

appears that those more recently started in Gujarat at Surat and Godhra are proving satisfactory. Further details will be found in the reports of the Deputy Directors, published as appendices hereto.

36. The important experiment in Vernacular primary schools of introducing an alternative course in the higher standards qualifying for the alternative Vernacular (Agricultural) Final Examination, was launched in the year under report when 17 masters completed their training and took over their duties. The special training of those teachers is in the hands of the Agricultural Department, and it is now possible to form a preliminary opinion upon the success of the training. It appears from the inspection reports of the Inspector of Schools that this has not been quite so adequate as is desirable. It appears essential that no effort should be spared to make this training as efficient as possible and it would in my opinion be worthwhile to put the very best available officer in this Department, having the necessary qualifications, on special duty to conduct this training personally. Proposals to this effect have been submitted to Government.

#### STATISTICS.

37. This branch has been very fully occupied in compiling the revision of the Statistical Atlas, Bombay Presidency. This is now with the publisher and it is hoped that it will soon be out. Dr. Mann, permanent Director of Agriculture, has given great attention to improving the general presentation of the statistics, and by the free use of modern methods of illustration he has effected a great improvement upon the last edition which was published 20 years ago.

#### PUBLICATIONS.

38. In addition to these two publications the Department has published during the year under report the following memoirs, bulletins and leaflets.

##### *Memoirs.*

1. Memoirs of the Department of Agriculture in India, Vol. XII  
No. 5, March 1924.  
Studies in Gujarat Cottons, Part II, by Maganlal L. Patel,  
B.Ag.

*Bulletins.*

- (1) No. 113 of 1923. Year Book of the Agricultural Department in Sind.
- (2) No. 114 of 1923. Studies on the Rice Plant and Rice Cultivation. (Technical series No. I).
- (3) No. 115 of 1924. Shevri as a fodder crop.

*Leaflets (with Vernacular versions).*

- No. 8 of 1923. Sulphate of Ammonia.
- No. 1 of 1924. Improved strains of Kolamba Rice for the North Konkan or Thana and Kolaba Districts.
- No. 2 of 1924. Castor cake—A Manure of the cotton crop in Khandesh.
- No. 3 of 1924. Red Mauritius variety of sugarcane in Kanara and in Konkan generally.
- No. 4 of 1924. Improved varieties of Tomatoes.
- No. 5 of 1924. Spraying against plant pests with Insecticides.

## FINANCE.

39. The expenditure of this Department which fell from Rs. 19,50,254 in 1921-22 to Rs. 14,77,950 in 1922-23, recovered to Rs. 15,12,250 in 1923-24. The former figure, however, was swollen by about Rs. 1,36,304 owing to retrospective effect being given to revision of pay.

The receipts rose from Rs. 2,96,000 in 1922-23 to Rs. 3,39,000 in 1923-24.

As regards the Personal Ledger Account which is used for financing seed, &c., the total amount advanced was Rs. 2,09,408 and the total amount recredited within the year was Rs. 1,51,889. Various schemes financed from the Sir Sassoon David Trust were in progress from funds already received.

The subsidy from the Indian Central Cotton Committee amounted to Rs. 30,870, of which Rs. 27,175 was spent during the year.

40. It is no exaggeration to say that finance is the most formidable administrative problem confronting the Department of Agriculture to-day. The Department has been in existence long enough for an estimate to be formed

of the value of its services to Agriculture and the Country and still more of its potential value. We are now faced with unlimited opportunities for useful expansion in the spheres of

- (I) Research and Experiment.
- (II) Propaganda and Service.

In paras. 2 to 21 and more particularly in para. 9 of this report I have summarised the main pieces of research which are in progress; but it is obvious that these are only a sample of the vast number of problems which could profitably be investigated. Similarly the amount of propaganda and service which the Department is undertaking is only a small fraction of what could usefully be undertaken. On the other hand the Departmental budget cannot be expanded indefinitely out of Provincial Revenues, and moreover, this latter method which is the only method at present in force, of financing the Department, is defective in one very important respect. The grants are liable to be heavily cut to cope with periods of depression and consequent retrenchment policy. Thus the Agricultural Department grant of 1922-23 was cut by nearly Rs. 3½ lakhs or 22 per cent. as compared with that of 1921-22, owing to temporary financial stringency. Scientific work cannot be economically carried on unless it is pushed through to completion. A break at any stage means, in considerable degree, a new beginning.

41. In these circumstances it seems highly desirable to devise some means of facilitating the wide expansion of the work of the Department and at the same time of securing uninterrupted progress by, at least in part, eliminating the exigencies of the Provincial Budget.

One method of giving effect to this idea, would be to build up an "Agricultural Improvement Endowment Fund" which would be invested and administered by Trustees with the Hon'ble Minister for Agriculture as the Ex-Officio President. This fund might be created in the first place, out of the earnings of the Department of Agriculture. These amount to Rs. 3 lakhs or more per annum and are purely incidental to the operations conducted and are not the result of an earning policy. The loss of this sum to the Provincial Revenues would not have much financial significance to the State but the gain to the Department of Agriculture would be very material. In the first year the interest would amount



to Rs. 15,000 or Rs. 20,000 and in five years time the annual interest would approach a lakh of rupees. The income would in fact, be cumulative and would, therefore, provide for a process of continuous expansion of the research programme of the Department.

42. If such a fund existed it would probably be advisable to confine its expenditure to research and the application of its fruits in practice, retaining the ordinary Departmental Budget grant for financing the permanent organization of the Department embracing the salaries of the Services and the maintenance of the institutions such as the Poona Agricultural College and the Experimental Stations at Surat, Dharwar and elsewhere. This Budget grant could be kept within reasonable limits if all the special research schemes and consequent propaganda work were put on a temporary footing and financed from the Endowment Fund. In this way it would be possible to prevent the creation of a huge permanent personnel within the Department.

43. As regards the problem of financing propaganda and service to the public, there is already a subsidy scheme in force in connection with the Taluka Development Associations. The arrangement is that Government provides a sum equal to that raised locally, subject to a limit of Rs. 1,000 or in some cases Rs. 2,000 per annum. The unsatisfactory feature about this scheme, is that the local funds have to be raised by voluntary subscription and hence are liable to fluctuate widely from year to year. The amounts collected also appear to depend very largely upon the influence and power of the officials who are promoting these Associations.

It seems eminently desirable to devise a better method of raising local contributions, and I think the amounts should be provided out of the Taluka Cess, increasing the latter by a small fraction, if necessary. In view of the fact that Government gives a half share subsidy this idea should not prove altogether unacceptable to at least a certain number of talukas.

44. It would of course be necessary to prevent the development work becoming too officialised and perhaps the most appropriate way to administer the funds would be by re-constituting the Taluka Development Association as follows :—

(I) Half the members to be nominated by the Taluka Local Board.

(II) Half to be non-officials nominated by Government.

(III) The ex-officio president to be the president of the Taluka Local Board for the time being.

#### ADMINISTRATION.

45. In the year under report there were the usual transfers and postings of the personnel of the services owing to leave and other vacancies. The most important of these were--

(1) The permanent Director of Agriculture, Dr. Mann, proceeded on 6½ months leave in April 1924.

(2) Mr. Gilbert became Deputy Director of Agriculture in Sind on his return from leave in February 1924 *vice* Mr. Main who had proceeded on leave in November 1923.

(3) Mr. Bruen proceeded on deputation to the Government of India in April 1924 to act as Imperial Dairy Expert.

(4) Mr. Jenkins proceeded on long leave in May 1924.

(5) Mr. B. S. Patel is acting as Deputy Director of Agriculture for Animal Breeding *vice* Mr. Bruen.

(6) Mr. Gokhale is acting as Professor of Agriculture *vice* Mr. B. S. Patel.

Messrs. C. S. Patel and K. M. Powar of the Bombay Provincial Agricultural Service are acting as Deputy Directors in the N. C. D. and Konkan respectively, and Mr. Salimath of the Upper Subordinate Service continues to act as Deputy Director in the Southern Division.

Another matter to be mentioned here is the revival of the post of Inspector of Agricultural Schools which was kept in abeyance for two years. Mr. R. Y. Hulkoti is acting in this appointment.

46. The time has now arrived in the life of this Department when some of its original and most conspicuous officers have come to the end of their service and proceeded into retirement with the good wishes of all who served with them and under them.

Professor J. B. Knight has already been absent from India for over two years but his actual retirement took place with effect from the 19th April 1924. Professor Knight will always be remembered as one of the founders of the Poona Agricultural College ; and previous to the close of 1905 before the present fine building was complete he practically carried the entire burden of the teaching of all sections, save Botany, on his shoulders ; and it is greatly to his credit that some of the best officers in the Department today, were students of the College at that period.

Rao Sahib M. L. Kulkarni has also retired with effect from 1st April 1924 and his service history affords an impressive example of what can be achieved by a man of energy who believes in, and acts upon the principle of self-dependence. He joined the Department over 30 years ago in a very humble capacity ; and for several years his salary was only Rs. 20 per mensem. He was fortunate in coming under Mr. Mollison, the then Deputy Director and late Inspector General of Agriculture with the Government of India. Mr. Mollison took some trouble in training this man which was well repaid as Rao Sahib Kulkarni rapidly rose through various appointments to Superintendent of the Dharwar Experimental Station and Divisional Superintendent of Agriculture, finally acting in the Indian Agricultural Service as Deputy Director of Agriculture for six years and retiring with the latter rank. Rao Sahib Kulkarni's name will always be associated with the Department's organization in the Dharwar area and more particularly with the introduction of improved cottons and their advantageous sales through the adoption of a system of grading based on ginning percentage.

Poona :  
September 11, 1924.

T. F. MAIN,  
Ag. Director of Agriculture.

## APPENDIX A.

LIST OF TALUKA DEVELOPMENT ASSOCIATIONS ORGANIZED  
UP TO DATE.

According to the scheme laid down in Government Resolution No. 3378, dated 5th June 1922, Revenue Department, 38 Taluka Development Associations have been formed until now as shown below :—

*Gujarat Division.*

Surat District	...	1
----------------	-----	---

*Khandesh and Nasik Districts.*

East Khandesh District	...	4
West do. do.	...	2
Nasik do.	...	3

*South Central Division.*

Poona District	...	1
Sholapur do.	...	2
Satara do.	...	2

*Southern Division.*

Belgaum District	...	3
Bijapur do.	...	1
Dharwar do.	...	3

*Konkan Division.*

Kanara District	...	2
Ratnagiri do.	...	3
Kolaba do.	...	1
Thana do.	...	2

*Sind Division.*

Hyderabad District	...	3
Nawabshah do.	...	1
Larkana do.	...	2
Sukkur do.	...	2

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Out of the 38 Associations, 11 were formed in the year 1922-23 in the following Talukas :—

- (1) Chorasi (Surat), (2) Pachora and (3) Jalgaon (East Khandesh), (4) Madha (Sholapur), (5) Satara, (6) Khed (Poona), (7) Dharwar, (8) Ron and (9) Gadag (Dharwar), (10) Chikodi and Athani (Belgaum).

The remaining 27 Associations have been formed during the year 1923-24 in the following Talukas :—

*East Khandesh District.*

1. Taluka Bhusawal.
2. Do. Raver.

*West Khandesh District.*

3. Taluka Dhulia.
4. Do. Nandurbar.

*Nasik District.*

5. Taluka Nasik.
6. Kadwa Canal Development Association.  
Ojhar Tambat.
7. Taluka Satana.

*Sholapur District.*

8. Taluka Sholapur.

*Satara District.*

9. Taluka Islampur.

*Belgaum District.*

10. Taluka Gokak.

*Bijapur District.*

11. Taluka Indi.

*Thana District.*

12. Taluka Mahim.
13. Do. Kalyan.

*Kolaba District.*

14. Taluka Alibag.

*Ratnagiri District.*

15. Taluka Dapoli.
16. Do. Ratnagiri.
17. Do. Rajapur.

*Kanara District.*

18. Taluka Sirsi.
19. Do. Karwar.

*(Sind Division) Hyderabad District.*

20. Taluka Hyderabad.
21. Do. Hala.
22. Do. Tando Allahyar.

*Nawabshah District.*

23. Taluka Shahdadpur.

*Larkana District.*

24. Taluka Larkana.
25. Do. Kambar.

*Sukkur District.*

26. Taluka Sukkur.
27. Do. Ghotki.

Subsidies amounting to Rs. 23,582 have been paid to all the above Associations during the year 1923-24 except the following :—

1. Raver.
2. Nandurbar.
3. Nasik.
4. Ojhar Tambat.
5. Kalyan.
6. Rajapur.
7. Satara.
8. Gadag.
9. Ron.
10. Dharwar.

26 Associations have been registered under the Co-operative Societies Act.

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## APPENDIX B.

ANNUAL REPORT OF THE COLLEGE OF AGRICULTURE, POONA,  
FOR THE YEAR 1923-1924.

This is the sixteenth year of the existence of the College. No Bombay students have been excluded in favour of those outside the Presidency. The present rule is to admit men from outside the Presidency, if there are vacancies after all the Bombay demands are met.

*Land Acquisition.*

About 73 acres of new land were acquired during the year. This brings up the College area to 300 acres. All the land except the village (Fatak Wadi) near the railway gate has now been acquired and fenced during the year under report.

*Staff.*

I was in charge of the College as acting Principal throughout the year. In May 1924, I was made permanent as Principal with retrospective effect from 31st May 1923.

On the retirement of Professor Knight in April 1924, Professor Patel was made permanent as Professor of Agriculture. Later he was appointed to act as Deputy Director of Agriculture for Animal Husbandry in place of Mr. Bruen who went to Bangalore as acting Imperial Dairy Expert. Mr. V. G. Gokhale, Deputy Director of Agriculture, Konkan, was appointed to act as Professor of Agriculture and took charge on 10th June 1924.

In September 1923, two of our College Staff were transferred to hold responsible research posts at Research Stations financed by the Central Cotton Committee. Mr. Ramrao Kasargode, Assistant Professor of Entomology, went to Surat as Cotton Entomologist and Mr. G. S. Kulkarni went to Dharwar as Cotton Mycologist. Mr. G. S. Kulkarni had previously been appointed acting Plant Pathologist to the Government of Bombay.

Mr. Jhaveri, Entomological Assistant, Surat, was appointed to take the place of Mr. Ramrao as Assistant Professor of Entomology. He joined in October but unfortunately met with an accident in November and had to remain on leave till about the end of May during which time Mr. V. G. Deshpande acted in his place. Mr. Jhaveri has now resumed his duties.

Mr. Baluch, Assistant Professor of Dairying and Manager of the College Dairy, was deputed for further training in dairying to Bangalore in December and Mr. M. M. Desai from North Gujarat was appointed to act in his place from the beginning of January.

*Optionals.*

The Senior B.Ag. students elected optionals as follows:—

	No.
(a) Agricultural Economics, Land Development and Intensive farming.	25
(b) Advanced Botany	... 15
(c) Advanced Chemistry	... 3
(d) Stock Breeding, Feeding and Management including Dairying.	8
(e) Advanced Entomology	... 3
Total	... <u>54</u>

*Examinations.*

Of the sixty-eight candidates who appeared for the B.Ag. Examination in March 1924, fifty-five passed, one of them in the First Class and the rest in the second class.

Forty-six students were sent up for the I.Ag. Examination. Of these two passed in the first class and thirty in the second class. One of these thirty men has to take an examination in one subject with the I.Ag. but is allowed to keep terms with Jr. B.Ag. men.

At the final College examination for the Diploma two men appeared out of whom one was granted the Diploma. Four students appeared for the first examination for the Diploma and passed.

*Students.*

As usual the College Census was taken at the end of June, one month after the opening of the College. This is a convenient date for statistical purposes, as the College population settles down by that time. A few changes in the student population take place thereafter.

It has been our experience in previous years, that a man applies for admission to the College and is admitted, and that many of these admitted men do not join.

An admission fee of Rs. 5 was this year, therefore, demanded with the application for admission and ninety-three men were so admitted to the College. Out of these the number on the roll at present is seventy. Some of the men thus admitted did not join, and a few left after joining.

Besides the above number, five men who are teachers in the Cochin State, Education Department, have been directly admitted to the second year of the Diploma Course at the request of their Director of Agriculture. The men are qualified science graduates.

The total number of men admitted this year, therefore, is seventy-five. This number of admission is the officially sanctioned number.

*Short Course.*

Men who wish one year's training mainly in practical agriculture with a small amount of training in the allied sciences to enable



them to grasp the principles underlying agricultural practice are admitted to this course. We admitted twelve men this year out of whom five failed to come. There are, therefore, seven men in the class including a Veterinary Graduate from Bombay.

*Special Courses.*

A few students are also taken up every year to take up special courses in any particular branch of science allied to agriculture. We have three such men this year. One of them, a Jamadar Ramji Lal, was deputed by the Officer Commanding the Indian Army School of Education, Belgaum, to take up courses in agriculture and allied sciences for a period of a month and half. One Mr. Vartak was allowed to take up a course in Agricultural Chemistry and the Kumar from Orissa who was in the short course class last year has been allowed to take up a further agricultural course.

Details of all students for the last eight years appear below :—

Details of Students.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
First year students ...	53	61	60	89	84	67	51	70
Second year students ...	36	39	46	50	59	65	49	39
Third year students ...	23	35	38	48	49	57	61	54
Short course students ...	...	...	23	12	18	...	5	7
Special course students ...	7	2	3	4	6	5	4	3
Total ...	124	187	170	203	205	195	170	173

The statement below gives the localities from which our students are drawn :—

Locality.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
Deccan and Khandesh ...	8	19	27	38	39	29	28	38
Southern Maratha Country and Konkan.	50	42	49	52	53	56	46	42
Gujarat ...	36	36	43	40	38	34	33	36
Sind ...	9	7	7	6	7	2	6	7
Assam ...	1	1	8	1	1	1	3	...
Central India ...	1	3	...	4	2	2	3	5
Nizam's Dominions ...	6	6	8	7	6	4	5	3
South India and Ceylon ...	5	13	16	23	18	10	14	19
Burma ...	5	6	7	19	30	32	17	9
United Province ...	2	2	1	2	...	...	...	...
Berar ...	...	1	...	...	2	3	2	2
Bengal ...	...	1	4	7	8	6	2	2
Central Province ...	...	...	5	4	4	3	3	2
Nepal ...	...	...	...	...	1	1	1	...
Idar State ...	...	...	...	...	3	...	...	1
Madras ...	...	...	...	...	3	10	2	...
Ajmer ...	...	...	...	...	1	1	...	2
Udaipur ...	...	...	...	...	...	...	1	...
Travancore ...	...	...	...	...	...	...	1	...
Goa ...	...	...	...	...	...	...	3	2
Mysore ...	...	...	...	...	...	...	...	1
Mesopotamia ...	...	...	...	...	...	...	...	1
Persia ...	...	...	...	...	...	...	...	1
Total ...	124	187	170	203	205	194	170	173

## Classification of the students according to communities :—

	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
Brahmins	55	61	68	84	76	84	69	73
Marathas	4	6	16	20	21	21	15	14
Lingayats	2	2	1	5	10	7	4	3
Patidars (Gujarat)	10	13	12	7	5	4	7	8
Jains	...	...	6	4	1	2	2	2
Mahomedans	6	4	9	12	15	8	10	9
Parais	12	7	5	5	2	3	4	6
Christians	...	...	7	16	21	20	14	12
Ceylon students	...	...	6	7	2	2	...	3
Budhists	...	...	7	9	16	17	12	9
Anavils (Surat)	...	...	...	...	2	3	...	2
Others	33	44	33	34	34	23	33	32
Total	124	137	170	203	205	194	170	173

Further classification shows that out of 118 students from the Bombay Presidency (including Sind) 27 (or 22·89 per cent.) come from the four chief Agricultural Communities of the Presidency, *viz.*, Marathas and Lingayats in the South and Patidars and Anavils in the North.

*Courses.*

The main course is the three years' course open to students qualified according to the rules of the Bombay University.

The Principal may also admit a few other students to the course, and the successful candidates receive the College Diploma. The total number 52, admitted in the last nine years bears the following proportion annually to the total number in the class :—

	Per cent.
1916—12 out of 54 equal to	... 22·2
1917— 3 out of 58 equal to	... 5·1
1918— 8 out of 51 equal to	... 13·1
1919— 4 out of 60 equal to	... 6·6
1920— 7 out of 89 equal to	... 7·8
1921— 1 out of 84 equal to	... 1·2
1922— 2 out of 67 equal to	... 2·9
1923— 6 out of 53 equal to	... 11·3
1924— 9 out of 70 equal to	... 12·8

As a rule students of the Presidency proper are not admitted under these special conditions unless they are deputed by a State or an Institution.

*Scholarships.*

The allotment during the last eight years is as under :—

Locality.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.
Deccan	8	8	5	7	4	6	4	5
Southern Maratha Country	7	2	4	4	2	6	3	3
Gujarat	3	6	3	1	2	2	5	5
Konkan	2	1	3	3	7	1	3	2

*Library.*

The Library now numbers 12,250 Volumes, out of which 20 were added in 1923-24.

*Other Institutions.*

The Dairy, Veterinary Hospital, Manjri Farm, Ganeshkhind Garden, &c., continue to be used for the teaching of students.

*Employment Bureau.*

This College functions as an Employment Bureau for its graduates and has been able to put graduates and employers (whether Government or private) in touch with one another and thus secure employment for several useful men. It is hoped that this side of our activities will develop.

The statement of passed men employed in 1922 and 1923 as far as known up to date is given below :—

Total number—38—1923.		Total number—45—1924.	
Agricultural Department, Bombay.	3	Agricultural Department, Bombay.	5
Agricultural Department, C. P.	1	State Service	... 2
State Service	... 1	Agricultural Department, Burma.	7
Agricultural Department, Burma.	8	Private Bodies	... 2
Not known	...25	Not yet known	...29
	—		—
<b>Total</b>	<b>...38</b>		<b>45</b>
	—		—

*Conferences.*

The University appointed a Committee this year for revision of the syllabus of the agricultural course. The Committee under the

chairmanship of Dr. Mann met at the College and discussed this matter several times. The report is now before the syndicate.

In April a departmental Plant Breeders' Conference was organised and held at the College for the first time. This was of great utility to all the members who attended and certain definite lines of work and policy were decided upon.

#### *Exhibitions.*

This year the College has taken a prominent part in three exhibitions. The first of the three was held during September 1923 for the benefit of the Co-operative Conference delegates and members, when the exhibits were arranged in the College buildings and various parts of the College estate.

The second one was held in the main hall of the College in December. This consisted of the exhibits to be sent to Wembley for the British Empire Exhibition. This was open to the Poona public for three days.

During May the Indian Industries and Trade Developing Syndicate, Ltd., Karachi, held an exhibition on the Deccan Gymkhana grounds and the College put up a stall there on behalf of the Department. The Syndicate awarded a gold\* medal for this. All the three exhibitions were very successful.

#### *College Gymkhana and other Activities.*

On March 15, 1924, the College suffered the loss of a friend in Mr. Garland Craig, General Secretary of the Y. M. C. A. in Poona, who died of smallpox. During the whole of his service in Poona Mr. Craig had been in close touch with our students. He helped in their games, and put his own tennis court at their disposal. He was many times appealed to for all sorts of assistance and one of his last acts was to motor some of our students to the Sassoon Hospital in the middle of the night. These men had been accidentally poisoned and immediate transport to the Hospital was essential. They all recovered. In addition Mr. Craig had many friendly meetings of students and their friends in his house, and was a frequent and welcome guest at College functions. Students and staff attended his funeral and subscribed to a brass plate in his memory, which plate has been put on the walls of the College Hall, the shrine of our traditions.

Mr. Craig's successor, Mr. Perry Park, has already made himself well known among our students, and it is to his inspiration particularly that volley-ball and basket-ball are being played with unusual vigour and expertness. The value of these open-air group games is inestimable.

\* This was not actually received as we were supposed to pay for it.

The College platoon of the University Training Corps for the second time won the Inter-Platoon shooting shield. The platoon continues at full strength. This College has no less than four officers of the University Training Corps on its staff.

In the Intercollegiate Sports we carried off five cups, coming third among the Colleges. This is an honourable place, considering how small a number of men we have to draw on compared with the Arts Colleges.

The various departments of the College Gymkhana have been well patronised in their respective seasons. We had a fair cricket team and some excellent tennis players. Hockey and foot-ball were fairly attended. In the latter game we feel the loss of many of our Burman students, who played this game well.

The Students' Union, an unofficial body representing students interests and largely occupied in organising social intercourse, has this year for the first time a student president. It had, up to date, one of the staff as a president. This now autonomous student body continues to fulfil most useful functions and to be a great help to the life of the College.

Among our distinguished visitors during the year were (1) Sir Mahadeo Chaubal, (2) Mr. Street, Joint Secretary, Royal Services Commission and (3) Dr. McRae, Imperial Mycologist, Pusa.

The *esprit de corps* of the College grows daily, and the twin ideals of the College, science and sport, continue to be pursued with increasing eagerness. With this spirit we hope to produce not only good farmers but also good citizens.

#### - College Veterinary Hospital.

During the year under report the following processes have been increasingly employed with excellent results :—

(1) Drenching animals by nasal route by a single india-rubber tube. Bottle drenching has been given up in most cases.

(2) The method of castration by Burdizzo's Castrator has been a great success. Cultivators in several districts have adopted this without objection.

(3) Gastro-intestinal Lavage has been a great success. Dog owners have very much appreciated this method.

The treatment of Rinderpest by iodine, that of Tetanus by carbolic acid and the use of potassium permanganate in veterinary practice have been newly introduced this year.

The details of the working of College Veterinary Hospital are given below :—

*Statement showing the details of the working of the Agricultural College Veterinary Hospital, Bhamburda, Poona, for the year 1923-1924.*

Patients treated, &c.	1921-22.	1922-23.	1923-24.	Remarks.
Total	2,419	2,714	4,537	
Inpatients	514	400	484	
Outpatients	1,617	2,160	3,787	
Patients treated on tour	176	69	167	
" supplied with medicine	112	85	99	
Daily average attendance of	41.57	39.25	46.80	
" " " inpatients...	24.08	16.66	19.72	
" " " outpatients..	17.49	22.51	25.66	
Free patients	1,032	1,252	1,808	
Paid patients	1,099	1,278	1,479	
Agricultural animals	448	487	617	
Non-agricultural animals	1,603	815	1,191	
Castrations performed	99	63	87	
Attendance on Rinderpest	10	6	6	
" " foot and mouth	10	3	5	
" " black quarter	...	2	1	
" " Hemorrhagic Septicæmia.	1	...	3	
" " Glanders	1	...	...	
" " Epizootic Lymphangitis.	1	...	1	
" " Fowl Cholera	1	...	...	
" " Pneumo-pericarditis	1	...	...	
Inoculations performed	154	256	929	

W. BURNS,  
Principal,  
Agricultural College, Poona.

## APPENDIX C.

SUMMARY OF WORK DONE UNDER THE DEPUTY DIRECTOR OF  
AGRICULTURE, NORTH CENTRAL DIVISION,  
NASIK, 1923-24.*Staff and Organization.*

1. Mr. W. J. Jenkins was in charge of the Division till 8th May 1924 when he went on long leave and I took over charge from him. Amongst the subordinate staff there was no important change except that Mr. R. B. Nimbalkar, Head Master of the Dhulia Vernacular Agricultural School, was transferred to Jambhul Vernacular Agricultural School and his place taken over by Mr. J. N. Purandhare.

2. In view of the suggestions made by the Registrar, Co-operative Societies, Poona and the Director of Agriculture, Poona, the district staff of the division was re-arranged on a territorial basis so that the work of any two officers may not over-lap and more intensive propaganda may result. This scheme was put into force at the end of the year in May 1924 and it is expected it will result in more intensive and efficient work. According to this scheme the 3 districts of this Division are sub-divided into 9 sections each containing from 2 to 4 talukas and each section is put in charge of a Non-Graduate fieldman or District Agricultural Overseer according to the importance of the work and strength of the available staff. It may be mentioned here that the staff both inferior and superior available in this Division is too small to cover all the talukas of the Division and hence the work in 6 talukas out of 33 in the Division is left out altogether, while some of the sections will have to be left only in charge of Kamgars.

3. As per orders contained in Government Resolution, R. D., No. 4541, dated 23rd January 1924, the Dhulia Farm was converted into a Vernacular Agricultural School and it is now being accommodated on the Farm by making suitable additions and alterations in the existing buildings. Thus the Farm will in future serve the purpose of the School in addition to the Cotton Breeding operations which are carried on there under the Cotton Breeder.

4. The Divisional Board of Agriculture, N. C. D., held four sittings during the year at Jalgaon, Nandurbar, Bhusawal and Nasik and it is gratifying to note that this peripatetic system of holding its sittings at different centres has resulted in making its powers and usefulness more public and popular and is always attended by a large number of visitors who take keen interest in the work of the Agricultural and Co-operative Departments. Since its inception, in all, eight meetings have been held and it may congratulate itself that there are now ten Taluka Development Associations in the Division and besides it can lay to its credit much useful work in considering schemes of tagavi loans, non-credit societies, cotton sale and seed societies and many questions affecting the general welfare

of the agriculturists of the Division. The members have continued to take unabated interest in the deliberations of the Board and during the year the following members constituted it:—

- Mr. W. J. Jenkins, Deputy Director of Agriculture, N. C. D.,  
(Chairman).
- „ L. S. Potnis, Assistant Registrar, Co-operative Societies,  
Bombay (5th meeting  
at Jalgaon).
- „ A. C. Desai, do. (6, 7 and 8th meetings).
- „ B. R. Ransing, Dhulia, West Khandesh District.
- „ S. B. Deshmukh, Pimpalner, West Khandesh.
- „ P. M. Bildikar, Pachora, East Khandesh.
- „ A. V. Patil, Satana, Nasik.
- |  |                       |
|--|-----------------------|
| Rao Saheb Rupchand Motiram, Jalgaon,<br>East Khandesh. | } Cotton<br>Industry. |
| „ „ Gulabchand Hiralal, Dhulia,<br>West Khandesh.      |                       |

5. A conference of the members of the staff was held on 28th April 1924 at Nasik when many important Agricultural problems of the Division were discussed and the programme for the next season's work was drawn up after mutual inter-charge of ideas and experience.

#### *Season.*

6. Monsoon set in late at the close of the month of June and the Kharif sowings were completed during the first half of July. During the later part of July there were heavy rains in many parts of East Khandesh which spoiled the germinating cotton crop. In parts of West Khandesh and Nasik the rainfall was below normal and caused scarcity of fodder in many places. There was a long break from the middle of August to the middle of September when good rain fell, which eased the situation to a great extent both in Khandesh and Nasik. There was little rain in October; but there was a specially hot spell in this month which affected the cotton crop adversely and the prospects for Rabi crops were not good. The cold weather was not normal, there being less of cold and absence of dew. The effect on the crops was that both Kharif and Rabi crops came to below normal in both Khandesh and Nasik.

#### *Farm Section.*

7. *Jalgaon Farm.*—In spite of the adverse conditions of the season the cotton crop of the Farm came out normal due to careful tillage during the break from mid August to mid September and the average yield was 603 lbs. per acre from a total area of 128 acres 14 gunthas under this crop. The total quantity of N. R. seed obtained from this was 42,012 lbs. of which 39,000 lbs. was handed over to the Cotton Supervisor for distribution in the District.



8. The Mahua cake was again tried to compare with castor cake; but the results were not conclusive; however, in view of the fact that Mahua cake is not obtainable in large quantities and is slow in effect it was decided to abandon further trials.

9. The experiment to see if nitrate of soda can be utilised as a top-dressing to prevent wilt was again tried during this year but the results were not favourable and it has been abandoned.

10. Castor cake as manure for cotton is getting more and more popular and in proportion to the demand the prices are also rising. The usual dose adopted on the Farm and recommended is 400 lbs. per acre. In order to see if the dose can be reduced to 300 lbs. due to high prices, comparative plots manured with 400 lbs. and 300 lbs. per acre were laid out and the results of the past two seasons show that the dose can be economically reduced to 300 lbs. and this is now being recommended to the cultivators.

11. Groundnut crop suffered from excessive rains of July in the beginning and did not recover entirely from this effect in the long run. However, an average yield of 1,135 lbs. was obtained from a total area of 25 acres and 38 gunthas.

12. Jowar and Udid mixture occupied an area of 18 acres and 36 gunthas and in spite of adverse conditions of the season excellent crop was obtained with an average yield of 1,115 lbs. of Jowar and 425 lbs. of Udid per acre.

13. The total area under Rabi crops was 19 acres and 38 gunthas of which 16 acres and 38 gunthas were under wheat, 2 acres under gram and 1 acre under coriander. The wheat crop was below normal with an average yield of 650 lbs. per acre while gram and coriander did fair with a yield of 560 lbs. and 480 lbs. per acre respectively.

14. The Farm, besides having served as a central seed farm for N. R. Cotton seed in the Division, is always a centre of various activities. It has an implement depot which recovered Rs. 407-1-0 as hire and sold miscellaneous implements and parts worth Rs. 2,425-4-0. New implements are first tried on the farm and then recommended in the district. Besides, implements from several firms are stocked on consignment account for sale. During the year Skeen's bucket water lift was tried. A demonstration was held on 13th and 14th September when many cultivators attended it.

15. The farm is run on business lines and serves as a centre for training apprentices. To enlarge its usefulness in this direction it is settled to take in Agricultural Graduates for post training in Farm management. Last year there were some applicants for admission but due to want of housing accommodation no students came in. Now accommodation for three students has been made by erecting kacha huts and a curriculum has been settled for intending students and publicity is being given to this. Students will only be attracted for this training if big land-lords and Jahagirdars realise the usefulness of engaging trained men for estate management.

16. The total receipts during the year were Rs. 28,746-7-8 against the total expenditure, including pay, &c., of the staff, of Rs. 21,997-4-2. Due to recent retrenchment the contingent grants of the farm have been cut down too low which tell upon the efficient management of the farm, but it is hoped it will be recouped soon.

17. *Dhulia Farm*.—As stated above in para. 3, the farm is now converted into an Agricultural School and in future it will serve as a demonstration plot for training the students and a cotton breeding centre for Khandesh. During the year under report large portion of the area was under different strains of cottons segregated by the Cotton Breeder for studies and multiplication. As mentioned in para. 19 of last year's report the orchard now consists only of lemons and oranges and it will be utilized to teach students in budding, grafting and general fruit culture which industry is increasing day by day in this Division.

18. *Khed Nursery*.—In view of the increasing importance of fruit-growing industry in Khandesh, a keen necessity for a good nursery was felt and this has now been met with by the offer of one acre of land at Khed by Rao Saheb Gulabchand of Dhulia from his garden there as stated in para. 19 of last year's report. A Horticultural Fieldman is now stationed there and a beginning made by planting Jamburi seedlings in about 4 gunthas which will give about 2,000 seedlings next year for grafting. Arrangements are being made to put this work on a more systematic basis.

19. *Belgaon plot*.—In Nasik District, there is no departmental plot and consequently a great handi-cap was felt in making preliminary trials and experiments which could not be made on cultivators' filed satisfactorily. This want has now been met with by the offer of 5 acres of land by Mr. Jategaonkar of Belgaon near Nasik as stated in para. 7 (b) of last year's report. A Kamgar has been posted there and during the year under report several experiments with wheat, chillies, potatoes, Bhendee (Ladies fingers), &c. were carried out.

Potatoes as a Kharif crop were tried and a yield of 2,320 lbs. per acre was obtained though the season was not favourable. There are several tracts in the District where this crop is likely to be successful and plots on cultivator's field are being laid out for demonstration.

There is a small silo which was filled in with 22,500 lbs. of green grass. Nearly 13,000 lbs. of ensilage was procured from it. Skeen's bucket water-lift was tried and demonstrated.

*Research and experiments on crops.*

20. (a) A committee of Drs. Mann, Burn, Messrs. Jenkins, Prayag, and M. L. Patel was held in October 1923 to settle out the lines of work in cotton breeding in Khandesh and as a result of their deliberations it was settled that the object of cotton breeding work

in Khandesh was the discovery of higher yielding, higher ginning, and longer stapled types of cotton suitable for the tract, the order of importance of the characters being as above set out. In view of the above policy the following work was undertaken during the year:—

- (1) Studies of 9 strains in Bani-Comilla hybrid.
- (2) Studies of the promising strains in N. R. and N. V.
- (3) Studies of Cernum-Indicum crosses from Nagpur.
- (4) Studies of Neglectum types from Cawnpur.
- (5) Studies of Bishnor Jari and Bani 315.

Many types imported from outside were impure and pure strains are being segregated for further studies and cross-fertilisation work. In all the Cotton Breeder had 1,642 plants under observation and studies and it is hoped to issue these observations and studies in the form of a memoir when suitable material is collected.

BXX 27, one of the promising strains of Bani Comilla hybrid was tried at Jalgaon in 2½ gunthas plots in comparison with N. R. and in yield and ginning percentage it was found superior to N. R. It is being arranged to sow this on a two acre plot on the Jalgaon Farm for further comparison and seed multiplication.

(b) To demonstrate the use of castor cake as manure for cotton several plots were laid out all over the cotton tract. The crop was treated in doses of 400 lbs. and 300 lbs. per acre and the results obtained were very convincing except in West Khandesh where due to shortage of rain-fall the crop did not come out satisfactorily. In East Khandesh, blood manure, which is available in limited quantities at Bandra slaughter-house, about 5,000 bags a year, was tried in doses of 100, 150 and 200 lbs. per acre and the results showed a profit of about Rs. 50 an acre after deducting the cost of the manure. Next season it will again be tried and demonstrated.

21. *Spanish Groundnut*.—This crop has now become of great commercial importance in the Division and is fulfilling a very important position in the economic and rotational system of the tract. During the last ten years its acreage has increased from 4,100 acres in 1912-13 to 106,044 in 1922-23. Messrs. Volkart Brothers of Bombay brought to the notice of the Department that the crop was deteriorating in quality. An enquiry was made regarding this but it was found that the quality had deteriorated due to adverse conditions of the seasons and that wherever the seasonal conditions were favourable, the produce was of good quality. However, a fresh stock of seed was obtained from the United States of America and it was tried on the Dhulia and the Jalgaon Farms. So far the observations went the fresh seed did not turn out superior to the local acclimatised seed. However, this will be watched in future and attempts will be made to renovate the seed if necessary.

22. *Wheat*.—This crop occupies a large and important area in the Nasik District and varietal and manurial experiments were tried

at several places ; but due to adverse conditions of the season the results were not conclusive.

In West Khandesh, manurial experiments with castor cake, sodium nitrate, &c., on wheat under irrigation were carried out and the results obtained were very promising. They are tabulated below :—

Serial No.	Treatment.	Yield per acre.		Remarks.
		Grain lbs.	Chaff lbs.	
1	No manure ...	928	1,780	After deducting the cost of manure, the profits from extra yields come to Rs. 30 to 40 per acre.
2	300 lbs castor cake per acre ...	1,213	2,800	
3	150 lbs. sodium nitrate per acre ...	1,322	3,066	
4	Complete manure ...	1,534	4,133	
	112 lbs. ammonium sulphate ...			
	224 lbs. super phosphate ...			
	300 lbs. castor cake ...			

23. *Bajri*.—The Akola Bajri is getting more and more popular and large quantities are now imported by cultivators for seed purposes in the Division. It is observed that it gets deteriorated by cross-fertilization in a short time and fresh seed is to be imported every now and then. However, as the yield is very much higher than that of the local, people do not grudge the extra cost of transport and the demand is increasing.

24. *Rice*.—In western parts of the Nasik District, bordering on the Konkan, rice is an important crop and in trying to find out a suitable substitute for rab, the department has been able to demonstrate that 12 lbs. of Ammonium Sulphate applied to a guntha of seed bed, produces 20 per cent. more seedlings of very good vigour. This is being demonstrated to cultivators and during the year under report 3,300 lbs. of Ammonium Sulphate was sold in Igatpuri Taluka for this purpose.

25. *Fruits*.—Since the practice of spraying grape vines with Bordeaux mixture against grape vine mildew was introduced, the area under this fruit is increasing very steadily in the Nasik District and it now occupies an area of 1,300 acres against 336 acres in 1917-18. Manuring with Ammonium Sulphate was tried in several gardens ; but the effect was not appreciable. Mr. H. V. Gole, who is a keen student of grape cultivation, is experimenting on the trailing of grape vines on simple wires instead of Pangaras. The wires were supplied some years back by the department and the results will be watched with interest.

Orange cultivation is steadily progressing in Khandesh and the establishment of the nursery at Khed will help the industry a great deal. Mr. Manakchand Kisandas of Utran in East Khandesh has planted an area of nearly 120 acres under oranges and lemons and is conducting the plantation on business lines. The Department is always in touch with him and the progress of the plantation is watched with interest and it is hoped it will be an object lesson in fruit-culture in Khandesh.

26. *Sugarcane*.—As a result of continued propaganda by the Department, there has been a great improvement in the cultural, manurial and manufacturing methods of the sugarcane industry in the Division. People now plant their canes wider and freely use Ammonium Sulphate and castor cake as manure with advantage. However, due to fall in the prices of Gul and the uncertainty of water supply in canals and wells, the area under this crop has recently decreased. Several varieties of canes were tried at Konkangaon under the Kadwa Canal and of these Manju variety appears to have some prospects, it being early and the water in the Kadwa Canal being available only for 8 months.

27. *Onions*.—This forms an important crop in parts of the Nasik District and Sodium Nitrate applied at the rate of 400 lbs. per acre gave an increased yield of 2,360 lbs. of onions per acre. Further trials with reduced doses are being laid out in the next season.

28. *Potatoes, Garlic, Chillies, etc.*—Potatoes have been recently introduced both as a Kharif and Rabi crop in Dindori and Nasik Talukas and are making a head way in suitable areas. Manurial experiments with Sodium Nitrate and castor cake on Garlic and Chillies were carried out in Nasik and Khandesh and useful results obtained to form further basis of experiments.

#### *District Cotton Work.*

29. The demand for pure N. R. seed has continued to be keen and the supply was less than demand. The consequence was that the registered seedgrowers who were given most of the fresh seed on concession rates failed to abide by the conditions by which they were to return part or whole of the seed produced by them and they made profiteering from it by selling it at exorbitant rates. Moreover, the registered seedgrowers being scattered throughout the District, extension of N. R. seed was diffused and the absence of concentration failed to make any demonstrable increase in the area of N. R. Cotton. Again the Department had not sufficient funds to finance all the seed produced even if the seed produced by seedgrowers was made available. Under the circumstances, during the year under report a scheme was worked out in consultation with the Registrar, Co-operative Societies, by which most of the seed produced at Jalgaon and Dhulia was distributed to selected Co-operative Societies and Taluka Development Associations who gave the seed to such of their members who agreed to return half or

more quantity of seed produced to the society or association, the rate of purchase and sale being settled by the managing committees of the bodies concerned. In case of dispute the matter was to be referred to the Deputy Director of Agriculture, N. C. D., Nasik. Under this scheme 31,360 lbs. of fresh seed has been distributed to 11 Co-operative Societies and 8 Taluka Development Associations in the Division. If the scheme works satisfactorily the area of work will be centralised and the extension of N. R. will be carried out on a more systematic basis. During the year the total quantity of fresh seed from Jalgaon and Dhulia Farms available for distribution was 41,033 lbs. of which 31,360 lbs. was distributed to co-operative bodies as stated above and the remaining 9,673 lbs. was distributed to other parts of the Presidency.

30. The total quantity of second class seed procured for distribution during the year was 292,000 lbs. of which 41,700 lbs. was purchased by the Department from the Personal Ledger Account; 113,487 lbs., by co-operative banks at Dhulia and Malegaon, 87,097 lbs. by Taluka Development Associations of Jalgaon and Pachora and the remaining by the Co-operative Credit and Seed Societies. Of course all the business had to be arranged by the Department.

31. Besides the above, several reliable seedsmen and big landlords had their crops purified at their cost under Departmental supervision and they distributed nearly 75,000 lbs. of seed in their neighbourhood. If these people instead of taking to profiteering, carry on the work on more equitable lines, they will also serve a useful medium in the dissemination of the seed.

#### *District Propaganda Work.*

32. *Shows and Demonstrations.*—In addition to the several experimental and demonstrational plots laid out on the cultivators' fields as described above, under crop experiments, a large number of organised shows and demonstrations were held during the year. Amongst these, two, one at Bhadali in Jalgaon Taluka and the other at Ravalgaon in Malegaon Taluka, were of special interest. The former was organised under the auspices of the Jalgaon Taluka Development Association and attracted a large number of visitors. A series of lectures on Agricultural improvement and co-operation were arranged at this show. The other show at Ravalgaon was arranged through the generosity of Shet Walchand Hirachand on his estate where the working of tractor ploughs was specially demonstrated to a large number of visitors from the Division.

33. *Implement Depots.*—Thirteen Departmental implement depots were maintained during the year and the total revenue from these on account of hire amounted to Rs. 1,770-11-6. It has been the policy of the Department to shift these depots to new and unworked centres as soon as the recommended implements become popular and are adopted by the cultivators.

34. *Seed, Manure and Implement Distribution.*—In spite of many private agencies and organisations springing up in the Division the Department has always to meet a large number of enquiries for seed, manure and implements supply and to execute them. During the year besides the N. R. cotton seed mentioned above the District Staff supplied nearly 20,000 lbs. of various kinds of seeds worth about Rs. 2,000. A great demand for castor cake as manure for cotton has arisen in the Division and the Department assisted in procuring and distributing nearly 125,000 lbs. of it worth something like Rs. 10,000. Besides this 25,000 lbs. of Ammonium Sulphate and other artificials worth Rs. 3,300 were distributed by the Department. Implements, mostly ploughs and cane crushing mills, worth Rs. 14,000 were purchased by the cultivators through the Departmental agency.

35. *Distribution of Copper Sulphate Packets.*—As per orders contained in Government Resolution, R. D., No. 6799, dated 19th February 1923, a special campaign was organised to make a wide spread distribution of Copper Sulphate packets for steeping jowar seed against smut in co-operation with the Revenue Department, the various Taluka Development Associations and other co-operative bodies. The Departmental Staff and the Fieldmen of the Associations were specially engaged for some time in demonstrating the steeping of jowar seed in Copper Sulphate solution and in all 12,506 packets were distributed in the Division.

*Agricultural Associations and Non-credit Work.*

36. *Associations.*—Since the institution of the Divisional Board and the formation of Taluka Development Agricultural Associations, considerable local interest has been aroused in the Division. There are now in all 14 Agricultural Associations of which 10 are registered or are under process of registration under the new scheme. They are situated as under:—

<i>East Khandesh.</i>	<i>West Khandesh.</i>	<i>Nasik.</i>
* (1) Jalgaon.	* (1) Dhulia.	* (1) Nasik.
* (2) Pachora.	* (2) Sindkheda.	* (2) Kadwa Canal.
* (3) Bhusawal.	* (3) Nandurbar.	* (3) Satana.
* (4) Raver.	(4) Shirpur.	
(5) Edlabad.		
(6) Jamner.		
(7) Chopda.		

All these Associations have their own Fieldman who is either lent by the Department till their own man is being trained by the Department or their own trained man. Their yearly programmes of work are laid out by the managing committees with the help of

\* These are already registered or are under the process of registration.

the Department and they are then submitted to the Divisional Board which after scrutinising recommends for subsidy.

As a result of this new activity the work of the Department has been greatly facilitated. Most of these Associations have their own implements which are given to the cultivators of the Taluka on cheap hire. Many take up distribution of seed and manure and serve as seedgrowers for cotton seed to the Department. Several have taken up propaganda work for co-operative development both credit and non-credit. Thus their activities have given a great stimulus to agricultural and co-operative development in the Division and it is hoped if properly encouraged both by officials and non-officials, they will form a very useful link between the Agricultural and Co-operative Departments on one hand and the agricultural community on the other.

37. The Shirpur Agricultural Association in West Khandesh has got a Cattle Breeding Farm at Sangvi where a herd of 75 cows, bulls and young stock of the Tapti Khilari breed is maintained. On the recommendation of the Department, the Government sanctioned a subsidy of Rs. 800 a year, to this Association and the question of increasing the subsidy is under consideration if the Association abide by certain conditions. It is hoped, if this farm is well developed, it will serve a very useful purpose in providing pure breeding bulls in the Tapti Khilari tract.

38. Similarly the Jamner Agricultural Association in East Khandesh is maintaining a herd of about 90 cattle at Gangapuri and the question of giving a subsidy to it is under consideration. It is proposed to maintain here a pure breed of Nimari cattle. The present breed is a mixed one and the Association is being persuaded to dispose it of and maintain a pure breed of Nimari cattle.

39. In East Khandesh a District Agricultural Association has been organised as a deliberative body for considering subjects of general agricultural interest and sending the same to the Divisional Board for discussion and recommendation where necessary.

40. *Non-credit Work.*—There was a good number of seed, manure and sale societies in the Division, but most of them were in a dormant condition and several had stopped working completely. With the help of the Agricultural Organiser during the year, several have been set in motion and by now 5 seed societies have been set working and 3 new seed societies have been registered. In addition to this, proposals of a new co-operative ginning society at Kolpimpri have been sent for registration.

In future, when the Taluka Development Associations, which are registered under the Co-operative Act, are properly set in working, these will perform the major work of supply of seed, manure and implements in their respective talukas to the cultivators and thus will serve to a great extent the purpose of non-credit societies in the Division.



*Agricultural Education.*

41. Dhulia Agricultural School, which commenced its working last year, has been now permanently transferred to the Dhulia Farm from the City and this year it has full two-year classes. Though it has been transferred on the Dhulia Farm still great difficulty is experienced, owing to lack of proper and adequate accommodation. However, with the present arrangement the boys will have full advantage of practical work as they will be spending more time on the Farm.

42. There were 10 boys throughout the year and at the annual examination held all passed. The successful students are now undergoing the 2nd year course and a new batch of 18 students has been admitted in the 1st year, out of 36 applications received from the three districts.

*Mechanical Assistance and Boring Work.*

43. *Mechanical Assistance.*—The Mechanical Assistant attended to the sugarcane crushing plant at Dindori and surveyed and reported on the schemes of Pumping Installations submitted for tagai loans at different places. In addition, he paid visits to the Farms and attended to overhauls, repairs, &c., of machinery there. Besides his regular work, he has prepared a new winnowing machine which is still under a trial.

44. *Boring Work.*—During the year three machines worked in this Division; but great difficulty was experienced owing to want of fishing tools as well as high labour cost and consequent scarcity. The three machines worked in all 458 days and bored 1,069 feet. Out of 20 bores, 8 were successful during the year. There is a keen demand for these machines with power adjustment as the labour is very scarce and dear in cotton growing areas.

*General.*

45. *Assistance and Advice to Cultivators.*—The always increasing calls upon the services of the members of the staff for assistance and advice in manure, seed, implement, diseases of crops, &c., is cordially met with. The Department recommended to the Collector of Nasik 12 persons for giving licenses for pig killing and he has kindly granted the same.

46. *Publicity.*—A leaflet on castor cake as manure to cotton was published. Besides, the staff contributed a number of articles in Shetki and Shetkari, College magazine and other local news papers. A large number of notes and articles were submitted to the recently organised Publicity Committee. In short, every effort was made to make the work of the Department as widely known as possible.

47. *Help from Revenue and other Officers.*—The Department received cordial help from the Revenue authorities of the Division

and in fact the vitality of most of the Agricultural Associations in the Division is due to their cordial co-operation and support.

48. *Fieldman's Class*.—At the request of the Pachora Taluka Development Association a Fieldman's class was organised on the Jalgaon Farm where the Fieldmen of the Taluka Development Associations of the Division were trained in the work which they have to perform.

49. *Propaganda Meetings*.—Members in their tours organised meetings and delivered lectures on suitable subjects. During the year 70 such meetings were organised.

*Personal.*

50. I am sure the work of Agricultural improvement and organisation has made a very good progress in the Division and all the staff have put in a good year's work. It is invidious to make mention of names when all have done so well. However, I must mention the name of Mr. N. V. Bhagwat, the District Agricultural Overseer, Nasik, who took a very prominent part in organising three Taluka Development Associations in the Nasik District where no sort of Agricultural Organization existed before.

C. S. PATEL,  
Deputy Director of Agriculture,  
N. C. D., Nasik.

## APPENDIX D.

SUMMARY OF WORK DONE UNDER THE DEPUTY DIRECTOR OF  
AGRICULTURE, SOUTH-CENTRAL DIVISION, POONA, FOR  
THE YEAR 1923-24.*Staff and Organisation.*

1. I continued to be in charge of the Division throughout the year except one month and ten days from 22nd April 1924 when Mr. K. M. Pawar, B.Ag., acted for me. Mr. M. G. Athalye, L.Ag., Divisional Superintendent of Agriculture, Deccan Canals, was on leave from 12th November 1923 to 15th May 1924. Mr. K. M. Pawar acted for him. There were some minor changes in the subordinate staff. Two posts of graduate fieldmen under training are allotted to this Division during the year owing to the increased work. A staff conference of the District Agricultural officers was held in April 1923. It had considered the lines of work and the policy regarding the introduction of the recommendations of the Department, the ways of securing the co-operation of the people and of the district officers of the Revenue and Irrigation Departments. The work was carried out in pursuance of the resolutions.

2. *Lines of Work.*—The work during the year was continued and developed on the lines as in the year 1922-23. (1) The Farm and Experimental Work especially at Manjri and Baramati was overhauled and is made to bear on the present needs of canal farming. (2) In the Propaganda work there was no change in the policy. Few more lines of work, however, were added; such as Java system of growing cane (in the low lying places which have gone out of cultivation). According to the new scheme of Tagavi under Improvement Loan's Act, the Deputy Director of Agriculture as a Chairman of the Divisional Board is called upon to criticize the applications and inspect or get inspected the schemes for which Tagavi is applied for. This work is greatly increased, especially in Poona and Satara Districts. (3) In the section of Mechanical Engineering, progress is marked, and my Division, as will be seen later, has rendered useful services to the cultivators. (4) In the section of Agricultural Organization, Taluka Development Associations, Irrigators Associations, Sale, Implement and Manure Societies, are included. To aid this kind of work study of markets and land problems is taken up. (5) In the Agricultural Education there is no change in the policy except in the examination of the boys.

*Conditions affecting Agriculture of the Division during the year.*

3. The year, on the whole, was not satisfactory for South Central Division. The amount of rainfall was deficient, Manjri Farm (Poona District) receiving 13.40 inches (against average of 20), Baramati 8.88 (against 20.84), Kopergaon Farm (Nagar District) 10.87 (against 15.28) and Mohol Farm (Sholapur District) 14.28 (against 25.91 inches). In the Nagar District, which is proverbially

liable to famine, the rainfall though scanty, was received timely and hence the District harvested fair crops. Fodder obtained was hardly enough for the year's supply throughout the Division. For sugarcane the year was very bad, having long breaks in rains, defective humidity, abnormal heat and very wide range of daily variation in temperature. The average outturn of gul per acre was poor and the rate obtained was poorer still. Average outturn of cotton was very poor but the high prices made good the short harvest to some extent.

4. The cost of cultivation including manure and labour did not come down to any extent. This affected sugarcane industry as it requires more capital and labour. Sugarcane borer and mealy bugs were bad on all the canals. The attack of bug was very bad. It affected the tonnage as well as sugar contents. During the latter part of the crushing season the Nira Valley Company had to refuse offers of sugarcane as the percentage sucrose in the cane was much affected.

#### *Farms and Experimental Work.*

##### *Sugarcane.*

5. *Situation of Sugarcane Industry.*—Sugarcane industry especially on the canal, is undergoing a very critical time. Before the World War, more than half the sugar supply of the world was got from beet. During war beet sugar industry was completely dislocated. Partly due to this dislocation and largely due to the increased demand for sugar during war the cultivation of sugarcane received impetus and the area under sugarcane increased in all the sugarcane growing countries. After the cessation of war, beet came again in the field forcefully and thus the supply of sugar has increased at a time when the buying capacity of the people in most countries had gone down. The prices of manures (cake and mineral manures) and farm wages which had gone up during war remained high. As a result of these influences prices are falling since July 1922.

The year under report was bad for the growth of cane in the Deccan, while the prices were very low (Rs. 18 to 25 a palla of 250 lbs.). As a result most business farmers suffered losses. Number of tenant farmers have given notices to the owners of land for reduction of rents and some have run away. The area under sugarcane is falling on the main Deccan Canals (Pravara, Godavari, Nira, Mutha and Krishna). In the year 1912-13, it was 13,660 acres. During war it rose. In the year 1920-21, it rose to 20,680 acres. In the year 1921-22 it was 19,570 acres. Next year it will be still less. (According to the preliminary memorandum of the Director of Agriculture it will be about 10 per cent. less in the year 1924-25.)

The Department of Agriculture is now recommending reduced doses of concentrated manures and is introducing certain economies (detailed on page 51 of the last year's report).

6. *Experimental Work.*—There are three sugarcane farms in South Central Division. The main sugarcane research station of the

Department is at Manjri (on Mutha Canal, near Poona), the sub-stations Baramati and Kopargaon are on Nira and Godavari Canals respectively. Instead of giving the results of each farm separately the findings of the important research will be given by problems tackled.

7. *Manjri Farm.*—This is the first year after the new cropping scheme of the farm is introduced. The old work was gone over. The findings are given in the last year's report. Broadly speaking it may be said that the new scheme is intended to investigate the following points :—

- (1) Time and application of topdressing (it is a new experiment).
- (2) Quantity of Nitrogen to produce heavy crop.
- (3) Economic substitution of Farm Yard Manure.
- (4) Rotation crops for sugarcane with a view to diversify canal farming. (This is a new experiment.)
- (5) Suitable quantities and intervals of irrigation water (new experiment).
- (6) Different methods of cultivation.
- (7) Variety study.
- (8) Chemical study of cane in the field and chemical control in Gurhal house.

In reading the results of the experiments, it is necessary to remember that some of experiments are only one year old.

(1) *Time of Application of Top-dressings—Manjri.*—Last year's results show that the concentrated manure, which is usually given by the farmers in one or two doses when the cane is about five months old, may better be applied in 3 doses ; one dose at the time of planting, 2nd when the crop is three weeks to eight weeks and the 3rd at the time of earthing up.

(2) *The Quantity of Nitrogen to produce Heavy Tonnage of Cane—Manjri.*—In this experiment a mixture of safflower cake and Ammonium Sulphate containing 75, 150, 225 and 300 lbs. of Nitrogen was applied to three different plots in three doses (one at three weeks, one at eight weeks and one at the time of earthing up). The land was green manured with San. Similar experiment was tried at Baramati for the last three years.

It can be said that outturn of cane or gul increases with the increase of Nitrogen. *The financial position, however, depends on the prices of Gul and manures.*

(3) *Economic substitute of Farm Yard Manure—Baramati.*—(a) In this experiment 20,000, 30,000 and 40,000 pounds of dry matter (in San green manure and Farm Yard Manure) as bulky manure was compared. All the three plots were green manured and the different amounts of bulky manure were made up by adding Farm Yard Manure.

The plots yielded respectively 18,888, 19,804 and 21,832 lbs. of dressed cane. *The price of extra outturn, however, does not warrant addition of bulky manure (over 2,000 lbs.).*

(b) *Manjri*.—The experiment is intended to find out whether whole or part of the Farm Yard Manure applied to sugarcane can be replaced by oil cakes. One plot received 200 lbs. of N. in F. Y. M., another received 100 lbs. in F. Y. M. and 100 lbs. in cake and the third plot received all the 200 lbs. of Nitrogen in cake.

The plot receiving all its Nitrogen in cake has done best. Next comes the plot receiving Nitrogen in cake and Farm Yard Manure. *It, therefore, seems that where Farm Yard Manure is scarce or costly, oil cake can replace it with advantage.*

(c) *Manjri*.—This experiment is designed to find out if addition of oil cake to San green manure will pay. One plot was manured with San green and another was given addition of oil cake to make up 200 lbs. Nitrogen.

The plot receiving an addition of oil cake yielded 1,688 lbs. of more Gul per acre and has left a margin over the extra expenditure on oil cake.

(4) *Rotations for Sugarcane*.—Since the cycle of rotations is not complete the figures cannot be interpreted.

(5) *Irrigation Experiments*.—*Manjri*—(a) *Interval Series*.—Total quantity of water given as irrigation in addition to rain water to all the three plots is 75 acre inches. Only the intervals vary. One plot gets waterings every 8th day, another gets every 10th day and the third every 15th day. (Due to the canal difficulties the intervals could not be kept up very rigidly though effort was made to avoid violent changes.)

The following table gives the results:—

Interval.	Weight of cane in lbs.	Extraction P. C.	Weight of Gul in lbs.	Borer attack P. C.
8 days	71,978	64	8,624	2.01
10 "	52,107	63.4	6,003	8.9
15 "	57,359	61	6,391	4.27

It may be noted that borer attack was bad in 10 day plot and hence the outturn is lower than 15 day plot. It is worthwhile noting that the extraction of 15 day plot is poorer than the others due perhaps to the less juicy nature of canes in that plot. *The results clearly show that the same total quantity of water if applied at shorter intervals produces more cane and consequently more money.* Even at last year's low prices the outturn of the 8 day plot is worth over Rs. 200 more than that of the other plots

*Baramati.*—This corroborates the identical experiments conducted for the last three years at Baramati. The following table shows the average result of the last three years at Baramati:—

Interval.	Weight of cane in lbs.	Cost of cultivation.	Net profit.
8 day	108,160	Rs. 770	Rs. 570
10 "	100,220	767	492
15 "	87,040	755	341

It may also be noted that the Belapur Syndicate which receives water by guage goes over the farm at least every week.

*Manjri—(b) Quantity Series.*—In this experiment the interval is common (*i. e.*, 10 days) while the total quantity of irrigation water varies. First plot gets 75 acre inches, second gets 100 acre inches and the third 125 acre inches.

The following table gives the result:—

Quantity of water.	Weight of cane in lbs.	Weight of gul in lbs.
75 acre inches	52,107	6,003
100 "	61,630	7,528
125 "	75,272	8,850

*It is seen that 100 inches plot gives more outturn than 75 inches plot; also 125 inches plot gives more than 100 inches plot.*

*Baramati.*—The conclusion is borne out by the results of similar experiments conducted for the last three years at Baramati.

At Baramati it was found that if the doses be so arranged to give less water when the crop is young and more as the crop advances in the hot season, cutting down the quantity during the rains, the crop comes better.

(6) *Different Method of Cultivation—(a) Local versus Standard or Manjri system and the effect of prices of Gul and Manure on the business—Baramati.*—The comparison is instructive and will be given rather in detail. There were three plots (1) Standard method (depending on San green manuring for bulky manure), (2) Standard plot with addition of 20 cart loads of Farm Yard Manure per acre, (3) Local method plot. The first and second received 150 lbs. of Nitrogen in Ammonium Sulphate and cake per acre in two

top-dressings. The third or the local plot received 40 cart loads of Farm Yard Manure before planting and about 220 lbs. of Nitrogen in safflower and castor cakes in two dressings. The first two were planted in rows 5' apart (the seed rate for the first two was 8,000 sets per acre). In the local plot 14,000 sets were planted in beds in rows 2½' apart.

The following table gives the results of the experiments from 1921-22 to 1923-24 :—

Years.	1921-22.				1922-23.	
	Weight of Gul per acre.	Cost of cultivation per acre.	Value of outturn per acre.	Profit or loss per acre.	Weight of canes per acre.	Cost of cultivation per acre.
1	2	3	4	5	6	7
	Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Lbs.	Rs. a. p.
Standard Method (without F. Y. M.)	7,336	737 0 0	1,146 4 0	408 4 0	96,933	847 3 0
Standard Method (with 20 c. c. of F. Y. M.)	8,956	854 7 0	1,399 6 0	544 15 0	101,366	871 7 0
Local Method	10,061	1,157 15 0	1,711 1 6	653 2 6	100,930	1,123 13 6

Years.	1922-23.		1923-24.			
	Value of outturn per acre.	Profit or loss per acre.	Weight of canes per acre.	Cost of cultivation per acre.	Value of outturn per acre.	Profit or loss per acre.
1	8	9	10	11	12	13
	Rs. a. p.	Rs. a. p.	Lbs.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Standard Method (without F. Y. M.)	1,348 8 0	496 5 0	85,920	587 2 3	966 9 7	379 7 4
Standard Method (without 20 c. c. of F. Y. M.)	1,405 2 0	533 11 0	106,830	645 2 3	1,164 10 10	519 8 7
Local Method	1,899 0 0	276 2 6	109,460	895 13 3	1,205 2 10	508 5 7

It is seen that the outturn of cane and gul and also the costs of cultivation of the local method plot are more than those of the other two plots throughout. The effect of price of gul, however, has made considerable difference in profits in different years. In the year 1921-22 the prices of gul were high, while in the year 1923-24 these were low. The cost of labour had not fallen in proportion. As a result, in the year 1921-22 the local plot left more profit than in 1922-23 and 1923-24. With low prices the moderate doses of standard method left better profits.

*It is, therefore, not very safe to give any prescription for manure and other costs. The best way is to induce the farmers to keep accurate accounts and to make them compare these as changes in prices of manure and gul take place.*



(b) *Distance between the Rows in the Standard System—Manjri.*—One plot was planted 4' apart and another 5' apart in rows. The four feet plot has given better results. It is, therefore, worthwhile going into the question more deeply. Trials of distances between the rows were conducted on private farms by the Divisional Superintendent of Agriculture, Deccan Canals, Kopargaon, and his staff in the District. Though these were carried under different conditions here also it seems that in fairly deep black soil four feet is the best distance. The results of one of these on the Nira Canal are given in the subjoined table :—

Distance between rows in feet.	Yield per acre Gul in lbs	Profit or loss.
5 feet ...	11,455	Ra. 322
4 ,, ...	12,268	402
3 ,, ...	11,869	300

(c) *Kopargaon.*—The standard method (5') was compared with the West Indies modified method (6½' and 3½' alternately). The modified West Indies method gave better results.

(7) *Experiments with Varieties of Sugarcane—Manjri.*—The object is by repeated trials of selected varieties to test their fitness for cultivation, under field conditions. The treatment was common, that is, Standard Method. The varieties so tested were in the first instance grown for some years in small plots.

Serial No.	Name.	Weight of Gul in lbs.	Weight of cane in lbs.	Extraction p. c.	Brix corrected.
1	Red sports ...	8,128	74,851	69.0	16.86°
2	Waxy Red ...	8,153	60,053	70.0	19.14°
3	White transparent ...	8,024	61,762	68.5	19.46°
4	D-109 ...	7,948	71,563	62.2	16.15°
5	B-1528 ...	7,381	59,474	68.3	17.12°
6	Java ...	7,197	63,668	64.1	18.44°
7	Pundia ...	5,585	47,926	71.0	18.50°
8	B-208 ...	5,542	46,745	64.0	18.6°
9	Manjav ...	4,863	41,894	67.0	17.61°

The results show that all the selected varieties except B-208 and Manjav have beaten Pundia. Waxy Red and White Transparent are below D-109, B-1528 and Java in point of the weight of

cane but having higher percentage of total solids rank higher in point of the weight of gul which after all counts more for our farmer.

In the following tables instead of giving the outturns of cane and gul, a different scheme of presenting the results is adopted. Pundia, which is the common variety, is taken as 100, while the varieties compared with Pundia are given their valuation according to their performance. The following tables show the results of four years (1920-21 to 1923-1924):—

Comparison on the basis of four years' average *gul* as criterion.

Name of Variety.	D-109.	Red sports.	B-1528.	Waxy Red.	Manjav.	White Transparents.	Java.	Pundia.	B-308
No. in order of merit.	1	2	3	4	5	6	7	8	9
Gul ...	146.09	143.08	132.85	110.27	102.5	102.05	100.706	100	87.53

Comparison on the basis of four years' average with *cane* as criterion.

Name of Variety.	Red sports.	D-109.	B-1528.	Java.	Waxy red.	Pundia.	White Transparent.	Manjav.	B-208.
No. in order of merit.	1	2	3	4	5	6	7	8	9
Cane ...	153.15	147.93	114.75	113.29	109.97	100	98.91	96.65	89.84

The average results also confirm the conclusions drawn above. D-109, Red sports, B-1528 and Waxy Red are decidedly outstanding. Many other promising varieties are being tried but their results are not mature. These will be soon ready for field trial.

At Kopargan (Godavari Canal) the ratoons of Manjav, Red sports, B-376 were kept along with that of Pundia. All of them beat Pundia; Manjav yielding 97,920; Red sports 97,240 and B-376 76,880 against Pundia yielding only 75,968 lbs. of dressed cane. At Kopargaon as plant cane Red sports in 1922-23 yielded better than Manjav. It is interesting to note that Manjav does better on Godavari Canal. It has done very well on most of the private farms there, and it is gaining popularity. It does not tiller much but does better when planted comparatively thick and for filling gaps. At Manjri (on the Mutha Canal) it was badly affected by mealy bugs and did poorly. It was tried on a fairly large scale by a farmer at Loni but it was not as good as Pundia.

8. *Java Method of planting Cane.*—Upon seeing the rain fall and soil conditions in the sugarcane tract of Java in the year 1922, I thought that the trench system, of preparing the land and planting cane, would suit most of the water logged lands, on the Nira and Godavari Canals, which have gone out of cultivation and would

enable the owners to raise good crops of cane with very few waterings. With some difficulty, I got the Executive Engineer, Poona Irrigation District, to grant Mr. Unde of Hol (on Nira Canal) half an acre additional area with a view to give trial to this method. Part of the expenses were borne by the Agricultural Department. The land was waste due to water logging.

The system is intended to supply water when required and to drain the excess water in the soil as well as the surface wash of the rain. Small drains  $1\frac{1}{2}$ ' wide at the top, 1' at the bottom and  $2\frac{3}{4}$ ' deep are opened every 34 feet across the fall of the land. According to the nature and lie of the land and at right angles to the small drains, trackers (bigger drains)  $2\frac{1}{4}$ ' wide at the top, 1' at the bottom and  $2\frac{3}{4}$ ' deep are opened about 120' to 200' apart. These trackers are joined to a main drain or drains which take the excess water away. In the middle of the rectangles made by the trackers and small drains, raised foot paths are kept.

The trenches or furrows 21" wide and 12" deep are opened about 4' apart parallel to the trackers for planting sugarcane sets. While opening these trackers, care is taken to leave 9" dams along the small drains. All the work is done by hand. The soil from the trenches for furrows is piled between the furrows to form ridges and the bottoms of the furrows are lightly dug and cane sets planted at the rate of the 5,000 sets per acre. The cane plants in the furrows receive soil from the ridges in three instalments. In Java about 80 lbs. of Nitrogen (in Ammonium Sulphate) is given when the plants are very young. At Hol we, however, gave the usual quantities of manure but rather early.

At the time of watering, the drains were filled and water bucketted from these to the furrows. Only five such waterings were given. The plot produced 8,030 lbs. of gul and 13,000 sets for planting. Neighbouring plot, which was not spoiled and which was under cultivation, produced only 7,500 lbs. of gul.

The crop was as good as any in the tract and attracted the attention of many cultivators. A neighbour of Mr. Unde has put in four acres of his water logged waste under this system. The stand of the crop is very good.

9. *Complete Manure of the Union Agency.*—It analyses 5.50 per cent. Nitrogen, 2.69 Amonical Nitrogen and 1.25 per cent. Phosphoric Acid. It was tried on the canals and also on the river Warna on lift irrigation. The manure was given on the basis of equal cost and was compared with the usual top-dressings of Ammonium Sulphate and oil cakes. In one case it has given better result; in others it has given either equal to or a bit less outturn than the other plot. The trial is continued under closer supervision.

10. *Turmeric as alternative or rotation Crop.*—With the fall of prices of gul and increase of price of Turmeric, efforts were made to introduce this crop on the canals. Seed was distributed at concession rates. The high prices realised for the outturn has given a

very good impetus to this crop. It is not safe to depend upon one money crop like sugarcane and the introduction of Turmeric, it is hoped, will help to diversify canal farming to some extent.

11. *Fodder Supply.*—The fodder section of the Farm at Kopergaon grew fodder as usual. The season being very poor the outturn was low. The total outturn of the fodder section was 193,608 lbs. dry and 155,754 lbs. green. At the same time of the report (August when fodder was very scarce) this section is rendering very useful service. It is supplying baled kirbi to several hundred cultivators from all over the eastern talukas of the Deccan.

*District and Propaganda Work.*

12. The organization of the Propaganda work is continued on the last year's lines. The District Staff held number of demonstrations, helped the cultivators by way of giving advice and rendering practical assistance in treating seeds and crops against pests, supplying seeds and manures, assisting in repairs of machinery, boring wells, helping in the marketing of the crops, &c. The staff also helped the several Taluka Development Associations.

13. The Divisional Board met regularly and invinced interest in their work. There was no change in its personnel.

The work of the Board was regularly reported to the Director of Agriculture and the Registrar of Co-operative Societies. The Board looked after the work and finances of the Taluka Development Associations and the distribution of loans for land improvement. It assisted the Registrar, Co-operative Societies, by way of criticizing and making recommendations on the applications for the formation of Co-operative and Manure Societies, &c.

The Board lays down policy for giving loans under Land Improvement Loan's Act. During the year under report 36 applications from several co-operative credit societies for over Rs. 1,00,000 were recommended. The inspection of schemes has greatly added to the work of the Deputy Director of Agriculture and his staff.

14. *Demonstration, &c.*—During the year over 45 demonstrations were held in the several districts noted below. All these were well attended. Besides these demonstrations, parties of cultivators were taken to Hol (Nira Canal) to show them how the low lying water logged lands can be made to grow sugarcane by Java Method and also to Mohol Farm (Sholapur District) for showing how fairly good crops can be grown on every moderate rainfall by means of proper cultivation or dry famine methods:—

Canal tract	... 10
Satara District	... 4
Poona District	... 16
Sholapur District	... 7
Ahmednagar District	... 8

15. *Improved Furnaces.*—A trained fieldman was deputed to Warna Valley (Satara District) for constructing and demonstrating the Poona furnace. Several new furnaces were constructed and their working demonstrated. The people were satisfied at the performance of the furnaces. A multiple furnace was built for the Irrigation Association at Kolhar (Pravara Canal) and worked for several weeks. The furnace has become a necessary adjunct of power crusher and the use of such combination is spreading.

16. *Crop Pests and Diseases.*—Campaign against Tambara Disease (Mites) on potatoes in Khed Taluka was continued as in the past year. The work was organised through the Taluka Agricultural Development Association, Khed. In all 125 cultivators from about 20 villages took the advantage of spraying and dusting their crops. In all about 95 acres were treated. Fumigation against potato moth, was undertaken for the cultivators in the Khed Taluka and a goodly number of cultivators took advantage of this facility. Over 62 tons of potatoes were fumigated.

17. Under the special orders of the Government, steeping of jowari seed (against smut) was undertaken on extensive scale with the help of Revenue Officers. About 16,338 packets sufficient for about 65,352 acres were distributed and several dozen small demonstrations of steeping were given.

18. *Pig Killing.*—Pig killing by poison baits was tried again and again but was not found successful. A short campaign of pig killing was organised for the Irrigators Association, Godawari Canals. The operations were confined to distributories 7 and 8 on the Left Bank Canal. The Department gave a subsidy of Rs. 200 and also lent 4 guns. The Association contributed Rs. 180-3-0. As a result of the campaign, 29 pigs were killed and 13 wounded.

19. *Implement Depots.*—The most noticeable feature of the year was that Messrs. Kirlosker Brothers brought down the prices of iron ploughs by nearly 50 per cent. owing to the keen competition of a rival firm started at Satara Road Station. It may be remembered that apart from the two Implement factories (Kirloskar Brothers and Satara Industrial Works) there are a very large number of business people throughout the Division who keep large stock of iron ploughs for sale and hire. As a result the demand on our Depot is going down. In fact, the Departmental Depots have done their work and it is nearing time that they should cease. All the same the Departmental Depots earned Rs. 2,302 as hire.

20. *Distribution of Seeds, Implements, &c.*—As a result of sustained efforts of the Department, by way of demonstrating the use of implements and concentrated manures and maintaining implements and manure depots to supply these a number of private shops all over the Division have been opened who supply implements, accessories and concentrated manures. Besides, the Cooperative Manure, Implement and Sale Societies have sprung up. All these render very useful service to the farmers of the Division.

The following table shows the distribution of seeds, manures, implements and copper sulphate packets done through the District Staff. In some of these cases the orders received were sent for compliance to the firms direct :—

Name of District.	Seeds.		Implements.		Manures.		C. S. packets.	Remarks.
	Ibs.	Value.	No.	Value.	Quantity	Value.	Number of packets.	
Sholapur ...	9,982	963	31	975	16,400	2,386	2,360	
Satara ...	801	81	7	820	...	...	1,602	
Ahmednagar ...	36,470	4,558	346	10,373	1,120	120	8,060	
Poona ...	855	162	6	415	9,940	779	2,137	
Canal tract ...	9,840	1,526	136	4,701	57,865	7,298	2,179	
Total ...	57,948	7,290	576	17,284	85,325	10,593	16,338	

*Agricultural Engineering.*

21. *Boring.*—During the year under report one power plant was added to the stock of this Division making in all two Engine and four hand power plants. One of the hand power plants is lent to the Taluka Development Association, Madha. The details of the working of each of the machines is tabulated below :—

Machine No.	Idle for want of		Working days.	Average work done per day.		Number of bores in the year.		No. of feet bored.	Amount of bills for bores.	Remarks.
	Coolies and Holidays.	Repairs, accident, transit, enquiries.		Successful.	Unsuccessful.	Successful.	Unsuccessful.			
17 Sholapur, H.	40	127	190	3' 2"	10	1	595' 0"	Rs. 769	P. 8	0
23 Sholapur, H.	42	60	255	4' 6"	19	1	1,145' 0"	1,602	9	0
8 Satara, E. ...	35	207	124	4' 8"	3	4	605' 6"	1,104	13	0
25 Satara and Poona, H.	52	120	194	2' 10"	6	4	552' 0" 133' 0"	699	9	0
18 Poona, E. ...	39	65	129	3' 9"	4	1	470' 0"	797	4	0
Total ...	...	...	892	...	42	11	3,511' 6"	4,973	11	0
A verage work per machine in the year... 766'										The average is calculated on the working of 4 machines for full one year and of the 5th machine for 7 months only.
13 Poona and Madha, H.	27½	248½	90	6' 4"	8	...	5' 10" 481' 6"	57	8	0
								396	0	0

H = Hand-power. E = Engine-power.

Though analysis of the bores taken is not made, it seems that water is generally tapped within 60 to 80 feet from the ground level in the Deccan. Of the deep bores (between 100 and 200 feet deep) in Satara and Poona Districts only one (at Satara Road Station) is successful. Most of the shallow bores in the Sholapur City tapped good supply of water.

It is rather a hard job to keep the plants busy and save wastage of time in shifting and transport. Every effort, however, was made to keep the plants busy. The Assistant Boring Overseer attached to this Division was on sick leave and all the work had to be managed by me and my office with whatever help I got from the Boring Assistant of the Agricultural Engineer.

In passing I may note that the boring charges are too heavy for the small Deccan farmer and as a result I had to accept several indents for non-agricultural purposes. *If unsuccessful bores (made for Agriculture) are not charged for the cultivators will be encouraged to invest money in boring and thus improve their farms.*

22. *Power Crushing.*—A second Power Plant No. 92, Chattanuga, was added to this Division during the year under report. This plant was let out to Kolhar Irrigator's Society on Pravara Canal. The old Plant No. 44, Chattanuga, was let out to two farmers on Mutha Canal. As a result of personal experience one of them purchased a new crusher for himself through the Deputy Director. The Division has by now over 16 private power crushers. The Mechanical Assistant rendered considerable help and gave advice to the owners of most of these.

The following table gives the performance of the two power plants maintained by the Department for demonstration and service:—

No. of plant.	Average extraction.	Number of working days.	Pans boiled.	Hire earned.	Remarks.
Chattanuga No. 44 ...	59.75	116	803	Rs. a. p. 506 9 0	Both are rather old plants.
Chattanuga No. 92 ...	66.46	99	1,275	682 8 0	

As a result of the experience with power crusher at the Government Farms and in the District, it is found that though the substantial cane farmer needs power crusher and finds it useful, the type (*e.g.*, Chattanuga) which is used for demonstration is not satisfactory. The British makes which the Government Farms at Manjri and Kopargaon use are found satisfactory, but unfortunately, British manufacturer does not manufacture smaller plants. Negotiations are, therefore, opened with Dapuri Work-shops and Messrs. Kirloskar Brothers.

23. A suitable ridger for opening furrows for planting sugarcane and earthing it up is built with the help of Messrs. Kirloskar Brothers which is found useful.

24. A rope making machine which was seen by me in Japan is ordered. It is just received. It is expected that it will be found very useful and will make a suitable side industry to the Konkan and Mawal peasants.

*Agricultural Organisation.*

25. *Taluka Development Associations.*—Of the three Taluka Development Associations formed in 1922-23, the Khed and the Madha Taluka Associations continued their activities successfully.

(1) The Khed Association has engaged a trained fieldman. The Association sprayed about 95 acres of Potatoes against Tambara, fumigated over 62 tons of Potato tubers and gave several demonstrations. The Association has formed a Potato Sale Society and struggled hard against the combination of brokers.

(2) The Madha Taluka Association was allowed to retain the Departmental Fieldman. The Association has purchased a few iron ploughs, a chaffcutter and a spray pump for demonstration. It distributed 5,806 lbs. of N. R. Cotton Seed to 146 cultivators, 210 lbs. of Akola Bajri Seed to 50 cultivators, and a large variety of vegetable seeds to large number of people in the taluka. The Fieldman demonstrated iron ploughs and wooden drills (for sowing wide). As a result of these demonstrations over 44 ploughs were ordered by the cultivators through the Association. Side by side it supplied a large number of accessories including 26 shares of iron ploughs. It also distributed free of cost about 26 wooden drills meant for sowing seed wider than the local practice. The Association has popularised manila rope for Mhot and supplied over 2,725 feet rope. It demonstrated steeping of jowar against smut and distributed 750 packets sufficient for 3,000 acres. With the help of boring plant lent by the Agricultural Department, the Association took eight bores.

(3) The Satara Taluka Development Association had engaged a Fieldman but he left the service. The Association has not been able to fill his place. The Association gave few demonstrations and distributed freshly imported Spanish peanuts.

(4) A new Taluka Development Association is formed at Islampur (Taluka Walwa) during the year under report. It has engaged a trained Fieldman. It is expected that this Association will be very useful to the Agriculturists of the taluka.

26. *Irrigators Association.*—The Irrigators Association at Kopergaon (for Godavari Canal) and Baramati (for Nira Canal) are doing useful work. During the year under report I was able, with the help of Messrs. Kalbhor of Poona and Bala Patil of Narsingpur, to form two more Associations, one at Poona (for Mutha Canal) and one at Shenoli (for Krishna Canal) in pursuance of the recent orders



of Government. Besides these the irrigators on Ekruk Tank (near Sholapur) have formed one. Though at present these Associations concentrate on ventilating their grievances they are found useful in introducing improvements in Agriculture. Efforts are made to interest them in non-credit co-operation.

The Kolhar Society has undertaken to manage a distributory supplying water for 100 acres cane and 600 acres other crops. In addition, it hired a Departmental power crushing plant and milled over 70 acres of cane on joint responsibility. The Department found this society useful in introducing proved improvements in sugarcane growing, especially because the tract is newly opened for sugarcane and the local cultivator knows very little of cane farming.

27. *Non-Credit Co-operative Societies.*—This work is only recently entrusted to the Deputy Director of Agriculture. It may be said that though Co-operative Credit Societies have succeeded in South Central Division, the Non-Credit Societies have not. There were over 32 Non-Credit Societies in 1922-23 though hardly more than half a dozen of them can be said to be working. Probably the precarious and uncertain rainfall, smallness of holding and illiteracy of the farmer are largely responsible. Perhaps these societies were formed in haste without giving special attention to the needs and the economic condition of the people. It was, therefore, proposed to proceed cautiously. It seems that the canals offer better facilities for Gul Sale and Manure Societies; while the light soil tracts (requiring shallow ploughing more often) of Nagar offer opportunities for well organized Implement (Plough) Societies.

This in view, attempt was made to start a Gul Sale Society at Poona, revive Manure Society of Manjri and start two large Implement Societies in the eastern part of Nagar and it can be said that this short programme is carried out to some extent:—

(a) *Gul Sale Societies.*—(1) Of all kinds of Non-Credit Co-operative Societies marketing (of Gul) in the canal tracts seems to hold great promise. Rao Saheb Kale of Hadapsar was thinking of a Gul sale shop for sometime. At the same time Mr. Ghule, a broker at Poona, who has had long experience in the line and who is actuated by class consciousness was prepared to work in the interest of farmers. It was, therefore, thought possible to combine the influence of the veteran co-operator Rao Saheb Kale and experience of Mr. Ghule. The idea was mooted in 1922-23. After several small conferences with the Director of Agriculture and Registrar, Co-operative Societies, it was decided to form a society at Poona to serve the sugarcane cultivators of the Haveli Taluka. Some difficulties arose but these were overcome by Mr. Madan, the Registrar, very tactfully and the society was registered. It is gratifying to note that in the very first year, the society was able to sell over 1,250 carts of Gul.

(2) Mr. Rajadnaya of Aitawade (Satara District) has organized a sale shop through the Yellur Union at Kolhapur.

Though it is not a sale society, it is expected to render useful service to the sugarcane growers in Warna Valley.

(b) *Potato Sale Society*.—A sale society is organised by the Potato growers in Khed Taluka under the guidance of Dr. Mann who is long associated with the Khed people. The volume of the business is not very large and only very few brokers in Poona handled most of the crop. It is, therefore, easy for the brokers to combine. The commodity is perishable; while the cultivators (members) lack in co-operative spirit. As a result the society could not start its work. The efforts of the officers of the Agricultural Department and of the few loyal members are not wasted and it was possible to induce the Poona Municipality to introduce iron scale in place of the old fashioned wooden balances. The potato growers were agitating for scales for years.

(c) *Implement Societies*.—There were ten societies at the beginning of the year. Two more registered during the year and third (at Shevgaon) has applied for registration. It is the last one to which the District Agricultural Overseer, Ahmednagar, was asked to pay special attention, since its development was intended to be different in size. The small societies have not much furnished and so a large society for a taluka with a paid man to look after the work, was organized. The capital of the society is Rs. 10,000; out of which about Rs. 4,750 are collected. It has got 110 iron ploughs. It worked for two years without being registered and earned Rs. 3,428 as hire (in two years) from over 500 cultivators. Similar society is contemplated for Pathardi Mahal.

#### *Agricultural Education.*

28. *Marathi Agricultural School, Loni*.—Thirty boys were admitted in the first year. Many of them, however, were either unsuitable or too poor to follow the instructions. Only 18 were finally retained. Out of them 17 passed. In the second year, there were 22 students in the beginning of the year. One of them left the school. 21 appeared for examination out of whom 19 passed.

The following shows the castes for their parents:—

	1st year	2nd year.	
Marathas, Kunbis, &c.	... 12	9	
Brahmins	... 6	10	
Others	... 0	2	
Total	... 18	21	= 39

Out of the total number of 39 students 19 were from South Central Division, 16 from other Districts of the Bombay Presidency, 1 from Berars and 3 from States.

29. As in the last year, the school, in addition to its legitimate work, trained 5 teachers deputed by the Educational Department for the Agricultural bias schools. By now there are four bias schools in South Central Division. Some of the teachers trained at Loni are appointed to the bias schools in North Central Division and Southern Division. The scheme shows every promise of success. The school at Peit (Satara District) is receiving special attention of Mr. K. S. Dikshit, B.A., the Deputy Educational Inspector.

30. During the year under report a change was introduced in the examination. In addition to the Terminal and Annual Examinations regular weekly examinations were held. The weeklies were given certain valuation in the final result. This kept the boys up to mark and one or two failed in the annual test were pulled up as they deserved, on the strength of their work throughout the year.

Since the accounts are not audited yet, the statement of finances cannot be given. However, it can be said the cost of boarding and the total cost of educating a boy is brought down.

*Personal.*

31. The staff in the Districts and in my office worked satisfactorily. The work of Mr. V. V. Gadgil, District Agricultural Overseer, Ahmednagar, deserves special mention. He ably organized the Shevgaon Implement Society. Perhaps it is the biggest Implement Society in the Presidency run very successfully.

Poona:  
4th September 1924.

P. C. PATIL,  
Deputy Director of Agriculture,  
S. C. D

## APPENDIX E.

ADMINISTRATION REPORT AND SUMMARY OF WORK DONE BY  
THE DEPUTY DIRECTOR OF AGRICULTURE, SOUTHERN  
DIVISION, FOR THE YEAR 1923-24.

*Staff and Organisation.*

Mr. Gilbert, after his return from leave was transferred to Sind. I held charge of the office of the Deputy Director of Agriculture, S. D., throughout the year, and was out on tour for 254 days.

Gadag farm was abolished and a new Rice Breeding station was opened at Mugad, 6 miles from Dharwar.

The District work was altogether re-organised with the approval of the Director of Agriculture and the Registrar, Co-operative Societies, B. P., Poona. The Inspectors and Overseers were doing mainly propaganda work and the Agricultural Organisers were attending to organisation work in the same area. This largely meant overlapping of work with all its evils and considerable waste of time and money in travelling. Under the new organisation, all these officers are given separate charges (three talukas each) wherein they are required to do both propaganda and organisation work. This arrangement aims at concentration in different limited areas with efficiency and economy. The Deputy Director has now ten District Officers (six graduates and four non-graduates) directly responsible to him, working in different quarters of the Division, divided mainly on the basis of the nature of different tracts and the problems to work with. Besides this regular District staff arranged on territorial basis, he has under him a Cotton staff, a Boring staff, a Mechanical Assistant, an Embankment Officer and a Seed Organiser doing special works in the Division and he has four farms and a Breeding section to attend to. He is now required to work direct with 20 heads of sections in different lines and his work has considerably increased. The Deputy Director continued to be the Chairman of the Divisional Board and guided the operations of seven Taluka Development Associations and 67 Non-Credit Societies through his District staff.

2. There were many changes in the personnel of the staff which affected the work to a certain extent. Messrs. R. K. Kulkarni and S. G. Kadkol were lent to the Indian Cotton Committee. Messrs. T. S. Swadi and H. B. Kulkarni were on leave for 8 months and Mr. G. R. Deshpande for one year and seven months. Mr. M. A. Shetti, the Seed Organiser, was deputed to act as Assistant Registrar for a year and Mr. R. S. Patil, one of the Agricultural Organisers, took his place. Mr. R. K. Itigi, the District Agricultural Overseer, Haveri, was made the Agricultural Organiser and a new graduate has been appointed in his place. In all five new graduates had to be entertained during the year and trained to do their duties.

*Season.*

3. The special features of the season were—scanty rainfall in June, abnormally heavy and continuous showers in July, and absence of rains in October and November which affected the growth of almost all crops except cotton.

4. In Mallad (Western Talukas) owing to want of rains in June and heavy rains in July, paddy crop could not be sown in time and many fields had to be left fallow. The crop sown suffered from floods when young and from long break in October at the time of grain formation. The paddy crop is estimated to be 60 per cent. of the normal.

5. In Gadinad (Transition tract) jowar suffered from the same causes and the crop remained stunted. It is estimated to be half the normal. Cotton crop thrived very well upto October when continuous break acted as a check. Easterly winds, however, did not prevail and bolls formed did not drop. Westerly winds kept up the moisture and saved the crop. The yields were better than expected and approximated to average. The season for sowing cotton was very favourable and the area considerably increased during the year. Owing to absence of late rains, the crop matured earlier than usual, and one of the marked effects of this early ripening was a fall in the ginning percentage.

6. In Yerinaḍ (Eastern tract) the rainfall was very scanty. Both rabi jowar and wheat crops almost failed and gave very poor yields. Cotton did fairly well and so did Safflower. Upland cotton round Gadag and Ron and in banded fields of Bijapur District has done considerably well. In a few places favoured by late rains, the cotton crop was a bumper one this year. It is the cotton crop which saved the situation of this tract.

7. The Mallad cultivator has not obtained enough for himself and his cattle. He has supplemented his fodder supply with forest grass. The condition of cattle considerably fell during the hot weather, and many died from epidemic diseases. The Gadinad cultivator has got enough. The high prices of cotton have enriched him. The Yerinaḍ cultivator obtained very little to eat but the cotton crop saved him.

8. Scarcity of fodder supply and drinking water were greatly felt. On the whole the season under report was far from satisfactory in most parts of my Division and its effects would have been worse if the prices of cotton realised were not so high. The prices of food stuffs went high only for a period, but import of rice from Bezawada and jowar from Davangeri side soon reduced them to normal.

9. The work done by various sections will be summarised under the following heads:—(1) Investigation and Experiments, (2) Propaganda, (3) Organisation, (4) Agricultural Education and (5) Miscellaneous.

*Investigation and Experiments.*

10. Investigation was mainly done on Government farms, Dharwar, Gokak, Tegur and Mugad, whereas experiments were conducted on Government farms as well as in cultivators' fields.

11. *Dharwar Farm.*—This farm continued to rise in importance as a Plant Breeding station. In cotton, selection in the cross between Dharwar No. 1 and Rosea and the study of the cross between Dharwar No. 1 and Wagale were the main items of work.

The cross between Dharwar No. 1 and Rosea reached its 6th generation during the year. There were many pure lines which were uniform for good yielding character. Further selection was made in these promising lines and about 100 plants individually taken. These represent only three plants of F<sub>2</sub> generation, the majority of them being derived from only one plant of that generation. Some of these selections are very promising and their behaviour on a large scale is being watched.

12. Thirty-one strains of the cross that were found to be pure for high ginning and long staple were tested for yield during the year. The yield varied from 225 lbs. to 550 lbs. per acre. Of these 13 have been selected for further trial. The strain 1-A-18-3-15 has given the highest yield (550 lbs. per acre) with ginning percentage 33 and staple 1.1". It is proposed to multiply the seed during the coming season and a small quantity of selfed seed is obtained for the purpose.

13. I am very glad to state that the Cotton Breeder, Mr. Kottur, has succeeded in obtaining strains which have all the desired characters of the two parents and we have great future for this cross.

14. The cross between Dharwar No. 1 × Wagale reached its F<sub>2</sub> generation. The F<sub>1</sub> generation does suffer from wilt. The wilt resistant character is not completely dominant. The F<sub>2</sub> generation is more resistant to wilt than F<sub>1</sub> and may give resistant plants of the Wagale type. Selection of wilt resistant plants with other desirable characters is made in the F<sub>2</sub> generation and these will be grown during the coming season for testing the inheritance and for further selection. The study of the Special Cotton Mycologist indicates that Wagale is immune to cotton wilt or at any rate immune to the species of cotton wilt that is prevalent on the Dharwar farm. This enhances its value in breeding wilt resistant strains.

15. Selfing and multiplication of the seed of Dharwar No. 1 and Gadag No. 1 cottons continued as usual.

16. Jowar Breeding work comprised (1) maintaining some important varieties pure, (2) selection for high yield among the local varieties, and (3) study of characters. The varieties that were kept pure by protecting the ears from cross fertilization were Chowri (two types), Arlin, Nandyal, Muddinandyal, Mahisal, Holgi.

Vagar (two varieties), Fulgar white, Fulgar yellow and Handimasadi. Of the two types of Chowri, the amber glumed type is giving better yields than yellow glumed, and further work will be done only on that type. Nandyal and Muddinandyal types fared better than Fulgar types during the year. Holgi did not give good ratoon (second crop) for want of late rains. Vagar variety has two types. One with dark red grains gives better yield than that with yellowish red grain. These will be tested in the Mallad area during the coming season.

17. Selection for yield continued in Fulgar yellow, Fulgar white, Nandyal, Muddinandyal and Mahisal varieties.

18. A few strains in Fulgar yellow, Fulgar white and Nandyal were grown on large scale for testing their yielding capacity and they are promising.

19. The following characters are being studied with a view to discover the correlation if any of any of these characters with yield :—

- (1) Stem—(a) height, (b) number of nodes.
- (2) Leaves—(a) size, (b) colour of mid rib.
- (3) Peduncle—(a) length, straight or curved condition.
- (4) Ear—(a) length of rachis, (b) breadth of the ear, (c) weight.
- (5) Grain—(a) percentage of grain to ear, (b) colour, (c) size, (d) weight.
- (6) Earliness—On all the above characters.

The data so far collected will be examined and conclusions drawn.

20. *Natural Crossing*.—An attempt is being made to find out the percentage of natural crossing taking place in jowar under the ordinary field conditions and results will be available next year.

21. Other experiments conducted by the Superintendent of Dharwar were mainly on crops, and manures.

22. *Crop Experiments*.—Comparison between Dharwar No. 1 and Kumpta made by the Superintendent was in favour of the latter, whereas that made by the Cotton Breeder was in favour of the former. The extent of the attack of wilt to Dharwar No. 1 has been the main cause for the difference. The Superintendent, Mr. Shevade, further summarises the results of this experiment for the last five years and the figures are on the whole in favour of the Kumpta Cotton. Wilt is the disturbing factor in the experiment, and Dharwar No. 1 Cotton which is greatly susceptible to this disease will not be introduced in the wilt affected areas. Experiments in cultivators' fields free from wilt are all in favour of Dharwar No. 1 Cotton, except one at Haveri.

23. Dharwar No. 2 Cotton was tried in a wilt-affected plot where Dharwar No. 1 could not grow, and the yields are very encouraging ranging from 435 lbs. to 670 lbs. per acre.

24. Holgi jowar which ratooned well during the last season failed to do so this year due to want of late rains.

25. The Plant Breeding Expert, Poona, sent six strains of Pivala Kathya variety of wheat selected by him for high yield and tillering capacity. These were grown in comparison with local variety (hard red). Results are very attractive and are tabulated below:—

Plot Nos.	Strain No. or variety.	Per acre.				
		Yield of grain.	Yield of chaff.	Value of produce.	Cost of cultivation.	Net profit.
		Lbs.	Lbs.	Rs.	Rs.	Rs.
329	No. 162 ...	742	1,606	124	21	103
342	" 103 ...	749	955	105	21	84
	" 167 ...	661	1,284	106	21	85
	" 168 ...	679	948	97	21	76
	" 171 ...	665	777	91	21	70
	" 224 ...	647	822	90	21	69
	Local ...	374	560	55	21	34

The comparative trial will be repeated during the next season with the two best strains Nos. 102 and 103. Observations indicate that these strains flowered a week to fortnight later than local wheat.

26. The Director of Agriculture, B. P., supplied new seed of Spanish Peanut variety of groundnut for trial and multiplication. The crop thrived well for a time but suffered later owing to want of rains in September, and yielded 1,433 lbs. of dry nuts per acre, which fetched Rs. 208 leaving a net profit of Rs. 136 per acre. Two types of plants were found in the crop, one with large plants with large leaves branching and bearing well while the other with small plants with small leaves branching and bearing less. These two types have been separated by the Cotton Breeder, Mr. Kottur.

27. Lucern during the 2nd year of its growth without irrigation gave 16,958 lbs. against 18,336 lbs. last year (*see* page 65, para. 13 of last year's report), a very good yield indeed. The cost of raising it was only Rs. 64 against Rs. 105 of last year. The value of green fodder was also greater during the year owing to scarcity of fodder and the net profit estimated is Rs. 162 against Rs. 139 of last year. The crop suffered from want of late rains.

28. Algaroba plants are making good progress.



29. *Manurial Experiments.*—The experiment on Farm Yard Manure series reached its 16th year during the year under report. An analysis of the results of 12 years was published in 1921-22. In the year 1921-22 a dressing of 15 tons per acre every second year to jowar crop was added to the experiment. Average figures of these four years are tabulated below :—

Manurial treatment per acre.	Average per acre.			
	Jowar.		Cotton.	Net profit.
	Grain.	Kadabi.	Seed cotton.	Per rotation.
	Lbs.	Lbs.	Lbs.	Rs.
15 tons every 2nd year ...	1,379	3,606	476	61
10 " do. ...	1,270	3,803	436	71
5 " do. ...	1,085	2,844	399	60
2½ tons every year ...	1,053	2,867	412	62
2½ tons every 2nd year ...	821	2,062	369	49
No manure ...	622	1,831	298	39

The application of 15 tons produced slightly higher yield of both jowar and cotton than 10 tons, but it was insufficient to cover the cost of extra manure. 10 tons every second year to jowar crop is the best application.

30. The heavy dressing of crude night soil in 1914-15 has continued to give good results both on jowar and cotton.

The average results of 4 years of ploughing in Farm Yard Manure either before jowar or before cotton have not paid more than ordinary method of applying it to jowar crop.

31. *Gokak Farm.*—The Superintendent of this farm continued to work mainly with a view to make the farm pay and conducted many useful experiments as well.

32. *Manurial Experiments.*—Top-dressing cane in 3 doses was not in any way better than once at the time of earthing up. The experiment needs repetition. Top-dressing paddy with cake manure has confirmed the results of previous years and no more experiment is needed. The crop top-dressed will only be demonstrated. Results of top-dressing maize, turmeric and chilly crops are not encouraging and the experiments will be repeated. Green manuring with San in the Rabi season has again given better results than Sunflower. Application of 7½ tons of Pig manure per acre has given better results than the same quantity of Farm Yard Manure on maize crop. Pig manure is a new source of manure, available in cities and deserves attention. It has done equally well on fodder jowar. On sugarcane the results are not encouraging and the experiment will be repeated.

33. *Cultural Experiments.*—The modified Manjri Method of cane cultivation was found to be more paying than local and slow furrow irrigation has given better results than local system.

A mixed crop of maize and tur in rows has given decidedly better results than two crops of maize during the same year, and deserves introduction in the tract. Besides immediate benefits the mixture is in the interest of the fertility of the land.

34. *Crop Experiments.*—In the trial of cane varieties Barbedos has given the best results. Next stand the local and Red Mauritius. Dharwar No. 1 and Dharwar No. 5 cottons were compared and Dharwar No. 1 was found to be far superior to Dharwar No. 5 both in point of yield and quality of cotton. A record yield of 1,635 lbs. per acre has been obtained. This variety will be recommended in the Canal tract. In the trial of tobacco varieties, local broad leaved has stood best. Sumatra and local long leaved have given almost equal yields. In the trial of chilly varieties, Byadgi Long has been the best. In the trial of sweet potatoes Ceylon White has given the highest yield of tubers, whereas local red has given the best yield of creepers.

35. *Garden.*—A new plantation of 150 Santras and Mosumbees has been laid out. The nursery is being developed. The garden with all its new plantation worked at a profit. The Santras and pomegranates bore fairly well. Slow irrigation referred to in the last year's report seems to be suited only to guava and pomegranate trees. Taste for fruit trees is developing in the canal tract.

36. Besides field experiments, the farm sold implements, manure, and seed worth Rs. 5,660 to the cultivators from its depot, trained candidates including the Devi-hosur Agricultural School students in gul-making and cane and fruit cultivation, answered queries received from cultivators and arranged to crush cane of the neighbouring cultivators with power crusher.

37. *Tegur Farm.*—The year under report was a very trying one in general for cattle which suffered from scarcity of fodder and drinking water as well as epidemic diseases. Tegur Farm was kept free from contagion. A good quantity of fodder was grown in the Kharif season and sufficient hay was prepared out of spear grass. The grass did not grow well in September and could not be harvested for silo-making. Only one pit was filled in, which contained 20,000 lbs. The supply of drinking water in the well was adequate. The cattle on Tegur Farm, therefore, continued to thrive well. The herd is gradually improving and is attracting the attention of surrounding cultivators. The cross-bred bullocks have fetched far better prices than country ones of the tract which is the real test of the improvements effected. The farm is run by a practical fieldman, Mr. Gulayya.

38. *Mugad Farm.*—Mr. Bhalerao who has done rice breeding work on Karjat Farm is in charge of this new station.

39. Rice breeding work on this farm was conducted on two common varieties, viz., Mugad and Antarsal. 118 samples of Mugad and 93 of Antarsal were collected from intelligent cultivators in 40 places in the Mallad talukas of Dharwar and Belgaum Districts through the District Agricultural Overseers and grown in two lots (dibbled and transplanted). The individual plants numbered 24,000 in Mugad and 14,000 in Antarsal variety. Out of these, 321 plants in Mugad and 266 in Antarsal have been selected. Many of these are selected on the basis of characters supposed to be associated with high yield, while a few of the selections are purely of botanical interest. Various characters of these individual plants and their numerical values have been recorded.

40. The main characters of economic value on which selection is based are (1) flowering date, (2) plant height, (3) tillering capacity, (4) panicle length, (5) grain weight of plant, (6) straw weight of plant and (7) number of grains per ear.

41. These individual selections have been preserved separately for next year's sowing together with a sample of mixed lot for comparison.

42. Along with rice breeding the problem of Gonag\* is being studied further. Various samples have been collected and preserved for study during the coming year.

43. *Experiments in Cultivators' Fields.*—The District staff conducted a number of experiments the important among which were :—

(1) *Bone meal on paddy crop.*—The use of this manure is steadily increasing in Khanapur Taluka of the Belgaum District.

(2) *Top-dressing cake manure to paddy crop.* The use of this manure is also gradually extending.

(3) *Cake and ammonium sulphate to Sugarcane Crop.*—The use of these manures has been freely taken to in Chikodi and Hukeri Talukas of the Belgaum District, and in the Gokak Canal tract.

(4) *Trial of early varieties of groundnut.*—Cultivation of Spanish Peanut variety is largely extending in Haveri Taluka and Mundargi Petha of the Dharwar District.

(5) *Trial of jowar varieties given by the Cotton Breeder, viz. (Nandyal, Muddinandyal, Bilchigan and Mahisal).*—The season for jowar was not good and trials need repetition.

(6) *Trial of wheat varieties, Local, Bansi, Pusa No. 12 and Pusa No. 4.*—The season for wheat too was very bad and experiments need repetition. Bansi wheat has given better results than others and its cultivation is gradually extending round Harobelvadi and Aminbhavi in Dharwar Taluka and in parts of Navalgund Taluka of the Dharwar District.

\* Bulletin No. 107 of 1921 on Gonaga—a weed in drilled paddy by Mr. S. S. Salimath, B.Ag.

(7) *San green manuring in the transition tract where supply of farm yard manure is scarce.*—The crop grew very well and was ploughed in but the season for the succeeding crop wheat was bad and effects of green manuring were not manifested.

(8) *Introduction of turmeric crop.*—The trial at Bailhongal was very successful. In an area of 8 gunthas a yield of 30 maunds of dry turmeric and 60 maunds of seed sets has been obtained. The results of this experiment have induced a large number of cultivators to go in for this crop, and the District Agricultural Overseer, Bailhongal, was deputed to Satara to secure the quantity of seed required.

(9) *Trial of Upland cotton as a row crop in Udid*—This was tried with great success at Aminbhavi, a village in Dharwar Taluka and has attracted a good many cultivators.

#### *Propaganda.*

44. *Demonstrations of improved Implements (Iron ploughs, Circular chaff-cutters, Disc harrow, Iron scraper and Wheat-thresher).*—They were 28 in Dharwar District, 20 in Belgaum District and 49 in Bijapur District. The use of iron ploughs is steadily extending. The prices of Kirloskar Brother's iron ploughs have gone down to half and many cultivators purchased them. The business of hiring out these iron ploughs by associations, societies and middlemen *did not prosper*, as it did in previous years. Disc harrow and circular chaff-cutters have attracted the attention of cultivators. The wheat crop was very poor and the demonstrations of wheat thresher were not very attractive. Ploughing competitions were held in two places in Bijapur District and four places in Belgaum District.

45. *Demonstrations of Gul-making, Nahan Cane crushing mill and Poona furnace.*—These were two in Dharwar District, four in Belgaum District, and two in Bijapur District. The use of Nahan mills is fast spreading especially in the Mallad Talukas of the Belgaum District. The Poona furnace has passed the stage of demonstration in Belgaum Mallad, but elsewhere needs more.

46. Other demonstrations were of new method of planting cane in nine places and the use of prickly pear as a famine fodder in three places.

47. *Propaganda against smut.*—In most of the demonstrations above referred to, steeping jowar seed against smut was shown to the people. Besides these, at sowing time a series of demonstrations was specially arranged. They numbered 15 in Dharwar District, 11 in Belgaum District and 50 in Bijapur District. The propaganda was mainly done through the Revenue officers in obedience to

Government Resolution No. 6799, dated 19th February 1923. The number of packets distributed and used is given below:—

Name of the District.	Number of packets distributed.	Number of packets used.	Remarks.
Dharwar ...	31,000	18,915	
Belgaum ...	20,500	8,325	
Bijapur ...	12,000	3,434	

In Bijapur District and the eastern parts of Dharwar and Belgaum Districts season for jowar was not favourable and a number of packets remained undistributed. The Mamlatdar of Hukeri and Mahalkari of Murgod in Belgaum District and Mamlatdars of Ranebennur, Haveri, Shiggaon and Ron in Dharwar District did good work.

#### Organisation.

48. The District staff every now and then inspected the existing agricultural non-credit societies in their charge and prepared grounds to start new ones.

49. *Seed and Implement Societies.*—They are 34 in number—23 in Dharwar District, 7 in Belgaum and 4 in Bijapur District. The business done by these societies in hiring out implements is not in any way encouraging. All these societies together own only 160 ploughs—very few indeed. Attempts are being made to increase the number. The business done in seed is fairly good. In all, cotton seed (mainly Dharwar No. 1 and Gadag No. 1) worth Rs. 16,741 was purchased by 28 societies from the Cotton Sale Societies and distributed in their villages. The District staff with repeated advice has been attempting to induce these societies to forecast their indents in advance. Gadag-Betgiri and Devi-hosur Seed Societies have done more work than others.

50. *Manure Societies.*—Belladbagewadi Manure Society distributed groundnut cake worth Rs. 958 and earned a commission of Rs. 84. Kabbur Society was not doing any work and it was revived. It has distributed 25 bags of groundnut cake and 6 bags of Ammonium Sulphate worth in all Rs. 787 and has earned a commission of Rs. 34. These are the only two Manure Societies situated in the cane tract of Belgaum District. There is large scope for Co-operative Manure Supply Societies in this tract since middlemen are already playing their part. The societies at Kabbur and Bellad-Bagewadi were not being well managed, and efforts are being made to improve them.

51. *Cattle Breeding Societies.*—Sadalga, Ainapur, Hiremallur, Harur and Sidenur Cattle Breeding Societies have considerably improved and have realised the benefits of such societies. All these societies are thinking of building common cow-sheds outside the

villages. Three societies started in the famine tract of Mundargi Petha have no prospects. The Dharwar Cattle Breeding Society with its farm outside the town has not been able to show any progress. Inadequate management and want of water supply are the main drawbacks and efforts are being made to attend to these. Other societies have just commenced their operations.

52. *Dairy Societies.*—The Dairy Society at Belgaum has done good business. It has sold 1,26,000 lbs. worth Rs. 14,150. The Gowlis are thinking of having a Housing Society. The Hubli and Bagalkot Societies have done only fair business. In all these societies, both consumers and producers are members of the society and their interests clash. More producers' societies are what are needed.

53. *Cotton Sale Societies.*—Among all the Agricultural Non-Credit Societies, these have played a very useful and important part and seem to have a great future before them. The success is largely due to the introduction of improved types of cotton and the method of selling them by auction after grading which have attracted the attention of millowners and exporters and have enabled them to offer due prices which cannot be obtained in the existing ordinary market conditions. The total number of dokras sold by different societies in auction sales is 32,938 (Dharwar—1,060, Hubli—14,643, Gadag—15,626, Haveri—1,167 and Bijapur—432). The rates realised in auction sales for Dharwar No. 1 and Dharwar No. 3 cottons were on an average Rs. 20 and Rs. 12 more than those for Ordinary Kumpta and for Gadag No. 1, Rs. 40 more than those for Dharwar-American. The extra profit realised by cultivators for these 32,938 dokras is estimated to be Rs. 2,55,240. Hubli and Gadag Sale Societies continued to do good business. Haveri Sale Society was put to proper work and this and Dharwar Sale Society sold their cotton by sample at Hubli. Bailhongal and Annigeri Societies sold their cotton by private treaty. Bagalkot failed to respond and Bijapur Sale Society was newly started.

54. *Other Sale Societies.*—The Chilly Sale Society at Byadgi has sold 978 Bengali Maunds of produce worth Rs. 21,017. The season for chilly crop was very poor during the year and the business done by the society is fairly good. The Seed-Organiser, Mr. R. S. Patil and the Honorary Organiser Mr. Mannbasangouda Patil did considerable propaganda for this society which will have its effects during the coming season.

Tobacco Sale Society at Nippani sold 1,569 Bengali Maunds of produce worth Rs. 46,019 and earned a profit of Rs. 842. This society is not yet really a Producers' Society. Middlemen bring the produce to the society and get profits. Efforts will be made to make it more a Producers' Society. Outside buyers are yet approaching the society through dalals. There are difficulties about finance which are being solved. The method of grading tobacco is being

studied and various samples have been got analysed by the Agricultural Chemist to the Government of Bombay. Personally I have made detailed enquiries on the cultivation and marketing of tobacco crop and have prepared a note on the subject.

55. *Fencing Societies.*—Four of these in Kalghatgi Taluka referred to in last year's annual report have realised the benefits of their walls built against the ravages of wild pigs. Further attempts were made during the year to organise more societies in that very tract and extend the existing wall in both the directions. On one side the Tadas and surrounding village cultivators have agreed to form a society, and on the other 3 group societies, Nelliharvi, Bom-migatti and Tavargerri. These have collected most of their share capital and have approached for registration of their societies. It is estimated that the wall will extend on one side 9 miles and on the other 11 miles. The Deputy Director, the Assistant Registrar, the Deputy Collectors, I and II Divisions and the Mamlatdars of Kalghatgi and Shiggaon Talukas of the Dharwar District have all worked together for the extension of this wall. Four group societies at Tegur, Kittur, Bidi and Arabhavi have been planned and are being worked out. The fencing societies have attracted the attention of cultivators in the Mallad tract and a number of applications are coming forth.

56. In Mundargi Petha the prickly pear referred to in the last year's report which had become the abode of wild pigs was removed from many villages. The Deputy Collector, III Division, greatly helped the movement.

57. *Joint Cultivation and Irrigation Societies.*—A good deal of Government land is lying waste in the Mallad tract of Dharwar and Belgaum Districts and attempts are being made to start a few Joint Cultivation Societies here in this tract. At Maharajpeth in Hangal Taluka a big scheme with 700 acres of land and with Rs. 30,000 share capital is being worked. At Devagiri in Dharwar Taluka and at Yelvi in Shiggaon Taluka two small schemes are under consideration. A Joint Mango Cultivation Society at Aminbhavi has been worked out and papers sent for registration. The society has got lands, has dug pits and has ordered 400 mango grafts to plant for the season. It is hoped that Fencing and Joint Cultivation Societies will change the aspect\* of the Mallad tract. Two Irrigation societies, one at Maharajpeth and the other at Kittur are being worked out.

58. *Taluka Development Associations.*—Among 7 Associations started during the last year, Dharwar, Indi and Chikodi Associations did good work. They conducted various experiments and demonstrations and did good propaganda. Gadag and Gokak Associations had to dispense with the services of their fieldmen and are in search of new men. Athani Association suffered in its boring work, and Ron

\* *Vide* pages 4 and 5, Bulletin No. 110 of 1922 (Year Book of the Agricultural Department in the Southern Division). Article by T. Gilbert, B.A. and S. S. Salimath, B.Ag.

Association failed to respond. Only Chikodi and Gokak Associations have collected good funds. Others have not progressed well with their collections. The District staff is working with these Associations but regular funds are not coming forth. If Taluka Development Associations are to be purely propaganda bodies, all Local Credit and Non-credit Societies should be made to regularly contribute their quota, otherwise these bodies should take up business side by side with propaganda.

To collect subscriptions from individuals has been difficult and has only been possible in Chikodi and Gokak talukas where Revenue Authorities have taken interest. Mr. Palekar, the Deputy Collector, II Division, Belgaum, has taken personal interest in these Associations and has done considerably good work. There is a good future for these Taluka Development Associations and I personally feel that they should do both business and propaganda to start with. Two new Associations in Hangal and Hirekerur Talukas in Dharwar District, one in Sindgi Taluka in Bijapur District and one in Parasgad Taluka in Belgaum District are being worked out by the District staff.

The District Agricultural Association, Dharwar, which did pioneer work in past years is now losing grounds. Various Taluka Development Associations and Non-credit Societies have taken its work. Its work of hiring out iron ploughs too was considerably reduced owing to fall in prices of iron ploughs which has enabled cultivators to purchase their own ploughs. Its magazine is improving.

A certain relation between the co-operative bodies and this Association is needed, and a committee has been appointed to consider the question.

59. *District Cotton Work.*—This continues to be the important work of the Department in the Southern Division. Experiments were laid out in 8 places to test the merits of Dharwar No. 1 Cotton against Ordinary Kumpta. In 6 places out of 8 the yields of Dharwar No. 1 are better, in one place equal, and in one place less than Kumpta. The trial of Gadag No. 1 against N. R. at Ahirsang in Indi Taluka of Bijapur District is distinctly in favour of the former. Attempts are being made to replace short-stapled N. R. Cotton by Gadag No. 1 in Bijapur area. The advantages of Gadag No. 1 Cotton over Dharwar-American have been proved in previous years and need no more experiments.

60. The growth of these improved types Dharwar No. 1 and Gadag No. 1 Cottons, is rapidly extending round Hubli and Gadag respectively. The cotton staff supervised the pedigree seed farms and has further been able to establish two blocks of 5,000 acres each in compact areas, one for multiplication of Dharwar No. 1 at and round Sharewad near Hubli and the other for multiplication of Gadag No. 1 at and round about Hulkoti near Gadag. Farm seed was grown in pedigree seed farms under close supervision of the cotton staff. Seed obtained from the produce of pedigree seed farms was sown in these 5,000 acre blocks



and the seed from selected lots obtained from these blocks was preserved for general distribution. The District staff of the Agricultural Department and the Cotton Sale Societies did considerable propaganda for the spread of these cottons. 38 Depots were opened for seed distribution. Dharwar No. 1 is gradually extending from Hubli to Haveri Taluka and Gadag No. 1 from Gadag to Bijapur area. The area under Dharwar No. 3 continues to be limited. The total area under these improved types actually sown with seed of known purity reached figures as follows :—

	Acres.
Dharwar No. 1	... 74,968
Dharwar No. 3	... 5,040
Gadag No. 1	... 65,044
Total	... <u>1,45,047</u>

61. Nearly one-third the produce of this area was sold in auction sales arranged by the Sale Societies and fetched Rs. 2,55,240 extra profits to the cultivator (*vide* para. 53). The stuff was graded by the Cotton Staff. The remaining two-third quantity was sold in other ways and the extra profits realised cannot properly be estimated, but can roughly be taken as 3 lakhs. Thus the spread of improved cottons mainly Dharwar No. 1 and Gadag No. 1 has resulted in an extra profit of 5 lakhs and a half during the year.

62. The co-operative seed and sale organisation is not keeping pace with the spread of these varieties. Adequate and more timely finance to the cotton grower is what is really needed and this can be brought about by organic relation between Cotton Sale Societies and District Central Banks on one side and Cotton Sale Societies and Rural Credit Societies on the other, which is wanting at present. With the spread of improved varieties of cotton, there is a great future for co-operative cotton sale and I am working with various bodies concerned to solve the question of finance. The yields and prices of these two cottons, and the propaganda done by the District staff, the Seed Organiser and Cotton Sale Societies have encouraged the cultivators to a great extent; and it is hoped that the area under these two cottons will considerably increase during the next season. The Cotton Sale Societies at Hubli and Gadag have stocked in all 686,000 lbs. Dharwar No. 1 and 650,000 lbs. Gadag No. 1 seed of known purity for distribution during the coming season which will suffice for an area of 86,000 acres and 82,000 acres respectively. The demand will certainly be more than the societies can meet and the middle men will continue to play their part. They have also stocked a good deal of quantity especially Gadag No. 1 seed, the demand for which from Bijapur area is very great.

63. The cotton clean picking propaganda was continued by the District Staff and Cotton Sale societies and prizes were awarded. This will have its effect on the nature of cotton picking during the coming season.

64. The Cotton Transport Act was brought into force and has worked satisfactorily in the Southern Division. The import of inferior cottons like Bengal and Irani and mill waste through rails has altogether been stopped and the quality of both Kumpta and Dharwar-American Cottons considerably improved. The Gadag merchants complained that their market will considerably suffer if equally good cotton coming from the adjoining Nizam's Dominions and Madras Presidency is prohibited to come in. The Director of Agriculture arranged to issue licenses and the Cotton-Overseer was entrusted with the work. Illicit import did take place to a certain extent through roads. A case was presented to the Magistrate but only cartmen became liable for punishment under the existing wording of Rules under the Act. The rules need modification in wording and I have represented the matter to the Director of Agriculture. The import of short stapled Sholapur Cotton by road into Bijapur market also did take place; and Nakas are what are needed on the border. The import by road is, however, insignificant when compared to that by rail. The Cotton Transport Act has considerably improved Hubli and Gadag markets which are the biggest markets in the Southern Division, and has worked both in the interest of producers and consumers.

65. *Boring Work*.—This was another important work which was much appreciated by cultivators and people in general. Many of the wells dried up during the year and demand for boring was great. Work in Dharwar and Belgaum Districts was done in concentrated areas and two machines worked in each of these Districts. Only one machine did work in Bijapur District, mainly under the direction of the Collector for drinking purposes.

66. In all 59 bores were taken against 18 last year and the total depth bored was 3,533 feet against 1,164 feet. The following table gives details:—

District.	Purpose.	No. of bores.	Successful.	Failure	Rejected.	In-complete.
Dharwar ...	Agriculture ...	21	16	1	4	...
	Drinking ...	12	11	...	...	1
Belgaum ...	Agriculture ...	8	1	3	3	1
	Drinking ...	10	4	5	1	...
Bijapur ...	Agriculture ...	3	1	2	...	...
	Drinking ...	5	3	...	1	1
Total ...		59	36	11	9	3

Out of these 59 bores, 32 bores were for agricultural and 27 for drinking purposes.

67. The percentage of successful bores in the Division is 79.59 (Dharwar 96.42, Belgaum 38.4, and Bijapur 66.16). The work at Savanur and Kundgol in Dharwar District was exceedingly good. All the 14 bores at Savanur were successful. The betelvine gardens were suffering badly from want of water and these bores saved the situation. Similarly 10 bores were successful at Kundgol where water-supply was very scarce and was a crying need. The work in these two places has been much appreciated. In Belgaum District the tract round Nippani and Bhoj does not seem to be suited to boring. There are very few underground currents. Yeksamba seems to be fairly good. In Bijapur District Muddebihal is not favourable whereas Bagalkot is good.

68. There were 11 accidents and all of them were removed as early as possible. The work done on the whole was far better than in previous years and reflects credit on the Boring Assistant. The Boring Department worked at a profit of Rs. 1,902. The total receipts were Rs. 7,621 and the expenses came to Rs. 5,719.

69. The Mechanical Assistant erected a new oil engine on the Gokak Farm and attended to repairs of cane crushing mill and centrifugal pump there. He has fixed an oil engine and countershaft on Bankapur Farm and further work of fixing corn mill and chaff-cutter is in progress. He inspected occasionally Dharwar Farm and Devi-hosur school machinery and gave advice. In the District he attended to the repairs of three existing pumping plants and erected two new ones. Besides he inspected 5 new pumping sites and prepared plans and estimates.

70. *Embankments*.—The special officer appointed for bunding work prepared 34 schemes during the year, 15 in Dharwar District, 13 in Bijapur District and 6 in Belgaum District. The number of applications for advice on bunding considerably increased during the year and with a view to discourage idle and indifferent applications a deposit system has been introduced. Construction of work is in progress in 11 places, 6 in Dharwar and 5 in Belgaum District. Some plans deal with surface erosion and conservation of moisture while others offer problems of controlling fairly large nallas with a view to accumulate silt.

#### *Agricultural Education.*

71. The Agricultural School at Devi-hosur completed its 10th year. 52 applications were received during the year for admission but only 12 admitted on rigid selection, after personal interview. The total number of students was 22 in the two classes, 12 from Belgaum District, 7 from Dharwar District, 2 from Karwar and 1 from Bijapur District. The curriculum remained the same as last year but more time was devoted to practical farm work and cottage industries than in previous years. The students were taken on tour

to Satara and Belgaum Districts to show them the cultivation of garden crops which could not be undertaken on the school farm owing to want of water-supply. All the 12 students in the first year and 8 students in the second year who appeared for the examination passed during the year.

72. Three 2nd year teachers were trained here for vernacular schools with agricultural bias to be opened one in each District, Dharwar, Bijapur and Karwar accordingly to the scheme laid down by Government.

73. The total expenditure of the school was Rs. 8,041 and receipts Rs. 2,566. The school is gaining popularity.

*Miscellaneous Work.*

74. The Divisional Board held its quarterly meetings regularly and an extra-ordinary meeting and discussed various subjects of importance. All the members official and non-official were regular in their attendance.

75. With a view to train District Agricultural Overseers in organising work and Organizers in agricultural propaganda and 5 new graduates in both, a training class was arranged for a fortnight. Junior fieldmen on the Dharwar Farm also attended the class. The Deputy Director, the Assistant Registrar, the Farm Superintendent, the Cotton Breeder, and the Cotton Superintendent took various classes. Mr. Nalwadi, the President of the Karnatak Branch Institute and Mr. Jog, M.L.C., also gave some lectures on co-operation. Various subjects concerning improved implements, manure, seed, method of farming and organisation of different agricultural non-credit societies were explained and discussed. It is hoped that this training class will be of much use to the officers concerned.

76. A Divisional Conference of all the Heads of Sections was organised when the work done and to be done by various sections was freely discussed. At the time of this Conference all Taluka Development Associations were invited and programme of work for each taluka was prepared in consultation with the Association and the District Officer concerned. This Conference had a very educative value and made various officers and Taluka Development Associations understand each other's work.

77. A series of training classes was organised by the Assistant Registrar which I personally attended and delivered lectures on the subjects concerning agricultural non-credit co-operative movement. Myself and the Assistant Registrar undertook some joint tours to conduct these training classes. The advantages were that many non-official gentlemen and co-operative societies were made to take more interest in the agricultural improvement.

78. The District staff attended to many individual calls for advice on different matters concerning mainly crop production, fruit cultivation, and bunding. 149 Takavi loan applications for land improvement were dealt with. Various sites were inspected and estimates of schemes made.

79. I have prepared two notes one on Tobacco Cultivation and its marketing, and the other on cake manure to paddy crop. The latter has been submitted to the Director of Agriculture, B.P., Poona, for publication as a leaflet.

*General.*

80. My office is now required to work direct with 20 Heads of Sections, 7 Taluka Development Associations and 67 Non-credit Societies besides Revenue Officers and individuals. The work of the Divisional Board has also very much increased. An additional clerk is a bad need in my office.

The staff in general has put in very good year's work. The duties of the District staff are so widening that I cannot but repeat the remark I made last year that each officer badly needs a Kamgar under him.

81. Many Revenue Officers and private gentlemen considerably helped our demonstrations and organisation work and my thanks are due to them. The Assistant Registrar practically worked with me in organising work and Rao Saheb M. L. Kulkarni, the retired Deputy Director of Agriculture, helped me with his occasional advice. Among non-official gentlemen Rao Saheb S. S. Mangsuli of Athani, Mr. M. S. Patil of Hukeri, Rao Bahadur Mallanaik Patil of Bailhongal, Mr. Virupaxappa Maribal of Kittur, Mr. S. M. Gowri of Khanapur, Mr. Paramshetti Kadappa Patil of Gokak and Messrs. V. S. Phathapekar and V. V. Shirgaonkar of Belgaum in the Belgaum District, Rao Saheb Pampapati Desai of Aminbhavi, Messrs. F. T. Nalwadi and S. V. Desai of Dharwar, Rao Saheb C. S. Shirhatti of Hubli, Khan-Saheb Khudawand Muhammad Ghaus of Navalgund, Mr. M. V. Koti of Gadag, Mr. Shiddangouda Patil of Hulkoti and Messrs. Kubihal and Shetti of Alur in the Dharwar District, and Rao Saheb S. J. Deshamukha of Almet, Rao Saheb P. G. Halkatti of Bijapur, Mr. G. C. Limaye of Bhatkunki, Mr. Satappa Gunari of Sindgi deserve special mention. I must express my opinion that the activities of these official and non-official gentlemen have roused the local interest for agricultural improvement in various parts of my Division.

In conclusion I am glad to make a mention that the Hon'ble Mr. A. M. K. Dehlavi, Bar.-at-Law, J. P., Minister for Agriculture and Co-operation, took a tour in Belgaum and Dharwar Districts and paid visits to Dharwar and Tegur Farms and many Agricultural Co-operative Institutions. His visits were very valuable and encouraging.

S. S. SALIMATH,  
Ag. Dy. Director of Agriculture,  
S. D., Dharwar

## APPENDIX F.

## SUMMARY OF WORK DONE BY THE DEPUTY DIRECTOR OF AGRICULTURE, GUJARAT DIVISION, FOR THE YEAR 1923-24.

*I. Staff.*

I was in charge of the Division throughout the year.

2. Practically there was no change in the organisation of the subordinate staff except the addition of the post of a Head Master for the newly opened Vernacular Agricultural School at Surat.

*II. Experimental and Research Work.**(1) Cotton Breeding at Surat and Broach.*

3. The whole of the cotton area of the Surat Farm was sown with the seed propagated from pure bred strains of 1027 A. L. F.

The seed propagated from selfed flowers becomes sufficient for sowing on the Surat Farm cotton area in the third generation, and the resulting seed is distributed in the Athwa group for the next season.

A comparative trial of this strain with the local cotton gives the following results :—

Variety.	Yield in lbs. per acre.	Ginning percentage.	Length of fibre in centimeters.
Surati Local	601½	35.5	1.75
1027 A. L. F.	667	35.9	2.23

This strain is valued at Rs. 55 more per Khandi than the ordinary Surat cotton by the Mill Owners Association, Bombay. The work on crosses is being continued with the object of still further improving the strain, and the results are very promising.

4. The crosses between the two pure bred strains of Broach and Goghari E<sub>1</sub> have reached F<sub>2</sub> generation. The segregates which seem to be more near the desired types will be tested at Surat and Broach, as it is found from the cotton survey of Halol Taluka made by Mr. M. L. Patel and that of the Broach Tract made by me, that any improved stapled strain, with a ginning percentage of lint lower than 39.5 will not be appreciated by the cultivators so long as the relative prices of stapled cottons do not rise. Hence the strain Selection I A will not be multiplied but it is hoped a suitable segregate from the crosses will be available shortly, which will be multiplied and distributed in the Broach tract.

5. As reported in paragraph 5 of the last year's annual report a very substantial sum was placed at the disposal of the Director of

Agriculture, B. P., by the Indian Central Cotton Committee to start cotton research work at Surat. A Cotton Physiologist and a Cotton Entomologist with an adequate staff and a laboratory have started work in right earnest, though little late, with promising results in the near future.

(2) Cotton Breeding at Viramgam.

6. In spite of the failure of the monsoon in the North Gujarat during the year, the cotton crop at the Viramgam plot yielded 400 lbs. of Kapas per acre, *i.e.*, about 190 to 230 lbs. more than the surrounding cultivators' crop, owing to special attention to better cultivation.

All the five strains of Wagad Cotton of last year were again tried and found to maintain the same characters with the following results :—

Plot No.	Name of the strain.	Yield of Kapas per acre.	Ginning percentage.	Valuations by Messrs. R. D. Tata & Co.	Length of staple in centimeters.	Remarks.
		Lbs.		Rs.		Good for
2	Wagad 14	426	41.1	590	1.92	16's
3	Wagad 8	434	41.0	590	2.0	16's
4	Wagad 12	458	40.7	590	2.0	16's
5	Wagad 4	416	37.5	610	2.1	20's
6	Wagad white flowered.	380	30.8	590	1.95	16's

Wagad No. 4 has again proved to be the best strain of all the above five in point of length of staple, feel and valuation. It has got only one weak point, *viz.*, a little low ginning percentage as compared with the rest.

Wagad seeds from the four principal noted places, *viz.*, Mandal, Viramgam, Patdi and Jagudan, were obtained during the year 1922-23, and the home grown seed of these varieties was grown on 7 guntha plots each for comparison as to how far the five strains are superior to them and also to find out a suitable material for further selection. The results are summarised below :—

Plot No.	Name of the variety	Yield of Kapas per acre.	Ginning percentage	Valuations by Messrs. R. D. Tata & Co.	Length of staple in centimeters.	Remarks.
		lbs.		Rs.		
7 & 9	Local Mandal	499	35.8	575 to 580	2.0	12's
10	Local Viramgam	411	36.0	"	1.95	"
11	Local Jagudan	411	36.5	"	1.9	"
12	Local Patdi	366	37.4	"	1.9	"

This is on basis of valuation on 3rd May 1924.

Fully good Viramgam at Rs. 600 per Khandi of 784 lbs.

Fine Broach at Rs. 600 per Khandi of 784 lbs.

It will be seen that our five strains except Wagad white flowered are superior to all the local cottons as regard ginning percentage and quality of fibre.

*Multiplication of seed.*—During the year under report 366 lbs. of seed in all of the four strains No. 14, 12, 8 and 4, was distributed in the villages of Sokhli and Gedia. But owing to the failure of monsoon the cotton crop entirely failed, even though the fields at Sokhli were commanded by wells, which also failed. During the current season very nearly the same amount of seed has been distributed in the villages of Sokhli and Jakhawada and sown in fields with better facilities of irrigation.

(3) *Jowar Breeding at Surat.*

7. Unit Selection was continued in 17 selections of which only 5 appear to be promising of which 4 are from Perio and 1 from Chapti.

They were compared with the local variety in alternate strips with the following results:—

Yield of grains in lbs. per acre of:—

train.	Lbs.	Local.	Lbs.
A. D. <sub>4</sub>	942.4	Local.	812.5
A. D. <sub>6</sub>	1,088.0	"	840.8
M. T. <sub>1</sub>	846.9	"	803.0
M. T. <sub>7</sub>	897.1	"	735.9
Chapti <sub>8</sub>	910.9	"	846.8

From the above it will be seen that A. D.<sub>4</sub> is the best. It will be grown on a large scale next year for further propagation.

M. T.<sub>7</sub> has a superior quality of grain and it may turn out to be a suitable type for yield as well as quality. The work is being continued for maintaining the purity of the strains for further crossing and for studying further the character of the jowar plant.

(4) *Tobacco Breeding at Nadiad.*

8. 32 Promising strains were sown from selfed seed in the year under report for three different objects, viz., (1) for obtaining selfed seed from the best selected strains for further studying the flower and vegetative characters, (2) for studying the leaf characters and also the comparative yield of the strains among themselves, and (3) comparing each of the purified selected type with each of the four recognised varieties, viz., Gandiu, Piliu, Keliu, and Shengiu



on a large scale. From the above 32 strains only 12 promising and uniform ones from selfed seed will be continued.

Name of the strain compared with the local variety of the same type	Yield in lbs. per acre of cured leaf.	Remarks.
Strain No. 1	1,698	
Gandiu, Local	1,404	
Strain No. 30	1,490	
Piliu, Local	1,300	
Strain No. 15	2,148	
Keliu, Local	2,028	
Strain No. 22	988	
Shengiu, Local	832	

From the above it will be seen that each of the strains 1, 22, and 30 is far superior to each of the corresponding local varieties. The seed of these promising strains is given out to intelligent cultivators for trial in their original localities.

9. In tobacco, the differences in prices due to quality are almost as great as those between different varieties of cottons. Therefore, the primary object of this Station is to segregate high yielding strains having intrinsically good qualities as appreciated by the local market and if possible by the exporters. It has been decided to study the question of manuring from the next year and the question of curing will be handled still later.

(5) *Surat Agricultural Station.*

10. *Cotton.*—Cotton seed of 1,027 A. L. F. sufficient to sow the Farm area was supplied by the Breeding Branch. The total area under cotton was 69 acres 10 gunthas, which yielded 469 lbs. per acre as against the average yield 371 lbs. in the surrounding Athwa group villages. From this, 18,400 lbs of pure seed was obtained for distribution in the Athwa group villages.

*Jowar.*—The total area under jowar was 67 acres and 38 gunthas and the average yield per acre was 972 lbs.

11. *Ridging Experiments.*—The original plan was modified a little, last year, as reported under para. 10, page 77 of the last year's annual report. In cotton the two years' results show that there is an average increase of 15 to 23 per cent. by simple ridging and shallow and deep intertillage respectively without any manuring; and of 41 per cent. by ridging, deep intertillage in the furrows, and the application of 10 tons F. Y. M., all applied in the furrow. But the results were not so encouraging in the case in which the manure was applied 75 per cent. in the furrows and 25 per cent. on the top as compared with the above.

Similarly in the case of jowar the average results of two years show an increase of 23 per cent. more in grain and 10 per cent.

more in fodder by simple ridging and deep intertillage in the furrow without any manure over that sown on the flat. In the plots ridged and manured as above increase of grain ranged from 24 to 31 per cent. and that of fodder from 29 to 36 per cent. over the flat system. Even in this case the plots ridged and manured in trenches gave better results than those in which 75 per cent. of the manure was given in trenches and 25 per cent. on the top.

From the last year's experience it can be said that sowing on ridges gives better results than that sown on the flat and the cultivators of the surrounding villages are very keen to adopt this method if the ridges could be easily and cheaply made in the hot weather. In all, in the surrounding villages 285 acres were sown on ridges prepared by one paired implements lent from the farm. Not only that but they have purchased these implements worth Rs. 1,579 and still the demand for the purchase is pressing. The farm is supplied with a case tractor but as it was received rather late no advantage was either taken by the farm or given to the surrounding cultivators. However, it is hoped that it will help materially in preparing ridges at a fairly cheap cost and eventually in extending this system in the district.

12. *Breeding Herd.*—The purity of the Kankrej herd is very scrupulously maintained. The strength of the herd on 1st April 1924 was 103 as against 94 of the last year. The total milk yield was 76,257 lbs. and 12 ozs. of 32 cows as against 78,800 lbs. of last year of 42 cows. From these 32 if we deduct 2 heifers, which calved in March, and an old cow, the average yield per cow comes to 2,618 lbs. as against 2,477 lbs. of the last year.

At present there are six cows in the dairy whose annual average of more than five years is about 3,000 lbs. Two best cows of the herd Anpurna and Bhuli both sisters have given 3,516 and 3,847 lbs. of nine years, and five years and ten months' average respectively. Cows Budhi and Lehra reported to be very good milkers are getting old but their yields have not gone down 3,000 lbs. Daughters of Bull Mohan by mother Budhi have begun to cow and two of them have given more than 3,000 lbs. during the year under report.

13. *Premium Bulls.*—During the year under report the system of giving out bulls on premium system was introduced and in the course of six months the dairy was able to distribute six bulls in the Surat and Broach Districts.

(6) *Broach Farm.*

14. The same work of evolving suitable types of cotton for the Broach tract is continued and the Breeding Branch hopes to put out a strain shortly in the district which will compete with local Goghari mixture in ginning percentage and will have the staple equal to that of Selection I A.

15. The selection work of Rabi jowar was continued but on account of very deficient rainfall it was not possible to propagate seed of the most promising strains.

16. Nitrate of Soda was further tested, as reported last year, on cotton at the rate of 135 lbs. per acre and it has kept up its reported increase. The average increase in yield from the last three years' results comes to 576 lbs. per acre for the manured plot as against 386 lbs. of the unmanured, *i.e.*, the yield is nearly 50 per cent. more. The manure has been recommended to intelligent cultivators during the current season.

(7) *Dohad Farm.*

17. *Wheat Seed Selections and Multiplications.*—Wajia x Popatia Cross for which very high hopes were entertained as to its rust resistant quality was found to be badly affected with rust along with others; though in point of yield it had kept up its reputation.

*Pusa 4 and Baxi.*—These two varieties of wheat were being grown on the farm on a large scale for purposes of seed distribution. All the seed grown on the farm was distributed through the Co-operative Bank of Dohad. During the year under trial two more varieties of wheat, *viz.*, Pissi and Pusa 12 were tried on the farm for comparative yield. The following statement shows the yield:—

Name of the variety.	Yield per acre in lbs.	Remarks.
(1) Pissi	1,463	
(2) Baxi	1,143	
(3) Wajia x Popatia Cross	1,131	
(4) Pusa 4	1,152	
(5) Pusa 12	1,114	
(6) Wajia	1,175	

From the above it will be seen that Pissi has yielded nearly 300 lbs. more per acre, whilst the rest are almost all on a par.

18. *Cultural Experiments—Wider planting of Maize.*—The same experiment as in previous years was continued. The sowing of Maize 2' apart as against the local practice of sowing 15" to 18" apart during the last six years has given an average increase of 25 per cent. over the local method. The new method of sowing by a drill 24" apart instead of by a plough 15" to 18" apart is advocated in the tract and specially amongst the Bhills.

(8) *Amalsad Farm.*

19. The *Red Rot* in sugarcane did not appear this year too. But the canes were badly affected by mite disease and on account of irregular and scanty rainfall yield was not good and although there was a very keen demand for seed, it could not be met with fully on account of diseased canes. The system of sowing whole canes after a Nangar, heavy plough, is being replaced by set planting in furrows and the surrounding cultivators have begun to take full advantage

of using the farm implements, specially, the ridger and the iron ploughs. They have also begun to buy artificial manures for sugarcane, ginger and chikoo, &c.

20. The growing of turmeric crop on ridges as against the practice of sowing it in beds was further demonstrated and the results of yields, viz., 16,829 lbs. per acre in the former case as against 13,595½ lbs. in the latter case goes to further confirm the superiority of the ridge system over the beds system.

### III. Agricultural Education.

#### (1) Vernacular Agricultural School, Godhra.

21. This has now completed its fourth year and is well established. The classes started with 31 boys in all, 13 being in the 2nd year and 18 in the 1st year selected out of 50 applications that were received for admission. According to caste and Districts, their number stood as under:—

(1) According to Caste:—		(2) According to Districts:—	
	No.		No.
Brahmins	... 9	Kaira	... 17
Dharalas	... 7	Panch Mahals	... 13
Patidars	... 13	Ahmedabad	... 1
Barot	... 1		
Rajput	... 1	Total	... 31
	—		—
Total	... 31		

22. The staff, curriculum, and methods of practical training and of the school farm management remained the same as reported in past years, the farm work being done by the boys themselves. Ridge cultivation was introduced on the school farm, and the cotton on ridges yielded better, viz., 440 lbs. per acre as against 305 lbs. on the flat even though the rainfall was less, i.e., only about 19 inches during the year under report against the annual average of 40 inches.

23. Besides the training in agriculture given to the boys of the adjoining Dharala School, primary school teachers selected one from each of the five Districts of Gujarat were taken up for special agricultural training with a view to introduce through these teachers an agricultural bias course in the higher standards of rural schools. After successfully going through the special agricultural course at the end of the year under report these five teachers have been posted in the rural schools as under which are provided with a small plot of land for imparting practical agricultural training to the boys:—

Place.	Taluka.	District.
Waghchhipa	Pardi	Surat.
Shukaltirth	Broach	Broach.
Uttarsanda	Nadiad	Kaira.
Kanbha	South Daskroi	Ahmedabad.
Nadisar	Godhra	Panch Mahals.

Five more teachers have been again taken up for the current year.

24. In the annual examination held in April 1924, by Messrs. C. S. Patel, Cotton Superintendent, Surat and G. P. Pathak, District Agricultural Overseer, Panch Mahals, Godhra, the results were very satisfactory, 13 and 13 boys passing out of 15 and 13 that appeared in the 1st and the 2nd year respectively. From the Dharala Boarding School, seven and eleven boys in the 1st and 2nd year respectively appeared, all of whom passed.

25. Rs. 300 were received as a contribution from the District Local Board, Panch Mahals, and Rs. 500 from the Sir David Sassoon Trust Fund. The total expenditure of the School during the year under report was Rs. 8,797-6-0, consisting of Rs. 3,503-12-0 for pay and travelling allowance of establishment; Rs. 2,700 for boarding charges of the boys and the primary school teachers; Rs. 1,335-10-0 for purchase of live-stock, books, furniture, implements and miscellaneous expenses; and Rs. 1,258 for cultivation charges and upkeep of live-stock. The receipts of the School amounted to Rs. 625-2-9 for the sale proceeds of the School produce as against Rs. 196-13-2 of the last year. The average feeding charge per boy per month as verified by the Auditor amounted to Rs. 7-4-0 during 1921-22 and Rs. 7 only during 1922-23; the average cost of the whole institution per boy per month being Rs. 22 and Rs. 20-8-0 during the two years respectively, which shows that the School is being run comparatively very economically.

(2) *Vernacular Agricultural Education in the Bhil Boarding School at Dohad.*

26. The new classes began with eight boys in the 1st year and six in the 2nd year. The results of their annual examination held by Mr. G. P. Pathak, District Agricultural Overseer, Panch Mahals, in March 1924 was very satisfactory, 7 and 6 boys passing respectively from each class.

(3) *Vernacular Agricultural School, Surat.*

27. Continuance of this School started for one year as an experimental measure from 24th June 1923, has been sanctioned for another year as per G. R. No. 8133, R. D., dated 2nd May 1924. Out of 19 boys admitted in the beginning, 13 remained in the School till the end of the year under report. Their classification according to caste and Districts is given below:—

Caste.	No.	District.	No.
Anavils	... 4	Surat	... 11
Patidars	... 5	Broach	... 1
Rajputs	... 2	Sachin State	... 1
Kali Parej	... 2		
	—		
Total	... 13	Total	... 13

All these are from purely cultivating classes.

28. *Staff*.—There was only one Head Master (Agricultural graduate) and one non-graduate fieldman, as there was only one class during the year. A vernacular assistant master will be added when both the classes are full.

29. *Curriculum* is just the same as that of the Godhra School. An area of 11 acres and 15 gunthas for dry crops and a piece of 1 acre and 17 gunthas for garden crops were set apart from the Surat Farm for the use of the School boys and necessary implements with two pairs of bullocks with ploughman were also given to the School from the Surat Farm. The School will be gradually equipped as funds will be available.

30. Out of Rs. 5 000 (2,500 sanctioned by Government and Rs. 2,500 contributed by the Surat District Local Board), the total cost of the School during the year was Rs. 4,780; consisting of Rs. 1,500 for cultivation charges; Rs. 1,580 for Boarding charges; Rs. 1,500 for the rent of the bungalow hired for the School, and Rs. 200 for miscellaneous expenses including postage. The sale proceeds of the School produce amounted to Rs. 34-11-8.

31. Out of 13 boys, 8 passed in the annual examination held in April 1924 by Messrs. T. V. Nagarsheth, District Agricultural Overseer, Surat and J. G. Naik, Head Master, Vernacular Agricultural School, Godhra. The results seem to be promising. 17 New students have been taken up in the 1st year, so in all in both the classes the total number of boys is 30. Of the new batch two students from Cambay State have joined the School at their own cost.

#### (4) *Publication of Agricultural Matters.*

32. The publication of the Broach Quarterly Magazine was continued as usual, 26 articles in all being supplied by the Agricultural Staff in the Division.

Agricultural notes are being supplied to the Publicity Committee, recently established at Poona, for publishing articles on agricultural matters in local papers co-operating in the matter.

Mr. M. L. Patel's Memoir, "Studies in South Gujarat Cottons, Part II" was published.

#### IV. *Propaganda Work.*

33. *Divisional Board*.—The Divisional Board of Agriculture, Gujarat, established last year, held four meetings during the year under report. In addition, the Gujarat Divisional Cotton Committee attached to the Board held its Special Meeting on 9th December 1924 to consider the complaints from the cultivators and the trade about the Cotton Transport Act and it was attended by a Sub-committee of the Indian Central Cotton Committee.

The work of the Board was very gratifying in bringing about the closer co-ordination of the Agricultural and the Co-operative Departments; and in controlling and extending propaganda work in concentrated areas.

34. *District Cotton Work.*—The work is being continued as per settled policy during previous years. The total area under the control of the Department was 9,146 acres 6 gunthas against 8,400 acres of the last year. The cotton was ginned at the following gins:—

- (1) Messrs. Tata and Sons' Gin, Navsari.
- (2) Messrs. Whittle and Co.'s Gin, Bardoli.
- (3) Messrs. Narandas Rajaram and Co.'s Gin, Sania.

The total quantity of Kapas ginned at these centres amounted to 2,788-13-28 Bhars = 66,925 Maunds and 28 seers, the quantity of lint obtained from this came to 1,108 Khandis 14 inds. and 3¼ seers (about 2,217 full pressed bales). Most of this was purchased by the two well known firms of Messrs. Narandas Rajaram and Co. and Messrs. Rally Brothers at a premium varying from Rs. 20 to Rs. 25 per Khandi and the Department is thankful to both of them. The lowest rate obtained by cultivators was Rs. 300, while the highest was Rs. 337 and they seemed to be satisfied with the rates realised.

*Cotton Seed Distribution.*—The total quantity of seed purchased from the controlled area was 1,749,650 lbs. and no second class seed was purchased by the Department, as it was not found advisable to do so from past experience. The whole lot was disposed of as under:—

	Gallis.	Mds.	Srs.	=	Lbs.
The Rajpipla State ...	742	0	0	=	890,400
The Baroda State ...	59	15	0	=	71,400
British Districts (Six Depots).	348	3	0	=	417,720
Through other gin-owners ...	234	11	10	=	281,250
Miscellaneous demands from outside.	14	2	0	=	16,880
Reserved for resowings ...	60	0	0	=	72,000
Total ...	1,458	1	10	=	1,749,650

This is the fifth year since these operations were started and the results obtained so far are very satisfactory. The Goghari mixture percentage has gone down very much in most of the British tract, south of the Narmada, excepting a greater part of Olpad where seed of Selection I A and with it seed from the adjoining

Baroda Territory of Mangrol Taluka seem still to prevail. Similarly a part of Mandvi Taluka, which is surrounded on three sides by Baroda Territory and on the fourth side by Olpad, has a mixture seed growing. In addition to the above two, a very large part of Baroda Territory specially Mangrol and Kamrej Talukas and parts of Songadh, Vyara and other adjoining areas are not growing the Farm seed to the desired extent.

The most note-worthy feature of the year was the application of the Cotton Transport Act to the tract south of the Narmada. The people of Olpad and Mandvi raised huge cry over this Act; and consequently, had its operations been not relaxed to a certain extent, the whole area would have been purified in no time.

If the people of Olpad and Mandvi and those of the adjoining Baroda Territory try to copy the example of the Rajpipla State, the whole problem of purifying the tract of Goghari mixture becomes very simple and could be thoroughly dealt with within a couple of years. During the year under report, Rs. 1,34,400 were advanced by the gin-owners to the cultivators at 6 p. c. interest and Rs. 94,500 were advanced by the Director of Agriculture, Bombay Presidency, Poona, from his Personal Ledger Account for the seed purchase and distribution operations. The total turn-over of the whole transaction comes to Rs. 11,32,400.

35. *Agricultural District Work—(a) Demonstrations and Shows.*—During the year under report 15 demonstrations and shows were held including the one at Bansda and one at Ahwa (Dangs). Under recent orders of Government the Dangs tract is transferred from Gujarat Division and now included in the North Central Division and the services of the Bhil boy specially trained at the Godhra Vernacular Agricultural School for agricultural propaganda work are also transferred to the North Central Division. Of the above 3 were party demonstrations, viz., 1st on the Surat Farm, which was a great success, 2nd on the Broach Farm, and third on the Agricultural School Farm at Ambali (Godhra). In addition to these big demonstrations, about 50 village demonstrations were held by the Implement Depot Keepers and Kamgars in villages and the total area so worked came to nearly 200 acres.

(b) *Implement and Seed Depots.*—The depots at Godhra, Dohad, Kalol, Jhalod, Prantij and Bulsar were continued. The Implement Depot at Bulsar issued implements free of hire charges for their introduction in the backward tract; and about 20 persons took benefit of the same in working about 68 acres of land. The hire charges earned by all the other depots amounted to Rs. 47-6-0 only.

(c) *Distribution of Seeds, Implements and Manure.*—Various kinds of seeds were distributed in addition to cotton seed distributed by the Cotton Staff, from the different farms and by the District Agricultural Overseers amounting to nearly 80,000 lbs., consisting of new and improved types of cotton, wheat, groundnuts, &c.,



159 implements worth about Rs. 2,256 including spare parts and artificial manures about 8 tons including denaturalised salt worth about Rs. 1,200 were also distributed.

(d) *Demonstration Plots.*—The District Agricultural Overseers managed 142 demonstration plots on cultivators' fields covering an area of 166 acres 30 gunthas, to demonstrate different methods of tillage and manuring and improved varieties of crops recommended by the Department.

(e) *Measures to prevent Smut in Jowar.*—As per Government Circular No. 6799, R. D., dated 19th February 1923, vigorous efforts were made to spread through the Revenue Officers the propaganda work of steeping jowar seed in copper sulphate solution for prevention of smuts. For this purpose 21 meetings were held by Agricultural Officers to demonstrate the method and use of this solution to the officers of the Revenue Department and the cultivators.

The total number of packets of copper sulphate thus distributed was 8,582 during the year under report. Though this is a very big item in comparison with the distribution by the Department in the past years, the packets could not be distributed to the fullest extent owing to unfavourable rains that were scanty and irregularly distributed in the districts of North Gujarat. It is hoped that a more organised campaign will be carried on next year with the mutual help of the officers of the Revenue Department.

36. *Agricultural Associations.*—(1) The Chorashi Taluka Development Association which was started on 18th June 1922 continued to do very good work. It has got in all 716 members including 15 patrons. Including the amount of Rs. 1,000 subsidy from Government the total income of the Association during the year was Rs. 2,633-12-9 and the expenditure amounted to Rs. 1,829-7-8. The balance including the reserve fund on 31st March 1924 was Rs. 5,475-12-9.

The Association maintained a graduate fieldman and a Kamgar and also conducted an implement depot for giving out useful implements on hire. The main activities of the Association are demonstrations and supply of foreign implements to its members. Implements worth Rs. 120, seeds and plants worth Rs. 157-8-0 including cabbage seed worth Rs. 24-4-0, and 550 packets of copper sulphate were sold from the depot. Budding of 700 country rose plants and 100 country bore trees (*Zizyphus jujuba*) were done in some places. An agricultural survey of the Chorashi Taluka was made by the District Agricultural Overseer, Surat and co-operative survey of the taluka was also undertaken by the Agricultural Organiser, C. S. N. D.

(2) Efforts are being made to start a similar Taluka Development Association elsewhere and one will be started in Jalalpur Taluka next year.

(3) Efforts were made to make the old Agricultural Associations in Kaira and Panch Mahals Districts rather active, by calling the

meetings and helping some of them in raising demonstrating plots of various new crops and improved methods.

37. *Agricultural Co-operative Work.*—Four new Co-operative Non-credit Agricultural Societies were started during the year, making in all 22 such societies in Gujarat. The most important out of the new ones were Power Pumping Society at Ankhilav in the Kaira District, one Power Pumping Society at Tukwada in the Surat District, and one Co-operative Ginning Society at Kareli in the Broach District.

Five out of the nine Cotton Seed and Sale Societies worked during the year. The total value of cotton and cotton seed sold by Cotton Sale and Seed Societies during the year was Rs. 6,35,929 an increase of 138.3 per cent. over the previous year's figures.

38. *Insect and other Pests*—(a) *Katra or Hairy Caterpillars* (*Amsacta mooreii*).—The campaign of controlling Katras by dusting with Paris Green was again conducted during the year at 3 places, viz., Dohad Farm, Galalia Falia (near Dohad) and Derol (Taluka Kalol, Panch Mahals). About 349 acres of various crops were dusted with the mixture of Paris Green and slaked lime in proportion of 1 in 20 to 1 in 25 with the result that the Katras attacking the growing crops either remained dormant or fled away by the smell of the mixture. The Katras do not seem to eat lime and so long the dusted mixture remains on the leaves they do not eat the leaves also; but as soon as it is washed away by rains or blown away by wind then they again appear and the crop has to be dusted again. In order to avoid this dusting several times this year, a trial was made to mix Paris Green with edible flours of cheap millets which being organic the Katras seem to eat them readily and die in lots. This is being further tried during the current season with every hope of success.

(b) *Granary Pests.*—A trial of fumigating seeds for storage against weevil attack was carried on at Dhansura and Demai in Ahmedabad District. 424 lbs. of wheat seed and 1,280 lbs. bajri seed were fumigated with Carbon Bisulphide at the rate of 1 oz. for 200 lbs. and stored in jars with the results that no weevils were found in the case of well dried seeds.

(c) *Wild Pigs and Jackals.*—About 210 packets of strychnine and 213 of white arsenic were distributed for poisoning trials on wild pigs and jackals. From the available reports received it was observed that due to the use of 155 packets, 47 animals were found dead. The work of carrying out poisoning trials requires strenuous attention of a special officer and the question is under consideration.

(d) *Jowar Stem Borer.*—Mr. Jhaveri was transferred to Poona as Assistant Professor of Entomology and the work of further investigation is entrusted to a new graduate under the guidance and supervision of Mr. Ramrao, the Cotton Entomologist, stationed at Surat. The results of this research are being published shortly in the form of a memoir.

39. *Boring.*—As mentioned in para. 24 of the last year's report 12 machines remained for working in this Division; out of which there were only 3 efficient machines (*viz.*, one Musto Power and two Musto Hand Power) the rest being Cawnpore type machines not suitable for going deeper beyond 100 feet and also working in rock.

Out of 95 applications received for boring during the year only 43 applicants sent in their agreements, the main reason for the serious fall in demand being the exorbitant rates of boring sanctioned by Government in comparison with the rates previously charged by the Government and those of private boring contractors.

33 bores including three left incomplete last year were made in the year under report, involving a total depth of 1,757 feet out of which 19 were successful giving an increase of 21,750 gallons of water. Out of the remaining 14, four were abandoned, four failed and six remained incomplete at the end of the year. Ten applications remained unattended for want of machines to be worked in rock.

21 old bores that were choked up by sand, &c., were cleaned and set right on application from the well owners. In seven cases of old bores, pipes had to be cut in the well as their water level had gone down considerably, so that water from the bores was allowed to flow freely in the wells.

Seven accidents occurred during the year of which six were removed and trial to repair one was in progress.

During the year one of the Cawnpore machine was converted into power by attaching a small 3 B. H. P. Oil Engine which can work 3" to 4" bore.

At the end of the year under report it was arranged to send all the remaining eight Cawnpore type machines to the Agricultural Engineer, Poona, for modification so as to make them suitable for rock boring for working in the Ahmednagar District. It was also arranged to convert the two Musto Hand Machines into Power and to purchase one 6" Power Drilling Machine. It is expected that these three power machines would be available for work in October next and when ready they will do very good work.

40. *Mechanical Assistance to Cultivators and Others.*—The Mechanical Assistant received in all 30 inquiries during the year under report, of which 25 were attended to and five were pending. Most important of those attended were (1) complete erection of two pumping plants; (2) inspection and repairs to eight pumping plants; (3) site survey and preparing estimates and drawings for seven proposed pumping plants; (4) repairs to one hand pump; (5) over-hauling a Fordson Tractor; (6) site survey and preparing estimates and drawing for a co-operative ginning factory at Kareli (District Broach).

The Fordson Tractor on the Chharodi Cattle Farm was overhauled and put into working order. It will now be given on hire on applications for motor ploughing from the cultivators in North Gujarat. Mr. Vaidya's services have been of very great use to cultivators specially.

A new case tractor 22-40 B. H. P. has been recently purchased for South Gujarat and is being tried on the Surat Farm. On seeing that it successfully works on the Farm and round about, it will be given out on hire to cultivators in the Surat and Broach Districts.

Surat:  
Dated the 3rd August 1924. }

BHIMBHAI M.,  
Deputy Director of Agriculture,  
Gujarat, Surat.

## APPENDIX G.

SUMMARY OF WORK DONE BY THE DEPUTY DIRECTOR OF  
AGRICULTURE, KONKAN, DURING THE YEAR 1923-24.*General.*

1. *Charge.*—Mr. V. G. Gokhale was in charge of the Division throughout except the last twenty days of the year when Mr. K. M. Pawar held the charge. This report for the above reason has been prepared by Mr. Gokhale.

2. *Lines of Work.*—The work of the year 1923-24 has proceeded and developed along the same main lines as of the last report without any changes of importance in the detailed organisation and equipment of those main lines.

3. *Staff.*—The strength of the superior technically educated staff of assistants stood in the year as follows, as compared with that of the last year :—

	1922-23	1923-24.
Research and Experiment ...	8	8
Extension and Propaganda ...	5	5
Agricultural Education ...	2	1
In training ...	Nil	1

The Agricultural School at Veshwi having been closed, the post of the Head Master of that school was reduced.

4. *Cost of the Year's Work.*—The following statement will furnish the information in abstract and in comparison with the previous year for each broad division of activities :—

Class of Work.	Establishment (pay and allow- ances).		Contingencies.		Total.	
	1923-24.	1922-23.	1923-24.	1922-23.	1923-24.	1922-23.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Research and Experiment ...	15,693	18,317	16,533	17,982	32,226	36,299
Extension and Propaganda...	18,845	16,161	6,229	4,825	25,074	20,986
Agricultural Education ...	4,536	5,294	8,300	10,027	12,836	15,321
Direction and Superintend- ence.	14,741	17,310	1,793	1,796	16,534	19,106
Total ...	53,815	57,062	32,855	34,630	86,670	91,712

It will be seen that the expenditure has been reduced down under almost all the headings except those of agricultural propa- ganda, the total expenditure amounting to about six per cent. less

than that of the last year. The increased expenditure under Agricultural propaganda is due to leave charges, to one graduate being additionally entertained for training and to the expansion of propaganda activities which may be regarded as in the right direction.

5. *Physical and other Conditions influencing the Agriculture of the year.*—The rainfall and the season on the whole was not favourable. The peculiarity of this year's rainfall was that nearly three-fourth of the annual precipitation was received in July, while June and August got few showers. The conditions which affected the yield of rice, the important crop of Konkan, were the holding off of rain in the seedling stage heavy showers in July resulting in lodging the crop in low-lying fields, very light showers in August and suspension of rain in September. On the whole the net effect of the season was decrease in the yield of rice by 10 to 25 per cent. Rabi crops could not be grown for want of sufficient moisture. There was sufficient water for irrigated crops in streams and wells, but in upghat Talukas of the Kanara District and other parts of Konkan near the hills supply of water was less.

With regard to pests and diseases, those worth a special mention, as occurring in addition to the usual ones are a mild attack of rice stem borer in Ratnagiri, attack of mango hoppers in Ratnagiri and Kolaba and a very severe attack and loss by Koleroga on betel-nut in Kanara amounting to 40 per cent. and more. Trouble from wild pigs is on the increase in Kolaba and parts of Ratnagiri District near jungles. In the upghat Taluka of the Kanara District, namely, Sirsi and Yellapur, the elephant trouble is on an increase and is threatening to be serious on that side.

6. *Results of the Year.*—These are summarised below under the headings of the main lines.

#### *Research and Experiment.*

7. *Researches into the Increasing of Yield or bringing about an Economy in Rice Cultivation.*—The physiological factors which contribute towards making up the yield, and the best and the most-economic ways to influence their action have been under an intensive and exhaustive study at the Karjat Rice Research Station for the last five years. Out of the rice experimental work at Kumta and Ratnagiri, representative of quite different sets of conditions of soil and climate, which was remodelled since 1922 to conform to the general policy adopted for the main station at Karjat, that at Kumta was continued but owing to diversion of the investigating staff at Ratnagiri to more important work, the latter ceased to serve as a supplementary centre.

The programme of the year's work aimed at verifying the yet inconclusive results of the past period and at exploring deeper into the requirements of the rice plant in respect of proper nourishment and water. The verifying part of the work has confirmed the findings of the past work so as to need no further repetition. The

further exploring part has brought us to a new line of attack of how the size of the ear-head can be increased without reducing the optimum number of bearing plants per acre. Next year's work has been so planned as to throw light on this issue. Experiments were also designed to study the water requirements of rice and the methods of approaching the subject have been cleared up. At Kumta the inaction of manures in absence of humus and comparatively higher proportions of straw to grain in contrast with those at Karjat have assumed special importance. The study of some side issues have led to the following results of practical value :—

In advocating nitrogenous manures such as sulphate of ammonia on trap soils represented by Karjat, no change seems to be necessary in spacing that is generally adopted by cultivators without manure, but some economy in the quantity of seedlings may be brought about by reducing the number of seedlings transplanted per bunch by half.

Artificial manures such as sulphate of ammonia, mineral superphosphate and sulphate of potash do not leave any residue even in the first year of their discontinuance.

A Committee consisting of the Director of Agriculture, Deputy Director of Agriculture, Konkan, the Agricultural Chemist, the Economic Botanist, the Rice Specialist and Mr. K. V. Joshi, the late Rice Specialist, has been constituted to direct the policy of the future work.

8. *Selection and Breeding of Higher Yielding Strains of Rice for South Konkan.*—It has been stated in the last year's report that being encouraged by the success achieved in evolving substantially higher yielding strains of *kolamba* rice for the North Konkan at the Karjat Rice Breeding Station, breeding work for South Konkan was to be taken up at Ratnagiri on the existing Ratnagiri Farm since the year under report.

A Committee consisting of the Director of Agriculture, the Plant Breeding Expert, the Deputy Director of Agriculture, Konkan, the Economic Botanist and the Breeder in immediate charge of the work has been constituted to advice and control the general policy of the work.

The work of the year, therefore, consisted of the first stage of plant breeding work, *viz.*, collecting and growing under comparable conditions bulk seed samples representative of the commoner varieties grown at present on fairly considerable scale in the area to be served. In all 234 such bulk samples were collected and grown. From the crop of these samples 913 individual plants, indicating by their characters, to be observed on growing plants, the possibility of giving high yield, were selected, harvested and their yields weighed separately. Judging further from the actual yields, 200 individuals, showing the highest yields amongst the samples representative of different conditions, have been taken out for further testing. Only 40 of the latter under the late group are to be dealt

with on the plant to plant basis and the remaining are to be observed on the collective performance of each of them separately to see if they contain any material worth further working up.

Judging on the basis of the performance of the various bulk samples tested, some samples, giving higher yields than the local by from 3 to 172 per cent., have been obtained and it is mostly from these lots that our material for future work has been taken.

9. *Remedial Measures against Rice Land Crabs.*—The land crab is responsible for a very great direct and indirect damage in the North Konkan and also in Sind, and the study of the pest and remedial measures against it has been taken up since the year 1922, as requiring the first attention amongst several zoological problems of the Konkan. During the year under report, three more species of land crabs have been found and identified and their distribution has been further studied in new tracts; two cases of mating were noticed and some evidence was observed to show that crabs might be producing young ones more than once in their life-time; out of a net work of openings of hibernating burrows, most of them are superficial. Some data have been obtained in the laboratory regarding the rate of growth and the number of moults cast by the different species, and it is adjudged that the *Gecarcinucus* species might be living up to 4 to 5 years while the *Paratelphusa* might be living only up to 2 or 3 years. One very important weak point has been discovered in its life history which is likely to be of great value in controlling the pest, and that is a temperature above 100° F is quite fatal, death taking place within 2 or 3 minutes at 110° F.

The investigation of remedial measures was continued. Baiting into them earthen pots was not successful to any practicable extent; amongst the several baits and attractive smells and poisons tried, boiled rice, grass hoppers and Paris Green proved to be the most effective respectively. Fresh air-slaked lime and washing soda were also found useful, but washing soda is out of the question as it is harmful to plant growth. The fumes of a number of substances were tried, out of which carbon-bi-sulphide, methylated spirit, petrol were found very successful. Carbon-bi-sulphide being given a field trial gave the best results. A small quantity of naphtheline to petrol or spirit accelerates their action. All these are yet to be tried on a business scale.

10. *Selection and Breeding of higher yielding Strains of Nagli (eleusine coracana).*—This work is being done at Hatkhamba, 10 miles east of Ratnagiri. The year of report is the third of taking up this work. The fifteen strains which were isolated out of a large number of single lines tested in the previous year were further studied in an intensive manner. These showed an increase up to 50 per cent. in this year's comparisons with the locals, whereas they were also selected last year because these had given 100 per cent. or more yield. On the whole the absolute outturns of strains have remained more or less the same as last year, but those of the checks



have increased considerably. It appears this behaviour of the checks in the two years might be due to the fact that the local checks used during the two years have not been the same, last the seed samples used for checks were obtained from a single cultivator, whereas in the report year the sample was made up from 20 lots of one and the same variety obtained from several cultivators, the idea in doing the latter being to make the sample as average and representative as possible. These strains, nevertheless, have kept their high ranks on the whole as compared to some more continued as reserves. Six out of the fifteen, not having given good yields this year, nor being consistent in replicates and being also those from the lower ranks of the last year, are not worth continuing. All the rest will be continued for further verification. Also out of the reserve lot of 71 individuals, two have shown fairly high yields and one has a special characteristic, so these will be added to the strains for intensive study.

Some evidence has been noticed whereby natural cross-fertilization is suspected to a small extent—say from 1 to 2 per cent. Thus the strains under intensive study must be thoroughly tested about their undoubted purity before they could be finally decided as fit for recommendation. The two of the best of these can be tested on a field scale. The reserve lot with the exception of some which are definitely poor will also be continued.

11. *Remedies against Blight Disease of Onions.*—This is the third year of the investigation of this disease and into remedial measures in collaboration with the Plant Pathologist to Government. The year's results on the Kumta Farm confirm those of the previous years that the addition of one or more elements of plant food in artificial forms or spraying with Bordeaux mixture do not appreciably change the incidence of disease. The post of the Plant Pathologist being in abeyance further study has also to be suspended.

12. *Bone Meal as a corrective of salt affected sweet Rice Lands in Kanara.*—This experiment was repeated on cultivators' fields for verifying the first year's results. These have fully and conclusively corroborated the first year's remarkable results which are now ready for demonstration. The results have been sent up for publication in the Agricultural College Magazine.

13. *Testing of the Use of concentrated Manures and new Varieties of Sugarcane in Kanara.*—It has been found essential to have farm yard manure in the land from the beginning of the sugarcane crop on soils represented by the Kumta Farm. Mere artificials like sulphate of ammonia are not effective. Contrary to expectations even a small dose of 200 lbs. of bone meal has been found beneficial to sugarcane in laterite parts of Konkan. This is a very valuable result.

On the Kumta Farm it has been found that increasing the distance between the rows of sugarcane to more than 2½ feet results in a reduction in the yield per acre.

In the matter of varieties, Red Sport and Manjav may be finally put down as ones competing fairly well with Red Mauritius with advantages of earliness and richer and purer juice and the disadvantage of softness of the former. Two promising strains Nos. H. M. 544 and 312 evolved by selection out of Red Mauritius by the Mysore Department of Agriculture and reported to be superior to Red Mauritius in their tracts similar to upghat Kanara parts have been taken for trial on cultivators' fields. The crops obtained are yet too small a scale to judge about their profitableness or otherwise. Similarly new varieties are under trial on cultivators' fields in the Mundgod (eastern) tract of Kanara, which has much less rainfall but some supply of tank irrigation.

14. *Sulphate of Ammonia for Melons.*—The profit of using sulphate of ammonia for melons as compared with fish manure, which is the local manure used in the Kolaba District, was confirmed in this year's trials on ordinary rice and alluvial lands, but the results were not as good on heavier description (or Manat) of soils.

15. *Experiments in increasing the Yields and Profits from Cocoanuts in Konkan.*—Some manurial treatments which have been recommended by other cocoanut investigators were begun to be tested in cultivators' gardens in Kanara. This being the first year of the trial no results are observable. One dwarf and reputed variety from Malay States and another dwarf and green variety from Cochin which are reported to be good yielders are being compared with the local ones. A general study of the cocoanut plant is also taken up; no difference was noticed in the germination of the top and bottom nuts of a bunch; although seed nuts planted vertically germinate a little later than those planted horizontally or inclined half way, eventually the growth gets equalised. The suitability of *crotolaria striata* and *tephrosia candida* as green manuring plants in cocoanut gardens has been conclusively proved by this year's results.

16. *Bourbon Tree Cotton on Varkas Lands in Ratnagiri.*—The experimental plantation started in the previous year which was reduced to sticks at the end of the fair season revived again after the setting in of the monsoon of the year under report, and made a fair growth up to the end of that monsoon; but the plants began to wither and drop their leaves again in the fair season without producing any bolls. A plantation started on deeper soils on the Ratnagiri Farm is, however, growing well and produced bolls. It is, therefore, clear from this that whereas this tree cotton would succeed well on deep but well-drained high lands, it has no prospects of success on shallower rocky slopes of hills.

17. *Wheat in the North Konkan.*—This year's trials confirm the results of the past two years that Pusa 4 can be grown fairly successfully as it is not susceptible to rust.

18. *Safflower as a Rabi Crop in Moisture retentive Rice Lands.*—The stray cattle is a great hardship for the cultivation of Rabi crops in moisture retentive rice fields as fencing isolated patches costs a

good deal. With the idea of seeing whether safflower could grow successfully and by its spiny nature would give a crop unmolested by stray cattle, this was tried in fenced fields first to see how it grows with very hopeful results.

18A. *Tobacco in coastal parts of Kanara.*—This crop was tried a third time on the Kumta Farm and on cultivators' fields. The results can now be said to be conclusive that this crop bids fair to be a decided success and a profitable crop to grow. It is believed and also experienced to a certain degree that it requires to be watered overhead so that the sticky substance secreted on leaves is washed away and the cured tobacco would not be bitter in taste.

19. *Algaroba (Prosopis juliflora).*—The few plants which are established on the Ratnagiri and Kumta Farms continue to live and those on the Ratnagiri Farm which have received irrigation and are on deep soil have grown vigorously wild big plants. Those without irrigation on varkas lands are just keeping up.

20. *New Fruit Trees.*—On the Kumta Farm oranges and mosambis continue to thrive well giving nearly the same quality of fruit as in Poona.

Alphonso, which is a lasting variety of mango, has been now conclusively proved to be suitable for Kanara conditions. Its plantation is being steadily taken up by cultivators.

At the request of the Ratnagiri Taluka Development Association the Government of Bombay have appointed a committee for enquiring into the present conditions and difficulties of marketing of mangoes and to make recommendations. Guavas and citrons have been found to thrive well in the eastern tract of Kanara.

21. *Improvement in Implements.*—The small Vatandar plough, which is a turn-wrest one, sold by Messrs. Kulkarni and Sons of Dharwar, has been found to suit the eastern tract of Kanara.

The Eureka plough sold by the Mysore Department of Agriculture has been found to be more economic for ploughing the sandy rice fields which are usually hand dug in Kanara.

Disc harrow and sabul plough were tried for over-turning the salt rice lands of the North Konkan. The sabul plough was found to draw heavy for one pair of Konkan bullocks and the tilth produced by the disc harrow was not enough.

A light disc harrow was found on the Kumta Farm to prepare a fine puddle for transplanting rice, but it needs to be still lighter so as to be drawn by an ordinary pair of Konkan bullocks.

22. *Oven Drier for Drying the Garden Produce in Kanara.*—The experimental oven-drier constructed at Killar, taluka Siddapur of the Kanara District, was continued to be tested for drying betelnuts, plantains, &c., with great advantages. The defect of the uneven distribution of heat in the drying chamber referred to in the last

year's report could not be improved upon as the Agricultural Engineer, who was approached for expert advice, was not able to have it visited and examined.

23. *Best Way of utilising Bare Minor Forest Areas for Supply of Leaf Manure.*—This is the third year of the experimental plantation started at Kumta. Out of 23 species so far tried all have been able to survive through the fair season and start growth again during the next rainy season. From the experience of two years *terminalia tomentosa*, *cassia arboria* have been found to yield the highest quantity of vegetation in a given length of time up to the second year of growth. Out of the species tested all except mango and *dillenia pentagyna* stand pruning very well. *Memeceylon edule* and *gardenia gumanfera*, *calatropis gigantia* and *Kuda* are not browsed by cattle. As tested for rice, the green leaves of *nux vomica* and *terminalia belerica* and dry leaves of *cassia arboria* came to the top.

The trials in establishing plantations of *calatropis gigantia*, which has proved so remarkably beneficial for rice are being done at several places in almost all the Districts of Konkan. The optimum conditions necessary for success have not yet been known. Cuttings planted strike growth very well but the root system is not sufficiently developed to successfully tide over the fair season on shallow rocky hill slopes. On deep soil they have thriven better but it appears that the plant requires a thoroughly porous aerated well-drained soil. The plants grown from seeds sown in *situ* have not been able to survive through the dry season, though some self-sown plants are seen to establish themselves.

24. *Lac Culture.*—Brood lac sticks on *Ziziphus jujube* were obtained from Pusa and have been used for inoculating both *ziziphus* and *butja* trees at Karjat (at the foot of the Western Ghats). The inoculations have been quite successful on both of them and a good deal of lac has been produced by them. It is to be seen whether they will stand the high temperatures in April and May.

#### *Extension Work.*

25. Extension work consists in bringing agricultural improvements to the notice and into the practice of agriculturists and giving such advice and help as will make the agricultural industry in general more profitable. This work is principally carried on through the intinerent district staff who are called Agricultural Overseers, assisted by Kamgars. The Agricultural Stations also serve as standing centres of demonstrations or as centres for distributing improved seeds, manures and implements. Government have also desired since 1922 that local bodies, each not extending over an area of one taluka should be stimulated and encouraged for gradually taking over the work of Agricultural and Co-operative propaganda wherever conditions are ripe for the same by according their sanction to a grant of an annual subsidy equal to half their expenditure up to a limit of

Rs. 1,000. Similarly Government have, since April 1922, constituted Divisional Boards of Agricultural and Co-operative propaganda consisting of a majority of non-official representatives of the two movements to generally direct, control and supervise the working of the propaganda activities of the two movements either through Government Departments or the Local Bodies referred to above.

26. *The Work of the Konkan Divisional Board during the year.*—The Deputy Director of Agriculture, Konkan, continued to be the Chairman of the Board throughout the year according to the constitution. All the quarterly meetings were regularly convened and attended with quorum. The non-official members appointed on the Board for the year 1924-25 are as follows :—

- |   |   |
|---|---|
| 1. Mr. K. T. Karulker, Umbergaon, District Thana.   | } Representatives of Agricultural movement.     |
| 2. Mr. V. V. Nilekani, Sirsi, District N. Kanara.   |   |
| 3. Mr. V. K. Sanjanwala, Umbergaon, District Thana. | } Representatives of the Co-operative movement. |
| 4. Mr. V. V. Athalye, Shiposhi, District Ratnagiri. |   |

The non-official members with the exception of only one took a keen interest in the work of the Board and contributed many valuable suggestions. In addition to the administrative work of exercising general control and supervision of the Agricultural and general propaganda through the Government Departments and Taluka Development Associations, the Board considered and passed during the year 15 resolutions calculated to improve the policy of the propaganda, but 9 could meet with the approval of the Joint Board of the Director of Agriculture and the Registrar, Co-operative Societies, Poona.

27. (a) *Through direct Agency of the Agricultural Department.*—The work was carried on unhindered by any circumstances such as absence of staff and the like. The detailed items of improvements proved to be worth introducing, which have formed the activities of the year are given below by each district, the sphere of operations which it has been possible to tackle being indicated in brackets against each district. The items shown in italics represent the major ones.

*Thana District.*—(Chiefly round Palghar and in Kalyan Taluka).

(1) *Improved Strain of Kolamba Rice*, (2) *Nitrate of Soda for Onions*, (3) *Silage*.

*Kolaba District.*—(Chiefly Ulhas and Patalganga valleys and Andhra valley).

(1) Stimulation of irrigation farming on the tail waters of the Tata Hydro-Electric Works, together with all improvements possible; (2) *Substitutes to meet the deficiency of Rab for rice*; (3) Meston plough, (4) *Improved Kolamba Strains of rice*; (5) Bone meal manure for rice; (6) Nitrate of soda for onions; (7) Blade harrow for puddling, (8) Bulsar Rahat, (9) Leg horn breed of poultry.

*Ratnagiri District.*—(Chiefly Ratnagiri, Sangameshwar and Devgad talukas).

(1) Bone meal, fish manure and sulphate of ammonia for rice; (2) *Mass selection of rice seed*; (3) *Deccan harrow for puddling rice fields*; (4) New profitable crops of sweet potato and *kharif* chillies on *varkas* lands; (5) Guinea grass on *varkas* lands; (6) New and profitable crop of onion; (7) Extension of sugarcane cultivation; (8) Poisoning of wild animals doing damage to crops; (9) Meston plough; (10) Sabul plough; (11) Hand weeding tools; (12) Mote; (13) Spraying against mango hoppers; (14) Improved breeds of poultry; (15) Silage; (16) Surti Buffalo bull at Ratnagiri.

*Kanara District.*—(All over the district).

(1) Mass selection of rice seed; (2) *Bone meal manure for rice*; (3) Fish and ammonium sulphate in seed bed for rice; (4) Sulphate of ammonia for paddy in east Kanara; (5) Mascaty variety of rice; (6) Planting fewer seedlings; (7) Half seed rate; (8) *Red Mauritius and other higher yielding varieties of sugarcane*; (9) *Use of concentrated manures such as sulphate of ammonia, fish manure and undi cake for sugarcane*; (10) Wider planting and more efficient and economic tillage by sabul plough; (11) *Improved mills, furnaces and pans*; (12) Groundnut on *makki* and *hakkal* lands; (13) *Vari* on *hakkal* and *kumeri* lands; (14) *Onion cultivation together with top dressing with concentrates*; (14) Tobacco cultivation; (15) Improved rice land puddler; (16) *Spraying against koleroga of betelnut*; (17) Pig proof wire fence, *poisoning of wild animals*, and organisation of communal watching for the protection of crops from wild animals; (18) Extension of grafted mangoes; (19) *Silage in East Kanara*; (20) Introduction of new and more profitable irrigated and *hakkal* land crops in East Kanara; (21) Surti Buffalo bull at Kumta.

*Well Boring.*—All districts.

*General Propaganda.*—While carrying on propaganda in connection with specific improvements detailed above, dissemination of general knowledge of improved methods of agriculture, giving advice answering queries are also done by means of literature talks and discourses and magic lantern shows.

For the purpose of bringing the various improvements specified above to the notice and into the practice of cultivators demonstration

plots on cultivators' fields numbered as follows in comparison with those of the last year :—

Year.	Thana.	Kolaba.	Ratnagiri.	Kanara.	Total.
1923-24	Not reported.	18	32	106	156
1922-23	...	23	19	74	116

The year has added its quota to the progress under the various items with more or less rapidity as they fit in with the economic and temperamental conditions of the people to a more or less degree. spraying against *Koleroga* (mildew) disease of betelnut in Kanara has been received with an enthusiastic response; similarly the introduction of the higher yielding strains Nos. 42 and 79 of Kolamba rice on a large scale for the first time in the Karjat Taluka of the Kolaba District having fully confirmed the expectations arrived at from the results at the Breeding Station, the distribution operations have been extended to cover an area of about 10,000 acres in four or five talukas of the Thana and Kolaba Districts.

The following items of improvements have been now sufficiently popularised so that no further propaganda is necessary in them :—

*Kanara District.*—Improved sugarcane mills, Concentrated manures for sugarcane, Groundnut.

It has been also conclusively proved that the following items do not at all fit in with the Agricultural economic and temperamental conditions of the people and there is no need to go on further with them :—

*Thana District.*—Mass selection of seed (rice).

*Kolaba District.*—Bone meal for rice.

*Kanara District.*—Kirlosker's land side plough for Eastern Kanara.

The experimental work has also conclusively proved during the year the suitability of the following new items of improvements which will be included in the programme of propaganda work from the next year :—

*Thana District.*—Manuring of plantains with a mixture of superphosphate and nitrate of soda. Introduction of leg horn breed of poultry.

*Kolaba District.*—Introduction of leg horn breed of poultry.

*Ratnagiri District.*—Hand weeding tools.

*Kanara District.*—Popularisation of grafted varieties of mangoes. Green manure crops in cocoanut gardens, Guinea grass as a fodder crop in gardens.

28. *Arrangements to supply Implements, Manures, Seeds and other Articles.*—In order to meet the demands which are created as a result of the propaganda work for articles which are not an ordinary market commodity, the organisation for sale and hire depots and free agency work for arranging supply of others direct from the firms were continued. Bone meal manure, sulphate of ammonia, Meston plough, Poona gul boiling pans and sugar cane mills, pig proof wire fence, farm dynamites for making pits for mango planting and mango grafts were the most important of the articles thus dealt with. Arrangements to supply denaturalised salt for manurial puposes duty free were continued. Government have fixed a rate of annas thirteen per Bengal maund for three years up to 1925-26 even though it may cause some loss in the transaction. The number of permits issued together with the total quantity of salt for each district during the year under report is given and compared with that of the last year in the following statement :—

Period.	Thana District.		Kolaba District.		Ratnagiri District.		Kanara District.	
	No. of permits.	Quantity issued.	No. of permits.	Quantity issued.	No. of permits.	Quantity issued.	No. of permits.	Quantity issued.
November issue ...	7	Bengal Mds. 85	Nil.	Bengal Mds. Nil.	32	Bengal Mds. 725	47	Bengal Mds. 285
April-May issue ...	21	2,676	10	158	70	1,424	60	543
Total for the year 1923-24.	28	2,761	10	158	102	2,149	107	828
Total for the year 1922-23.	7	180	2	40	51	1,128½	48	398

29. *Well boring for Cultivators.*—The organisation for well boring for cultivators has been transferred to the control of the territorial Deputy Director from the 1st of February 1923. There has been no alteration during the year in the number of Musto Patent Hand Machine and one Calyx power drill which were available at the end of the last year. Three of the hand and one power machines were allotted to the Thana District where there has been the greatest success and demand for well boring, while one hand machine has been allotted to each of the remaining three



districts in which boring is yet in an exploratory stage. The following is a resume of the work done from 1st July to 30th June of the year :—

District.	Number of machines.		Number of enquiries which resulted into definite orders supported by agreements.	Number of definite orders which cannot be provided for up to the end of the next year for insufficiency of machines.	Total footage bored.	Number of bores completed.		Number of bores incomplete.	Number of bores cleaned.	Putting up hand pumps.	Repairs to engines and power pumps.
	Number of enquiries received during the year.	Number of machines.				Successful.	Unsuccessful.				
Thana ...	4	64	36	28	1,535'	19	7	4	6	22	1
Kolaba ...	1	16	6	10	291'	2	2	1	...	...	...
Ratnagiri ...	1	15	6	9	80'	...	2	1	...	...	...
Kanara ...	1	6	3	3	139'	1	2	...	...	...	...
Total ...	7	101	51	50	2,046'	22	13	6	5	22	1

During the year under report 1,535 feet were bored in the Thana District with 19 successful bores, the highest depth for the successful bores being 107 feet. From this year's results it may be said that there are possibilities of water being tapped in the Kolaba District as will be seen from the above statement. The boring work in the Ratnagiri District is still under trial and nothing definite can be said just now but it is expected that some data will be available next year from which conclusions can be drawn. The Kanara conditions reported last year still hold good.

#### B. Through Local Non-official Organisations.

30. *Old Type Agricultural Associations.*—There has been no improvement in the general apathy and defunctness of these local organisations excepting the few rare cases in which the local Agricultural and Revenue Officers have made it their task of love. The reasons for this have been explained in full in previous reports and it is time to abandon these as hopeless.

31. *Taluka Development Associations according to the new Government Scheme.*—The origin and special advantages of these local bodies under this name as per scheme sanctioned in Government Resolution No. 3378, dated 5th June 1922, R. D., has been explained in the last year's report and more fully in the Government Resolution itself. Efforts to bring the provisions of the Government scheme to the notice of the public with a view to stimulate, encourage and help local interest and effort to form Taluka Development Associations in areas which are regarded as ripe to take up the work of agricultural improvements on their own shoulders were continued. As a result, Mahim and Kalyan Talukas of the Thana District, Karwar Taluka of the Kanara District and

Rajapur Taluka of the Ratnagiri applied to and were recommended by the Divisional Board for recognition. All of them applied to get themselves registered under the Co-operative Act, but no intimation has yet been received about Rajapur and Kalyan which were sent up late in the year. The application of the Murbad Taluka of the Thana District is still under enquiry of the Divisional Board while Malvan has applied to the Deputy Director of Agriculture, Konkan, for making the preliminary Agricultural survey for them.

Thus including those formed in the past, the following talukas in each District have Development Associations at the end of the year under report:—

Thana:—Mahim and Kalyan.

Kolaba:—Alibag

Ratnagiri:—Ratnagiri, Dapoli and Rajapur.

Kanara:—Karwar and Sirsi.

All of them have been advised in drawing up their annual programmes and budgets and have appointed Kamgars for carrying on their propaganda work. Technical advice and guidance was frequently given to the Managing Committee in the conduct of the work and in directing and supervising the work of their Kamgars. All the Associations are yet in their infancy and require considerable guidance in technical matters by the officers of the Agricultural Department before they will be able to take from their Kamgars systematic and effective work. The Sirsi Kamgar being particularly good, the work of that Association has been much better organised and effective than others. Alibag has been the worst in this respect. It has been the general experience that the *management find it extremely difficult to command sufficient confidence of the people to put together their local quota of contributions annually*. Some associations have, therefore, under their consideration schemes of collecting together a permanent fund. All Associations have adopted a bye-law to have the Mamlatdar of the taluka as the Vice-President and wherever the Mamlatdars have taken active interest, results have been better than where they are apathetic. The keen and active interest taken by Mr. K. R. Situt of Rajapur Taluka must be specially mentioned. Messrs. G. K. Gokhale, while Mamlatdar of Sirsi and V. B. Kale of Alibag have also distinguished themselves from others in this respect.

Annual reports have been received from all, except Alibag. They show varying quality and quantity of work but which can be generally said to be much short of what could be expected.

Government subsidies as mentioned below were paid by the Director of Agriculture on the recommendation of the Konkan Divisional Board:—

Mahim Rs. 600, Alibag Rs. 800, Ratnagiri Rs. 1,000, Dapoli Rs. 521, Sirsi Rs. 500, and Karwar Rs. 600.

32. *Stimulation of Co-operation for promoting Agricultural Improvements.*—The Agricultural propaganda staff are side by side with individual persuasion, also on the look out for stimulating co-operative effort for promoting agricultural improvements. Several possibilities of fencing, implement hire, irrigation and sale societies have been located and investigation and stimulation were carried on during the year with the following results :—

Implement Hire Societies at Mundgod	...	1
Sale Societies—Mango Sale Society at Ratnagiri	...	1

A special paid officer for stimulating, investigating and supervising agricultural co-operation for the districts of Thana, Kolaba and Ratnagiri has been transferred since the year 1923 to the control of the Agricultural Department under the Divisional Deputy Director of Agriculture. The Agricultural Organizer before directing his attention to the stimulation of new societies had first to see to the consolidation, improvement, expansion of the existing Non-credit Agricultural Societies and Taluka Development Co-operative Associations, to taking steps to bring about the recovery of overdues. Most of the Manure and Cattle Breeding Societies have degenerated very much and have allowed overdues to accumulate and had to be visited many times. Some of them have been stimulated to life and arrears have been recovered from some others but they can by no means be yet left to themselves. In addition to the above in all 5 irrigation, 2 fencing, 2 manure, 1 dairy and 1 Taluka Development Co-operative Association possibilities were in hand for investigation but the following only have so far reached the stage of materialisation :—

Sale Societies—Dried Plantain at Agashi	...	1
Dairy Societies—At Kalyan	...	1
Taluka Development Association—At Murbad	...	1

Liquidation work of three societies was entrusted and attended by him. The incumbents of the post being quite new they had to get themselves trained in the work.

Proposals for Non-credit Agricultural Co-operative Societies from the District Honorary Organisers for Co-operative Societies were sent up for the opinion of the Deputy Director of Agriculture.

The greatest need for the development of proper schemes of agricultural co-operation is the availability of long term loans at a low rate of interest.

#### C. Through Publications.

33. Leaflets in English as well as vernaculars for free distribution containing new successful results of the Konkan Division to be recommended, drawn up during the year are as follows :—

1. Higher yielding strains of Kolamba Rice for North Konkan.

2. Red Mauritius variety of sugarcane for Konkan (Particularly Kanara).

Notes and articles were contributed to the various Agricultural Magazines by the members of the staff of which there were (20) extracts, abstracts, &c. and (32) original ones being mentioned below:—

Subject of note or article.	Name of author.	Where published.
1. Sugarcane borer and its control.	P. V. Wagle, Entomological Assistant, Konkan.	Konkan Sheti Samachar.
2. Cultivation and uses of cashewnut.	Do. ...	Do.
3. Varkas crops ...	V. L. Bhoosker, Varkas Land Specialist, Hatkhamba.	Do.
4. Varkas cultivation ...	Do. ...	Do.
5. Flowering and fertilization of Nagli.	S. K. Patwardhan, Agricultural Investigator, Hatkhamba.	Do.
6. Possible lines of increasing the yield of rice in Konkan.	D. M. Kulkarni, Scientific Assistant, Rice Research Station, Karjat.	Do.
7. Turmeric cultivation ...	Do. ...	Do.
8. Chemical and Physical analysis of rice soils in relation to their fertility.	Do. ...	Agricultural College Magazine, Poona.
9. Ginger cultivation ...	K. V. Joshi, Rice Specialist, Karjat.	Konkan Sheti Samachar.
10. Cottage industries ...	M. V. Gadkari, Scientific Assistant, Rice Research Station, Karjat.	Do.
11. Information about laterite stone in Goa.	Do. ...	Do.
12. Lemon budding ...	Do. ...	Do.
13. Method of sending grafts and plants by post.	Do. ...	Do.
14. Agriculture and agriculturist.	Do. ...	Do.
15. Cultivation of cane in Mundgod Peta.	G. B. Pandit, Agricultural Demonstrator, Mundgod.	Do.
16. Importance of salt to food.	Do. ...	Do.
17. Comparison of city life and village life.	Do. ...	Do.

Subject of note or article.	Name of author.	Where published.
18. Review of Konkan Sheti for 1922-23.	G. B. Pandit, Agricultural Demonstrator, Mundgod.	Konkan Sheti Samachar.
19. Experience of ensilage making 1922-23.	Do. ...	Do.
20. Papai as a fruit ...	Do. ...	Do.
21. Lemon as a fruit ...	Do. ...	Do.
22. Six monthly report of Mundgod Demonstration Farm.	N. J. Gokhale, Kamgar, Mundgod.	Vakkaligaroo Vakkali-tanavoo
23. Cottage industry ...	Do. ...	Do.
24. Suggestions for training boys in agricultural schools.	Do. ...	Do.
25. Demonstration at Andebail.	Do. ...	Do.
26. Note on Koleroga ...	M. R. Gokarn, Agricultural Overseer, Kanara.	Vakkaligaroo Vakkali-tanavoo and Konkan Sheti Samachar.
27. Myndoli variety of plantains in Goa.	M. R. Gokarn, Agricultural Overseer, Kanara.	Agricultural College Magazine, Poona.
28. A note on staking of sugarcane by wire.	V. S. Habbu, Superintendent, Kumta Farm, Kumta.	Do.
29. Report of demonstration held at Panwel.	N. V. Hanmante, Agricultural Overseer, Kolaba, Karjat.	Konkan Sheti Samachar.
30. Artificial manures and objection of the public on them.	Do. ...	Do.
31. Some useful hints about cocconut.	Do. ...	Do.
32. Importance of fruit and vegetables.	Do. ...	Do.

34. *The Konkan Agricultural Magazine.*—The monthly magazine in Marathi devoted exclusively to Konkan agriculture under the name *Konkan Sheti Samachar* commenced by Mr. Y. G. Gurjar of Alibag in the year 1917 and the editing of which was taken over by the Konkan Agricultural Department was regular in publication under the editorship of Mr. G. B. Pandit, L.Ag., Agricultural Demonstrator, Mundgod, District Kanara, for which he and others who contributed and Mr. Limaye who published the same punctually deserve the best thanks. Its circulation at present stands at 535 copies which is more by 14 copies as compared to the last year.

*Agricultural Education.*

35. *The Agricultural Middle School in Vernacular.*—The year under report is the seventh year of the Agricultural School at Jambul near Kalyan, District Thana, for giving agricultural education of a primary nature through Marathi primarily for the Marathi speaking Konkan Districts. There has been no change during the year in regard to the standard for admission and the course of studies.

The year opened with 17 students, 14 in the first year and 3 in the second year. At the end of the year, however, there remained only 11 students in the first year and 3 in the second year. Out of these only 1 in the senior class and 5 in the junior class passed in the examination. Whatever students could be secured for the school have not done so well.

The total expenditure of the school including the teaching staff and free boarding expenses amounted to Rs. 12,792-9-0 and the total receipts to Rs. 1,308-6-0 as against Rs. 13,017 and Rs. 3,830 respectively of the previous year.

Out of 47 boys turned out successful from this school up to now, 1 having just passed out and 10 of the previous batch have not yet settled in life, 9 are managing their lands, 7 are in service connected with agriculture, 4 continuing ordinary secondary education, 13 are engaged in business other than that of agriculture and whereabouts of 3 are not traceable. Those that are engaged in farming have not as yet exhibited any striking development to justify their education at this school.

In spite of the several measures resorted to for recruiting as detailed in the previous reports there has not been any improvement in the apathetic attitude of the people towards this form of agricultural education. It is, therefore, thought that unless some definite inducements such as preference in selecting candidates for *talathis* and rural school masters is offered in the beginning the response is not likely to be much better. Proposals to this effect were sent to Government but they did not meet with their approval. The Head Master undertook a special propaganda tour for explaining the manner and matter of teaching and all the arrangements for the lodging and boarding of students. He obtained about 30 applications from the parts of Thana and Kolaba Districts but eventually only 2 of the 30 applicants actually joined.

36. *Agricultural Bias Classes in the Rural Primary Schools.*—Four teachers one from each of the four districts of Konkan Division selected by the Educational Inspector and the Deputy Director of Agriculture, of the Division were trained in agriculture for one school year. Four primary schools, also one in each district, have been selected in which classes will be opened with the help of these trained teachers. Four more teachers have been selected for training during the school year commenced from 1st June 1924, for opening classes in additional primary schools next year.

37. *Training of Kamgars for meeting the Demand from private Farms or for carrying on Agricultural Propaganda of Taluka Development Associations.*—Two men were trained during the year for this purpose and employed by the Taluka Development Associations.

*Crop Tests.*

38. In accordance with Government orders contained in G. R. No. 601 of 21st January 1914, R. D., the graduate staff took during the year crop tests as follows :—

Name of crop.	Thana.	Kolaba.	Ratnagiri.	Kanara.
Rice	...	4	2	2
Sugarcane	...	...	...	1
Nagli	...	...	1	...

*Personal.*

39. The year is characterised by many changes in the personnel of the superior responsible staff of graduates, as many as half the number of posts having changed incumbents. All, with a solitary exception, have continued to work faithfully and hard, to the best of their respective abilities and capacities. The name of Mr. N. V. Hanmante, B.Ag., is to be added this year to the list of special mention made in the past.

V. G. GOKHALE,

*Offg* Professor of Agriculture,  
College of Agriculture, Poona.

K. M. PAWAR,

*Offg.* Deputy Director of Agriculture,  
Konkan Division.

## APPENDIX H.

THE DEPARTMENT OF AGRICULTURE IN SIND  
ANNUAL REPORT, 1923-24.*Introductory.*

I write this report under rather unusual circumstances as I took charge of the work in Sind at the end of January 1924, with no previous experience of Sind Agriculture, and am now on the point of retiring from the Department. I have studied past records of the Department's work and the current work on the Farms, and I take this opportunity of writing a review rather than a report, and of expressing my opinions, for what they may be worth, after such brief experience, regarding the work, its organisation and its future.

*Organisation and Finance.*

2. The Deputy Director of Agriculture controls Experimental Farms, each in charge of a Superintendent, at Mirpurkhas, Larkana, Jacobabad and Sukkur, a Seed Farm at Mirpurkhas and a cotton estate for seed production at Chellaro, about 14 miles from Mirpurkhas. Except at the last, each Superintendent has one or more Assistants, and the Superintendent of the Sukkur Farm supervises a small sub-station for trial of wheat varieties at Shikarpur. The Superintendent, Mirpurkhas Farm, manages a Central Agricultural Depot, which is a Store for Seed and Implements for sale, and also contains the Mechanical Assistant's workshop. A Cotton Breeder is also directly subordinate to the Deputy Director of Agriculture. His designation is a misnomer, as his duties include wheat and rice breeding. His headquarters are at Mirpurkhas and he has Assistants there and at Larkana. His work is diffused over four Experiment Stations. A Divisional Superintendent is responsible to the Deputy Director of Agriculture for Propaganda in East Sind, and also controls a small sub-station at Jamesabad for demonstration of cotton varieties and implements. Demonstration work in Middle Sind, comprising Talukas, Hyderabad, Halla, Shahdadpur and Tando Allahyar, and in North Sind comprising Talukas Sukkur, Ghotki, Kambar and Larkana is under the control of the Assistant Registrar, Co-operative Societies in Sind, with officers of the Agricultural Department working under him. A Mechanical Assistant with Headquarters at Mirpurkhas inspects Farm machinery, and controls boring and implement repairing, and is a consultant.

The Divisional Board of Agriculture met three times to discuss propaganda work.

3. The sanctioned strength of the Agricultural Department in Sind is :—

- One Imperial Officer,
- Two Provincial Gazetted Officers,



Twelve Graduate Fieldmen,  
 Eighteen Non-graduate Fieldmen,  
 Seven Clerks,  
 Five Kamgars,  
 Three Mechanical Establishment, and  
 Three Engine Drivers.

Three Graduate posts are vacant.

4. The cost for 1923-24 was :—

Salaries including T. A.	...	Rs.	92,157	0	0
Contingencies	...	„	77,141	12	4
Total	...	„	1,69,298	12	4

and the receipts credited to the Treasury were Rs. 60,116-10-2.

#### *Farms.*

5. The Mirpurkhas Farm is 60 acres in area, of which 8 acres are devoted to fruit gardening, 12 acres 24 gunthas to buildings, roads and drains, and the remainder to cotton and wheat breeding and testing, trial of rotations, and fodder growing. 23 acres were under Kharif, 8½ under Rabi and 8½ fallow. The Farm possesses 9 bullocks valued on 1st April 1924 at Rs. 690, and dead stock of value of Rs. 4,223. It spent Rs. 5,975, on contingencies, and sold Rs. 6,506 worth of produce of which the garden accounted for Rs. 3,844. The Farm has two wells, and there is a third in the bungalow compound. A large pukka well is an urgent need for the fruit culture, and a second would be advisable. Cotton on the Farm did very well; it was sown in good time and yielded two good pickings, one on the 20th October and the other on the 20th of November. Mr. Umersah, the Superintendent, is of opinion that it would have yielded two more fair pickings, without watering after October, if frost had not come. The area under berseem was very small, and the poor Rabi supply of water rendered this and the wheat crop very poor indeed.

6. The most striking impression the experimental agriculturist receives on his first visit to Mirpurkhas Farm—and this impression is emphasised everywhere he travels in Sind is the extraordinary difficulty of carrying out field comparisons of crops and treatments. Ordinarily he chooses an area of land which when treated all alike produces an even crop. He knows from experience that though to the eye his crop appears even, the measurement of the yield of a single portion of it is liable to a large error when used as an index of the yield of the whole. When comparing two varieties, or two treatments, he multiplies his plots under each to a number calculated to reduce probable error to a negligible amount with reference to the differences in yield he desires to measure. Heritable capacity to

yield is a difficult enough quality to estimate under the most favourable conditions, and in Sind, where one cannot start with an area judged by the eye to be uniform, the difficulty is enormously increased. I think that this question needs very close study by a man who understands the mathematics of probability, before we can use the field in Sind properly as an out-door laboratory for fine research on the plant's capacity to yield.

7. The Seed Farm was cropped with Punjab American F 4 cotton on 24 acres, Punjab American 285 F on 16 acres, 27 W. N. cotton on  $34\frac{1}{2}$  acres, and 30 W. N. on 4 acres. These cottons are described at paras. 16 to 21.  $37\frac{1}{2}$  acres were under Kharif fodder, 6 acres under wheat, and  $12\frac{1}{2}$  under berseem.  $42\frac{1}{2}$  acres were manured with castor cake, 6 acres 15 gunthas with Farm Yard Manure, and 15 acres 38 gunthas with silt. The seed produced was 9,672 lbs. F4, 8,054 lbs. 285 F, 12,029 lbs. of 27 W. N. and 566 lbs. 30 W. N. The closing valuation of dead stock on 31st March 1924 was Rs. 11,260 and of live stock Rs. 836 for 27 bullocks. Contingent expenditure amounted to Rs. 7,380, sales to Rs. 19,369, and produce issued gratis Rs. 11,473.

8. This farm suffers from the shortage of staff which meant that during the year it was for several months controlled by the Superintendent of the Mirpurkhas Farm, Mr. Umershah, in addition to his own duties.

9. The Chellaro sub-station's place in the production of cotton seed is described under cotton. The station is sublet to hari. 1,678 maunds of phutties was produced from 242 acres, giving an average of 6.9 maunds per acre. The highest output on one hari's holding was 17 maunds 14 seers per acre. 280 maunds of phutties, the last 2 pickings were rejected for seed supply, and the remainder gave 918 maunds of seed. The whole cotton produce was worth Rs. 28,143 of which  $\frac{2}{3}$ , Rs. 18,749 was the hari's share. Even charging the whole of Rs. 3,888 for karia excavation as current expenditure the station showed a profit of Rs. 4,996, and this is sufficient to meet the cost of salary and travelling allowance of the permanent establishment and to show a clear profit of Rs. 1,136. Mr. Jaffurali manages this station.

10. The Larkana Farm is 65 acres in area and of this  $24\frac{1}{2}$  acres were under paddy and  $21\frac{1}{2}$  acres of high land under other crops. Mattar followed paddy on 18 acres 11 gunthas and berseem on 9 acres 19 gunthas. The rest is occupied by buildings, roads and drains. A pump on the Ghar Canal enables the farm to grow Rabi crops, and to sow rice early. Mr Baluch the Superintendent, describes the research in hand on rice, with reference to seed economy, time of transplanting, dry season, ploughing, Rab substitutes, rotations, manures and duties of water. Some of these are mentioned under para. 23 which also covers Mr. Thadani's work. The classification of jowars is in progress and varieties are being tested. Wheat varieties are being compared, and the place of berseem in the rotation is being investigated.

Berseem is being allowed to go to seed, to see if it is possible to organise its seed supply in Sind and to avoid importation from Egypt. Dead stock on 31st March 1924 was valued at Rs. 9,446 and 7 bullocks at Rs. 1,076. Contingent expenditure amounted to Rs. 7,055 and sales to Rs. 1,631.

11. The Jacobabad Farm is a seed station for Pusa 12 wheat and a machinery testing station. No fine experimental work is attempted. Mr. Mahomed Umarchan Barakzai, the Superintendent, is studying farm management, and instances as an important question the overlap of Rabi threshing operations and early feed work for the Kharif crop. The farm is watered by flow, and by a pump driven by a Cletrac tractor.

12. 71 $\frac{3}{4}$  acres were sown with Pusa 12 wheat, and 19 $\frac{1}{4}$  with other varieties. The cropping scheme planned 56 acres of gram, but water was only available for 10 acres, and three Pusa types 18, 25 and 6 were sown. Jambho was grown on one acre. 690 maunds of Pusa 12 seed were sold for the 1923 crop. The amount available for sale in 1924 has not yet been threshed and weighed.

13. A Cletrac tractor is doing excellent work. Mr. Barakzai estimates the cost per acre of ploughing with a two furrow plough to a depth of 7 inches at Rs. 3-7-7 per acre for fuel, oil and labour, and on a working year of 200 days overhead charges of Rs. 2-6-8 per acre. The rate of ploughing is one acre and a half per hour, and the tractor was not fully loaded with a two furrow plough. The Superintendent considers that there is a big field and an immediate field for tractor ploughing, and if private enterprise will not come forward, I strongly recommend Government to buy another tractor and a three furrow plough and to provide staff and to hire it out. The closing valuation of farm dead stock was Rs. 4,360 and of experimental machinery Rs. 15,577. Capital expenditure from contingent grant amounted to Rs. 5,556 and working expenses to Rs. 4,257. Cash receipts were Rs. 7,881.

14. The farm report reads as that of a capable farm manager.

15. The Sukkur Farm is irrigated by a pump, and affords a standing demonstration of thorough reclamation of kalar land by liberal watering. Except for 3 acres devoted to testing wheat strains, and 28 gunthas to vegetables, the farm is now devoted to the production of fodder for the buffalo dairy herd. 19 acres were under berseem which is the principal fodder crop grown in the cold weather. 17 $\frac{1}{2}$  acres were under jowar in the Kharif season. Maize was sown on 2 acres in March. It gave a poor yield but is a useful carry over fodder between berseem and jowar. Guar and Udid were grown on small areas in June. Gram sown on two acres after jowar failed. Shaftal was grown on a small area, and unlike berseem can be made into good hay.

A steam engine is used for pumping and chaff cutting. Rs. 1,032 had to be spent on repairs. Other costs for the year amounted to

Rs. 3,232 for 1,880 working hours. The Superintendent, Mr. Ali Mahomed Ulvi, calculates the cost per acre for one Kharif watering as Rs. 3-13-0 and for one Rabi watering Rs. 7-10-0.

16. The strength of the dairy herd at the close of the year was 12 buffaloes of the old stock, 2 heifers with first calf, one in calf, and 31 young stock and 2 bulls. Four cows were sold during the year. 17 calves were born, of which 2 died and 4 were sold. 13 of the young stock are kept at Larkana. The number in milk ranged from 9 to 15 and the yield of the herd was 64,386 lbs. of milk. The best cow gave 6,176 lbs. in 300 days. The year's working resulted in a loss of Rs. 906. If this farm is to be looked upon as a dairying enterprise I do not think that it will succeed. Mr. Ali Mahomed looks after the stock well and the value of his farm for the future depends on the need for establishing a buffalo stud, and on this I cannot express an opinion for want of experience.

#### *Cotton.*

17. The study and selection of varieties in the past have led to our handling two cottons on a large scale, a selection from the Deshi cotton known as 27 W. N. and Punjab American F 4. For the immediate present, a pure seed supply of 27 W. N. is of major interest on the Jamrao and there is no reason why this cotton should not spread a very long way as our organisation for seed supply develops. Previous reports have described this organisation and the need for renewal of a fresh basis of self-fertilised seed every year, because of inevitable cross fertilisation in the field with other varieties. An area of 4 gunthas is self fertilised on the Mirpurkhas Farm, and this gives enough seed for  $1\frac{1}{2}$  acres on an "Increase Block" on the same farm. In the 3rd year this becomes 30 acres on the Seed Farm, and in the 4th year 600 acres on the Chellaro station. The Chellaro produce is ginned under our supervision, and the seed as far as possible distributed in compact area. The growers agree to market their cotton under arrangement with a firm who undertake to keep this seed of the 5th generation separate from the bulk of the seed they handle. Here I think Departmental activities must cease. If we can give a reasonable guarantee of purity to seed of the 5th generation as available in the ginning factories, it is as much as our staff can undertake and as much as we can reasonably ask Government to finance. The trade, who have freely expressed their opinion on the superiority of 27 W. N. over Deshi types must work with associations of growers to secure supplies, and the growers must associate with leading firms to deliver pure and in bulk a cotton which the firms readily pay a price considerably better than they pay for ordinary cotton. Here is a splendid field for co-operative organisation the big stumbling block in that agency and banking, as available to the ordinary individual are not separate enterprise but I am sure that a close study of the marketing system will show a way, as it has done in the south of the Presidency, where a new method of marketing has done much for co-operative sale.

18. The Punjab American 'F 4 depends for its success primarily on the early water supply. We have not yet developed an organisation for seed production in Sind beyond growing 24 acres on the Seed Farm, and are dependent on importations from the Punjab. In 1923 the seed for the 1923 crop was supplied by local firms and was very impure, but the fact that 7,000 acres are estimated to have been sown, shows how keen the people are on this cotton and led to arrangements for the importation of 4,000 maunds of seed from the Punjab. This under Mr. Gulmahomed's management has been imported and sold for the 1924 crop as well as 79 maunds grown on the Seed Farm. The seed imported is certainly botanically impure, and this points to the need for organising our seed supply in a similar way to that adopted for 27 W. N. As a beginning, a small area was self-fertilised in 1923.

There is no question that American type of cotton has a great future when early water becomes assured. Whether the best variety is Punjab F 4, or 285 F, or whether we shall establish a better variety than either of these, by selection and crossing of imported varieties, remains to be seen. Apart from the superiority of the American types over Deshi types, previous records show that the Americans are earlier, and not nearly so likely to derive benefit from water which might be applied to Rabi, as are the local types.

19. For the present, 27 W. N. finds its special market and we must continue to organise its seed supply. For the present and for the future we need an American cotton station where early water is assured, and this means a pumping station.

20. Cotton research under Mr. Thadani's guidance is directed largely towards the search for better American strains, but his work is hampered by the uncertainty of the water supply at Mirpurkhas Farm. Of the two Punjab varieties handled, 285 F has a one inch staple, against 6/8" of F 4. There seems to be but little difference except in ginning outturn in other characters which go to make a good farmer's cotton, and if the current season confirms these results, I think that 285 F should replace F 4. To get finally satisfactory tests it is, however, necessary to establish and multiply in Sind pure strains of the original types created by the Punjab Agricultural Department. Seed imported by the Trade is not pure, and F 4 of one year is not necessarily the same as F 4 of another year. As a basis for this, a small quantity of pure seed of each variety has been obtained from Lyallpur.

21. Mr. Thadani is studying the outturn per plant of various American strains imported a few years ago, and is also making detailed observations on staple, ginning outturn, flowering period, maturing period, and on the relative numbers and positions of fruiting and non-fruiting branches. Some new varieties have been imported from America for 1924 sowing, but only a small amount of the seed has been sown, hoping that we shall have better water facilities for sowing the bulk of the seed next year. We are ready to launch out on a promising programme as soon as our pumping station is established.

22. Observations on yield, ginning outturn, and earliness have been made on 27 W. N. in comparison with Jamrao Deshi cotton. 27 W. N. has a long history and is the product of many years work on local cotton. We are convinced of its superiority, and I hardly think that we shall now find variations in the local crop which are still better. It may have value for research on inheritance but beyond this, I am of opinion that research work on it should cease.

*Rice.*

23. Mr. Thadani has sent in an article for publication as a Memoir which describes his research work on rice. He records a morphological description of varieties handled and discusses results of preliminary work regarding fertilisation, sterility and the biometrical study of various characters, and recounts the progress made with rice breeding.

24. The study of the natural course of fertilisation is a very necessary preliminary to breeding, and the conclusions arrived at are that self-fertilisation is the rule, that pollination of a plant may continue over 5 to 7 days, that flowers do not open before 7-30 a.m., or after 12-30 p.m. and that flowering is most profuse between 10-30 and 11-30 a.m. That the range of temperature during the hours of flowering is 86° to 99°.

25. Sterility, the failure to form mature grain, is common, and as high an average as 34 per cent. sterile flowers per head have been counted. The causes of this have not been traced and further study in field and laboratory is an urgent need, and it is hoped that facilities for cytological study will soon be provided. Protecting the plant in muslin bags, the plant breeder's usual method of assuring fertilisation, causes a great increase in sterility.

26. The biometric studies aim at measuring variations in and recording average measurements of, characters which have a bearing on those two complexes, capacity to yield and market value. This class of work needs great patience and perseverance because of the large numbers of plants handled. A knowledge of the measurements of such characters as numbers of tillers, length of ear, weight of grain per plant, shape of grain, is of great importance to the plant breeder when selecting varieties whose character he wishes to combine in the evolution of a better plant. A knowledge of the range of variation of one character in one variety is very necessary, to enable him to judge the probability that a single plant which in his breeding plots shows a higher measurement of this character than the parent plant, will or will not yield progeny with this higher measurement.

27. The breeding work is directed at increase of yield and securing an early, high yielding variety. In interpreting plot yields, a method of calculation has been used which I hope will stand the

test of criticism on publication, and if so will go a long way towards solving the problem described in para. 6 above.

28. Mr. Baluch's work on rice extends some of that described above to comparison of varieties on a large scale and otherwise deals with problems of irrigation and culture. Duties for rice cultivated on flow and on stagnant water are being worked out, it has been shown that a very much smaller seed rate than is usually practised, can be adopted. Dry ploughing with an iron plough has been shown to be beneficial, and is being practised by some, and it remains to be seen how far it will fit in generally with the farm economy of the tract. Early sowing of seed beds under present conditions must I think be regarded as an insurance. If lift water is available it is probably worthwhile to sow in anticipation of the earliest date on which flow water can arrive, and subsequently if necessary, sow again. The problem will assume a definite form when the arrival and continuance of water supply come under definite control. Duties under stagnant and flow water are being compared, but no conclusions are yet possible.

29. Research work on wheat was described in last year's report and continues at all the Experimental Farms. Yields of four strains calculated from fourteen 200 feet rows of each measured separately, show no difference outside the limits of probable error between the yields of these and of Pusa 12. Of bearded strains, Mr. Thadani is of opinion that C. S. 24 and 25 are definitely superior in yield to Punjab 11, which we have been distributing hitherto in Jamrao tract. Jacobabad, as mentioned above, is the base for the seed supply of Pusa 12. Further organisation is not completely worked out, but it is hoped that two seed societies promoted recently will take a prominent part. Government sanctioned a grant of Rs. 5,000 to cover loss on importation of large quantities of seed for the coming Rabi season. For various reasons which I have detailed in a special letter, I have not carried on with this scheme, my chief reason being that I thought visible local supplies were ample to meet the probable demand for seed, and that bigger supplies forced on the market would not be used for seed.

#### *Other Crops.*

30. The only other crop which is receiving detailed botanical study is jowar. The growing of bajri, berseem, mattar, guar, jambho is incidental to the management of the farms.

#### *Fruit.*

31. The work on fruit is concentrated at the Mirpurkhas Farm. An attempt to compare some grape varieties in the Municipal Garden at Shikarpur has not been very successful.

Grapes, citrons and mangoes are the principal features of the Mirpurkhas Farm garden. Varieties of all are being compared.

The nursery supplied to the public Rs. 425 worth of young plants and cuttings, amongst which the principal items were 348 oranges, 73 Bombay mangoes, 37 Pomeloes, 35 grapes. Fruit realised Rs. 3,312 of which oranges accounted for Rs. 2,074 and vegetables realised Rs. 107. An attempt to establish grape cuttings imported from Poona long after the Sind plant had passed its dormant winter stage have failed. If cuttings cannot be imported from Poona in the winter, then I think the only way is to establish young plants in Poona, in pots, and bring them undisturbed to Sind.

*Implements and Machinery.*

32. To a man coming from the South Deccan, where the heavy plough is spreading so rapidly, it is at once remarkable that, of iron ploughs only the very lightest type is used at all, and that as a general rule, nothing has been found superior to the Egyptian plough. I doubt if any implement can be found to turn a furrow in dry heavy Sind soils and, if dry ploughing is to become an essential part of Sind farming, the bullock power implement needed may be an iron frame carrying a steel share similar to that of the Egyptian plough, and a bar point below the share, or in other words a rigid, heavy, one tyned cultivator.

33. Sowing in lines with a single tyned drill has been demonstrated for some years past—its advantages need no repeating, but the stumbling block to progress is the slowness of the operation. Sowing under normal conditions of inundation must be done quickly and if drilling, with its great advantages is to replace broad-casting, a multiple tyned drill must be designed, or found. The Hoosier drill is very useful for wheat at Jacobabad, as was reported some years ago. An American Cotton Planter has been used successfully at the Seed Farm.

34. The Cambridge roller continues to do useful work. Reaping and threshing machinery are being investigated.

35. Tractor ploughing probably has a great future as mentioned when discussing the work of the Jacobabad station. Two types have been tried, the Cletrac and the Austin and I think there is no doubt that the caterpillar type is infinitely the better for Sind.

36. The future for implements, and machinery which involves unusual capital outlay to save labour or otherwise to give greater efficiency, will depend on the entire rejection of the fact that the ordinary individual cultivator cannot buy, as an argument against their being used. The average individual cannot afford the capital investment if he has ready cash, let alone if he has to borrow. Their future will depend on the enterprise of non-agriculturists or zemindars, who have capital to invest and will either individually or in limited liability association, purchase machinery and hire it to their neighbours.



37. Mr. Tambe, the Mechanical Assistant has been engaged in repair work, well boring, and consulting. He certifies all the farm engines to be in good order. This section of the work is one of the most important, and the most understaffed in the Division, and I am convinced that money spent to develop experimental mechanical engineering will be well spent.

*Agricultural Education.*

38. Agriculture is being introduced in the Upper standards of a few primary schools. This is an experiment which has great possibilities. An attempt to introduce a secondary agricultural schools failed, because I think the course was suitable for the town bred boy going on the land, and he does not exist—the land bred boy goes in for secondary education to get off the land. The introduction into the primary school of the elements of the sciences in their relation to agriculture is a recognition that a farmer educated in the science of his surroundings is well educated and leaves school well equipped to follow his father's profession, and under no handicap if he wishes to carry his schooling further.

*The Future.*

39. In conclusion I would say a few words as to the future. An Agricultural Department, to achieve success must be able to look ahead agricultural experiment of all classes generally takes several years to yield definite conclusion, and now that Sind agriculture is destined to change so radically in the course of a few years, it is time to abandon research work which can only have a bearing on farm economy of the immediate present. A future for the Sind Agricultural Department has already been drafted in broad outline by the Commissioner in Committee, and I can only express a hope that the close of the year will see the Department in a position to look ahead with full confidence to a definite policy involving large expansion.

40. The problems outlined for solution fall roughly into three categories:—

- (1) those involving the improvement of the plant.
- (2) those involving chemical and physical research into the causes of and remedies for infertility of soil and
- (3) those directly concerned with farm management and economy.

In connection with the last, I would issue a word of warning. A system of farming worked out to conserve fertility on a farm managed as a freehold estate with paid labour, may break down when applied to other forms of tenure.

41. I have heard the opinion expressed that it will be time enough for the Agricultural Department to start in when the barrage water comes. With this opinion I most emphatically

disagree. The future of agriculture in a country dependent on irrigation must be much more a controlled future, than need be the case of a country farming under rainfall, and an Agricultural Department should start in at the beginning to help those responsible for land legislation and water control to guide the country's future to the most profitable ends, and should not be called in to find out how to make the best of farming conditions, created without its help. The existing Department has been consulted up to the present stage of development. The wish for its immediate expansion and continued help has been emphatically expressed in the report of the Committee referred to above, but it will not be able to help without expansion, and without confidence that its work will be adequately financed.

42. Sir John Russel enumerates the following factors for success in farming:—

(1) The crops must suit the soil and the climate.

(2) The system of husbandry, *i.e.*, the method of growing and disposing of the crops must suit the local conditions and the markets.

(3) Given suitable crops, failure may still result from

(a) Insufficient plant food.

(b) Insufficient water.

(c) Insufficient air for the roots.

(d) Too low a temperature.

(e) Too little root room.

(f) Some harmful quality in the soil or some plant disease.

I have heard the argument advanced that our proposed pumping stations in Sind will lead us astray, because we shall not have silt to contribute to the removal of the factor "insufficiency of plant food", but, even if the pumping station cannot solve the problem of sufficiency of plant food, surely it can study the other limiting factors and also help to evolve suitable crops by importation, breeding and selections.

Opinions differ as to whether silt will supply plant food necessary for maintenance of fertility or whether stock farming will have to form a much larger part of the farmer's enterprise. If the latter, we shall be launching largely into the unknown as regards a system of farming, and may be involved in the careful fostering of stock and stock produce markets. If the experiment station cannot answer this problem, are these places in Sind where intensities approach those anticipated, and where a careful study of opinions and statistics can be made on the maintenance of fertility by silt laden water unaided by manure?

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## APPENDIX I.

WORK DONE UNDER THE PROFESSOR OF AGRICULTURE,  
POONA, DURING THE YEAR 1923-1924.*Charge.*

Mr. B. S. Patel was in charge of the Office of the Professor of Agriculture throughout with the exception of 20 days at the end of this year during which I was called upon to officiate. Mr. Patel held charge of the Office of the Deputy Director of Agriculture for Cattle Breeding in addition to the duties of the Professor of Agriculture from April until I relieved him.

*Lines of Work.*

The principal function of the Professor of Agriculture is to be responsible for the teaching of the Agricultural subjects of the University courses for the degree of the B.Ag. at the Poona Agricultural College which represents about 50 per cent. of the total work of teaching. For teaching of the practical side of the subject, a large farm and a dairy have also to be run, which further involves the administration of these two large institutions. Side by side with teaching, the College Dairy is also intended to be conducted on business lines. Similarly the farm serves as a head-quarter place of demonstration of improved implements and machinery to be recommended by the Department and of stocking the same as well as seeds for sale.

*Staff.*

The strength of the staff of Assistants which consisted of two Assistant Professors in the Bombay Agricultural Service and six graduate Lecturers and Demonstrators has increased by one post of graduate Demonstrator by the revival of the post of the graduate Fieldman College Farm, which was in abeyance. This has removed a long felt difficulty and we are now in a position to attend to the needs of the short course class more fully. There have been, however, many changes in the personnel of the staff. One more graduate Assistant has been made available from the Sassoon David Trust Fund for carrying out investigations into Economic Efficiency of tillage implements.

## I. Teaching.

The staff of the Agricultural Branch have had their hands certainly more than quite full with the College teaching and the management of the farm and the Dairy. The addition of a graduate's post as referred to under staff has relieved the over-straining of the Agricultural teaching staff and has helped to improve the teaching imparted to the short course. The extension of the farm area and the improvements made in the cropping scheme have made it possible to afford better facilities for practical farm work and more particularly its business aspect.

*The College Farm.*

*Function.*—This is first and foremost an institution for the practical teaching of the students of the College. Propaganda work in the direction of furnishing a museum of implements indigenous and improved and of supply and repair of improved implements and of seeds is also an important subsidiary function of the farm.

*Area of the Farm.*—During the year acquisition of the land referred to in the last year's report was carried through and a good irrigable area of 32 acres with 3 wells has been added on. This brings the total area of the estate to 276 acres. An area of nearly 12 acres out of this is set apart for the use of the Research Staff of other than Agricultural Branches of the College. A detailed survey including contours was carried out and a fully informed map of the estate is under preparation. The newly acquired land has been cleared out of trees, embankments have been put in and a good deal of development of this area has been partly carried out. Some of the uncultivable area has also been embanked and brought under the plough with a view to improve it and bring it under cultivation. Thus the total cultivable area has risen to 120 acres from 105 acres in the previous year. It is now hoped that the estate thus extended and developed and developing will give sufficient area for educational work (including an illustration of a small business farm).

*Season.*—On the whole the season, as has been the feature of last four or five years, was not a very prosperous one on the farm. There were practically no premonsoon showers which help a good deal to get land in condition for sowing. Up to the 15th July the rainfall was very precarious. But good enough rain started on 16th July and in a week's time sowings were commenced. From this time onwards the showers were almost continuous till the 15th of August, *i.e.*, nearly for a whole month giving in all 6.92 inches of rain; but the effect was more depressing than useful as it not only made the young plants suffer owing to continuous wet weather but also hindered interculturing and weeding operations a good deal. A month's almost rainless period which followed gave the crops a further set back with the result that in the first week of September the crops showed clear signs of want of moisture. The threatening situation was, however, saved by the storm of 11th September which was followed by almost continuous rain up to the 22nd September. October to January was again a dry period. The total rainfall of year 1923 amounted to 15.56 inches as against an average of 27.11 inches. It will thus be seen that the rainy season has been but an erratic and unsatisfactory one indeed, the effect of which was to practically ruin the *jowar* and groundnut crops. Although *bajri* did very well indeed, cotton and *rabi jowar* were about half the normal.

As regards plant pests and diseases the most outstanding that may be specially noted were:—Thrips on onions, leafcurl on chillies,

wilt on *gowar* and leaf catterpillars on *jowar*. The onion crop suffered considerably, specially the crop grown for seeds; but they did revive and came out successful with two or three sprayings of tobacco decoction and the onset of the cold weather. The leafcurl on chillies in one part of the farm proved very obstinate and in spite of treatment with lime sulphur wash did every serious damage to the crop. Wilt on *gowar* carried off a good crop.

*Some noteworthy Features of the year's Results of Cultivation.*—Amongst the irrigated crops cucurbits and *suran* have been found to give very high yields and profits, onion, Dharwar chillies and turmeric coming next. The actual statistics for these crops are given in the following table:—

Crop.	Area.	Average outturn per acre.	Net profit per acre.
		Rs.	Rs. a. p.
1. Cucurbits (Pumpkin, Bottlegourd and Cucumber).	20 Gunthas..	21,744	776 11 6
2. Chillies, Dharwar	1½ Acre	2,678	117 7 0
3. White cucumbers	½ "	11,932	547 7 0
4. Onions for bulbs	2½ "	17,040	217 10 7
5. Suran (4th year)	½ "	39,216	1,188 0 6
6. Turmeric	1 "	15,264	77 1 6

*Note.*—The calculations of profits provide along with other things for the cost of supervision, marketing charges, interest at 9 per cent. and land rent at Rs. 40 per acre.

**Propaganda Activities of the Farm.**—Besides the large amount of teaching which is the primary work of the Agricultural College Farm, a good deal of other propaganda work as can be done has always been the feature of this station. The year's activities are summarised below.

**Demonstration and Shows.**—In September last a very successful demonstration and exhibition was arranged for the benefit of the delegates of the Bombay Provincial Co-operative Conference. The attendance was quite fair and a number of gentlemen took a keen interest in the implement line and also the development of "Mal" lands. The crops standing on the farm at that time attracted particular interest on account of their fairly good stand in spite of the unfavourable rainfall.

Considerable work was also done in collecting and preparing the section of Agricultural products of the Bombay Agricultural Department's quota to the British Empire Exhibition.

The Agricultural College Farm and the College Dairy also exhibited a very interesting and large set of exhibits at the Indian Industrial Exhibition held on the Deccan Gymkhana grounds and also regularly attended the exhibition for 15 days in May to explain the exhibits to visitors. Great interest was taken by several visitors in the Agricultural Department stall.

Besides these two chief functions there has always been a regular stream of visitors that have been shown round and advised in regard to their difficulties.

*Sale and Repairs of Implements to Public*—Owing to reduction in prices, specially the heavy reduction of Kirloskar Brothers' implements, the sale of ploughs and spares increased beyond expectation and a comparatively large sale was effected. There have been weeks when numbers of customers had to go back disappointed on account of the firms' inability to replenish stocks. The total sales during the year amounted to Rs. 8,550 bulk of which is represented by Kirloskar's ploughs and spares of foreign ploughs.

*Sale of Seeds and Manure*.—A very large number of orders for seeds and manures have been met through reliable dealers and agencies besides the farm itself supplying large quantities of field crop seeds, such as groundnuts, jowar, onions, cotton, &c.

*Publications*.—Mr. K. S. Kulkarni, Lecturer in Agriculture and Superintendent of the College Farm, continues to be the Editor of the Marathi Magazine "Shetki and Shetkari" in which capacity he is required to do a very considerable amount of writing of articles besides ordinary editorial duties.

#### *The Dairy.*

*Purpose*.—Besides serving as a place for practical teaching of Dairying at the Agricultural College the purpose of the Dairy is to work out and demonstrate the possibilities of Dairying as a business on modern up to date lines.

*Staff*.—The charge of the Dairy was held by Mr. H. G. Baluch, B.Ag., Assistant Professor and Manager, till the end of December 1923 after which he having been deputed to Bangalore for higher training in Animal Husbandry for 15 months, Mr. M. M. Desai, B.Ag., has been acting in his place. Mr. H. G. Baluch was also deputed to investigate the Bhagnari Breed in Sindh for two months during which his Assistant, Mr. S. M. Patel, B.Ag., carried his work on. The Manager is assisted by two graduates one of whom underwent a change of personnel during the year.

*Herd*.—The herd consists in all of 245 animals out of which 36 were cows and 56 buffaloes and nearly a corresponding number of heifer calves of each. The remaining were breeding bulls, bulcalves and working bullocks. This situation differs from the last year's principally in the reduction of 7 cows and 8 buffaloes as a result of disposal of some uneconomic animals, other constituents remaining practically the same. Sindhi cows, Surati Buffaloes, and some cross buffaloes are now the only breeds maintained.

*Breeding*.—Certain animals had been marked out last year for observing and further building up of strains for higher milk production. The performance during the year as recorded below shows that the strains are continuing to come out pretty well this year also.

## Cows.

Strain.—Zankar (Female), 3,117 lbs. average of 14 years.

Name of offspring.	Dam.	Sire.	Average yield.	Period under observation.	Average yield at the end of previous year.	Remarks.
			L. s.	Y. M.	Lbs.	
Changuni ...	Zankar ...	Battasha ...	3,741	7 0	3,741	Died.
Chrissie ...	Changuni ...	Daulat ...	3,444	3 10½	3,590	
Amy ...	Do. ...	Pitambara ...	3,823	2 11	3,894	
Clarissa ...	Do. ...	Housha ...	2,936	2 3	3,316	

## Cows.

Strain.—Begum (Female), 2,379 lbs. average of 11 years.

Name of offspring.	Dam.	Sire.	Average yield.	Period under observation.	Average yield at the end of previous year.	Remarks.
			Lbs.	Y. M.	Lbs.	
Beatrice ...	Begum ...	Daulat ...	2,429	3 7½	2,310	
Bela ...	Do. ...	Gopia ...	2,739	1 2	1,444 for five months.	

Another strain that we are now introducing by line breeding from the Sire line is *Housha*.

Strain.—Housha (Male).

Name of offspring.	Dam.	Sire.	Average yield.	Period under observation.	Average yield at the end of the previous year.	Remarks.
			Lbs.	Y. M.	Lbs.	
Barbara ...	Casandra having 1,106 lbs. average of 2 years.	Housha ...	3,788	3 7	3,868	
Barahi ...	Barbara ...	Shivaji ...	4,110	1 1	1,421 in 4 months.	

Average performance of some of the other high yielders which are likely to afford suitable material for breeding has also been continued under observation with the result that the following individuals have conclusively proved to be worth using for building up high yielding strains:—

Serial No.	Name.	Years under observation.		Average annual yield in lbs.	Dam.	Sire.	Remarks.
		Y.	M.				
	<i>Cows.</i>		Y.	M.	Lbs.		
1	Auriline	5	0	3,817	Sundra	Daulat.	
	<i>Buffaloes.</i>						
2	Louse	5	3	4,039	Ghelinala	Bhimbai.	
3	Sajani	18	0	3,267	Padi	Not known.	

*Age at First Calving.*—It has been possible during the year to bring down this age on an average from 3 years and 6 months to 3 years and 5 months in the case of cows, and from 4 years and 9 months to 4 years and 8 months in the case of buffaloes.

*Period between two Calvings.*—On an average this period is about 400 days in the case of cows and 500 days in the case of buffaloes and it is also to be noted that the period between the first two calvings is longer than the subsequent ones—both for cows and buffaloes.

*Fodder Production.*—In all 160 acres were cropped during the year as against 130 acres of the previous year. The average yield of fodder during the year per acre under cultivation works out at 23,751 lbs. of green fodder as against 18,142 lbs. of the previous year which work out a cost of annas five and pies six and half and annas eight and pies 3 per 100 lbs. respectively. This was achieved by an increase of area under cultivation by about 30 acres, a change in rotation and more intensive cropping. The rotation we now adopt is *Nilva Jowar* mixed with *Chavali* (in the monsoon); oats and peas (in the cold season); and maize and *Chavali* (in seasons other than winter) and lucerne and guinea grass as perennial fodder crops.

*Result of Milk Yield, Cost and Price realised.*—The following statement records the results of the year in this respect:—

Year.	Average No. of animals.	Total milk production.	Average yield per head per year.	Cost of producing 100 lbs. of milk.		Total milk fed to calves.	Total disposal.	Value realised per 100 lbs.
				Rs.	Lbs. oz.			
		Lbs. oz.	Lbs.	Rs.	Lbs. oz.	Lbs.	Rs.	
1922-23	93.75	249,009	2,656.0	21.3	14.513	234,496	19.8	
1923-24	105.3	251,068.8	2,384.0	17.3	18,293.10	232,775	15.6	



*Net Financial Results of the Year.*

Year.	Total expenditure of the year.	Income.			
		From milk and milk products.	In other forms.	Total.	Net profit.
1923-24	43,596	39,214	11,497	50,711	7,115
1922-23	53,188	49,333	7,857	57,240	4,052

From the above data it is to be seen that the average yield per year per head shows a decline by about 9 per cent. which is mainly due to the fall in yield from buffaloes, cows having maintained their performance as in the previous year.

However, we have been able to produce the milk cheaper by about 20 per cent. which is mainly due to growing fodder at a less cost per 100 lbs. and to obtaining higher yields.

The value realised per 100 lbs. of milk yield shows a drop of about 21 per cent. which is due to more quantity of milk which had to be fed to a comparatively larger number of calves, to the loss of Sassoon Hospital Custom at a higher rate which necessitated the separation of that quantity to be eventually disposed of as ghee fetching only about one-fourth of the price for whole milk.

The receipts in forms other than milk such as, sale of animals and farm products and increase in valuation of live stock have, however, been more than those of the last year, and thus the net profit of the year under report is more than that of the last year by about Rs. 3,000.

This will show that the hope expressed in the last year's report about the possibilities of making dairying a business proposition even with the present prices of milk is on the way of being realised.

## II. Research and Investigations.

Very much as every member of the staff would desire to have opportunities for carrying on some Research and Investigations, they are so fully occupied by teaching, their first and foremost duty and the administration duties in connection with the Farm, the Dairy and the Propaganda that there is practically no time and no necessary peace of mind left to do any Research or Investigation Work. About 45 hours a week of each member are taken up by this with the exceptions of two or three junior demonstrators who have to put up 35 hours a week.

*Economic Efficiency of Tillage Implements.*—The Professor of Agriculture has, however, undertaken since late in the year under

report, research work in the Economic Efficiency of Tillage Implements for which one Graduate Investigator and the necessary funds have been provided from the Sir Sassoon David Endowment Fund. The work is started only two months since and there is no progress to report this year.

The other members of the staff have also been persuaded to consider if they can fit any small pieces of investigation which would not demand continuous attention at a stretch but can be done at short off periods and left off and resumed again as other duties permit. It is hoped we shall have something to report under this in the next year's report.

V. G. GOKHALE,  
*Ag.* Professor of Agriculture.

## APPENDIX J.

REPORT OF THE WORK OF THE AGRICULTURAL CHEMIST  
TO GOVERNMENT OF BOMBAY, FROM 1ST JULY 1923  
TO 30TH OF JUNE 1924.

During the year under report I was in charge of the Office and Laboratory of the Agricultural Chemist to the Government of Bombay, Poona.

2. The work under me may conveniently be divided into five sections for report. They are: (1) Analytical work, (2) Investigation work, (3) Teaching at the Agricultural College, (4) General Supervision of the Manure Mixing Laboratory attached to the Union Agency and (5) Water Finder Work.

*Analytical Work.*

3. The number of samples received during the period under report is given below. These samples do not include those analysed for investigation work carried by the chemical section although they include samples analysed in connection with the investigation carried on by other sections of the Agricultural and other Government Departments:—

	Private.	Government.	Total.
Soils	95	358	448
Manures	137	78	215
Waters	50	350 and 85	485
Feeding Stuffs	10	12	22
Oil Seeds and Oils	10	33	43
Milk and Milk Products	19	6	25
Vegetables		11	11
Fruits	3	43	46
Miscellaneous	97	10	107
	421	981	1,402

4. The number of samples received, continues to be as large as in former years both from Government Departments and private persons and the samples are fairly distributed all over the year. The number of samples received this year compare with the previous five years as given below:—

Year.	Total No. of samples.	No. of samples from the public.
1918-19	... 1,162	393
1919-20	... 1,355	396
1920-21	... 1,146	305
1921-22	... 1,142	184
1922-23	... 1,412	471
1923-24	... 1,402	421

5. The samples received from Government Departments are not for mere general information but their analyses are required in the investigation of the various problems on hand. The soil samples for instance have been analysed mostly in connection with the cotton investigation work or the growing of cotton under new system. A large number of water samples (350) were done for the P. W. D. in connection with river silt experiments. Some water samples were analysed for the Economic Botanist in his investigation on weeds growing in canals. Oil-seed samples also were done for the Economic Botanist in his study of the oil contents of the different varieties of safflower seed. The Horticulturist to Government of Bombay is engaged on selecting the best varieties of the various fruits grown and, therefore, several fruit samples were analysed for him. In connection with rice experimental work at Karjat manures and soils, especially manures were analysed. Thus the chemical Laboratory helps directly in solving many of the problems which the Department has on hand.

6. The real test of the success of the Laboratory, however, is not shown by the use which the Government Departments make of the Laboratory. It is shown by the use which the public and especially the cultivators make in getting their samples analysed and their difficulties solved. A large number of samples are received from the actual cultivators and from men engaged in industries depending on agriculture. In the year under report the actual number of samples received from the public was 421.

7. The character of most of the samples was nearly the same as in previous years. Majority of the soil samples sent by cultivators was from lands that do not yield the usual outturn or have degenerated in recent years. The water samples in most cases were for determining the salts to find out if the waters were in any way injurious.

8. Two years ago it was pointed out that many times the manures are adulterated and the cultivators lose much by not getting them analysed. Last year the Agricultural Department issued a leaflet advising the cultivators to invariably get their ammonium sulphate analysed as that manure was found to be very much adulterated in some cases that were brought to the notice of the Department. It seems that the cultivators are now beginning to understand the importance of getting their manures analysed.

In the year under report the manure samples received from the public were 137 as against 92 in the previous year and only 37 in the year 1921-22. This shows an awakening in the agriculturists. Ammonium sulphate and oil-cakes are the manures which are used in large quantities. Recently ammonium phosphate has come on the market. It varies in composition from 16 to 20 per cent. of Nitrogen and 11 to 45 per cent. of phosphoric acid. A certain gentleman in Bombay has prepared a liquid plant-fertilizer containing nitrogenous and potassium salts. This is not likely to prove to be

economic since the bulk when carried in solution will be very great and the freight charges prohibitive. It is always best to carry the manures in their original solid condition.

9. Dry figs are being prepared by the Horticulturist to Government on a fairly large scale for demonstration and in connection with this a large number of figs both dry and fresh was analysed. The figures of analyses may soon be published.

10. On the Dharwar Farm experiments are being carried to find how far the jowar fodder deteriorates by keeping or by exposure to the sun. The analyses show that in both cases the fodder deteriorates.

11. Some samples were received under the name of condensed milk. There was very little attempt at condensing the milk but the consistency was made up by the addition of starch and a large quantity of sugar. Addition of sugar is quite good but it is no use selling milk thickened with starch as condensed milk.

12. Some interesting substances of minor importance had been sent for analysis. Among them were (1) wax found on the leaf sheaths of jowar, (2) salt encrustation on the leaves of *Plumbago capensis*, (3) an essential oil called the Kulfa oil, &c.

#### *Investigation Work.*

13. The work in connection with the manuring of the rice crops is being continued in co-operation with the rice experimental station at Karjat.

14. The study of the changes in the nitrogen contents of the soil in connection with cotton growing experiments which are being carried at Surat will be completed in a few months more.

15. The investigation in connection with the recuperation of the nitrogen content in the Deccan soils is proceeding. Some valuable results have already been obtained and it is expected that the results obtained will be valuable.

16. Mr. N. V. Kanitkar, M.Ag., B.Sc., Assistant Professor of Chemistry, is carrying on his village survey work to study the economic condition of the villages. In the year under report he nearly completed the survey of Possari village near Karjat.

#### *Teaching.*

17. I was responsible for the teaching of Geology and Chemistry of all the classes at the Agricultural College. The teaching work has become very heavy in recent years and the teaching staff in Chemistry find it extremely difficult to carry on any research work. In addition to the teaching at the College there is generally some teaching work out-side the routine college work. In the year under

report there were two men under special training. Mr. M. K. Nayar, B.A., was trained to be a chemist for a private manure-firm in the Madras Presidency and Mr. M. M. Hasan, B.Sc., was trained to be an Agricultural Chemist for the H. E. H. the Nizam's Government.

#### *Manure Mixing Factory.*

18. According to Government Order No. 7790, dated July 27, 1918, R. D., a Chemical Laboratory is attached to the Union Agency with a view to encourage the use of manures by preparing mixtures of manures for the various crops. Mr. V. N. Gokhale, B.Ag., B.Sc., was in charge of the Laboratory from the beginning of the year to the 15th of April 1924 when he went on leave for two months. Mr. N. R. Gurjar, B.Ag., was put in acting charge for two months. After the expiry of Mr. Gokhale's leave he was taken back to the College on his original position and Mr. B. H. Patil, B.Ag., was sent to take Mr. Gokhale's place.

19. The analytical work done in this Laboratory includes soils, manures and manure mixtures for the Union Agency in their usual dealings. The total number of samples analysed was 122 and may be classified as under :—

Soil	...	1
Farm yard manure	...	2
Oil-cakes	...	12
Artificials	...	12
Manure mixtures	...	95
		122

20. The special problems on hand at present at the Union Agency Laboratory include the investigation of the use of a certain phosphate alone and in mixture for *bajri*, potato, and plantain crops and the investigation of the effect of that phosphate on other manures when stored as a mixture.

#### *Water-finder Work.*

21. For sometime it was a practice to sanction a temporary establishment consisting of an assistant and a peon to work with the water-finder machine. But during the last three years the temporary establishment was not sanctioned and the work had to be done by deputing one of the assistants from the Chemical Laboratory. This deputation means a great inconvenience and loss to the Chemical Laboratory where now-a-days there is such a rush of samples for analysis.

22. Two years ago it was decided to try and find out whether the demand for the water-finder remains even when a charge is levied for the use of the machine. During the last two years a fee

was charged at the rate of Rs. 10 for the first two days and Rs. 5 for every succeeding day. When the machine was given for wells for non-agricultural purposes travelling expenses according to Government rules were also charged. The fees have in no way reduced the demand and the calls are so many that they cannot all be attended to.

23. During the year under report Rs. 524-4-0 were received as charges for the water-finder work. The following table will give a clear idea about the work undertaken :—

Name of the District.	No. of villages visited.	No. of applicants for whom work was done.	No. of spots tested.	No. of indications of water currents given.
Bijapur	2	2	14	1
Dharwar	1	1	4	1
East Khandesh	1	1	5	...
Poona	7	7	48	7
Ratnagiri	3	4	18	4
Satara	3	3	15	1
Sholapur	4	6	31	7
Thane	7	8	59	8
West Khandesh	1	1	4	2
State-Baria	1	1	20	3
	30	34	218	34

24. Mr. V. G. Patwardhan, M.Ag., M.Sc., who was Lecturer in Chemistry was transferred to Manjri Farm as Superintendent from 14th November 1923. Mr. V. J. Atgur, B.Ag., has been deputed to the Public Health Department to work as Chemist at the Karachi Sanitary Laboratory from 1st of February 1924.

25. I am glad to say that all the assistants under me worked satisfactorily during the year under report.

D. L. SAHASRABUDDHE,  
*Ag. Agricultural Chemist,*  
 B. P., Poona.

## APPENDIX K.

WORK DONE UNDER THE ECONOMIC BOTANIST FOR THE  
YEAR 1923-24.

Dr. W. Burns, Economic Botanist, was in charge of the work throughout the year. Mr. G. B. Patwardhan, B.Sc., Assistant Professor of Botany, was on leave for nineteen days in May 1924. Mr. L. B. Kulkarni, M.Ag., Assistant Economic Botanist, was granted study leave for one year to study Agrostology (the improvement of grasses and grass lands) in America. Mr. T. P. Shah, B.Ag., and Mr. R. C. Pendse, B.Ag., successively acted in his place. Mr. D. V. Narayanayya was on leave from October 27 to December 14, 1923. Mr. W. V. Joshi, B.Ag., Assistant Economic Botanist, was on leave for a month and a half from April 15, 1924. The services of Mr. T. R. Khadilkar, B.Ag., Demonstrator in Botany, are lent to the Indian Central Cotton Committee with effect from September 1923, and Mr. V. N. Sane, B.Ag., is appointed to act in his place.

*Education.*

There was an unusually large number of students specialising in Advanced Botany and Horticulture in the final year. Nineteen appeared for the final examination with this subject as their optional and fourteen passed, one of them gaining a first class. Two men who have been working for their M.Sc. under the direction of the Economic Botanist presented their thesis, and both passed, one of them getting distinction and the award of the Moos Medal. The usual share of the teaching of the First, Second, Third Year and Special Course students was taken by the Botanical Staff.

*Information.*

One hundred and fourteen enquiries connected with Economic Botany were received and answered. In the herbarium one hundred and sixty-four specimens sent by the public and by Government institutions were identified.

*Research.**Canal Weeds.*

This work has been continued. Mr. C. C. Inglis, P. W. D., Executive Engineer, Special Irrigation District, Poona, has for some years been working on the same problem by other methods and with a different view point. The Economic Botanist and Mr. Inglis have been in frequent touch with one another. Several of their results arrived at independently are now beginning to appear complementary.

It cannot be said that we have reached anything like finality. The process of disentangling the many factors affecting the weed



growth is not easily done. So much also depends on crucial experiments arranged in canal conditions, and it is understood that Mr. Inglis is arranging these.

So far as was possible in laboratory conditions further work has been done by the Economic Botanist and the following are some of the results. For example, the experiment of growing *Potamogeton perfoliatus* (the worst of the Deccan Canal weeds) in tubs with varying conditions of substratum and water opacity was repeated (*see* pp. 151-152 of last year's printed report). The same four sets of conditions were given. The new experiment lasted from August 7, 1923, till February 7, 1924. Last year the tubs stood in the order of merit 4, 3, 1, 2. This year they were in the order 1, 3, 4, 2. It will be noted that 3 and 2 keep their respective places. Tub 2 had gravel substratum with clear water, and apparently offers the least favourable conditions for the growth of the weed. Tub 3 had silt substratum and silty water and apparently favours growth of the weed. The alteration of No. 1 (Gravel substratum and silty water) and No. 4 (silt substratum and clear water), can, I think, be accounted for by the fact that it was not possible to keep the conditions in either of these tubs uniform for any length of time. The fact that a silt bed is more favourable than any other substratum is a matter of common observation. The main point at issue has been the effect of silty water, and this point is not yet settled.

The plants in the tubs were cut off at the soil level in order to weigh the growth made and the underground parts were left in the tubs. The plants in tubs 1, 3 and 4 renewed their growth, but those in tub 2 (the one with least growth) failed to grow. The interpretation of this is not obvious. It may be that the plants were too weak when cut, or it may be that the more intense light killed the terminal bud.

To test the growth of *Potamogeton* in different depths, two pots were prepared and, in each, plants of *P. perfoliatus*, approximately equal in strength were planted. These pots were suspended in a well in our horticultural area (Modi Bag) the one five feet and the other ten feet below the water surface. The well water is disturbed frequently by the use of the *mot* but there is no silt. Now and then the pots were hauled up to see how the plants were progressing, but the times when this was done were cut down to the minimum, as there was a tendency when hauling up the pots for the surface soil to be washed out of them. The experiment is not yet concluded but it is apparent that the plant at 5 feet deep has made luxuriant growth and that at ten feet deep very much less growth. The main differing factor in this case is *light*.

The Nira Right Bank, the Mutha Right Rank and the Pravara Left Bank Canals were visited during closures and observations made on the distribution of the weed. These observations need to be correlated with the work of Mr. Inglis and other irrigation engineers

who have observed these canals during long periods. As an experiment in the way in which weed would or would not come back into cleared parts of the canal, we cleared two small patches of the beds of canals completely of silt right down to the rock. One of these was in the Mutha Right Bank Canal and measured 39 feet long (at mile 53/4). The clearing was done on October 23, 1923. Observations were made at the closures in February and July. There was very little silt on the cleared area. The alga *Nitella* had established itself and *Vallisneria* was beginning to appear. On the Pravara Left Bank Canal a patch 60 feet long was cleared on February 29, 1924. This was observed on June 30, 1924. The silt deposit was already from three to six inches deep, and the area was full of *Potamogeton pectinatus*. Canals thus differ markedly in their silting capacity and the corresponding growth of weeds, and it is apparent that individual canals need individual treatment. But in addition, the principle of the treatment would seem to be some method of stopping silt deposit. The question of suspended silt is still an open question.

In the Nira Canal the prevalence of *Vallisneria* and the absence of other weeds led us to enquire whether their absence might be due to non-infection. A study of the Vir basin showed that other weeds, including *P. perfoliatus*, were there, so that infection is possible. There must be some other factor which determines their absence.

A search for this factor has been made by having weekly samples of water sent from the Mutha, Pravara and Nira Canals for analysis. The following is a typical analysis:—

Samples collected on March 16, 1924.	Parts per 1,00,000 parts of water.			
	Nira, L. B.	Mutha, R. B.	Pravara, L. B.	Godaveri, L. B.
Total soluble salts	10.00	10.00	8.00	14.00
Calcium carbonate	3.50	3.50	4.40	5.40
" sulphate	...	...	...	...
" chloride	...	...	...	...
Magnesium carbonate	1.26	1.26	0.40	1.65
" sulphate	0.75	...	...	...
" chloride	1.90	0.62	0.80	1.78
Sodium chloride	0.58	3.50	2.40	1.70

In addition we have now begun to determine the hydrogenion concentration in these waters. It is hoped in time to get some correlation between these chemical facts and the distribution of the weeds.

I would again insist on the complexity of this problem of plant physiology, in which so many physical and chemical factors are inextricably involved.

#### *Seed Testing.*

The number of seed samples received for testing during the year was 219 of which 15 were grass seeds.

The majority of these samples were from Government Agricultural Stations.

The experiment to test seed longevity has been carried on. The results up to date are of the same nature as last year, *viz.*, little diminution of vitality after 2½ years.

#### *Safflower.*

As mentioned in last year's report, p. 153, a series of twenty-two pure lines of safflower was received by us from Mr. A. Howard, Imperial Economic Botanist. These were grown for the first time with us in 1922-23 and their progeny in 1923-24 from pure self-fertilised seed. This year a change was made in the method of cultivation with most gratifying results. This is the same method which has yielded such excellent results with cotton at Surat and which Mr. Howard has elsewhere recommended for various plants. It consists in growing the plants on broad raised beds and giving irrigation water in the furrows between, keeping the surface of the beds mulched by cultivation. For our safflower the beds were 6 feet broad and the furrows 1½ feet broad and 1 foot deep. The yield has by this means been tripled.

Numbers 6 and 7 of the varieties continue to lead as to yield among the pure varieties, but some of the crosses made by us outstrip them. This may be due to hybrid vigour. This will be tested next year. We are growing the best variety on a larger scale for purposes of multiplication and we shall also this year attempt to combine in one variety by hybridisation high yield and high oil percentage.

This originally minor research promises to be a thing of considerable importance and we hope in a year or two to be able to present growers of this important oil seed with a race of plants that will increase their profits considerably.

#### *Grass Investigations.*

This research is largely financed by the Sassoon David Trust. The main lines on which we are working were fully explained in last year's report (pp. 153-4). The following are additional facts.

At Kalas further development is taking place slowly in the same directions as already indicated, namely, the spread of certain species on the hilly portion and others in the low-lying parts. This year we

arranged to cut, graze and burn for a definite reason. Up to date there has been no cutting, grazing and burning, as we wished to protect the natural vegetation and give it a chance to grow. Our measures had the desired effect. In addition they had an unforeseen result. In the last two years the actual amount of vegetation produced on the land has been considerable. This has all been allowed to ripen and dry. It has then fallen to the ground and formed a layer of fibrous vegetable matter on the soil surface. Vegetable matter if it forms humus is an admirable thing, but this stuff is so fibrous that it rots exceedingly slowly and we found it keeping the rain from the soil beneath it and preventing the germination of the underlying seeds.

We, therefore, selected certain representative strips, one for grazing, one for cutting, and two for burning; one to be burned in February 1924 and the other in May 1924. Our February burning was anticipated by a band of budmashes who burned the tent on the area and set fire to the grass, on February 4. This fire spread over a good deal of the area but fortunately not all of it. We took the opportunity of this fire to map out two plots in order to show the distribution and extent of cover of the perennial grass stumps. The results of these measures will be apparent in the late months of 1924. Our lease of the area expires at the end of the current year but we hope to renew the lease as the area is only half-way towards its climax as a grassland.

Soil-moisture measurements to determine the exact soil conditions in which different species grow have been taken and a properly constructed meteorological station of small size has been maintained to give us accurate climatic records. The yearly observations of "quadrats" and species have been continued. The whole of our information gained at this station and elsewhere is now being embodied in a memoir of joint authorship which will appear in the coming year.

On the invitation of the bodies controlling them, the following Gowrakshans and Panjrapoles were visited:—Kandivlee, Mulund, Dakore, Nasik, Pandharpur. The grass land of each was botanically inspected and plans prepared for the improvement of the grazing and cutting and general management. At Kandivlee these ideas are being given effect to, and to some extent also at Mulund. We look forward to excellent results from this co-operation. At Belgaum two acres were fenced and the vegetation botanically examined. The dominant grass is spear grass (*Andropogon contortus*). We have started to re-seed a part of the land, in the same manner as was so successful at Government House, Ganeshkhind. The re-seeded plot at Pandharpur gave a yield four times that of the neighbouring ground, although the whole neighbourhood suffered much from drought. At Mohod-Budruk near Pandharpur a most successful silo demonstration was held. At Bankapur the fencing of the area for observation was completed. At Chharodi a preliminary survey of the distribution of the grass species was made and

mapped. In the re-seeded area at Government House now open to grazing all year round, there has been no re-invasion by *Andropogon contortus*, and the good species retain their dominance.

We gave expert advice and supervision in the re-grassing of the Poona Gymkhana wicket-table in the cricket field. This was a very successful piece of work, and the more so as the whole of the relaying had to be done in the dry season. The grass stood up to the hot weather and was played on frequently in June during which month there was almost no rain. The grass used was *hariali* alone (*Cynodon dactylon*).

There was a great public demand for grass seeds, a demand which we could not supply. There is here an opening for the local seedsmen if they will put themselves to the trouble of collecting these seeds from the open country in the months of October-November.

Since the methods of research on nut-grass (*Cyperus rotundus*) called in Marathi, *Lavala*, were so successful we decided to apply the same methods to spear grass, *Andropogon contortus*, and to begin with we are making a close study of the plant from seed to maturity both in the field and in the artificial cultures. We have already confirmed the fact that there are at least two definite varieties, and also the interesting belief that the hygroscopic twisting of the awn in the presence of water helps to bury the seed.

Mr. L. B. Kulkarni, M.Ag., who has done so much in these grass researches is at present in America studying methods of grass improvement in similar areas there, and we hope to have considerable benefit from his increased experience on his return here in December 1924.

#### *Weeds.*

The research on the weed *Lavala* (*Cyperus rotundus*) was brought to a successful close in the year under report. These results have been embodied in a memoir entitled "The Eradication of *Cyperus rotundus*, A Study in Applied Botany." This has been accepted by the Pusa Publication Committee for publication as a memoir of the Agricultural Department in India, in the Botanical Series. In our last report (pp. 154-155) a fairly full account of the main discoveries was given. We may now summarise our general conclusions and practical recommendations. These are:—

- (1) the prevention of seed production ;
- (2) the prevention of the formation of aerial-connections by germination seeds or tubers. We have found that until this aerial connection is established no underground tubers can be produced ;
- (3) the attacking of the weed as soon after the rains as the soil is workable. The process should include deep ploughing

and subsequent pulverisation, and turning over and over of the soil so as to expose as many tubers as possible to the effect of the sun's heat ;

(4) the following of this up in the rains with a thick green-manure crop and a second dry season's continuous cultivation when the land should be clear of weed :—

If, however, the land is wanted for a rains crop, it should be sown so that intercultivation can be practised and the aerial connection of the Lavala prevented from forming. Thereafter a second dry season's cultivation should reduce the weed and a third dry season's cultivation extirpate it.

The whole of the scientific details are contained in the memoir which will appear in the next few months.

#### *Bajri Investigations.*

In this research which is financed from the Sassoon David Trust we are trying to produce a drought-resistant type of bajri. Our methods have been fully described in last year's report (pp. 155-157). This year we have managed to isolate a number of strains practically pure as regards the type of hairiness. This is a long step toward our goal, since, as we pointed out last year our first difficulty lay in the extraordinary extent to which the different types of bajri had crossed with one another. The plant lays itself out to be cross-pollinated. The nonhairy plants have this year again shown themselves to be superior in yield, in size of head and in resistance to *Sclerospora* attack. As regards resistance to drought :—we grew the plants in four different series in different places, without irrigation, but in no place were the conditions severe enough to make any real distinction between the strains as to drought resistance. This year we have grown two series outside Poona, in the neighbourhood of Manjri, with a much smaller rainfall and the Poona series has been grown on the poorest soil we could find. We hope that these drastic measures will enable us to pick out the drought resisting strains.

In addition we have this year begun a complicated series of experiments on the water requirements of bajri throughout its life and at special seasons. This is following up certain classic work on the drought-resistance of maize in America. Plants are grown in sealed drums with known amounts of water added from time to time, and with weighments of the drums at intervals. We hope by this means to get some accurate facts as to the actual needs of bajri as to water and as to what stage of bajri is most affected by drought.

Fortnightly sowings made during the year bear out completely the findings of last year. They give the comforting information that bajri may be sown successfully as late as August. So in a year of very late rainfall bajri is a perfectly possible crop.

*Lantana Eradication.*

We invented a chisel in a tube with a spring to bring it back after it had been hammered into the stump of a Lantana bush. This instrument was made to our specifications at the Central Store and Workshops, Dapuri. The instrument proved too clumsy for our work and did not fulfil our expectations.

We then tried mere painting of sodium arsenite solution over cut stumps, with encouraging results. Rapid evaporation seemed to be preventing the soaking of the poison into the wood so we followed up the application of sodium arsenite solution by a layer of castor oil to prevent this evaporation. Trials were made on a large scale on a forest area near Poona where Lantana was common, and this method was used in April and in May 1924. So far, about 75 per cent. of the treated stumps have sprouted which shows that the method has not been effective on the whole. Where there was definite blackening due to the entrance of the poison, there has been no sprouting. There are distinct possibilities in the method. Our one difficulty is to ensure effective penetration of the poison. This we shall try to overcome. The cost of the treatment as now given is approximately Rs. 20 per acre.

*Potatoes.*

An attempt was made this year to establish a local source of seed supply. Potatoes for seed purposes are annually imported from Italy. We grew the Italian seed in Mahableshwar during the cold weather of 1923-24 to see whether we could thus have a stock of seed for the rainy season in the Deccan. In Mahableshwar the red Italian potato (known in Italy as *patata rose*) is grown to the exclusion of the white Italian in which the Deccan specialises. The white Italian when grown in Mahableshwar gave better total yields per acre than the red sort but produced individually smaller tubers. From the point of view of seed this was not a drawback. The potatoes thus got were stored in Mahableshwar till May when they were transported to Poona and stored in our store beside other potatoes. Within a few days the whole lot of potatoes brought from Mahableshwar rotted and the whole consignment was lost. The other potatoes in the same store were unaffected so that the Mahableshwar potatoes died on account of some infection of their own. This appeared to be mainly bacteria with some *Fusarium*. We shall repeat this experiment on a smaller scale next year.

The potato flower was studied in order to find out why viable seed is not produced, and as a rule no berries are produced. It was found that the pollen was defective. Berries are, however, occasionally found so that pollen must occasionally occur which is not defective. Our object in studying this matter was to get seed material for the development of new varieties.

Further storage tests were made from the end of the 1923 hot season till May. One lot of potatoes was kept in the Union Agency store house and one in cold storage in Bombay. The lot in Bombay was 600 lbs. and we lost only 2 lbs. from rot in three months. The lot in the Union Agency's store at Poona was of the same weight and was entirely wiped out by rots in 2½ months. There is no doubt that so far the only really efficient way of storing potatoes is in cold storage. This is particularly so in the hot weather.

Of the Scottish varieties, Great Scot has given us far the best results and we imported a ton of it this year which is being grown at various places in the Deccan. This will give us a final idea of its performance. It is also a variety which up to date has not degenerated when grown on in India and it is possible that it may prove to be a competitor with the Italian white round now so popular.

Against Tambera we are now recommending dusting rather than spraying on account of the greater ease with which dusting can be done and the less likelihood of the apparatus going wrong. We have found the best dusting mixture to be 20 per cent. of sulphur and 80 per cent. of slaked lime (dry). Two dustings cost Rs. 6-8-0 per acre.

The Peth pedigree stock is maintained and shows no diminution in its yielding capacity. A small amount of bacterial ring disease has crept into this crop. The stock will be grown elsewhere for two generations to free it from this.

Ring disease, however, does not persist long in the soil. We found this year that clean seed planted in ring-infected soil five months after the removal of the diseased crop was not infected.

#### *Miscellaneous.*

Fuller's Teasel (*Dipsacus fullonum*) is being grown, we believe for the first time in India, by us. A certain firm of wool merchants asked us to provide them with the heads of this plant which on account of its hooks is useful for bringing up the pile on woollen fabrics. We tried several Indian substitutes but in no case were the hooks strong enough. We obtained seed from Britain from Messrs. Dobbie & Co., Edinburgh and are now growing this plant which is doing quite well. It is a biennial so it will take two years to get the heads. If we succeed in doing so, we shall have established one new useful plant in the country which will benefit both industry and agriculture.

*Datura fastuosa* is a well known weed of waste places. We have found, in all, four types differing in colour, habit and other characters. These offer admirable material for the study of the behaviour of Mendelian characters and we are growing and crossing them for that purpose. The value of these experiments is partly for our students and partly for the science of genetics as a whole.



Algaroba plants, which are fodder trees, are now growing fast and we hope to have the first yield of their pods shortly.

*Publications.*

Dr. W. Burns, Economic Botanist—

“Scientific Precision”. Poona Agricultural College Magazine, XV, 3.

“Scientific Certainty”. Poona Agricultural College Magazine, XV, 4.

Mr. G. B. Patwardhan, Assistant Professor of Botany—

“Seed Standards”. “Some more Light on the Alleged deleterious effects of cattle drinking water in which Shingada has been cultivated.” Poona Agricultural College Magazine, XV, 1.

“Note on Loranthus on Eucalyptus in Poona”. JI. Ind. Bot. Soc., IV, 2.

Mr. L. B. Kulkarni, Assistant Economic Botanist—

“Some Exotic Fodder Plants”. Poona Agricultural College Magazine, XV, 3 and 4.

Mr. W. V. Joshi, Assistant Economic Botanist—

“Deterioration in Skin Colour of Potatoes”. Poona Agricultural College Magazine, XV, 2.

Mr. S. B. Rauade and Dr. W. Burns—

“The Eradication of *Cyperus Rotundus*”, Memoir of the Agricultural Department in India (in the press).

Mr. W. V. Joshi—

“Further Investigations in Potato Cultivation in Western India”. (In preparation.)

W. BURNS,

Economic Botanist to Government,  
Bombay, Poona.

## APPENDIX L.

ANNUAL REPORT OF THE WORK DONE BY THE PLANT  
BREEDING EXPERT TO THE GOVERNMENT OF BOMBAY,  
POONA, DURING THE YEAR 1923-24.*Rice.*

*Staff.*—I was obliged to go on leave from the 26th May to 25th of June 1923, owing to my ill health. Mr. S. G. Bhalerao, the former Superintendent of the Rice Breeding Station, Karjat, was transferred to Mugad on 19th May 1923 and Mr. M. V. Gadkari, Assistant to the Rice Specialist, Karjat, was appointed in his place. Later on, however, Mr. Gadkari was transferred back to the Rice Physiological Section owing to the transfer of Mr. K. V. Joshi, Rice Specialist, to the Cotton Physiological Work at Surat. Mr. R. M. Hegdekatti, a fresh Agricultural Graduate, was then taken in his place. Messrs G. G. Patil and R. B. Patil worked as non-graduate fieldmen.

*Season.*—The season commenced about a week late. The sowing had, therefore, to be delayed to some extent. The transplanting was not much put off. But the rains were very heavy in July and caused much damage in many places. The excessive down pour at this time retarded tillering to a certain extent, and the practical absence of rain after September interfered with the proper development of the grain. Thus on the whole the season was rather unfavourable.

*Method of Work.*—The method of work remained practically the same to which we had settled down as described in the last year's report. But my own illness, the transfer of Mr. Bhalerao and the repeated change of staff at Karjat resulted in slight deviations from the proposed line of work, and caused some break in the continuity of the same.

*Cultures under Study.*—The old strains Nos 79, 179, 153, 164, 32, 35, 134, 42 and 104 and some new ones such as 184, 17, 39, 65, 199, 202, 8, 82, 136 and 37 a Patni sample were studied intensively. In addition to these a number of new bulk samples and the progeny of several new panicles collected last year by Mr. Bhalerao were studied, and more particularly the latter in some detail. Some of these are likely to be useful.

*Behaviour of the old Strains.*—On the whole the old strains have remained true to their noted characters, though the unfavourable season caused a general reduction in tillering and yield of grain. No. 121 was not grown this year through oversight. No 134 did not give very satisfactory results. Attempts were made to purify No. 179 but its cultures cannot be said to be quite pure yet, as they are still showing great variability in the time of flowering and in the compactness of the panicle. As for the others the following table will show the yield of grain in the various cultures under different conditions:—

[Please see Table on next page.]

Comparative Table of Yields of the selected Strains and the Cultivator's Sample under various Conditions in 1923.

Name of Culture. Early strains.	Days taken from sowing to harvesting.	Fineness of grains (No. of grains per gram).	Cultures for plant to plant study with 18" x 8" spacing and single planting.			Extensive cultures with 12" x 12" spacing and 10 clumps per bunch.			Comparative cultures with 18" x 8" spacing and single planting.			5 Replications with 12" x 6" spacing and single planting.	Remarks.
			No. of plants studied.	Average yield per plant in grams.	Calculated yield per acre in lbs.	No. of bunches.	Actual yield in lbs. and oz.	Calculated yield per acre in lbs. and oz.	No. of plants.	Actual yield in lbs. and oz.	Calculated yield per acre in lbs. and oz.	Yield per acre calculated from the average of five replications.	
Strain No. 79 <i>Cultivator's Seed.</i>	110	51.87	230	11.63	1,116	300	12-3½	1,777	223	6-15½	1,361½	1,408.10	*The yield low due to ravages of crabs and poor soil.
Ghosali	119	38	...	...	...	300	11-0½	1,601	...	...	...	...	
Mahadi	126	34	...	...	...	300	10-8½	1,529	...	...	...	...	
Halwar	131	44 †	...	...	...	300	12-10¼	1,839†	...	...	...	...	
Halwa Kolamba <i>Intermediate Strains.</i>	131	61	...	...	...	300	11.8	1,669	...	...	...	...	†The sample is very coarse.
Strain No. 153	135	72.75	241	23.41	2,248	300	12-10¼	1,839	393	15-10¼	1,735.5	1,817.15	
" No. 164	135	58.90	238	23.00	2,208	300	12.14	1,832	388	14-4½	1,605.1	1,792.2	
<i>Late Strains.</i>													
Strain No. 32	145	81.20	238	24.13	2,317	1,180	78.8	2,397	393	17-10¼	1,957.0	2,041.10	
" No. 35	145	82.50	242	25.16	2,416	1,200	63.9	2,305	386	17.1	1,925.0	1,860.3	
" No. 42	145	70.25	240	29.78	2,859	1,320	89.9¼	2,957	394	20-5½	2,347.0	2,113.	
" No. 104	155	57.8	250	26.53	2,549	...	...	...	...	...	...	...	
<i>Cultivator's Seed.</i>													
Strain No. 1	145	75.	250	21.28	2,043	1,200	73.	2,649	393	16-1¼	1,785.3	...	
" No. 2	145	76.	235	24.72	2,326	517	26.4	2,211	315	12-6½	1,715.9	...	
" No. 3 (Zinya)	145	78.	250	24.85	2,367	1,200	64.3	2,330	395	14.4	1,571.7	...	
" No. 4 (Ghudyu)	145	83.	250	23.24	2,423	1,380	73.05	2,314	392	13.6	1,486.6	...	

It will be seen from this that strain No. 42 has always given the highest yield of all the selected strains and the cultivators' samples with which it was compared respectively in four and three different series. No. 104 comes next to No. 42 in yield in the extensive study series, where alone the two could be compared with others this year. No. 32 comes next to No. 42 in three series and No. 35 next to No. 32 in two series. Coming next to the early and intermediate strains which have generally rather low yields, Nos. 79, 153 and 164 have given better yields than three of the cultivator's intermediate samples. The remaining sample of the cultivator is only equal in yield to Nos. 153 and 164 though it yields better than No. 79. But all the three strains are comparatively finer grained and No. 79 is even earlier than the cultivator's sample.

*Purity and Yielding capacity of the new strains taken up this year.*—These have shown pretty normal frequency distributions in all the important characters.

*Statement showing the Comparative Yields and other important Characters of the Strains taken up this year for extensive Study.*

Strain No.	Date of flowering.	Fertile tillers.	No. of grains per gram to show fineness.	Weight of main panicle in grams.	Weight per plant in grams.	Remarks.
No. 79 (old strain for comparison).	5-9-1923.	4.5	51.87	3.99	11.71	Very early but coarse grained.
" 184 ...	4-9-1923.	4.6	63.00	3.63	12.46	Very early, finer grained, higher yielding.
" 164 (old strain for comparison).	28-9-1923.	6.72	58.90	5.04	21.00	Intermediate.
" 153 (do.)	28-9-1923.	8.61	72.75	4.18	23.40	Intermediate, tillering rather good and fine grains.
" 17 ...	28-9-1923.	5.94	63.00	4.44	20.26	Medium to fine grained.
" 42 (do.)	8-10-1923.	9.48	70.25	4.77	29.77	Good tillering, medium-fine grained, high yielding.
" 32 (do.)	8-10-1923.	8.41	81.20	4.21	24.13	Rather good tillering, fine grained.
" 202 ...	5-10-1923.	6.38	80.54	5.38	23.53	Fine grains, rather good panicle.
" 199 ...	7-10-1923.	6.97	83.01	4.49	23.32	Fine grains.
" 65 ...	6-10-1923.	6.44	82.37	4.74	22.16	Fine grains.
" 89 ...	5-10-1923.	7.16	93.37	4.28	20.48	Very fine grains.
" 82 ...	7-10-1923.	5.90	56.00	5.25	23.77	Coarse grains, rather good panicle.
" 8 ...	4-10-1925.	6.06	51.20	5.29	22.31	Coarse grains, rather good panicle.
" 136 ...	9-10-1923.	7.79	63.00	4.50	26.59	Medium-fine, grains rather good yield.
" 37 (Patni).	10-10-1923.	4.02	46.60	7.67	23.13	Tillering poor grains very coarse, panicle heavy.

It will be seen from the above table that No. 39 is the finest of the whole lot but rather poor in yield. No. 184 is a very early strain with medium-fine grains ; it has given more yield than No. 79 in the intensive study culture and equal yield in the comparative culture. It is, therefore, worth trying again. Nos. 199, 202 and 65 are all late and as fine as Nos. 32 and 35 but their yield is lower than the latter strains. Nos. 82 and 8 are very coarse and late but not high in yield. No. 136 also is much coarser than Nos. 32 and 35 though it yields more than these. No. 37, the Patni sample, is poor in tillering but the weight of its main panicle is 7.67 grams being the highest of all the strains tried so far ; but unfortunately its yield per plant is not high.

*New Panicles.*—(See table on page 155). Out of the many new panicles brought by Mr. Bhalerao, the progeny of Nos. 219, 220, 221, 222, 223, 224, 225, 226 and 227 only were subjected to detailed study. These are all late in flowering. Of these, Nos. 222 and 225 showed bimodality in the weight of the main panicle and in the number of fertile tillers respectively. Otherwise all the numbers showed rather normal frequency distributions in the various characters. No. 223 is as fine as No. 35 and its yield also was slightly more than that of No. 42. It also yielded appreciably more straw than No. 42. So this number seems to be very promising, but further trials are desirable as unfortunately it had produced a totally sterile plant which probably indicates a bad contamination. No. 225 is also nearly as fine as No. 32 and yields appreciably higher than that strain. Besides it has also yielded much more straw than any culture in the intensive study series. Nos. 221, 222, 227 and 226 are all as fine as No. 32 and have given higher yields though not as high as Nos. 223 and 225. No. 219 is low in yield and coarse in grain size. No. 224 which appears to be impure has yielded much more than No. 32. It is, therefore, worth purifying if possible.

The following new panicles were not subjected to intensive study ; but an equal number of seedlings obtained from each of them were planted in two rows, the spacing given being 12" x 6". Compared under such conditions No. 240 of these is finer than No. 164 of the old lot and its yield also is higher than the latter. It matures about the same time as No. 164 ; it is, therefore, well worth trying again. Nos. 239 and 241 are as coarse as No. 164 but give more yield. The flowering period of these is also the same as of No. 164. Nos. 242, 243 and 244 though flowering at the same time are all finer than No. 164 and seem to give higher yields than it. Similarly the late ones Nos. 237, 228, 229 and 287 are much finer than No. 42 of the old lot or even than No. 35 and their yields are also higher. These, therefore, deserve to be tried again.

Among the new bulk samples there are some promising numbers. Some of these also possess fine grains and are intermediate in ripening. These together with some of the promising late samples deserve being studied for their general capacity next season. The

following table will show the comparative yields and other important characters of the new panicles taken up this year :—

*Statement showing the Comparative Yields and other Important Characters of the new Panicles taken up this Year for intensive Study.*

Panicle No.	Date of flowering.	Fertile tillers.	No. of grains per panicle to show disease.	Weight of main panicle in grams.		Remarks.
				Weight of main panicle in grams.	Weight per panicle in grams.	
No. 219 ...	10-10-1923...	9-21	64-20	4-82	22-80	Tillering good, medium-fine grained.
„ 220 ..	9-10-1923...	7-60	64-20	4-69	24-70	Medium-fine grained.
„ 221 ...	7-10-1923...	6-70	78-48	5-51	25-80	Fine grained.
„ 222 ...	7-10-1923...	6-80	78-93	6-06	27-09	Fine grained, yield rather good.
„ 223 ...	7-10-1923...	8-50	82-54	4-69	30-	Tillering good, fine grained, yield good.
„ 2. ...	7-10-1923...	9-05	78-57	4-25	28-83	Tillering good, fine grained yield good.
„ 226 ...	7-10-1923...	7-75	83-25	4-85	28-33	Fine grained, yield good.
„ 227 ...	7-10-1923...	8-46	80-11	4-73	26-60	Fine grained, yield rather good.
Strain 42 (for comparison).	8-10-1923...	9-48	70-25	4-77	29-77	Tillering good, grains medium-fine, yield good.

*Statement showing the promising bulk Samples.*

Bulk No.	Period of growth.	Fineness.	Actual performance of the plant.		
			Tillers.	Yield grams.	Remarks.
7/6	Intermediate	Fine	11	33-0*	* If some of these plants turn out to be inherently high yielding and not merely responding to environmental conditions they might be worth having for propagating from.
10/2	Intermediate	Fine	7	27-8	
50/1d	Late	Medium	13	40-6*	
58/2	„	Very fine	13	39-3*	
37/6	„	Do.	12	37-5*	
42/2	„	Med. fine	10	33-5*	
58/1	„	Very fine	10	30-1*	
49/1	„	Do.	11	29-10	
46/4	„	Fine	11	29-20	
59/2	„	Very fine	13	31-5*	
37/7	„	Do.	7	21-4	
44/1	„	Do.	9	22-5	
26/3	„	Do.	9	23-2	

*Hybridization Work.*—So far the work was restricted only to the selection of desirable types and multiplication of the seeds of the most promising selections. There was, therefore, only a small chance so long of getting all round perfect types. It was, therefore, felt desirable to evolve types combining several desirable qualities. With this object in view some crosses were made (A) for the purpose of combining good tillering and heavy yield with very fine grain size and (B) for combining earliness, fineness and yield. The results of these are awaited.

*Publication of the Results.*—A leaflet giving the information about the improved strains has been issued for the benefit of the cultivators in the North Konkan and arrangements were made for the sale of seeds of the improved strains through the District Staff in the Thana and Kolaba Districts. A small memoir on the improvement of the Kolamba Rice in the North Konkan is ready for publication.

*Extension of the Use of the improved Strains in the Kolamba Tract.*—The improved strains are becoming popular and it is expected that during the coming season cultivators will grow them on some thing like 10,000 acres. Of these about 9,000 acres will be under No. 42 and about 500 acres under No. 79. It is also likely that about 500 acres will be grown with Nos. 153 and 164.

Lastly I wish to place on record my appreciation of the work of Mr. Bhalerao owing to whose transfer I have lost a very able and tactful Superintendent. At the same time I may say that Mr. G. G. Patil did very good work in Mr. Bhalerao's absence so that the new Superintendent, Mr. Hegdekatti, had little difficulty in working out the results.

#### *Wheat.*

*Locality.*—The work was carried on at the Ganeshkhind Botanical Gardens, Kirkee. Land was not available this year at the Poona Agricultural College Farm for the extensive cultures of the improved strains. But the seeds of some of our strains were distributed for trial to some of the Government Farms such as Dharwar, Jalgaon and Dohad, and on the fields of a few cultivators in Nasik and Prantij.

*Staff.*—Mr. N. M. Nitimargi, Agricultural Graduate in charge of the Wheat Breeding operations, was transferred to Surat for Cotton Physiological work in September 1923 and Mr. B. Nazareth, a fresh Agricultural Graduate, was taken in his place. Mr. Joglekar worked as non-graduate fieldman.

*Preparatory Tillage Operations.*—These were carried on from May and onwards. In September there had been nearly 5 inches of rain from 10th to 29th. The sowing was commenced on the 11th of October 1923. A light irrigation was given about 10 days after sowing and another one on the 8th of December just before

flowering to all except the dry cultures mentioned later. During the growth of the crop no rain was received nor was any more irrigation given except to the Khapli selections whose resistance to rust we wished to test. To these cultures, however, as many as seven waterings had been given to provide optimum conditions for the appearance of rust. A number of seeds had not germinated for some days owing to lack of moisture. After the first watering some of them began to sprout. But some seedlings which had not got a good start eventually succumbed. Wilt also was responsible for some of the gaps which occurred later on.

*Cultures under Study.*—Fifteen strains including Pusa 4 which was used for comparison, were grown for further determination of their purity and yielding capacity on an extensive scale. Plant to plant measurements and notes on the important characters such as dates of flowering, height of the plant, number of tillers, length and breadth of the flag, size of the ear-heads, &c., and total weight of the whole culture were taken and the frequency distributions of these except the last were worked out together with their means, standard deviations, probable errors, &c. These were found to be satisfactory in many cases. Each culture occupied 6 rows planted a foot and a half apart. The seeds in the rows were dibbled in two's in each hole. This was done for preventing gaps and maintaining uniform conditions. But the improper germination due to lack of moisture and the death of some seedlings due to wilt frustrated the object to some extent. The dibbled cultures were grown in duplicate series. One of these was given only one watering and was observed as to its adaptability to drier conditions. The other was given two waterings. Each of the dibbled cultures contained from four to five hundred plants. A third series which may be called the repetition series was also grown for trial on an extensive scale. In this series all the strains were grown 6 times in 6 adjoining plots in such a way as to distribute the various strains equally in different soil conditions. This series was sown as if with a drill. Here each culture occupied four rows and an equal quantity of seed ( $\frac{3}{4}$  oz.) per row was sown by hand as uniformly as possible for each of the six repetitions of a strain. The table of yields will show the plan of the repetition series and the yields of the various strains.

[Please see next page for Table.]



*Statement showing the Plan of the Repetition Series and the Yields of the various Strains.*

## WEST SIDE.

	C		B		A		D		E		F		Average yield per column in oz.	Yield per acre in lbs.
	No.	Yield in oz.	No.	Yield in oz.	No.	Yield in oz.	No.	Yield in oz.	No.	Yield in oz.	No.	Yield in oz.		
	212	46.50	171	103.00	83	124.50	210	106.25	168	69.25	278	116.50	77.3	1,412
	224	50.25	196	94.00	103	131.00	200	130.00	167	115.00	237	98.50	77.3	1,401
	229	57.25	Pusa 4	80.00	122	130.25	Pusa 4	111.75	162	88.00	228	111.75	67.4	1,222
	237	62.00	201	96.00	167	117.75	186	108.25	103	101.50	224	108.25	72.4	1,313
	278	56.50	210	93.00	168	105.25	171	91.60	52	124.25	212	103.75	67.3	1,220
	52	59.75	212	102.75	171	88.25	168	82.50	278	63.00	210	99.75	85.0	1,540
	103	77.75	224	97.50	166	106.75	167	84.00	237	97.25	200	76.50	82.8	1,501
	162	85.00	228	85.75	Pusa 4	93.25	162	89.75	228	67.50	Pusa 4	95.00	81.0	1,439
	167	86.50	237	119.25	200	101.00	103	39.75	224	61.75	186	72.50	79.8	1,446
	168	86.75	278	121.00	210	100.00	52	66.75	212	46.00	171	60.75	71.5	1,236
	171	88.75	52	113.25	212	84.00	278	46.50	210	51.00	168	54.00	79.9	1,435
	186	91.50	103	103.75	224	81.75	237	39.50	200	40.25	167	30.00	81.7	1,481
	Pusa 4	87.00	162	77.25	228	55.25	228	25.75	Pusa 4	19.25	162	13.00	73.7	1,427
	200	60.00	167	67.00	237	47.50	224	33.00	186	5.25	103	3.75	74.6	1,352
	210	60.50	168	78.50	278	65.00	212	21.00	171	2.00	52	0.75	81.5	1,477

SOUTH SIDE.

NORTH SIDE.

## EAST SIDE.

It will be seen from this that in every one of the six repetition plots three or four of the end cultures towards the east have given poor yields owing to the poverty of the soil. But taking things as they are, and averaging the yields of these six repetitions we see that at least nine out of the 14 strains compare well with Pusa 4. Of these four have actually given more yield and the other five though somewhat poorer are still quite comparable with it. On the other hand if we examine the yields obtained in a more even and normal looking plot, *viz.*, the B plot we find that nine strains have given more yield than Pusa 4 even if we raise the yield of Pusa 4 from 80, its actual yield here to 93 which it has given in other places.

*Rust Resistance.*—Conditions were not very favourable for the appearance of rust to any marked degree this year. Rust did appear here and there, but it did not affect our cultures to such an extent as to reduce their yields appreciably. Nos. 103, 162, 167, 186, 200, 228 and 278 had no rust at all. But Nos. 52, 168, 171, 210, 212, 224 and 237 were slightly affected. Nos. 168 and 171 were equally affected by *alterneria* also, both at Ganeshkhind Botanical Gardens and outside.

The series of the cultures that was maintained under practically dry conditions had absolutely no rust on any of the plants and

it is believed that on drier seed bed most of the strains would escape the rust attack.

The new Khapli strain which was given out last year as manifesting an extraordinary power to resist the attack of black rust was this year put under rigorous test. This culture was given seven waterings, and optimum moist conditions were maintained so as to encourage rust; and it was found that though the neighbouring cultures in the same plot, viz., an extra culture of No. 168 and 100 foreign ones were very badly affected by rust yet the Khapli strain was practically immune. At the same time it must be mentioned that other strains of Khapli grown under similar moist conditions close by did show considerable amount of rust. The yield per plant of this resistant Khapli type is also good as will be seen from the table given below:—

*Table showing the Comparison between the Yields per plant of Pusa 4 and the selected Strains.*

Strain No.	1922-23.		1923-24.			
	Irrigated.		Irrigated.		Nearly dry.	
	Plants studied.	Yield per plant in grams.	Plants studied.	Yield per plant in grams.	Plants studied.	Yield per plant in grams.
No. 52	230	12.01	362	7.22	492	5.5
" 103	257	12.46	453	7.74	446	3.6
" 162	259	10.83	458	7.15	432	4.7
" 167	260	11.09	507	6.12	517	6.1
" 168	265	8.01	458	7.01	603	2.9
" 171	285	5.88	429	6.85	500	3.3
" 196	275	9.67	432	9.59	534	4.9
" 200	266	10.11	383	9.02	418	2.8
" 210	263	6.12	452	8.44	477	3.5
" 212	229	7.37	465	7.00	493	4.7
" 224	275	6.78	364	8.35	508	4.7
" 228	265	11.51	442	6.50	500	4.7
" 237	239	12.29	500	6.70	540	6.1
" 278	214	15.49	252	6.66	368	4.3
Khapli	...	...	100	17.80	...	...
Pusa 4	213	18.69	443	7.08	431	4.7

The multiplication of this pure and rust resistant type is being carried on and its distribution for trial on other farms will be arranged next year.

Last year owing to the appearance of rust at Ganeshkhind Botanical Gardens it was not possible to make good comparison of the yields per plant of the selected strains with that of Pusa 4 in the intensive study cultures. But as there was no rust this year, it was possible to make such a comparison. The above table gives the yield per plant obtained in the year 1922-23 and in 1923-24 in the different cultures. It may be noted that in 1922-23 only single seeds had been dibbled in a hole, whereas this year two seeds were

dibbled in a hole. So the larger number of seeds and the consequent crowding has naturally reduced the yield per plant. This year's figures will show clearly that seven of our strains are better in yield than Pusa 4 while two are nearly as good as that variety in the irrigated cultures, and in the dry cultures three are better while six are quite as good. It may be noted here that these strains are practically the same numbers that could be compared well with Pusa 4 in the repetition series. Similarly four of these numbers, *viz.*, 103, 162, 167 and 224 have done well outside Poona, *vide* statement showing the results of trial of the selected strains outside Poona. Our rust resistant Khapli strain also of which single seeds had been dibbled in a hole this year compares favourably with the last year's performance of Pusa 4.

One thing finally emerges out of these comparisons both in rice and wheat that, however, carefully we try to compare different strains with each other or with a standard it is not possible to get very accurate comparisons until the strains are grown alternately in several replications with the comparable standard owing to unavoidable soil differences. It is, therefore, intended from the next year to get these comparisons by this method. The results of such a comparison will doubtless be far more reliable than at present and it is hoped that several of our strains will turn out to be promising even under that test.

Attempts are being made to breed the rust resistance of Khapli and Pusa 4 into our high yielding strains. The following crosses were made with the object of combining rust resistance and high yield :—

No. 52 × Pusa 4,	14 flowers crossed.
Pusa 4 × No. 168,	41 flowers crossed.
No. 168 × Pusa 4,	28 flowers crossed.
Pusa 4 × No. 171,	28 flowers crossed.
No. 171 × Pusa 4,	36 flowers crossed.
Khapli × No. 168,	12 flowers crossed.
Total ...	159

Besides these the following crosses were also made :—

Pusa 4 × No. 162,	24 flowers crossed.
No. 162 × Pusa 4,	17 flowers crossed.
Khapli × Pusa 4,	10 flowers crossed.
Total ...	51

*Trials of selected Strains outside Poona.*—Six of our strains were sent to Dharwar, Nasik, Jalgaon, Dohad and Prantij for trial and comparison with the local varieties. It is encouraging to note the favourable results obtained in several cases.

## Table of results—

Statement showing the results of trial of the selected strains outside Poona, in 1923-24.

Strain Nos.	Dry.						Irrigated.		Reclaimed from a tank soil and moisture good.	
	Dharwar.		Nasik.		Jalgaon.		Dohad.		Prantij.	
	Calculated yield per acre in lbs.	Remarks by local staff.	Calculated yield per acre in lbs.	Remarks by local staff.	Calculated yield per acre in lbs.	Remarks by local staff.	Calculated yield per acre in lbs.	Remarks by local staff.	Calculated yield, per acre.	Remarks by local staff.
103	749	" All strains far superior to the local variety and No. 163 the best of all." The local strain is naturally very poor.	150	Nos. 103 and 162 preferred, the season unfavourable and hence the low yields in general.	512	No. 224 superior to local in all respects.	1,103	All the strains stand well in comparison to Baxi. But for want of one irrigation the yield somewhat fell short.	2,133	The other three strains were sown to another cultivator who unfortunately mixed their yields at harvesting as they had some rust. But he preferred No. 224. The first man preferred No. 163 though its yield was less. As the local strain is sown mixed with Baxi no figures could be obtained.
162	742		160		768		1,217			
167	661		105		832		1,146			
168	679		90		704		1,200			
171	665		90		672		905			
224	651		60		928		1,175			
Local 1	364	60	714	1,184						
" 2	...	...	...	...	1,040					
" 3	...	...	...	...	1,292					

It will be seen from this that Nos. 103, 162, 167 and 224 have done well at several places.

It will be seen from this that all the six strains tried at the Dharwar Farm proved quite superior to the local Nos. 103 and 162 having topped the list.

At Nasik also these two strains behaved much better than the local though the season was most unfavourable to wheat.

At Jalgaon Nos. 224 and 167 proved superior to the local, No. 224 being superior to local in all respects.

At Dohad all strains could stand well in comparison with the local Baxi.

In conclusion I am glad to say that in the absence of Mr. N. M. Nitimargi, the experienced Superintendent of the Wheat Breeding Station, Mr. B. Nazareth could manage the wheat work efficiently with the help of Mr. G. H. Joglekar who has proved himself very energetic and useful.

R. K. BHIDE,

Plant Breeding Expert to the  
Government of Bombay, Poona.

## APPENDIX M.

ANNUAL REPORT OF THE PLANT PATHOLOGIST TO GOVERNMENT  
OF BOMBAY, POONA, FOR THE YEAR 1923-24.*Staff.*

Mr. S. L. Ajrekar, B.A. (Cantab. and Bombay), held charge of the post of Plant Pathologist to Government of Bombay, Poona, till the 27th January 1923, when his services were transferred to the Educational Department of the Bombay Government. The post since then has been filled by Mr. G. S. Kulkarni, M.Ag., and the section has been temporarily placed under the control of the Economic Botanist to Government of Bombay, Poona, pending the reversion of either Mr. Ajrekar or Mr. G. S. Kulkarni to this section.

Mr. G. S. Kulkarni's services were lent to the Indian Cotton Committee for cotton wilt investigation work from 8th September 1923 and the post of Assistant Professor has since been kept vacant.

Mr. M. N. Kamat, B.Ag., Assistant Mycologist, was elevated to the temporary post of lecturer in Mycology from the 12th November 1923 and has been holding charge of the post since then.

Mr. J. D. Randive, B.Ag., was appointed to act as Assistant Mycologist from the date Mr. Kamat vacated the post.

*Research.*

Owing to the absence of both the Plant Pathologist and the Assistant Professor of Mycology, little work could be turned out this year; the other staff was largely occupied with teaching duties at the College of Agriculture, Poona.

Experiments to test the resistance to the two Common Smuts (*S. sorghi* and *S. cruenta*) of the various jowar varieties were carried out and the results have revealed certain varieties of Milo to be perfectly immune.

Dwarf Milo, Standard Milo, Spur Feterita and White Milo have remained absolutely free from the smuts, the other varieties showing a percentage of smut attack varying from 15 to 100. The following table shows the details of the experiment:—

Serial No.	Name of variety.	Infected with	No. of sound heads.	No. of smutted heads.	Percentage of attack.
		<i>Resistant.</i>			
1	Dwarf milo	<i>Sphacelotheca sorghi</i>	All.	Nil.	0
2	Standard milo	"	" 370	" 1	0.2
3	Feterita	"	All.	Nil.	0
4	Spur Feterita	"	All.	Nil.	0
5	White milo	"	All.	Nil.	0

Serial No.	Name of variety.	Infected with	No. of sound heads.	No. of smutted heads.	Percentage of attack.
<i>Resistant—contd.</i>					
6	Dwarf milo	<i>Sphacelotheca cruenta.</i>	All.	Nil.	0
7	Standard milo	"	All.	Nil.	0
8	Peterita	"	925	1	0.8
9	Spur Peterita	"	All.	Nil.	0
10	White milo	"	A	Nil.	0
<i>Susceptible.</i>					
11	Sun rise Kafir	<i>Sphacelotheca cruenta.</i>	240	5	2.1
12	Black hull Kafir	"	180	9	5.0
13	Red Kafir	"	307	48	15.6
14	Dawn Kafir	"	225	68	30.2
15	Shalu	"	178	103	57.8
16	Sun rise Kafir	<i>Sphacelotheca sorgi</i>	205	21	10.2
17	Black hull Kafir	"	180	40	22.2
18	Red Kafir	"	165	166	100.6
19	Dawn Kafir	"	216	148	68.5
20	Shalu	"	140	102	72.8

The seed collected from the immune varieties has been sent to the Superintendent, Surat Farm, for varietal trial there and to the Superintendent, Sukkur Farm, Sind, for further trial regarding its immunity to the two common smuts.

It may be noted, in this connection, that these immune varieties grew well here and gave good outturn.

*Potato Wilt.*—This work is being carried out under the control of the Potato Committee. Certain strains of *Fusarium* have been isolated from wilted plants and their morphology and pathology are being studied. So far, no evidence of parasitism has been obtained though wounded potato tubers are easily attacked by the *Fusaria*. The work requires a large amount of observations both in fields and laboratory and a detailed study of the organisms associated with such wilts; unfortunately it has not been possible to devote as much time to this work as is warranted by the importance of the subject owing to inadequate staff.

*Mango Blight.*—Spraying trials were carried out against Mango blight (*Erysiphe cichoraceum*) in Ganeshkhind Botanical Gardens, Kirkee. Fifty plants were treated. The mixture used was a combined spray (Bordeaux mixture plus 1 per cent. Rosin Soap) effective against both the insects and the mildew which are, in many cases, associated; unfortunately, the blossoms were few and the mildew, also, was scanty, so that the trials have remained inconclusive this year; these will be repeated next season.

*Leaf Blight of Hariati (Cynodon Dactyon.)*—A species of *Acrothecium* has been isolated from leaves of *Cynodon dactylon*. It is being studied and the experiments carried out so far, though not quite conclusive, indicate its possible parasitism. It is likely that it may attack cultivated grasses also and hence its importance.

*New Diseases.*—It was interesting to observe a few smutted heads of Bajri (*Tolyposporium penniciliare*) in the experimental plots at the College Farm. The smut was till now considered to be absent from the Deccan and confined to Gujarat only; on enquiry, it was learnt that the seed was bought locally.

A species of *Aspergillus* was isolated from a large number of mango fruits, some wounded and others apparently sound but with a rot in the interior. The fungus is under study.

A species of *Diplodia* has been isolated from a wilted betel-vine specimen sent to this office for report from Dharwar District. This fungus was not previously known to attack this crop.

#### *Teaching.*

Courses in compulsory as well as Optional Plant Pathology were given to students at the Poona Agricultural College.

#### *Routine Work.*

The total number of specimens received in this office and identified were 81; a great many Bor fruits (*Ziziphus jujuba*) were received which showed an attack of a powdery mildew; the damage was reported to be severe; owing to inadequate staff, it was not possible to visit the affected area and try any treatment.

Mr. Randive, acting Assistant Mycologist, visited the Jalgaon Agricultural Exhibition held in December 1923, and gave practical demonstrations of spraying and the various fungoid diseases of crops.

Demonstrations were also arranged for the public, specially the delegates for the Co-operative Conference held in Poona in September 1923 and at the Indian Industrial Exhibition, held in May 1924 on the Poona Deccan Gymkhana grounds.

## APPENDIX N.

ANNUAL REPORT OF THE WORK DONE BY THE SOIL-  
PHYSICIST TO THE GOVERNMENT OF BOMBAY,  
GOVERNMENT FARM, MANJRI, FROM  
JUNE 1923 TO JUNE 1924.

The work of my branch which was so long divided into two sections, *viz.*, Research and Teaching is now being concentrated on research alone. Help is, however, given as usual to other branches of the Department as well as to the public regarding problems of soils.

These problems relate mainly to the physical texture of the soil including water logging conditions and salt incrustation and investigation of the colloidal material of the soil. A noteworthy problem which has been referred to me for investigation is to find out if the disease "sugarcane borer" does not spread more rapidly as the temperature of the soil rises higher and higher. If time would permit, the problem may be taken in hand in near future. Conservation of moisture during intervals of irrigation may play an important part in lowering the soil temperature and consequently in checking the disease if the theory is right.

*Dry Farming.*

As related in my last year's report research work in my branch is so directed that it may be ultimately useful in keeping down, as far as possible, famine in food grains and fodder in districts of scanty rainfall, in other words investigations into the existing methods of dry farming, practised here as well as abroad, must be carried out and if possible new methods evolved to suit the requirements of a particular crop in areas having a low and precarious rainfall. The carrying out of such an investigation requires close association with other branches of research, *viz.*, soil chemistry, botany including plant breeding, &c., and it was thought that the investigation into the methods of dry farming would be more conveniently carried out near the Central Institute of agricultural investigations, *viz.*, the Agricultural College, Poona. Such a place was found at Manjri which is not far away from Poona and is situated on the border of dry tract where the rainfall is little and which could afford facility for such kind of work at a considerably much less expense to Government. A couple of buildings and ample land for dry farm investigations were available and a suitable piece of land was selected after a thorough trial to see that no water of percolation from any irrigated tract round about the place moistened the sub-soil. Trial pits to a depth of eight feet were taken in the piece of land selected and the pits allowed to remain open for over eight days. It was found that the pits were dry and remained perfectly dry during all that time. As the land is situated at a higher level it is not likely that water would percolate into the area selected.



In order to see if Manjri, which is an irrigated tract, is at all suitable for dry farm investigation, a comparison of its climatic condition was made with such dry tract as Nagar and Sholapur, which are known as tracts of scanty rainfall. The following table shows such a comparison for the last 20 years for Poona, Manjri, Nagar and Sholapur, the figures being for rainfall and humidity for several periods, each period representing an average of five years:—

*Rainfall.*

	1908-12.	1913-17.	1918-22.
Poona	24.19	31.74	26.79
Manjri	20.64	25.33	17.55
Nagar	21.46	28.61	18.36
Sholapur	25.42	30.94	21.28

*Humidity.*

	1908-12	1913-17	1918-22
Poona	...	40, April	40, April
Do.	...	83, August	83, August
Manjri	...	48, April	45, March
Do.	...	86, August	84, August
Nagar	...	55, March	46, March and April
Do.	...	80, August and September	80, August and September
Sholapur	...	33, March	33, March
Do.	...	77, September	77, September

It will be seen from the above table that out of all the four places shown in the table, *viz.*, Poona, Manjri, Nagar and Sholapur, Manjri has the least rainfall and is not, therefore, such an undesirable place for dry farming as it would at first appear on account of the irrigation in the near vicinity. If we compare the figures of humidity it will be seen that humidity at Manjri in rainy season in August is higher than that at Nagar and much more so than the humidity at Sholapur. During summer, however, in the month of March humidity at Manjri is lower than that at Nagar.

A piece of land about 5 acres in the Kuran land at Manjri was, therefore, selected and the Professor of Agriculture in whose charge it was, was requested to spare it for the purpose of dry farm experiments and he was good enough to hand it over to me. The land was then cleared of the jungle and deeper roots of big babbul trees were dug out by hand and a fairly level piece of about an acre of land prepared for experiments on bajri and tur during the Kharip season. For Rabi season jowar would be taken. As the land is likely to sink unevenly this season and the results of this season are likely to vary a good deal, field experiments will also be repeated in prepared pots where the effect of sinking would be uniform in all the pots.

During the year under report a severe trial was given to Mason's pencil method of determining the water delivering power of the soil. A suitable desiccator was specially devised and all the precautions taken to protect the pencils from the outer atmosphere but in spite of all the precautions taken no two results would closely agree. The matter was then referred to Dr. Livingston of America who was the originator of the soil-point method and who had suggested the use of the pencils instead of the porcelain soil-points. In reply he wrote that the method was not very accurate if an average of two experiments was taken but an average of ten determinations gave fairly accurate results for purpose of field and pot-experiments. This work was specially undertaken by me on behalf of the committee of Bajri Research work of which I am one of the members.

The use of "atmometer" which determines the evaporating power of the atmosphere is of great importance in the investigation of dry farming experiments, and in any kind of work on drought-resisting plants. A few atmometers were kindly supplied to me by Dr. Burns and I have been able to modify the method of using the atmometers in such a way that the accuracy of reading could be brought to as close as 0.1 c.c. which was not quite possible in the method used before.

#### *Staff.*

Mr. G. M. Bapat, M. Ag., who joined me in the month of October 1923 as a graduate fieldman, has done all the work entrusted to him with great diligence and interest. Mr. G. R. Yadao, who worked under me as a non-graduate fieldman from July to March passed the examination for the Degree of Bachelor of Agriculture and left me for higher appointment in the month of May.

#### *Head Quarters and Accommodations at Manjri.*

My Head quarters were transferred from Poona to Manjri on the 15th of May 1924. My laboratory and office have been located on the Government Manjri Farm in one of the two buildings which was built for the purpose of holding sugarcane class and I have been given for my residential quarters the remaining building which was intended as the kitchen and dining hall for the boys who came to study in the sugarcane class.

There is, however, great inconvenience caused for want of accommodation to other members of my staff especially the graduate and the non-graduate fieldmen. Some permanent arrangement of quarters, which will go a great way in keeping the staff contented, is necessary.

V. A. TAMHANE,

Soil Physicist to the Government of Bombay,  
Manjri.

## APPENDIX O.

SUMMARY OF WORK DONE BY THE DEPUTY DIRECTOR OF  
AGRICULTURE FOR ANIMAL BREEDING, FOR THE  
YEAR 1923-24.

Mr. E. J. Bruen remained in charge of the duties of the Deputy Director of Agriculture for Animal Breeding till the 25th April 1924 after which he has been appointed officiating Imperial Dairy Expert, Bangalore and I have taken over the charge of his duties from 25th April 1924 onwards. He toured through the Presidency giving advice to private persons and Dairy Farms whenever he was called upon to do so. The Kandivali and Mulund schemes have been brought into operation and it is hoped that much useful work will be achieved through these institutions. Still negotiations are going on to co-operate with Pandharpur Gowrakshak to take up breeding of the Khillari and it is hoped that a scheme thereon will be submitted very shortly.

It is encouraging to note that people have begun to realise the benefits and now some farmers having a big herd as well as small farmers and others having few animals in village are taking real interest in joining together and asking for a good breeding bull on a Premium System. They have found to their advantage that the young stock has come out decidedly superior by having a good bull from the Department. Yet it might be remembered that we are simply buying the bull at the show and have no pedigree bulls to offer. However, if we can get somebody to take up breeding of pedigree bulls for supplying Premium Bulls the effect of such bulls will be very great and certain on the future stock.

It was arranged to hold five Shows in the Presidency including Sind, but only three Shows at Chharodi, Mahud Bk. and Athar were held and it is now needless to mention that all these were very successful. The Show at Bankapur could not be held on account of partial famine and that of Karachi had to be dropped as there was a serious attack of Rinderpest prevailing in and round about Karachi.

In addition to the existing farms for the three breeds Kankrej, Amrit Mahal and Sindhi, Government have now subsidised the Shirpur Agricultural Association Farm for the Tapti Khillari breed and the Kandivali and Mulund for the Gir breed and we have already put trained Managers at the latter two places and it is hoped that within few years some such farms for the remaining breeds also will be subsidised to undertake scientific breeding for the local breeds.

The demand for bulls is growing very rapidly and it is discouraging that all the wants could not be fulfilled for the scarcity of good bulls in the Central and Southern Divisions. Many of our breeds of cows are kept only for one purpose and though there is good market at a paying price for good male stock, there is no

demand for heifers and this handicaps the breeder a lot from economic points of view. Besides the farmer with his sentiments for cows is unable to dispose of his surplus heifer stock and thus he has to keep more animals than he needs or he can properly feed. I have observed that the bull calves are invariably well fed after they are born but the mothers carrying them for nine months and suckling them afterwards get very poor feeding. I believe there will be no market for cows as long as they are not economical to keep for milk production and as long as a taste and love of cow's milk is not created amongst people. So, as long as the question of breeding up a strain of breed that can give milk as well draft animals is not tackled properly, I see very little chance of better feeding and care of cows.

In this work the ideas of superficial points of colours and shape do interfere in securing good milking strain and I believe unless the Department takes a lead of creating new ideas of the types of animals that can produce milk and work cattle, all the economic difficulties will remain where they are. I agree that there is some risk in this but one has to take some risk to achieve something worth achieving.

The experiments of intensive handling of young stock milking and keeping records with Kankrej breed is carried out with the stock on the Chharodi Farm.

Unfortunately no such experiment has been started with Amrit Mahal breed at Bankapur yet for want of housing and other arrangements, however, it is decided lately to begin work though on a small scale with the means available.

The Sindhi Farm deals with a milch type of breed and I am glad to note that we have purchased a cow that has given over 10,000 lbs. of milk in one lactation and fortunately she has a bull calf. I have also purchased her heifer just recently. I believe, we ought to get the best milking animals true to type from anywhere at any cost and then work with them by keeping records and see if we can get any one of them turning out to be good breeder. I doubt, if we work only with ordinary maternal, we will ever get a chance of finding a fortunate animal valuable for breeding for milk production.

I wish to make a note of the special difficulty of getting men specially trained as cattle and Dairy Managers who can be available at a pay of Rs. 60 to Rs. 100 per month.

The private Farms like Shirpur and Gangapuri Farms and few others find great difficulty in getting a trained Manager within their means and if we are to extend our operations, we ought to take up the work of training such men at once at the College Dairy with a special two years' course in Practical Dairy, &c., and I believe this can be taken up with small addition of staff without waiting for a fully equipped Dairy School. Local men can then be trained up to be put out when needed.

The work of the Deputy Director is divided as follows :—

(i) Production of bulls and Experimental work on Stud Farms.

(ii) Propaganda and Village Improvement.

NORTHCOTE CATTLE FARM, CHHARODI.

Mr M. M. Desai held charge of the Farm till 7th January and Mr. V. G. Desai, B.Ag., a Graduate Fieldman in charge of Surat Dairy, was appointed to act in his place. Mr. M. M. Desai has been appointed to act as Assistant Professor of Animal Husbandry in the Agricultural College, Poona. Mr. M. G. Patel worked as Assistant throughout the year. All the staff have worked well.

*Season.*

The monsoon was very late and irregular. Rain started on July 3rd giving 2 inches and 33 cents in that month; August rain was 5 inches and 54 cents; September rain was only 49 cents; the total being 12 inches in 22 rainy days as against a rainfall of 23 inches and 21 cents in 32 days during the previous year. The rainfall was not uniform all over the Farm area, one of the best grass plot of about 400 acres being left out without any material rain.

*Crops.*

*Hay.*—The hay crop was below average. The low-lying areas where the grass used to be spoiled gave a fairly good grazing owing to the scanty rainfall and thus helped the situation to a certain extent. In spite of the bad season, the Farm did support some 1,500 cattle of outside people by allowing them to graze on the inferior variety of grasses during the latter part of the year. The total hay harvested during the year was 209,457 lbs. and the cost of production including stacking comes to Rs. 5-3-7 per 1,000 lbs. The cost is rather high as the grass was poor in growth.

In addition to hay crop the other fodder crops yielded as under:—

Sholapuri yielded 2,505 lbs. dry.

Sundhia yielded 3,300 lbs. dry calculated as 40 per cent. of green yield.

Local jowar yielded 3,500 lbs. dry calculated as 40 per cent. of green yield.

As the season was bad, we got no grain.

The Sunflower was sown on 1 acre and the yield was 7,217 lbs. green.

Most of the fodder was put into silos as green stuff, the grass being too poor for silage. The total amount of jowar put into silo was 175,899 lbs.

The quantity of Sunflower was too small to put into separate pit and, therefore, it was mixed with jowar. The mixed silage, however got de-composed, may be due to hollowness of the stem of Sunflower.

*Livestock.*

The following table shows the strength of livestock on the 30th June 1924:—

Serial No.	Name of Species.	No. of animals.	Remarks.
1	Cows adult	206	
2	Breeding Bulls	7	
3	Heifers	49	
4	Young Bulls	24	
5	Male calves	57	
6	Female calves	97	
7	Working bullocks	46	
8	Castrated stock	17	
	Total	501	

The breeding of the Kankrej herd on the Farm was continued on the same lines as reported in previous years. The tying of milch cows and young stock is continued and cows are milked and a record is kept; this will enable us in course of time to select a milking strain of Kankrej.

If we are to achieve good results in milk yield, the cattle ought to be more intensively handled and fed but the want of proper sheds and the sufficient budget for concentrates do not permit this. It is hoped this will be soon provided as soon as the policy of the Cattle Breeding Department is settled.

There is an increase in the number of milking animals over the last year but there being only few animals under study for second lactation period no data of use can be given yet.

*Diseases.*

The Farm having surrounded by a number of villages is apt to be visited by some sort of epizootic and the Farm herd being not quite trained gives much trouble for treatment or for milking. During the year under report, there was an attack of Foot and Mouth Disease in the month of December but preventive measures, such as

segregation, &c., were soon taken up and the disease soon disappeared. Rinderpest had made its appearance in some villages round about but fortunately the Farm had no trouble from that drastic disease. The total number of deaths recorded during the year was 29 due to debility, old age, some disease and venomous bites, &c.

The total number of births is 92 as against 66 of last year.

During the year 11 cow bulls and three buffalo bulls were put out on Premium System; the number is smaller compared with last year due to famine condition in the districts. Forty-nine old and other undesirable animals were cast and sold for Rs. 1,333.

If funds could be made available, the Farm area could be divided up into paddocks and a great deal higher yield of grass as hay and grazing could be obtained. As far as funds permit the area infested with shrubs and trees is cleared up and divided into plots.

#### *General.*

The cattle are in very good condition in spite of the scarcity of rain and the Manager, Mr. V. G. Desai, deserves the credit.

#### CATTLE BREEDING FARM, BANKAPUR.

Mr. A. B. Gadagkar was in charge of the Farm throughout the year.

#### *Season.*

The antimonsoon rains made a very promising beginning; the proper monsoon started a bit later, *i.e.*, in the last week of June and was quite good and opportune up to the middle of September after which there was no rain which resulted in the partial famine of fodder as the growth of both grain and standing crops was checked. It was really a very difficult task to secure kadbi for the Farm animals as there was a general failure of fodder crops owing to the scanty rains.

Andropogon Contortus or spear grass grows abundantly and owing to the sudden stoppage of rain in the middle of September, the operation of removing and collecting the spears with the aid of the comb was very successful.

The harvesting of grass by mowers has proved a failure on this Farm as most of the land is undulating and hence the whole area had to be cut by hand. The total area was divided into two plots, *i.e.*, for grazing and for cutting grass for hay and silage. The total quantity of grass cut was 215,400 lbs. at a cost of Rs. 440 as against 240,000 at a cost of Rs. 667-10-3 of last year. 97,000 lbs. were turned into silage. The yield of grass was not sufficient to last throughout the year and no kadbi was available to supplement it. Arrangements had to be made with the Forest Department for grass and 89,000 lbs. of grass was cut and carted at a cost of Rs. 696-4-0 from the forest. The cost of stacking of the whole lot came to Rs. 165.

*Livestock.*

The following table shows the strength of livestock on the 30th June 1924:—

Serial No.	Names of species.	Number of animals.	Remarks.
1	Cows adult	48	
2	Breeding Bulls	3	
3	Heifers	21	
4	Young Bulls	17	
5	Male calves	7	
6	Female calves	23	
7	Working bullocks	6	
	Total	135	

The above statement shows that the strength has reached to its maximum but the grass area is too small for the herd and if we wish to demonstrate better breeding and better care, we ought to have some grazing area. In fact the Government Farms ought to have at least 6 months fodder storage.

The herd on the whole has done well and shows very promising results from breeding point of view. The most striking point that can be cited is that three of the heifers bred on the Farm came to maturity when they were below 2½ years. This is really a satisfactory result and by this we have attained one of our aims for which the Farm exists.

Thirty-two cattle not true to type and others were sold by auction for Rs. 1,894.

*Disease.*

During the year Foot and Mouth Disease made its appearance in January but the spread of the disease was checked by the timely preventive measures adopted but at the close of the year under report a disease called "Black Quarter" appeared on the Farm on 7th June and within a fortnight or so 6 animals succumbed to this disease. As there was no curative treatment for the diseased ones nor any measures could be taken for the healthy ones, the only remedy resorted to was segregation. Accordingly the whole herd was removed to an area about 8 miles from the Farm and quite secluded from the villages round about.

The total casualties during the year were 13 in all.



During the year three Premium Bulls were put out from the Farm. The demand is increasing rapidly but the Farm being still in its infancy cannot meet all the demands but it is hoped that in few years most of the needs will be met.

The Farm has only one pucca building and the accommodation is very limited.

#### *Fodder Crops.*

An area of about  $1\frac{3}{4}$  acres was under "Sunflower" and the yield was 16,328 lbs. of green feed.

Also an area of about 1 acre and 29 gunthas was under jowar fodder and the yield was 5,200 lbs.

Both of these were put into silos.

#### *General.*

During the year 7 outside cows have been covered and in all cases the services were successful. No Cattle Show was held on the Farm this year as there was a partial famine prevailing round about the Farm. The livestock was in good condition when I visited the Farm in May.

Mr. Gadagkar's work was quite good in spite of his having no assistant.

#### WILLINGDON CATTLE FARM, PHIRAI.

Mr. B. B. Jamaspjina was Manager of the Farm throughout the year.

#### *Season.*

The tract is particularly devoid of rain and people round about depend upon well irrigation and power pumps. The average rain-fall is 5" and the year under report was bad as there was less than three inches of rain-fall within three consecutive days in August. The grazing is usually good in spite of scarcity of rain and the cattle got good grazing available even after the hay-making, the winter rain helping the sprouting of grass.

#### *Hay-making.*

During the year 66,000 lbs. of grass was cut, half of which was given in lieu of cutting charges for want of enough grant. At the beginning of the year, the Farm had only two or three acres of cultivation but during the year under report about ten acres have been broken and various crops were grown and fed to cattle.

Among the crops grown were Jowar, Bajri, Maize, Sunflower, Oats, Berseem and Wheat. A large portion of the area was cleared of "Kundu bush" and a road was constructed from the fencing gate to the cattle byre, &c. This Farm has been fitted up with a crude oil engine of 20 B. H. P. and the water supply is copious and gave a constant supply of water without any trouble.

In November the Landhi Farm was amalgamated and much use of it was made by sowing Berseem and Oats; thus green fodder is supplied to the cattle in the most trying months.

There are no quarters for labourers and the want is badly felt for six quarters to have efficient management of work on Dairy Farm.

#### Livestock.

The following table shows the strength of livestock on the 30th June 1924:—

Serial No.	Names of Species.	No. of animals.	Remarks.
1	Cows adult	38	
2	Breeding Bulls	4	
3	Heifers	4	
4	Young Bulls	6	
5	Male calves	20	
6	Female calves	11	
7	Working bullocks	2	
8	Tigris ewes	2	
9	Donkey	1	
	Total	88	

The herd has some of the finest recorded specimen of the breed and is being added by purchasing only selected specimen available in the locality. The chief defect of Sindhi animals, *viz.*, pendulous udders and bunched up teats are particularly avoided by selection.

Out of 34 cows in lactation during the year some 15 cows gave over 4,000 lbs. and some 8 cows over 5,000 lbs. of milk per lactation. One cow, a newly purchased animal, is an invaluable asset of the Farm. She can be called the only cow of her kind giving an average of over 10,000 lbs. in a lactation and her male calf that came with her is certainly priceless. The milk record of some of the highest yielding animals has been given as per statement attached.

*Milk Disposal.*

The farm is situated 13 miles away from Karachi, the market for milk and we have to cross the river on the road. The milk is taken on camel and there is lot of trouble in transit and the Farm being not equipped with pasteurizer the very valuable milk is not fully utilised. The wholesale rate of milk ranged from Rs. 4-8-0, to Rs. 5-0-0, per maund of 92 lbs. and it went to Rs. 9, only in November. To the best advantage we have to sell the milk to a contractor at Rs. 4-8-0 per 92 lbs. on the spot who takes all the risk of transport. Pasteurizer may prove a good asset in supplying the pure milk direct to the public bodies in Karachi.

*General.*

The result of breeding found among Farm bred animals has been satisfactory. Among the heifers bred from the herd and that were in milk, five have made a total of over 4,000 lbs. per lactation. The bulls Rupo, Shaikh and Tanwar which generally headed the herd have thrown out very good progeny.

During the year there were 35 calvings of which 21 were males and 14 females. There were four deaths of which one was of a cow.

Rinderpest prevailed for a long time in the district but fortunately the Farm was quite safe. Six heads of cattle and two sheep were sold during the year and the realizations were Rs. 1,300.

*Propaganda and Village Improvement.*

The work has been assigned to three persons named as Divisional Inspectors of Cattle Breeding, Northern, Central and Southern Divisions. This year also several villages in all the Divisions were visited by the Divisional Inspectors and advice on the importance of having breeding bulls, better feeding and care was given and their ultimate effect on the progeny and through them on agriculture was pointed out. Premium Bulls were distributed but the amount sanctioned, *i.e.*, Rs. 2,500 proved to be very inadequate to the demand and we had to refuse applications for want of funds.

The following bulls were given out on Premium System :—

Northern Division	...	3 Dangi, 1 Kankrej, 1 Tapti Khillari and 3 Buffalo bulls.
Central	„	... 3 Maswad Khillari.
Southern	„	... 5 Amrit Mahal
		and
		2 Merino rams.

*Cattle Shows.*

This year out of the five Shows proposed to be held only three could be held, *i.e.*, for Kankrej at Chharodi, for Maswad Khillari at Mahud Bk., and for Krishna Valley at Athni. At all these Shows there was good attendance of cattle and the agriculturists.

Rs. 417 were spent for prizes at Chharodi Show.

„ 427 „ „ Mahud Bk. Show.

„ 277 „ „ Athni Show.

Rao Saheb Mangsoli deserves credit for the success of the Athni Show.

The other two, *viz.*, for Sindhi breed at Karachi and Amrit Mahal breed at Bankapur could not be held as there was Rinderpest prevailing in the district and round about Karachi and as there was partial famine in the Bankapur Taluka and round about.

Along with this Show a demonstration of silo-making and the use of Burdizzo's Castrator was shown and its benefits over the country method were explained. The cultivators were much impressed with this demonstration and it is hoped that they will resort to this silage-making as it is very beneficial especially in such parts where fodder is very dear.

*General.*

*Staff.*—All the staff have worked well during the year. The Head Clerk, Mr. V. K. Gokhale, has in fact to play the part of the Personal Assistant for the good deal of the office work.

B. S. PATEL,

*Ag. Deputy Director of Agriculture  
for Animal Breeding.*

*A Statement showing the Milk Record of some of the  
highest yielding animals on the Willingdon  
Cattle Farm, Pihai.*

Serial No.	Name.	Milk yield.	No. of days in milk.	Average per day.	Age, years.	Remarks.
		Lbs.		Lbs.		
1	Iris No. 93 ...	7,749½	278	28	6½	Third calf.
2	Mandhir No. 66 ...	5,890½	395	14½	3½	First calf.
3	Majari No. 22 ...	5,647½	373	15	5½	Farm bred; first calf.
4	Lakhi No. 65 ...	5,484½	271	20·2	8	Third calf.
5	Ganga No. 2 ...	5,232½	319	16½	6½	Second calf.
6	Mochari No. 24 ...	5,152½	393	13	5½	Farm bred; first calf.
7	Tulip No. 85 ...	5,122½	356	14½	6½	Second calf.
8	Karachi No. 3 ...	5,014½	304	16½	11	Fifth calf.
9	Sugni No. 32 ...	4,944½	343	14½	5	Farm bred; first calf.
10	Irravadi No. 5 ...	4,779½	272	17½	8	Third calf.

B. S. PATEL,

*Ag. Deputy Director of Agriculture  
for Animal Breeding.*

## APPENDIX P.

ANNUAL REPORT OF THE AGRICULTURAL ENGINEER  
TO GOVERNMENT, FOR 1923-24.

I held the charge of the office of the Agricultural Engineer to Bombay Government during the year under report.

The activities of the Department were not solely devoted to advisory and research work as anticipated last year as there was a considerable increase in the executive which took up most of the time of the staff and consequently the research work in connection with the modification of implements and agricultural machinery, the survey of pumping sites on rivers for famine purposes and periodical inspection of agricultural machinery belonging to the Department has suffered. In the circumstances I was unable to visit Sind during the year and continue my investigations of last year.

The work actually done is summarised in brief as under.

*Modifications of Machines.*—A locally made Winnowing machine from the Jalgaon Farm sent by the Deputy Director of Agriculture for various improvements, has been taken in hand in order to reduce the driving power required, replace the tooth wheel gearing with a better and more efficient substitute, rearrange the shaking of the riddles and reduce the terrible noise now produced to a minimum. The tooth gear has been entirely done away with and a roller chain gearing having a  $\frac{3}{4}$ " pitch with necessary sprockets, bearings and a new shaft have been substituted to reduce the friction and the power to a minimum. The fan spindle bearings have been replaced with temporary roller bearings made at the shops and the spindle machined wherever necessary together with the bearings of main driving shaft.

The riddle arrangement is in progress and it is expected to be completed for a final test within a couple of months time. There has been also a great necessity of a suitable seed drill box for sowing jowar. A box suitable for the purpose has been newly made is under test for further modifications.

*Resource in case of Breakdown.*—The Crusher at Manjri broke down during the crushing season which took up much time to put it in working order. While it was under repairs a combined cane crushing plant consisting of a 15 B. H. P. Blackstone Crude Oil Engine and a No. 92 Chattanooga cane crusher had to be temporarily removed to Manjri, fixed and run there until the farm crusher was repaired.

Mr. S. V. Supnekar who has had a pumping installation set up on the river Koyna at Supna, District Satara, through this Department approached us for help at the eleventh hour to put his engine right and save his crops. On inspection it was found that the engine

required considerable repairs which were not possible in so short a time. A suitable engine had to be, therefore, sent to him on hire and fixed at his site to save the situation.

Mr. M. B. Mohite of Retra also came with the same difficulty when the cylinder of his engine cracked, rendering the engine useless for work until it was replaced. A noria had to be sent to him on hire to save his crops until his engine was put right.

Mr. Kuber of Dahivadi also fell in the same plight when his engine broke down which had to be substituted with one of the Famine sets in order to save his crops, until his engine was thoroughly repaired and erected on a new foundation.

*Advisory.*—Owing to the failure of rains the number of enquiries for pumping, crushing and other agricultural machines has fallen considerably. Out of 107 enquiries, 12 were for power pumping, 49 for boring, 2 for cane crushing, 10 for motor ploughing, 62 for admission in the oil engine class and 12 for general work. Of the pumping enquiries 2 were of a very complicated nature requiring heavy initial outlay, and consequently Messrs. Walchand & Co., of Bombay, promoter of one of them, had to give up the idea for the present as it was not a feasible proposition. Mr. Narrottam Morarji, promoter of the 2nd, is likely to go in for a plant but nothing has yet been heard from him definitely. One of the enquiry from Sindh from the Court of Wards has recently matured and I have at present in hand working drawings for the installation in question.

The Chharodi Government Farm was for a long time badly in need of a power plant for supplying water to the cattle as there was always a scarcity and difficulty of good drinking water in the whole area during hot weather. A couple of bores were specially taken in the well close to the office and bungalow for a copious supply of fresh water and the well near the office was found to be more convenient and possessing several facilities for a power plant. Accordingly plans for a suitable power plant capable of delivering water to the several byres through an elevated tank were made, the plant purchased and erected.

There are also some machines such as, Ensilage Cutter, Grinding Mill, Engine, Countershaft, &c., to be fixed on the Bankapur Farm and this work has been taken in hand with the help of the mechanical assistant from the Southern Division.

Two combined self contained cane crushing plants, one consisting of a 6 B. H. P. Blackstone oil engine and No. 44 Chhattanooga Crusher, and another of a 15 B. H. P. Blackstone Crude Oil Engine and No. 92 Chhattanooga cane crusher, complete with juice pump, magasee carrier, &c., mounted on a special girder frame, requiring no foundation have been worked for the Southern Central Division, during the crushing season as per Government, G. R., R. D., No. 5122 of 30th November 1922 issued on the recommendations of the Sugar-cane Committee. The plants, however, are found to be too small in

size as they do not deal with one ton of cane individually per hour. Bigger units have, therefore, to be recommended and if their purchase is sanctioned we shall be able to obtain more valuable data regarding crushing of cane.

The trials of the 15—27 Case Tractor in Khandesh were continued this working season and the tackle has ploughed about 144 acres and 15 gunthas of cultivator's lands to the end of May last at Rs. 10 per acre realising about Rs. 1,444, although the charges are not yet actually recovered.

These machines require continuous and exhaustive trials in order to enable us to say something definite about their efficiency and use when compared with bullock power.

There is again the trouble of getting trained men to handle these machines as it is entirely new to this country and the men will have to be trained along with the continued trials until their advantage over bullock power is well established and widely spread and several people go in for them under normal conditions. The machines under trial met with numerous breakages during the trials on account of unsuitable conditions and raw men. There is not a very big demand for such machines at the moment and consequently the spare part service is very poor compelling us to stop the operations with a slight breakage until the broken part is replaced either by making it at one of the big engineering shops or importing it from the makers through the agents.

Continued exhaustive tests are the only solution to solve the above difficulties and enable us to form a definite opinion about the utility of these machines for cultivators in general and with this view in mind Government have recently been pleased to sanction another Tractor for trials in South Gujrath and when this is set in action along with the Fordson now at Chharodi in North Gujrath and the 15—27 Case again in Khandesh we shall be able to obtain valuable data about their performance.

The steam plough at Sawnur was not worked during the last fair season as Sardar Mahaboobalikhan withdrew his offer to take it on hire owing to failure of rains and scarcity of water.

Funds were again available for the completion of the Fodder Baling and Bruising Plant at Karajgi during the year under report and accordingly the two hydraulic presses, the Bruiser with elevator, Keith fan, platform, &c., the counter shaft the Fourthrow Hydraulic Pump, the engine, &c., were erected on their respective positions, the fencing for the whole yard completed with gates and an over-bridge at the main entrance, the tram line laid all over the yard, for transport purposes, the frame work of the two sheds painted and the flooring of the big storage shed and the machinery shed finished in lime concrete.

The plant will be tried within a couple of months time and it is anticipated that regular work of pressing bruised Kirbi will be started from the middle of November next if the rains are favourable.



During the year under report there were only three pumping plants on hire to cultivators for irrigation purposes out of which two will be shortly returned and brought back to Poona owing to the parties' failure to pay the hire charges. Rs. 2,265-2-6 have been realised in the way of hire including Rs. 1,073-8-0 as old recoveries.

Along with the enquiries for the pumping plants on hire for irrigation purposes there are good many demands from agriculturists for emptying wells with power plants for sinking or deepening purposes. They are required generally for a very short duration and the expenses due to the foundation and erection are useless to the party after the work is completed. We have a very inadequate number of plants for this purpose and it is a matter for consideration whether such applications should be entertained for all and sundry.

The pumping plant at Nangaon on the river Bhima in Poona District irrigated about 79-31 acres of Perrenial crops 91-2 acres of Kharip and 164-14 of Rabi realising a total revenue of Rs. 4,272-10-0, during the year under report. This amount does not cover the actual expenditure incurred as the water is given to the cultivators on special concession rates. A scheme is under consideration of increasing the water charges so as to cover the total running charges and handing over the distribution of water to a co-operative society and we shall be able to know something definite about its feasibility during the next year.

*Boring.*—In addition to scrutiny and purchase of all stores and other equipments for the territorial officers and general advice in boring matters including purchase of new machines, removal of accidents, &c., to the divisions, individual inquiries and Local boards, the Department has converted one hand power Musto patent boring machine into a power unit for the South Central Division and inspected the boring machines in the Southern Division, South Central Division and North Central Division.

Three bore holes in a well at Wakora in Thana District were torpedoed with five charges with a view to open up the fishers underneath and tap more quantity of water. The result was not so very disappointing as the water level in the well was raised by 9'.

The oil engine class trained 22 cultivator students in the running of oil engines and pumps.

In general there were varied sorts of activities in the Department throughout the year in which preparation of famine sets and the overhauling and getting ready of the old Fowler and Wyles Motor Plough for further trials were included.

The staff has been all along very satisfactory and most willing and enthusiastic.

W. M. SCHUTTE,  
Agricultural Engineer, B. P.,  
Poona.

*Note.*—A statement giving details of the famine pumping sites is attached herewith.

Statement showing Particulars of Famine Pumping sites (in Bombay Presidency) approved up to date.

Serial No.	Register No. of site.	Name of District.	Name of Taluka.	Name of Village.	Name of river.	Area available in acres.	Approximate total lift in feet.	Size of pump and power of engine required for full available area.	Survey No.	Remarks.
1	2	3	4	5	6	7	8	9	10	11
1	1	Broach	Broach	Yadeshwar Bet.	Narbada	200	30'	9" Low Lift Centrifugal Pump and a 24 B. H. P. Engine.	...	Useful for famine only. Plant was already erected and worked in 1918-19.
2	2	"	"	Nikora	"	150	60'	8" " 40 " "	...	Do. do.
3	12	Kaira	Matar	Pala (Juna Gamtal).	Sabarmati and Watrok.	100	32'	6" " 15 " "	119	Ideal site for 12 months crops.
4	15	"	"	Ashmali	Sabarmati...	100	32'-6"	6" " 15 " "	268	Do. do.
5	16	"	"	Radu	"	150	37'	8" " 18 " "	665	Do. do.
6	24	Ahmedabad.	South Dakroi.	Miroli	"	150	41'	8" " 25 " "	...	Ideal site.
7	46	Nasik	Niphad	Gondegaon	Godawari	200	35'	9" " 30 " "	58	Good site. Plant was already erected and worked by the Department in 1918-19.
8	69	Poona	Mawal	Nane	Indrayni	150	31'	8" " 18 " "	418	Useful in famine years only.
9	78	"	Haveli	Chinchwad	Pavna	100	60'	6" " 25 " "	47	Plant was already erected and worked in 1918-19.
10	79	"	"	Dapudi	"	95	55'	6" " 22 " "	25	Useful for 12 monthly crops.
11	84	Satara	Karad	Tambava	Krishna	190	56'	9" " 50 " "	595	Lift is great but the distribution of water is very easy.

Serial No.	Register No. of site.	Name of District.	Name of Taluka.	Name of Village.	Name of river.	Area available in acres.	Approximate total lift in feet.	Size of pump and power of engine required for full available area.	Survey No.	Remarks.
1	2	3	4	5	6	7	8	9	10	11
12	85	Satara	Karad	Koparda	Krishna	187	56'	9" Low Lift Centrifugal Pump and a 50 B. H. P. Engine.	124	Ideal site.
13	88	"	"	Malkhed	"	144	56'	8" " 40 " "	...	Do.
14	90	"	"	Retre Budruk	"	214	50'	9" " 42 " "	436	Good site. Plant was already erected and worked by the Department in 1918-19.
15	110	"	Walwa	Kasgaon	"	150	56'	8" " 40 " "	...	Ideal site.
16	111	"	"	Tambawa	"	150	56'	8" " 40 " "	...	Promising.
17	131	Belgaum	Sampgaon	Dastikop	Malaprabha.	150	36'	8" " 25 " "	2	Useful in famine years only.
18	133	"	"	Kadrolli	"	150	36'	8" " 25 " "	305	Do. do.
19	183	Darwar	Ranibennur.	Chaudhanpur	Tungabhadra.	150	36'	8" " 18 " "	...	Ideal.
20	184	"	Ron	Hollimani	Malaprabha.	300	30'	10" " 32 " "	...	Useful for famine only.
21	185	"	"	Gadgoli	"	150	30'	8" " 18 " "	...	Do. do.
22	186	"	Karajgi	Benchinballi	Wardha	150	46'	8" " 35 " "	91	Promising site. Seven miles from Haveri Station.

C. G. PARANJPE,  
Ag. Agricultural Engineer, Poona.

## APPENDIX Q.

SUMMARY OF WORK DONE UNDER THE HORTICULTURIST TO  
GOVERNMENT OF BOMBAY, POONA, FOR THE YEAR 1923-24.

This is the third Annual Report of the Horticultural Section. During the last three years our main efforts have been directed towards the improvement of fruits, by breeding and selection and development of fruit industry. Each of our publication, whether it may be a Departmental Bulletin or Original Article in the Agricultural Journal of India, and every public speech or demonstration gives a strong hope in the practical outlook of the development of industries.

*Staff.*

There is no material change in the staff.

*Financial Conditions.*

Grants at the disposal of the Horticulturist—

(1) Office of the Horticulturist including the grant for the District Horticultural Officer, Rs. 750.

(2) Ganeshkhind Botanical Gardens—

Year.	Sanctioned budget grant.			Expenditure.			Receipts.		
	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.
1921-22	17,415	0	0	12,414	13	4	7,542	3	8
1922-23	9,475	0	0	9,128	7	2	5,413	13	6
1923-24	8,057	0	0	7,988	6	9	6,819	0	9

(3) Modi Bag—

1921-22	14,875	0	0	14,826	0	0	378	9	3
1922-23	6,928	0	0	6,905	0	0	1,231	11	3
1923-24	7,363	0	0	7,352	9	11	2,055	15	4

*Teaching.*

Teaching work in Horticulture for College students is conducted by the Horticulturist with the help of one Demonstrator. Besides this, we get a number of short course students and other outsiders who are being trained up in practical Horticulture by the Garden Superintendents.

As usual a class in elementary Arboriculture was held by the District Horticultural Officer for the benefit of men deputed by the Public Works Department.

Mr. H. P. Paranjpye's Book in Marathi on Fruit Crops which was in press last year is published and provides a useful reading.

*Investigational Work.*

Investigational activities are being carried out strictly in accordance to our programme submitted to the Director of Agriculture in 1921. Want of laboratory apparatus, scarcity of travelling allowances and inadequate facilities to carry out demonstration work have been keenly felt both in our investigational and advisory work. At any rate Horticultural Section has got to its credit this year the following publications:—

One Departmental Bulletin.

One Departmental Leaflet.

Five Research Papers in the Agricultural Journal of India.

Besides this, several important schemes regarding fruit improvement work in the Presidency have been brought forward. The details of our investigational work are summarised as follows.

*Laboratory Investigations.*

Major part of our laboratory work during the year under report deals with the sun drying of fruits such as Figs, Banana and Grapes. Besides, further detailed studies of Jhambul, Pine Apple, and Karwanda Juice also have been successfully made.

*Sun-drying of Figs.*—Sundried Poona Figs are not so superior as Smyrna figs but compete well with Grecian and Afghanistan imports. The cost of drying and packing including cost of packing material is Re. 0-4-4-8 per lb. It is definitely proved that about 20 to 30 minutes exposure to sulphur fumes gives a brighter produce than 10 minutes exposure. The results of our process are given in our original contribution to the Agricultural Journal of India. Volume 19, Part III and details showing the importance of this work as a cottage industry have been submitted to Director of Agriculture for his information. Introduction of Smyrna figs is strongly recommended.

*Dried Banana.*—Almost all types of Bananas growing in Maharashtra can be dried. Rajapuri Bananas give an attractive product when packed with sugar. Bleaching with SO<sub>2</sub> helps to preserve good colour. Dried Bananas when they are fumigated with Carbon Bisulphide and stored in air-tight containers keep without spoiling from insects or fungoid growths. People in Maharashtra can dry Banana just as people can do at Agashi.

*Grapes.*—The drying quality of all cultivated types of grapes has been tested. Phakadi, Kandhari and Pandbari Sahabi dry well and give agreeable raisins. Trial of better types such as Thomson seedless and Muskat of Alexandria has already been undertaken in some parts of Sind.

*Dates.*—Of all types such as Edalshahi, Tothar, Shinhuvani, Kechin keeps the best. This date can be ripened, fumigated with Carbon Bisulphide and packed for the market use. Our scheme for

the import of date suckers from Mesopotamia has been held back for the present. At any rate we hope to exchange large number of date suckers for our mango stocks with the Egyptian Ministry of Agriculture.

*Pine Apple Juice.*—A study of pine-apple juice has been thoroughly conducted; percentage of juice collected is 40. Our pine-apple contains 4.39% sugar. Impurities coagulate in pasteurisation and clarification is not very necessary. Although pine-apple market is very favourable for packing juice, the quality of the juice that we collect is unsatisfactory. Import of improved types is considered absolutely essential and it is recommended that a part of Amalsad Farm should be reserved for variety trials on a large scale. Method of bottling is the same as in the case of Jhambul Juice.

*Karwanda.*—Karwanda gives juice of greatly satisfactory value. Percentage of juice collected is 12 but its ultimate cost per gallon is almost insignificant. Impurities can be coagulated and juice filtered through ordinary felt or cloth filter. The method of bottling this juice is the same as in the case of pine-apple and jhambul juices.

Our greatest handicap in carrying out this work further is improper laboratory equipment. Our future great problems connected with the study of fruit juices are as follows:—

- (1) Preservation of color.
- (2) The value of condensed juices.
- (3) Packing materials.

In case laboratory is not equipped, this work cannot proceed further.

Besides this our cold storage tests and determination of loss of fruit in transit are important investigations in hand. This work is progressing satisfactorily and will be published when completed.

*Investigations in the Ganeshkhind Botanical Gardens, Kirkee.*

*Grape.*—The progeny of high yielding vines marked as a result of selection has not borne any fruit as yet.

Work on the self-sterility of grapes will soon be published in the Agricultural Journal of India. It is definitely decided that Pandhari Sahebi will bear well if it is grown along with fertile types.

One seedling vine has borne fruit. Both as regards foliage and fruit it differs from Bhokari and Phakadi. This seedling marks an improvement on the Bhokari, our standard cultivated type. There are several hundreds of seedlings, more to be tested before results are expected to be of any economic value.

The distribution of raisin grapes has been undertaken on a large scale. About 3,000 cuttings have been distributed. We have got about 10,000 cuttings more in stock for Sind growers. Shikarpur Municipality has established a small orchard of raisin grapes.

*Die-back of Citrus.*—Die-back is a very serious trouble in our orchards. The results of our observations were submitted to the Director of Agriculture. Die-back Committee has been established to discuss our results and to plan further investigations. Our main line of investigation now is to test the resistance of various stocks used for orange and particularly study the reaction of roots of these stocks to root pruning. So root exposure and die-back investigations will be conducted side by side.

*Packing of Mango Plants by Post for long Distance.*—A detailed account of this work is already published in the Agricultural Journal of India. Considerable improvement has been made since then. Now mango plants packed by this method stand 48 days journey in good condition. English and African scientists seem to appreciate this method of packing plants.

*Rice Improvement.*—The work on rice improvement has been taken in hand by Mr. Joshi at Karjat. The results of square sowing system will be made available soon.

*Potato Breeding and Selection.*—Several new types have been developed. Results have been submitted to the Director of Agriculture for publication. Further work in this connection has been stopped except that some desirable types are multiplied at Modi Bag.

*Banana Seedling.*—Many seedlings have borne first fruits. Large number of new seedlings also have been raised. This work will be continued till better types than those which exist are developed.

*Improvement of Guava by Selection.*—Individual performance record of about 600 seedlings has been kept for the last three years. The seedlings show numerous variations. The coefficients of correlations for 129 trees have been worked out as shown in the following table :—

The relation of yield of 1922 to 1923 crop (number of fruits).	+·402 <sup>+</sup> <sub>—</sub> ·049791
The relation of yield of 1922 to 1924 crop (number of fruits).	+·171 <sup>+</sup> <sub>—</sub> ·057633
The relation of yield of 1923 to 1924 crop (number of fruits).	+·272 <sup>+</sup> <sub>—</sub> ·054996

The coefficients are all positive and show sure causation. The relation of coefficient to probable error is also satisfactory. Selected plants have been propagated further to test their progeny. The percentage of improvement in quality and quantity of our present stock will be shown later.

Besides this a great deal of attention has been given to transplanting and top working of Mango Trees. This brief account shows the roll of importance which Ganeshkhind Botanical Gardens, Kirkee, is playing in the development of fruit culture in the

Presidency. This garden cannot be used by public in a better way than as a fruit farm. Great necessity has been felt to bring its forest area under cultivation. But irrigation facilities are not adequate. Retrenchment has badly hit this institute, particularly so far as the upkeep of the ornamental work is concerned. It is strongly hoped that both public and authorities will take liberal interest in the development of this garden.

#### *Modi Bag.*

*Mango Stock Improvement.*—Very remarkable results have been obtained regarding the relation of seed to the growth of the stock. Mango stones are classified as complete flat and incomplete according to their occupation from within by the cotyledons and useful relations are worked out from the growth of the stocks grown from such stones. It has been found by analysing the record of 30 wild mango trees that complete stones may provide larger percentage of vigorous plants for grafting purposes in a comparatively shorter time than other types of stones.

*Banana Selection.*—The detailed biometrical studies in Banana relating to yield both in number of fruits per bunch and weight of individual fruit in each bunch have been undertaken. The correlations are all positive and their value is very low and do not indicate sure causation. The result does not seem to offer much evidence to show that quantitative factor is inherited.

*Fig.*—Notching operations were done on a large scale over an area of 30 gunthas and an increase of 5 lbs. of figs is shown per tree. In Bulletin No. 117 of 1924, comparison of the successful and unsuccessful areas here with those of the conditions in California where they are recognised as satisfactory, is made, very remarkable results which have been obtained by notching are described, and the theory of this operation is discussed.

*Vegetable Improvement.*—Extensive tests have shown that the greater Baltimore tomato has given excellent yield and market appearance. 21 oz. seed has been distributed and Leaflet No. 4 has been prepared. Improvement of tomato by selection is progressing well.

*Foreign Introductions.*—Introduction of Smyrna figs, Capri figs and various types of raisin grapes is the important work in hand at this farm.

The area of this farm is very insufficient for investigational work. It can only be used for variety collection. Irrigation, manuring and selection of stock and other experiments require larger acreage than what we have got at present.

Under the circumstances, our conclusions gathered from individual trees are not likely to benefit the fruit growers to the same extent as we desire.



*District and Advisory Work.*

District work during the year under report has grown by leaps and bounds. 389 enquiries as compared with 300 in the previous year have been dealt with. Enquiries from outside the Presidency are increasing. Most of the enquiries deal with the industrial aspect of fruit market and manufacture rather than cultivation.

*District Nurseries.*—The nursery at Kolhar near Rahuri was closed down on 31st December 1923. In this nursery about twelve people had been trained in the art of budding besides students of the higher classes in the local vernacular school. One gratifying feature of this is that two teachers in the local Urdu school took advantage of the nursery and learnt the art of budding orange plants and the method of improving wild jujube trees by budding process. Some of the men learnt the art of grafting mango trees also. The fieldman in charge of the nursery was very useful in demonstrating the method of catching orange moths at night time.

The second Mango Nursery is now recently started at Dharwar. There is, however, one thing which is noticeable in all proposals to start a nursery, that when associations ask for our help in this matter they, as a rule, do not guarantee a certain number of students to learn the art and who would take up nursery business afterwards as a means of livelihood. The nursery, therefore, degenerates into a miniature Government concern.

*Public Speeches.*—The members of this section have addressed six largely attended public gatherings and explained the importance and possibilities of fruit cultivation and fruit industries in the Presidency. The Government of Bombay have appointed a committee at the request of the fruit growers to investigate into the question of marketing and preparing of mango products.

*Demonstrations*—The following table shows the number of demonstrations given to the growers during the year under report:—

Place of Demonstration.	Date.	Subject.	Remarks.
Ratnagiri ...	29-1-1924 ...	Spraying of Mango diseases.	Before the members of the Development Association a short speech was made.
Ratnagiri ...	24-4-1924 ...	Bottling of fruit Juices	A public speech was also given.
Vengurla Orchards.	Mango 30-4-1924 ...	Spraying of Mango diseases.	...
Modi Bag, Agreul-tural Poona.	24th and 29th 3-1924.	Drying of figs ...	Demonstration was given to the students of the Poona Male Training College.
Saswad ...	25-5-1924 ...	Drying of figs ...	About 400 fig-growers attended the meeting where a public speech was given.

Two lectures were delivered at the show at Bhadli in East Khandesh.

In last October a class was held at Nipani where local cultivators were called together for a week daily and they were given practical lessons and demonstrations in various methods of plant propagation ; in removing and extracting borers from mango trees, repairing the cavities of mango stems, and selection of sites for fruit trees such as citrus and grapes.

This is in brief a year's work of this newly established Horticultural Section of the Agricultural Department. We strongly hope that the practical value of this work will be fully recognised by the public.

G. S. CHEEMA,  
Horticulturist to Government,  
Bombay, Poona.

## APPENDIX B.

SUMMARY OF WORK OF AGRICULTURAL PROPAGANDA IN  
NORTH AND MIDDLE SIND, JULY TO DECEMBER  
1923, UNDER THE ASSISTANT REGISTRAR OF  
CO-OPERATIVE SOCIETIES, SIND.

I have the honour to submit my report on the progress of Agricultural Propaganda work for the period ending 31st December 1923.

In accordance with G. O. No. 5805, dated 10th January 1923, I was appointed Agricultural Propaganda Officer in addition to my duties as Assistant Registrar, and the following 8 talukas were assigned to me for carrying on intensive Agricultural Propaganda work:—

North Sind	...	{	Ghotki. Sukkur. Larkana. Kambar.
Middle Sind	...	{	Shahdadpur. Halla. Hyderabad. Tando Allahyar.

I took charge of my new work on 20th January 1923, and with the below noted staff set to work out the undermentioned programme which had been chalked out for me:—

*North Sind.*

- (1) Agricultural Inspector, Mr. Lokram.
- (2) Three District Agricultural Overseers.

*Middle Sind.*

- (1) Agricultural Inspector, Hajee Abdul Rahman.
- (2) Three District Agricultural Overseers.

*Programme of Work.*

- (1) To popularize and distribute approved varieties of seed.
- (2) To popularize and distribute approved Agricultural implements.
- (3) To propagate modern methods of farming.
- (4) Generally to formulate schemes that may tend to a successful execution of the above programme, *e. g.*, formation of Taluka Development Associations; opening of implement sub-depots, local manufacture of modern implements, &c.

Before dealing with the actual working of the above programme I would like to give a brief survey of the condition of the seasons during which I had to work.

*Seasons and Inundation.*

The Rabi season of 1922-23 was not quite satisfactory, partly because the lands were poorly inundated and partly because there was hardly any rain in the cold weather of 1922-23 with the result that the Bosi crops, in particular, suffered considerably.

With regard to the Kharif of 1923-24 the river was very hopeful in May, but went very low in the first fortnight of June, and began to improve only by the first of August. This delayed the sowing of rice, jowari and cotton considerably. From 1st August to 1st September the stream was wonderfully steady which saved the situation, though Kharif crops required one more watering; still both Kharif and Rabi crops were on the whole fairly good.

*I. Popularization and Distribution of approved Varieties of Seed.*

*A. Pusa 12 Wheat.*—In September 1922, I was offered the Agricultural Propaganda work at Poona and on my return immediately proceeded to Upper Sind and took to distribution of Pusa 12 Wheat which was known in the Agricultural Department to be of very superior quality. About 800 maunds were for the first time distributed in Sukkur, Ghotki and Pano Akil Talukas and about 200 maunds in Middle Sind. The Zamindars were at first hesitating to introduce the seed in their lands, as they were quite ignorant of it before. During the course of its germination and final harvesting, however, the following properties have come to light :—

- (1) The crop is wonderfully free from rust, while every other local variety suffered from it.
- (2) It yields at least 2 maunds more per acre.
- (3) Its gluten percentage is higher which makes it more tasteful and nutritious and enables it to command about 8 annas higher price per maund in the market.
- (4) It ripens about one or two weeks earlier and thus escapes the occasional adverse South Westerly winds which tend to shrivel the grain.

The Pusa 12 variety thus met with universal appreciation and Khan Sahib Chakarkhan, a leading Zamindar of Kaudhkot, Sardar Khan Ghoti of Ghotki, K. S. Dilmurad Khan of Jacobabad and others have kindly furnished certificates which eloquently speak of the superiority of Pusa 12.

Mr. Howard, the pioneer of this variety who came to inspect the crop on 30th of March 1923 along with Mr. Main had also

expressed warm satisfaction at the condition of the crop and was finally of opinion that the crop suited the tract admirably.

The Pusa 12 having thus established itself as universally popular the Khatedars and Haris who had grown it did not like to resell it to the Department. They wanted to store it for their personal use either for consumption as food or multiplication as seed. Moreover, the seed having been distributed in scattered patches it was difficult for the departmental agents to collect it. Besides the prevailing practice of financing Pusa 12 Wheat, *viz.*, buying departmentally at harvest time and selling at sowing time appeared fraught with many disadvantages. In the first instance it involved too much account keeping besides if at any time the prices fell the Government had to sustain loss. To safeguard against these drawbacks I negotiated with one Seth Tilockchand of Sukkur who agreed to purchase and stock Pusa 12 Wheat seed and sell it during the ensuing Rabi under orders of the Department. At Ghotki and Jacobabad also I made similar arrangements with local Zamindars. The Divisional Board approved of this arrangement and had also passed a resolution guaranteeing Seth Tilockchand against any loss owing to fall in prices, &c., subject to a maximum limit of annas five per maund within a total amount of Rs. 3,000. The total quantity secured and distributed during this year through this agency was about 2,000 maunds. The price of wheat at the time of sowing was very low indeed and the Department might have sustained some loss but as the appreciation of the seed was very great the buyers who were mostly the members of Co-operative Societies did not at all mind paying a little higher price than the prevalent market rate, with the result that neither the Government nor Seth Tilockchand or any one else sustained any loss. Added to the 2,000 maunds of wheat seed referred to over and above the quantity reserved by the Zamindars for the purpose of multiplication, the total quantity of Pusa 12 sown during this Rabi would be about 6,000 maunds.

There was indeed much greater need than the above quantity and I had thought of supplementing the available stock by importing more Pusa 12 from the United Provinces. But the quotations of that side were nearly double those of Sind and hence I had to rest content this year with what could be secured locally.

*B. 27 W. N. Cotton.*—Only 100 maunds of this seed were spared by the Department for distribution in the propaganda area. Most of this seed went to Co-operative Societies in the Hatri Union. The area in which this seed was sown was irrigated by the Kashki Canal which did not flow properly. It was not, therefore, possible to sow the seed earlier than the end of June and beginning of July, *i.e.*, about a month later than usual. Besides the seed supplied this year by the Agricultural Department was not grown at any farm but had been obtained from the cultivators' produce. It was unfortunately not of pure quality with the result that the germination was poor on the whole, and the cultivators had to resow blank patches in several places. This fact was duly brought to the notice of Mr. Main. The

Bokhro disease besides which was common in cotton crops also attacked the 27 W. N. The general impression regarding this variety has not, therefore, been quite favourable. I beg to submit herewith Mr. Abdul Rahman's detailed report regarding the 27 W. N. cotton seed for perusal of the Board.

*C. Bhitshah Cotton Seed.*—Bhitshah cotton is a variety of reputed cotton in Sind. The ginneries pay a premium of Re. 1 to Rs. 2 per maund for this variety. It has a ginning percentage of about 40 and yielding qualities higher than the ordinary Sindhi cotton. The 27 W. N. quality not being adequately available for supply I made arrangements with one Seth Radhakrishin, a big Sethia of Shahdadpur Taluka, to finance and supply this seed. The Department undertook to inspect that the seed cotton used for ginning was from the selected picks of Bhitshah crops and that the ginning was regulated at proper speed to avoid breakage of seed. After ginning the seed it was further sifted of dust and other impurities. Indents for this seed were executed by the Agricultural staff. About 2,000 maunds of this variety were in all distributed in the four cotton growing talukas, viz., Halla, Hyderabad, Tando Allahyar and Shahdadpur. The germination from this seed has been excellent and Zamindars, who had sown it, have expressed both written and oral satisfaction. Apart from having better germination the Zamindars report to have effected much saving in the seed rate. Usually they put 40 to 70 lbs. per acre, but 20 to 25 lbs. of machine-ginned Bhitshah have been found to give sufficiently thick stand of the crop and only 12 lbs. of hand-ginned Bhitshah were put in per acre with equally good germination. In several instances seed was delivered at the Zamindars' villages or at Railway Stations nearest to them. Seed depots were also opened at Taluka Head Quarters for retail sale. When germination reports of the first consignment got abroad there was great rush for the seed and the stock was exhausted immediately. The Bhitshah seed has been so popular that it has washed away from the Zamindars' minds, the unfavourable impression created by N. R. Moreover the success of this seed has gone a great way to induce the people to repose confidence in the Department and I might safely assert that the large sale of our implements is mainly due to the success of this seed.

*D. American Cotton.*—An experiment was also made with American Cotton in Tando Allahyar Taluka. An acre was sown with this seed and the result was highly satisfactory.

*E. Berseem and other miscellaneous Seeds.*—Out of the newly imported Berseem seed from Egypt the Deputy Director allotted 1,360 lbs. for the Middle Sind Division which was distributed promptly. As fodder crop is valuable round about Hyderabad, the growers were very grateful to receive this seed. The germination has been excellent but the growth up to date has been less vigorous probably due to abnormality of weather conditions. Inquiries and indents regarding Lucerene and vegetable seeds were also suitably attended to and complied with.

## II. Demonstrations of improved Implements.

Village to village demonstrations with the below noted implements and machines were held. In all about 400 villages, hamlets and fields were thus touched during the period and some of the places were visited more often than once. Moreover, big central demonstrations at the Head Quarters of each of the 8 talukas were organized from time to time where our implements were worked side by side with the local ones. The attendance at these demonstrations was always very satisfactory. Oral lectures on Agricultural Industry and on possible methods of better crop formed also a prominent feature of these demonstrations. The success of these demonstrations may be gauged from the indents received and complied with.

Ploughs :—Rajah, Monsoon, Egyptian and Meston.

Water lifts—Screw lifts.

Scrapers.

Clod crushers.

Drill tubes.

While the Rajah plough (costing Rs. 60 each) is considered to be the plough for the rich, the Egyptian plough has commanded much appreciation and popularity. No less than 700 ploughs in all were sold in the 8 talukas of which 97 per cent. were of the Egyptian type. It costs only Rs. 6 to Rs. 8 and is locally made and works with an ordinary pair of bullocks.

With a view to meet the great demand for the Egyptian plough and other implements, arrangements were made at Hyderabad, Larkana, and Sukkur for the local manufacture of implements. The carpenters of the firms were trained in the manufacture of implements and the firms were given all convenience and instructions from time to time as to the measurements of several parts and the kind of wood to be used. These works are from time to time supervised to see that the outturn is satisfactory as regards workmanship, material daily output, &c.

*Hand Archimedian Screws.*—Owing to poor inundation last year the flow areas stopped receiving water just at the sowing time when our hand Archimedian screw came to the aid of the cultivators. This is a very handy water lift easy of fixture and transport giving about double the quantity of the local Hurla. It is worked by hand and has been found so serviceable specially by the Larkana Taluka people against falling water that the Agricultural Association of that taluka during its last meeting resolved to have half a dozen prepared at once at the outset. About 15 such lifts were also sold in Middle Sind.

*Two-cultured Wheat Drill.*—By this two rows could be drilled at a time instead of one as usual. With a view to economizing labour and time, this implement is being used and has found favour in

Larkana Taluka. About 10 acres have been experimentally drilled with this tube, to demonstrate its efficiency.

*Implement Sub-depots.*—With a view to further popularize the departmental implements and bring them within easy reach of even the humblest of agriculturists, sub-depots have been experimentally opened for the present at two places, *viz.*, Bagarji and Larkana.

The object of the sub-depots is threefold :—

(1) To keep a stock of implements ready for sale so that the indenter may not have to wait till the implements desired are manufactured in Mirpurkhas or Bombay.

(2) To give the implements on a nominal rent of 1 or 2 annas a day to such poor people who cannot afford to buy them.

(3) This rent system gives the fullest opportunity to the user to examine the implements more scrutinizingly before he makes up his mind to buy them.

As sub-depots have been opened recently there has not been any phenomenal progress to report but there is not the least doubt that they will grow popular when the proper season of cultivation comes in.

The following table would give an idea of the implements disposed of through the agency of this Department :—

<i>Description of Implement.</i>	
Egyptian plough	... 650
Iron plough	... 14
Rajah „	... 4
Scrapers	... 5
Drill tubes	... 9
Yokes	... 12
Heavy clod crushers	... 4
Archimedian water lifts	... 30
Monsoon plough	... 43
Iron chains	... 12
Iron chunis	... 50
Ridging boards	... 5

The above list shows that every attempt has been made to make the people acquainted with the various implements of the Department and their appreciation could be judged from the sales effected.



### III. *Demonstrations in approved Methods of Farming.*

A. *Drilling Demonstration in Cotton.*—In all more than a dozen plots had been secured on private fields to show drill methods, but owing to poor inundation only 10 plots of area varying between 1 to 2½ acres were actually organized and drilled in Talukas Hyderabad, Shahdadpur and Tando Allahyar. The seed drilled in all cases was 27 W. N. except in one instance in which about 1½ acres had been sown with hand-ginned Bhitshah for comparison sake. A lot of difficulty had to be contended with in going through the programme of the demonstration plots referred to above, scarcity of water being the most unsurmountable one. With every fall of the river the water courses ceased to run and consequently water from the plots was cut off. Besides two resowings had to be done in almost all the plots as the germination of the 27 W. N. was not so satisfactory, the seed supplied being itself of an inferior quality.

Apart from drilling the above plots directly by the Department, trained staff assistance was also rendered to some other big Zamindars who put about 5 acres of land each under drill method by their own labour which had been trained by this Department. These plots also were regularly inspected.

The stand, yield and immunity from disease in all these drilled plots have convinced not only the growers of these plots, but also other cultivators with the result that many people are now desirous of following this practice of cotton cultivation.

Visitor's days were arranged when batches of Zamindars were taken to the nearest plots and advantages of the drill system explained to them. The growers have acknowledged the following advantages of the system :—

1. There is saving of hoeing expenses to the extent of Rs. 10 per acre.
2. The drilled cotton can withstand drought much better.
3. The rate of growth is quicker in drilled plots and the plants more vigorous.
4. The yield has been comparatively a little greater than the adjoining broad cast plots and had it not been due to heavy frosts this year, this point particularly would have been very conspicuous.

B. *Hot Weather Ploughing.*—This sort of ploughing is very necessary for the Rabi crops. Most of the wheat crops suffer lamentably on account of absence of proper moisture in the earth. To remedy this, hot weather ploughing has been deemed to be most efficacious. It implies ploughing up of land immediately after the harvest in the months of May and June so that the land may be thoroughly aerated and thus be able to absorb thoroughly and retain effectively every drop of monsoon water that enters its womb during August and September. Half a dozen plots have been

ploughed in the last hot weather in North Sind and the results will be watched in due course in the Rabi crop.

C. *Cold Weather Ploughing*.—This sort of ploughing is also as essential for the Kharif crops as hot weather ploughing is for the Rabi crops. Steps have been taken to plough about 6 plots in this cold weather.

D. *Practical Demonstrations in Rice Plots*.—Larkana and Kambar being primarily rice growing talukas the main lines of work here were:—

- (1) Economy in seed rate.
- (2) Early transplantation.
- (3) Bengal variety vs. ordinary variety.

With a view to have an exact idea with regard to the above three phases of rice cultivation about half a dozen plots (of area varying between 1 to 2½ acres) were secured in the two talukas and experiments carried on in them. The following conclusions have been arrived at:—

(1) *Economy in Seed Rate*.—The usual seed rate of rice is one maund per acre but the Department demonstrated with half the quantity. I personally inspected these crops and as a result of inquiry from the Zamindars concerned am glad to submit that the experiments proved successful and the Zamindars realized so.

(2) *Earlier Transplantation*.—The nature of inundation being most fitful in Sind, the earlier sowing of rice has been found to be imperative so that the crop may be able to ripen fully in time. The usual practice is to sow the seed in the nursery beds only after the water begins to run in the canals. If seedlings were grown on the existing wells and on the banks of the main canals for outlying lands at least 25 per cent. of the total area could be sown about 25 days earlier than usual. This 25 days earlier transplanting has been actually found to have remarkable effect, upon the yield to the extent of almost doubling it up.

The other advantages of this system are that—

- (1) There is very systematic division of labour.
- (2) It insures the crops against failure in the event of early fall of water.
- (3) It tends to mature the crops earlier thereby making the realization of better prices highly probable.
- (4) It liberates the soil much earlier so that "Dubari" crop is sown in time.

(3) *Bengal Variety of Dadkhani Rice*.—This variety has been introduced with an amount of success in the tract. Its peculiarities are:—

- (1) That it requires only 10 seers of seed per acre, i.e.,  $\frac{1}{2}$  of the ordinary seed rate.

(2) It is a very heavy yielder.

(3) It is very delicious in taste.

The only precaution to be taken with regard to it is that it must have a pretty assured water supply and a fortnight more to ripen.

The Zamindars have grown to appreciate this variety very much and they expressed their satisfaction both to Mr. Main and myself on my tour.

The area under rice cultivation in the two Talukas of Larkana and Kambar alone is about  $1\frac{1}{4}$  lacs of acres. If the results of the above three experiments, simple and inexpensive as they are, be applied and adopted the net gain to the Agriculturists will be enormous annually.

E. *Combat with Crop Pests.*—Complaints of rats doing damage to onion and wheat fields were effectively attended to and the Zamindars concerned were given rat poison. They appreciated it much and have sent in their written testimonials expressing their satisfaction. As this was the first year the poison was supplied free.

Inquiries were also received in connection with cotton pests and general precautionary measures were suggested. It is in my opinion very necessary that some agricultural expert (preferably the cotton breeder) should be specially deputed to investigate these diseases and suggest remedial measures.

#### IV. Inauguration of Taluka Development Associations.

With a view to facilitate the work of intensive Agricultural Propaganda, Taluka Development Associations have been deemed to be the best medium. I, therefore, organized eight such associations one for each of the eight talukas assigned to me. They have all commenced their work with an initial capital noted below against each:—

(1) Halla	... Rs. 800
(2) Hyderabad	... „ 900
(3) Shahdadpur	... „ 800
(4) Tando Allahyar	... „ 1,000
(5) Larkana	... „ 1,165
(6) Kambar	... „ 700
(7) Sukkur	... „ 400
(8) Ghotki	... „ 600

I have regularly been attending their periodical meetings and steps are being taken to execute every branch of Propaganda work under their auspices, *e.g.*, demonstration work, seed and implement distribution, &c. The associations in their turn are busy securing

inidents for seed and implements. Most of the associations have purchased implements for demonstration, sale and hire while the association of Hyderabad has gone a step further, *i.e.*, it has appointed its own Kamgar for field demonstration. Their budget estimates for the ensuing year have been prepared and are pending approval of the Board.

*General.*

*Tour.*—With a view to make the Propaganda work as best effective as possible I had to tour round in the Propaganda area very frequently at least once every month in each taluka. During the course of the tour I attended several demonstrations and delivered lectures on the advantages of improved implements and good seeds. The doubts and difficulties of the Zamindars on these heads were likewise solved both by myself and the Agricultural Inspectors. Among those who took the best interest in the work I must confess that the members of Co-operative Societies stand foremost, because they had both organization and money. In my opinion the fundamental difficulty why the agriculturists could not so far avail themselves of the suggestions of the Agricultural Department was “money” and I am glad to say that Co-operative Societies have offered much help in the solution of this difficulty.

*Conclusion.*

The result of work done during the brief period of 12 months at my disposal, as judged from the foregoing paragraphs, is indeed promising. In the eight talukas placed under me, people have learnt to appreciate the value of implements, seeds and methods of farming suggested by the Department and I hope if vigorous Propaganda is carried on by the Department for two more years, through the agency of the Taluka Development Associations, they will develop themselves fully during this time and will in future be able to conduct their business unaided by any official agency and thus liberate the Agricultural Department to tackle other talukas of the Province.

My best thanks are due to the two Inspectors, Messrs. Lokram and Hajj Abdul Rahman, for the very sincere help they rendered me in materializing the above programme of work.

AZIM KHAN,  
Assistant Registrar,  
Co-operative Societies, Sind.

MR. ABDUL RAHAMAN, INSPECTOR OF AGRICULTURE, MIDDLE  
SIND'S REPORT REGARDING THE 27 W. N. COTTON SEED.

*Introduction of 27 W. N. Cotton in Middle Sind.*

In 1922, for the first time 60 maunds of this cotton seed were distributed in this division and in the year under report 100 maunds of the seed were kindly spared for this tract. Most of it went to below noted societies in Hatri Union and all these places are adjoining and within a mile or less from each other. The Canal on which this area depends began this year flowing by the beginning of June and then there was stoppage of water for a fortnight or so due to fall in the river. The people were, therefore, in a position to sow this cotton by the end of June and beginning of July about a month later than usual:—

- (1) Hatri.
- (2) Tando Sayed Khan.
- (3) Kasim Gaho.
- (4) Phattoo Bhagal.
- (5) Ismail Chand.

The previous year's supply of this seed was from farm grown stuff and the area being under departmental control was comparatively better than this year's supply half of which it is said was obtained from cultivator's produce. The germination was so very poor that people had to resow blanks. The general complaint of the growers took the shape of a written report from their Officer who happened to visit those societies at the moment. I reproduce a portion of that:—

"That while auditing Gaho and Bhagal Societies I have heard complaints about the bad quality of cotton seed supplied by our Department. These members inform me that the seed is utterly useless and all their labours have gone for nothing. I have secured a sample of the seed for your inspection. I submit that this mixture of good and bad seed has created bad impression among the societies people and this is likely to affect adversely on the confidence which people repose in us."

On inspection of the sown area the following state of affairs was witnessed on site:—

Society.	Bhagal.	Gaho.	Chand.	Tando Sayed Khan.	Hatri.	Total.
Quantity of seed given	Mds. 15	Mds. 15	Mds. 12	Mds. 15	Mds. 4½	Mds. 61½
Number of members supplied with seed.	21	16	23	17	5	82
Their total area	33	33	23	32	10	131
No. of men whose germination was good.	6	7	11	6	3	33
Area of above	14	10	7	15	7	53
No. of men whose germination was bad.	7	8	12	11	2	40
Area of above	19	23	16	17	3	78
No. of men advised to reject the seed.	8	1	1	...	...	10

From the above it will be seen that about 60 per cent. of the area was bad and 42 per cent. area was good. The bad areas were resown with ordinary seed and no more seed of N. R. was available.

The general opinion of the seed was the same as above pointed out by the Auditor.

Besides the above area in compact group of villages the following were supplied with this seed at their request. The condition of their crop is noted in the same statement :—

Name.	Quantity supplied.		Area sown.		Condition of germination.
	Mds.	seers.	Acres	g.	
1 Seth Radhakirshin ...	10	20	8	20	Good germination.
2 Seth Haji Mohamed ...	4	20	3	20	Do.
3 Akhund Atta Mohamed ...	4	20	Nil.		Fed to cattle.
4 Mr. Manohardas ...	10	20	30	0	Not inspected.
5 Mukhi Harkishindas ...	1	20	2	20	Poor, resown with N. R..
6 Mr. M. A. Jagtiani ...	4	0	5	0	Do.
7 Bachal Brothers ...	3	0	Nil.		Fed to cattle.
Total ...	38	20	49	20	

On the whole it may be said that even with the above growers the seed did not do well. As regards germination with the qualified graduate cultivators like Messrs. Jagtiani and Manohardas the seed behaved in the same way. We had to resow twice in Jagtiani's fields. Bokhro disease was in evidence to a little more than normal. Poor germination compelled some of the Zamindars to resow with local seed but wherever spare quantity of N. R. seed was available it was made available with the efforts of the Department for some of the resowings.

The lands put to this cotton were generally good and well cared after. On inspection of the seed a sample of which was submitted to higher authorities personally, such Zamindars who were accustomed to using good seed, rejected it. Thus we lost about 90 acres of cultivation or about 33 per cent. of the 100 maunds supplied. Next inspection was done towards end of August and beginning of September. The plants were 3 feet to 5 feet in height, healthy first weedings have been done and in the best plots 2nd weeding has just commenced. The plants everywhere with the exceptions of late sown area have just commenced flowering, and in exceptionally good cases tiny fruit is in appearance. The cotton wilt was in appearance

both in Sindhi and N. R. Cottons to the same extent of about 1 plant diseased in every 200 plants.

There was a regular mixture of American Cotton in both good and bad crops averaging from 4 to 8 per cent. which is easily noticed and cultivators willingly weeded out the American plants when asked to do so. In places where the crop is not thick the cultivators refused to weed this out.

The tinge of the foliage of N. R. was everywhere lighter than Sindhi Cotton. This is probably a varietal peculiarity than any defect in N. R.

The late sown fields which represent about 60 per cent. of the area put to this cotton are stunted not more than 3 feet high and the rate of American mixture same as in all fields. Only one weeding has just been finished and have received only two waterings as yet.

As regards purity the N. R. crop sown from good seed bags and in areas in which resowings were done not from local seed but from the reserve stock of N. R., there were found to be almost the same quantity of mixture as will be evident from the record of following countings. An area of 10 paces by 20 paces was observed from each cultivator's field.

The plants counted —

Name.	Total No. of plants.	American.	Broad lobed.	Yellow flower.	Remarks.
Kadir Bux	318	16	21	17	In these countings, areas which were re-sown with local seed are not included.
Fazal	184	7	28	9	
Gulan Shah	272	15	18	8	
Isan	202	6	11	4	
Mohamed Saleh	326	11	23	6	
Muridalishah	308	8	30	12	
Usman	266	6	17	4	
Pir Bux	343	12	19	15	
Ahmed Nuhani	129	7	29	2	
Average and Total	2,348	88 3.8%	196 8.3%	77 3.2%	

It will be seen from these test calculations that besides American Cotton mixture yellow flower plants were present from about

2 to 6 per cent. and also broad lobed leaves to the extent anything up to 10 per cent.

There is strong opposition of men to weed out mixture. In the local Sindhi Cotton flowering is not yet commenced.

The third inspection of N. R. was done in beginning of November. The water has stopped early in September from these cottons. The N. R. is suffering from "Moorh" and "Ratti" diseases just as Sindhi Cotton. The yield is expected to be much affected adversely. The plants have attained generally good size and cotton has received in all from 2 to 4 waterings. Forming of bolls is general though not profuse. There is evidence of less mixture of American than seen at the last inspection. As regards mixture of yellow flower or broad lobed plants following countings were made. Two beds were observed from each field.

Grower. —	Yellow flower.	Broad lobed, white.	Total No. of plants in bed.	Mixture percentage.
Mahomed Bux	14	11	87	29%
Kaim Shah	21	9	99	30%
Ibrahim Jalal	18	12	105	29%
Sheru	14	10	74	32%
Urs	16	8	93	26%
Muridalishah	23	13	82	50%
Umer	19	12	116	26%

At the time of this inspection many plants which had not flowered at the time of 2nd inspection could be distinguishable. The mixture of yellow flower was from about 15 per cent. to upwards to 25 per cent. the mixture of broad lobed white flowered plants was from about 9 to 20 per cent. The American was either absent or hardly  $\frac{1}{2}$  per cent., as men have weeded it out because they say its interference excludes light and air from the Sindhi plants. Few bolls have opened hardly half per cent.

People were advised to keep their produce separate as arrangements were in progress to get them a premium for N. R. Cotton. They were, however, not willing to keep it separate because they said that the N. R. phutties were lighter than Sindhi and had not done as well as Sindhi. If they would mix it to their bad N. R., samples would pass with Sindhi as good besides the advance sales of phutties were in full swing and the people wanted money, the cultivators sold away the crop before picking.

Some growers who were in the habit of selecting their own phutties for seed were induced to pick from proper N. R. plants good phutties and stock it for next year's seed.



Arrangements were entered into with the ginning factory of Honourable Mr. Bhurgri at Hyderabad to purchase these who authorized their local agent residing near these societies to purchase the N. R. phutties and label them separately so that these could be ginned separately.

The last inspection was done early in December when all cotton was killed by frost and people who had sown late had lost heavily.

Chand, Hatri, Gaho and Bhagul Societies who had resolved to select from N. R. fields, proper well opened bolls and keep their phutties for next year's seed could not do so because frost killed the cotton before they commenced 2nd picking and phutties from 2nd picking is considered the best.

SUPPLEMENTARY NOTES ON AGRICULTURAL PROPAGANDA  
WORK IN SIND.

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In section IV of my Annual Report on Agricultural Propaganda Work I have dealt with the inauguration of Taluka Development Associations in all the eight talukas of the Propaganda area, and the main lines on which these Associations are to carry on their work. During the period of four months that has since elapsed, special attention was devoted to the development of these institutions and I am glad to say that they are now progressing favourably. In addition to their subscribed capital already referred to in the report, each Association has received Government subsidy.

*1. Working of Taluka Development Associations in Upper Sind.*

A. *Demonstration of approved Implements.*—Three out of the four Associations in Upper Sind, *viz.*, Larkana, Sukkur and Ghotki have maintained their Kamgars, pairs of bullocks and carts. In the fourth taluka, *viz.*, Kambar also the Association has appointed a Kamgar and proposes buying a pair of bullocks in September next when sowing operations commence. Implements are carried from village to village and demonstrations held. If any Zamindars desire, some of their plots are actually ploughed by the Associations' Kamgar on a light rental. This arrangement gives the Hari an opportunity of acquiring the first hand knowledge of working the modern implements and forming an unbiased estimate of their superiority. He may even be induced by these measures to purchase the implement.

While demonstrating the working of the superior ploughs the advantages of hot cold weather ploughing are also propagated as a necessary corollary.

B. *Manufacture of Implements, their Sale, Hire, &c.*—All the four Associations have opened their depots where implements have been purchased and stocked for the purposes of demonstration. Arrangements have also been made at Sukkur with a local Maistri for the execution of indents for implements required in all the four talukas of Upper Sind in the Propaganda area.

C. *Distribution and Multiplication of Pusa 12 Wheat Seed.*—Kambar is altogether a rice growing tract and hence no arrangement for the distribution of wheat seed has been made there. As for Ghotki and Sukkur, the Associations have started two seed societies whose function will be to purchase wheat grown out of the seed hitherto supplied and stock it for distribution during the next Rabi. As for Larkana, one of the most leading Zamindars and members of the Association has volunteered to purchase, stock and resell Pusa 12 in a similar manner for multiplication purposes at his own risk.

## II. Taluka Development Association in Middle Sind.

A and B. *Demonstration of Implements and their Manufacture.*—The Association in Middle Sind, namely, Shahdadpur, Halla, Hyderabad and Tando Allahyar have also like their sisters in Upper Sind entertained their own Kamgars who carry on implement demonstrations from village to village. They have likewise opened their own Depots of demonstration implements and have also made arrangements for the local manufacture of the ploughs, &c.

C. *Distribution of Seed.*—The work of distribution of cotton seed has been taken over by the four Taluka Development Associations of Middle Sind. All the four talukas are cotton growing and the Associations have so far distributed no less than 1,600 maunds of pure British cotton seed which is reputed to be of best quality. All the seed was purchased from factory owners of Tando Adam.

### General.

In all the eight talukas of the Propaganda area the Associations are securing plots from Zamindars for experimental purposes and the Departmental Officers are carrying on their demonstrations in improved methods of farming in them, *e. g.*, drill method, &c.

During the first year the agricultural Propaganda work was carried on solely by the Departmental Officials but now that the Taluka Development Associations have been started it is proposed to entrust a major portion of the work to them, more especially the distribution of seed and demonstration of implements.

The advantages from this procedure are obvious and may be briefly summarised as under :—

(1) The Department will be saved from the botheration of dealing in seed, which has in several instances resulted in financial loss to Government.

(2) Much of the time of the Departmental Officials which at present is being devoted to keeping accounts, carrying on correspondence, effecting recovery, clearing arrears, &c., would be saved.

(3) Moreover, the arrangement has a tendency to reduce Government Expenditure, could be gauged from the comparative budget figures of last year and this. Last year a sum of Rs. 4,000 had been sanctioned for Propaganda work in these areas, while this year owing to the existence of Taluka Development Associations the amount has been reduced to Rs. 3,000.

(4) As soon as this system of carrying on Agricultural Propaganda work is established the work of the Department will be minimised and in a short time the Department will be free to carry on intensive work in other tracts by turns.

AZIM KHAN.

Assistant Registrar, C. S., Sind.

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**ANNUAL REPORT OF THE DEPARTMENT OF  
AGRICULTURE, BOMBAY PRESIDENCY,  
1924-25**

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In preparing a report on the activities of the Agricultural Department during the year 1924-25, I do so in a more hopeful spirit than on any previous occasion. The year was, on the whole, a good one,—and, further, the purpose for which the Department exists, namely so to work as to bring about an increase in the value of the produce of the land in the Bombay Presidency, seems to have made considerable progress and to afford promise of greater progress in the near future. There are gaps in that promise, and areas where little progress has been made,—but generally speaking we can look round the Presidency and see, in most areas, improvements worked out or introduced by the Agricultural Department in large scale use, a gradually increasing desire among the cultivators for fresh developments, and a very strong movement towards the organisation of local agricultural development by the people themselves in many areas.

**SOME IMPROVEMENTS ALREADY INTRODUCED  
ON A LARGE SCALE.**

Before indicating the main features of *this* year's work, I will just indicate the present position with regard to some of these matters. The improvement of crops largely by the supply of pure or more valuable seed, has been perhaps the biggest cause of the increase in the value of agricultural production. In the first place we have those cases where we have been able simply to test introductions from the outside, and when found useful, to spread them.

*Groundnut.*—The most striking cases of this are the gradual development of groundnut as a cultivator's crop in Khandesh and in Upper Gujarat by the use of quick-growing varieties of high oil content by the Agricultural Department. These have led to an enormous extension of the cultivation, as is shown by the figures for the area in 1912-13 and in 1924-25.

*Groundnut Area.*

			Khandesh.	North Gujarat.
			Acres.	Acres.
1912-13	..	..	.. 4,119	395
1924-25	..	..	.. 1,40,190	39,151

When it is considered that this enormous increase means *partly* that a crop worth Rs. 40 per acre is replaced by one worth Rs. 80 to Rs. 100 per acre, and *partly* that it means an equally valuable crop to grow in substitution for cotton, the full value of the change will be perceived. I may say that Khandesh groundnuts, from the stock imported by the Agricultural Department, have now established themselves on the Bombay market as the most valuable in India, and importation of new stock to assist in maintaining the standard has recently been made.

*Wheat.*—Another introduction of very great value is the wheats from Pusa and the Punjab, which have been eminently successful both in Gujarat and as an irrigated crop, in Sind. In the last case “Pusa 12” wheat is spreading rapidly in Upper Sind where the area has increased from 5,000 acres to 14,000 acres in one year. This variety does not seem so useful for *bosi* land, and we are in active pursuit of another type which will fill the need. In South Sind “Punjab 11” wheat has spread in the Jamrao area, and will spread everywhere where the water supply allows wheat to be sown. In Gujarat, the type of wheat which has proved most successful has been “Pusa 4”, and this has become exceedingly popular in the Panch Mahals and in Ahmedabad both on account of its increased yield (200 pounds per acre at Dohad) and the higher price it commands.

*Cotton.*—If we turn to cotton, perhaps bigger things have been achieved than in any other direction. In most cases, the varieties now supplied and maintained pure by Agricultural Department, have been evolved at our experimental stations. In Sind, however, introduced American cotton is now spreading fast on the Jamrao, in spite of a water supply which continually gets poorer for American cotton. I anticipate that the limit of American cotton in Sind will be about 25,000 acres, until the Sukkur barrage water becomes available, and the progress towards that point (using two varieties developed in the Punjab ‘F4’ and ‘285F’) is shown in the following figures and diagram.

1917	..	78 acres.
1919	..	800 ”
1921	..	3,078 ”
1922	..	7,000 ”
1923	..	14,752 ”
1924	..	20,000 ”

In other cases, we have evolved our own improved types, and spread them. These have now come into common use all over Gujarat, South of the Narbada, all over Khandesh, over the whole of the Dharwar district, and to a less extent in other parts of the Southern Maratha Country and the Deccan,—and in the '*deshi*' cotton growing area of Sind. The maintenance of these improved types pure means an elaborate organisation for annually producing fresh seed, multiplying this, and then distributing it, but the result has been that in Gujarat the whole area south of the Narbada is rapidly coming to grow one type (1027A.L.) which is highly approved by the trade, and whose growing has been estimated by a commercial authority to mean an addition of 30 lakhs of rupees annually to the amount which would have been received if the crop had remained of the kind it was in 1919. A very similar position has been reached in the southern tracts of the Bombay Presidency, where with the co-operation of the Co-operative Cotton Sale Societies at Hubli and Gadag, quantities of pure seed respectively of improved Kumpta cotton seed (Dharwar No. 1) and of improved Dharwar American cotton seed (Gadag No. 1) sufficient for from 60,000 to 100,000 acres of cotton are produced in each case, and distributed as seed guaranteed by the Agricultural Department, each year. The produce always obtains a substantial premium over the ordinary cotton of the country, and the two together mean almost certainly an increased money value of 30 lakhs of rupees a year.

In Khandesh, the basis of distribution is a high yielding, high ginning type (N. R.) which has become very popular, and means, probably, at least twenty pounds of cotton lint per acre over the ordinary very impure type usually grown. The Co-operative Banks at Dhulia and elsewhere, the Taluka Development Associations and other local bodies are now taking a very active part in spreading this, and it is now grown over an area which can be measured by *lakhs* of acres, though I cannot get exact figures as to the extent.

In Sind, a variety which is very similar to the "N. R." cotton of Khandesh, but which has been locally evolved is the basis of distribution. It has been called "27 WN", it gives 20 per cent. more yield than the local cotton, and we have now an efficient means of multiplying it. At present the demand is far in excess of the supply, and the increase in yield alone by its use means an increase in receipts of many thousands of rupees each year. We have not yet solved here the problem of maintaining its purity when it gets out in the district, but

the matter is in hand and a way will probably be found before long.

So far as cotton is concerned, we have not yet been able to spread suitable improved types of cotton on a large scale in the Dholleras area of North Gujarat or in Broach. But we now have types ready (of which more later), and we are now doing large scale testing of them,—and also of still further improved types in Khandesh and in the Southern Maratha Country.

*Rice.*—Another crop in which improvement has now been made and is being introduced on a large scale is rice in the north Konkan. Last year we were for the first time able to spread a new type of “Kolamba” rice (No. 42) on 10,000 acres. This type gives an increased yield of twenty per cent. and has been so successful that the demand this year is more than we can supply. Our organisation limits us to being actually responsible for seed for this area, and we are as far as possible taking it into new places each year, leaving the people to keep their own seed for use. On 10,000 acres, it certainly means an increased return of Rs. 12 per acre, or over a lakh of rupees, and the automatic increase will rapidly multiply the return to many times this amount.

*Tobacco.*—I cannot help mentioning the case of tobacco, in which from selection begun in 1922 at Nadiad, we have succeeded already in isolating a type of high quality (for the Indian market) and high yield, the seed of which has been distributed on a large scale in Upper Gujarat this year. This will be maintained pure, and given out to the utmost of our resources, and means a very substantial addition to the agricultural returns of the Kaira and adjoining districts.

*Sugarcane.*—Any discussion of improvement of crops cannot leave out a consideration of sugarcane, where much has already been done and more is in immediate prospect. Indigenous cane has almost disappeared from the Konkan in favour of “Red Mauritius” introduced by the Agricultural Department with its better yield and more vigorous growth. In the Deccan Canal areas, the local “Pundia” is an excellent cane,—but some of the new types are in demand at least for special conditions, and we shall soon be faced with the necessity of organising a large scale supply of the seed of a number of new or introduced varieties which we have in hand.

*Improved tillage.*—The improvement of seed is one way of increasing agricultural yields. Others consist in better tillage



and better manuring. As to tillage, we have found and introduced improved implements in almost every region except perhaps Upper Gujarat, which has very special difficulties. In the black soil areas, iron ploughs of a pattern originally introduced by the Agricultural Department in about 1906 have covered the country, and are made locally on a very large scale by two firms in the Satara District, who now take most, though not the whole of the trade. It would be difficult to measure the value of this introduction, for it means better and more complete tillage, with substantially reduced drain so that the necessary equipment in cattle can be reduced. The cost has now been lowered to an amount within the reach of most substantial cultivators, and this with the organisation of implement societies, the pushing of these ploughs by Taluka Development Associations, and propaganda by the manufacturing firms themselves, is rapidly leading to the replacement of the old Deccan plough. More than 100,000 iron ploughs are now in use in the Bombay Deccan, I estimate,—and the introduction of ploughs means that other improved implements follow in their wake.

In other areas, the introduction of improved implements is slower, but in Sind, at any rate, is now proceeding very fast. The Egyptian and Sarkar ploughs are now in general use and manufactured by every blacksmith in the Jamrao tract,—and though in other parts of Sind they have been found to be only applicable to certain lands, yet for these they are going ahead. In the Jamrao tract it is estimated that the country plough has been replaced completely in the Mirpurkhas Taluka and in parts of the Sinjhoru and Digri Talukas, and to fifty per cent. or more in the remainder of the Digri and the whole of the Jamesabad Taluka.

*Ridge cultivation in Gujarat.*—The outstanding feature of the last year in the matter of tillage has been the introduction of ridge cultivation on a large scale in the Surat District. This method, which has consistently given 25 per cent. greater yield than cultivation on the flat under the special conditions of Lower Gujarat, has already extended to 1,200 acres, and there is keen interest in the matter, and great demand for help in constructing ridges and in laying out the land for the purpose. I anticipate a rapid development, as the method is applicable to several lakhs of acres, and must yield an increased return of between Rs. 10 and Rs. 20 per acre. A bulletin on this very great improvement is in the press, and a leaflet in Gujarati is under preparation. The credit for working out the method

from my original suggestions on the Surat Farm must go to Rao Saheb Bhimbhai M. Desai and Mr. K. B. Naik.

*Manuring.*—The other method of increasing crops is by manuring, but, in most cases, the introduction of concentrated manures is an uphill task. Except in sugarcane cultivation in the Deccan, high manuring is not usual in India, but now progress is being made. I may call attention to the gradual increase in the use of the richer oil cakes (groundnut and safflower) in the Deccan for sugarcane, and the more recent growth of the use of Sulphate of Ammonia as the most concentrated manure available for the same purpose. This last material has constantly proved itself the most effective top-dressing for sugarcane that we have, and it is now a regular Indian product. It has been pushed for the last five years, and every help has been given to firms which have taken up the matter. This year the consumption has gone to between two and three thousand tons, and it has now established itself,—resulting in a decreased cost and an increased return.

The use of concentrated manures for cotton (unless under irrigation) has been hitherto almost unknown, but as a result of intensive propaganda in East Khandesh, the use of Castor cake (200 to 300 pounds per acre) as a manure for cotton is becoming very popular and widespread. This is bound to grow, and seems to me the only way of bringing the yield of cotton lint in Khandesh (where it now is only about 100 lbs. per acre on the average) to a figure comparable with that in other countries. The opening for concentrated manures in this area is enormous, for in Khandesh alone the area under cotton in 1924-25 was about 14 lakhs of acres.

*Checking Pests and Diseases.*—To the sketch which has just been made of a few of the outstanding improvements of recent years, which have already come into use on a large enough scale to make a distinct increase to the value of the agricultural produce of the country, I have only to speak on one other type of work, which has now established itself definitely as a means of increasing production. This is the method of checking pests and diseases, and so preventing the spoilage of much that has been grown.

*Wild Pigs.*—Of the attack on the larger depredating animals, only that on wild pigs has become widespread. On the canal tracts in the Deccan where wild pigs are concentrated in limited areas, the use of hunting parties has proved itself effective, and the Agricultural Department now maintains

parties which go where they are wanted, their expenses being paid in any area, to the extent of one half by the cultivators themselves. These have been quite successful in the past year, and the wild pig is not now a present serious menace in these tracts, though they would easily again become so, if they were allowed to multiply. In the south of the Bombay Presidency, in the neighbourhood of the Kanara jungles, where such methods can hardly give much permanent relief, the method recommended by the Wild Animals' Enquiry Committee of building walls or putting up pig proof fences round large areas (even up to the whole area of a village) is being now widely adopted,—and about ten villages have either partly or wholly enclosed themselves. The result has been very satisfactory, the night watching of the crops is no longer necessary, the value of the land in the enclosed area has gone up in most cases, and there is,—in bad tracts like the Mundgod peta,—a strong demand for much extension of the method. And I look forward to the time when most villages in this area will be protected against the pest. When the enormous loss due to wild pigs is considered anything which acts even as a partial check on their depredation cannot but be regarded as being of very great value.

*Smut Disease of Jowar.*—Of other crop enemies, the fight against the smut disease in *jowar* by means of seed treatment with copper sulphate is now carried on on a very large scale, material to treat seed for nearly 350,000 acres being distributed last year,—most largely in the Southern Division. This means a saving of crop value of eight to ten lakhs of rupees. A much larger area is being dealt with in the present year, and I hope that this method (designed to save a loss of over 5 per cent. of the total crop) will soon enter into the ordinary agricultural practices of cultivators of *jowar*.

*Mildew of Grapes and Koleroga of Betel Palms.*—I may refer to two other remedies for crop diseases which have now entered into the ordinary practice of the cultivators on a fairly large scale. The crops involved, grapes and betel-nut—are not large in area, but they are very valuable. In the first case the adoption of spraying with Bordeaux mixture as a remedy for mildew has raised a dying industry in the Deccan to a very flourishing position, and nobody would think now-a-days growing grapes without using the method. The second case the treatment of the *Koleroga* disease in the Kanara gardens by spraying with the same mixture is becoming more and more widespread every year. The people recognise

its effectiveness, and are now buying spraying machines to a considerable extent. There are many other diseases which we are able now to deal by practical methods, most notably perhaps the *tambera* disease of potatoes and chillies, but the progress is slower, and it will be a year or two more before it can be said that these methods have entered into general practice.

#### SOME IMPROVEMENTS NOW UNDER INVESTIGATION OR TO BE INTRODUCED.

In this brief and very partial sketch I have only dealt with such things as have been discovered by the agency of the Agricultural Department and which have more or less entered into general practice. Now I want to consider those matters which are still under investigation or development, but which have promise of future importance in a similar way.

First let us consider as before the improvement of the crops grown by improvement of the seed, and let us take the important crops one by one.

*Cotton.*—In four regions we have new types of cotton which have been developed, which we are satisfied represent an improvement, or a still further improvement on what we have issued so far, and these are now being multiplied for distribution. In the Broach area of Gujarat, north of the Narbada, there is need of a type of cotton with a Surat staple, but with a ginning percentage of about 38 per cent. After many years of effort our cotton breeders at Surat (Mr. M. L. Patel) has now got such a type from the progeny of a definite cross made in 1919, and it is being multiplied for distribution. I am hoping that this type will ultimately cover the whole of the Broach tract as our selection "1027ALF" is extending over the whole of Lower Gujarat, south of the Narbada.

In the Dholleras tract, we have two selections from *Wagad* cotton which represent the best staple of that cotton, with a high yielding power and ginning percentage. These will spread very widely as soon as we can multiply them sufficiently. The problem of multiplication in Upper Gujarat presents great difficulties, which have not yet been entirely solved.

In the Kumpta cotton tract, where the cotton though good has an extremely small ginning percentage, the Cotton Breeder in Dharwar (Mr. G. L. Kottur) has succeeded in obtaining from the progeny of a definite cross made in 1918, a type with the Kumpta staple, but with a very much higher ginning percentage and a much better colour. This is being

multiplied at Gokak, and I am hoping to make this a centre of a very important improvement.

In addition to these, the Cotton Breeder in Khandesh, (Mr. S. H. Prayag) has isolated several types of cotton which have very great promise in that region, giving a much better cotton than the best now grown in Khandesh (N. R.), but with equal ginning percentage and yield. This requires mere testing, but next year I hope to be able to speak definitely.

These do not represent the limit of improvement, for our breeders are working with success in obtaining wilt resistant types of cotton in the south, and in the same area in obtaining from a definite cross a much higher staple American cotton than has been hitherto grown capable of growing healthily in the tract. This last piece of investigation is being financed by the Indian Central Cotton Committee to whom our best thanks are due. In Gujarat, any increase in staple beyond what we have reached seems only obtainable by crosses with American cottons. Such crosses present great difficulties, but we are confident of being able to solve them in the near future. In Sind, the whole question of cotton improvement is determined by the fact that with the advent of the Sukkur Barrage water, a very high class American cotton ought to be producible on a large scale, and attempts to find such a type is the basis of most of the work.

*Rice.*—Next to cotton, more work is now in progress on rice than on any other crop. In Sind at Larkhana, in South Konkan at Ratnagiri, in the Karnatak near Dharwar, our breeders are at work, producing types of rice which will give much higher yields without sacrifice of quality. The work is slow, and has only been in progress for three years, but we think that we have found a type suitable for large areas near Ratnagiri—and also a kind of rice at Larkhana in Sind which has great promise for that area. Our standard is an increase of at least 20 per cent. in yield over the rice now usually grown, and we hope to obtain this in several cases. At Karjat in the North Konkan, as already stated, we are now distributing rice seed of this standard of improvement.

*Jowar.*—Little has been said on previous occasions about the very important selection work on our premier cereal crop, *jowar*. But very promising results are being obtained both at Surat and Dharwar, and it seems certain that we have now pure types in hand yielding from 15 to 20 per cent. more grain per acre than is obtainable from the seed usually used. We have gone far enough at Surat, to put out seed, provisionally

on a large scale this year. If it stands the test, we shall have seed for wide distribution in 1926, and it will be a matter of organising the maintenance of a pure supply.

*Nachani.*—The main crop of the uplands of the Konkan and the Western Ghats is *nachani* or *ragi* (*Elensine corosana*) which seems very susceptible to improvement. Working at a special experimental station in the uplands near Ratnagiri, we seem now to have isolated types which, as in other cases, yield constantly from 20 to 30 per cent. more than the ordinary seeds now in cultivation. I hope to be able to announce in next year's report that types have stood the test and are ready for distribution.

*Wheat.*—The work on further improvements of wheat is somewhat halting at present, but I may say that in Sind some of the selections from local varieties seem to be what we have been on the lookout for, for use in the *bosi* area. If they stand the test in the present season we shall be able to multiply these for distribution. In Gujarat and the Deccan, I am not satisfied that we have got anything yet which is a great improvement on the Pusa wheats, or on those already locally grown, but the Crop Botanist (Mr. R. K. Bhide), is sanguine that some of the types isolated will fill the requirements.

Such are the research schemes in hand for the improvement of crops by seed selection and breeding. Other schemes for the improvement of crops, some of which are provided for by money provided by the Indian Central Cotton Committee, and by the Sir Sassoon David Trustees are as follows:—

1. *Study of Cotton Boll Shedding at Surat.*—It may not be generally known that over eighty per cent. of the buds formed on cotton plants in Gujarat fall before bolls are produced. The financial loss thus involved is enormous, and the Indian Central Cotton Committee has made a grant of Rs. 25,000 a year for five years to study the question, and to try and reduce the loss. Two years are already passed, and we have succeeded in narrowing down the problem. I feel sanguine that in the coming year we shall get on the track of a method of minimising the loss.

2. *Study of Cotton Boll Worm at Surat.*—The loss due to the Spotted Boll Worm in cotton all over the growing districts is very great indeed. It occurs every year and everywhere, though it is worse in some years and in some districts than in others. The study of this insect with a view to the checking of the damage has been subsidised by the Indian Central Cotton

Committee to the extent of Rs. 15,000 a year. The results of the study in the last two years seem to have shown that the most promising line of attack is the encouragement of parasites of the insects, and work with these is vigorously being carried on. The position is promising, and even a partial stoppage of the pest will be of very great money value to the community.

3. *Study on Cotton Wilt at Dharwar.*—It seems certain that the cotton wilt disease, which kills plants in patches all over the cotton fields is increasing in the Dharwar district, while it is very serious in parts of Gujarat and Khandesh. An investigation of this disease has been subsidised by the Indian Central Cotton Committee at Dharwar,—an amount of Rs. 25,000 having been granted for this investigation, together with that for the improvement of Dharwar American Cotton previously referred to. Very promising results are being obtained. Types of *Kumpta* cotton have been bred which seem almost immune to the wilt disease, and another year will enable us to judge as to whether we are in a way to solve the problem.

4. *Study of weeds, especially the Lavala weed (Cyperus rotundus) and its eradication.*—This investigation financed, to the extent of Rs. 15,000 in three years, by the Sir Sassoon David Trustees has resulted in very marked success. The *Lavala* weed, easily the worst weed of cultivation in Western India, has been studied, and practical methods for its eradication worked out. The scientific results have been published, and the methods are now being experimented with on a large scale.

5. *The Improvement of Grass Lands.*—There are millions of acres of very poor grass land in the Deccan and other parts of the Bombay Presidency which could probably produce far more fodder than is now the case. The methods by which this can be done especially under the conditions prevailing in the Deccan are the subject of the present investigation, which has been subsidised to the extent of Rs. 20,000 by the Sir Sassoon David Trustees. The results so far are valuable. In certain cases such grass lands can be improved by reseeded and the best seed for this has been worked out. In most cases, however, a system of grazing lands by rotation seems the most likely method,—and this matter has now got to the stage of large scale tests. The results to date in both the directions mentioned have been published and are available.

6. *The Improvement of the Potato Crop in Poona and elsewhere.*—This crop though small in area is exceedingly valuable, and has peculiar difficulties in a hot country like India. Diseases abound, and storage is very difficult,—and we are again indebted to the Sir Sassoon David Trustees for financing the investigation of these difficulties to the extent of Rs. 20,000. The results have been of great importance. The potato moth, the great enemy of storage is now shown to be capable of control. The ring disease which almost ruined potato cultivation in the war can now be kept in check. The *tambera* disease, the greatest enemy of *kharif* potatoes can be easily held under control by cheap dusting with sulphur. The problem of storage of seed potatoes, is not yet, however, really solved,—but we are on our way to a solution. A bulletin on the results of these investigations has been published in the last year, and is available.

7. *The Improvement of the Bajri Crop.*—*Bajri* is the most important *kharif* cereal crop of the poorer lands in the famine districts, and the development of a drought resisting, high yielding type has been the aim of this investigation. It has been financed by the Sir Sassoon David Trustees to the extent of Rs. 20,000. The improvement of the *bajri* crop is faced with peculiar difficulties owing to the extensive cross-fertilisation which always takes place, and also owing to the fact that the crop has never been previously studied. Promising results have, however, already been maintained, but several more years are needed before it will be possible to issue an improved type of seed which really meets the conditions of the famine areas.

8. *The Checking of the Jowar Stem Borer.*—This pest attacking our premier cereal crop is being studied at Surat, again under subsidy from the Sir Sassoon David Trustees. The work is difficult but it has been shown that the methods of attack of greatest promise are those which deal with the hibernating insect in the *Jowar* stubbles and in the *Jowar* straw or *kadbi*. In the former, ploughing up soon after the reaping of the crop kills most of the pests : in the latter, the shredding or even the chaffing of the *kadbi* would get rid of most of the insects, but is not always feasible. Work is going on, and I am sanguine of valuable results in the near future.

9. *The Katta Disease of Cardamoms in Kanara.*—This disease which threatens to destroy cardamom cultivation in Kanara has been traced to its source, and the cause has been clearly made out. It is caused by a protozoae parasite in the soil which can easily be destroyed. Where we are stuck now,



is now to prevent re-infection. This inquiry has been financed by the Sir Sassoon David Trustees to the extent of Rs. 7,000.

These are just a few of the more important investigations in hand or just completed for crop improvement. There are others which demand much time and energy, details of which will be found in the reports of the various Deputy Directors of Agriculture, and of the Economic Botanist to Government. I might, however, mention the work which has been planned on the difficulties of mango cultivation in the Konkan, and towards the cost of which a substantial grant (Rs. 5,000) has been received from the Sir Sassoon David Trustees. This will be actively taken up before the end of 1925.

In looking over the above list of investigations in hand it will be seen to what a very great extent we are indebted to the Indian Central Cotton Committee, and the Sir Sassoon David Trustees for the financing of investigations which are eminently necessary, but which could not otherwise be undertaken, and I think the thanks of Government are due to the bodies in question for the very large assistance given in this direction.

*Investigations on Tillage and on Implements.*—Perhaps one of the most important lines of improvement in agricultural practices relates to the use of implements. Almost the first big success achieved by the Agricultural Department was the introduction, a generation ago, of iron sugar cane mills, and the second was the introduction and extension of the use of improved ploughs in several parts of the Bombay Presidency and much can be done further in the same direction, though with more difficulty. Recognising this the Agricultural Engineer has been instructed by Government to devote his time chiefly to the work of designing implements to meet some of our special needs. Two results of his efforts during the present year seem to have reached a practical stage,—namely a cheaper modification of the Orient plough suitable for Sind, and a modified plough share for the iron plough now so common in our black soil areas. These are being tested on a field scale.—A number of other implements for which there is a demand are being worked upon, of which a list is given in the Agricultural Engineer's report. I may note here the close co-operation which is being given by the two large factories of agricultural implements in the Satara district—Messrs. Kirloskar Bros. of Kirloskarwadi and Messrs. The Satara Industrial Works at Satara Road,—in the development and introduction of improvements in implements.

In connection with the improvement of implements in use, I must refer to the important introduction of several ridgers and other instruments in connection with the development of ridge cultivation in the Surat District. So far those we have used have been of American Manufacture, but as the demand increases they will be made here, and we are already testing several such implements made by Messrs. Kirloskar Bros.

A very important piece of work has been recently undertaken by the Professor of Agriculture on the most economical implements needed to get the best results in water conservation in our uncertain tracts. The first year of this work was 1924 and the results are only preliminary, but in this matter we are again indebted to a substantial subsidy from the Sir Sassoon David Trustees.

Some notice will be expected in the present report as to experiments in the use of motor tractors in land cultivation. I may say that we have six such motor belonging to the Agricultural Department. Some are of old pattern, but a new "Case" tractor for use in Lower Gujarat has been purchased during the year. The present position is that there seems no evidence that tractor cultivation is cheap, but it *does* enable the necessary ploughing to be done quickly, and it can be carried out at a time of year when the ground is too hard for bullocks to work. Tractors enable, too, deeper cultivation to be made than would be possible otherwise, and they will probably have great use in ridge cultivation in the black soils of Lower Gujarat. They cannot be used on black cotton soil which is at all moist. In any case the depreciation is enormous, and the point for a purchaser to consider is not only the work that can be done in the first year, but what the machine will do in the second and third year and what its value will be at the end of the latter time when it must usually be scrapped, as an economical implement. These tractors have now reached a very high state of perfection, but we hesitate to recommend them except for special purposes,—and much more experiment under our conditions is still required before we can judge the position they are likely to take in farming in the Bombay Presidency in the future.

*Manuring.*—I have already referred to the successful development of the use of Sulphate of Ammonia as a manure for sugarcane and of oilcake as a manure for cotton in Khandesh. Both of these have now entered into general practice. More recent successful results are with the use of bone meal for rice

on the red soils of the Konkan, and the use of mixed concentrated manures in the irrigated tracts of the Deccan. But work with artificial manures is a slow business. The materials are relatively expensive, and except for irrigated tracts and those in which the rainfall is very secure, it is hardly safe to recommend their use. And the benefit derived from phosphatic and potash manures is usually very small, as compared with that noticed in temperate countries, even when they are combined with nitrogenous fertilisers. Experiments are continually being conducted, and we are indebted to various firms in India, England, and America for supplies of manures for experiments on our crops, and in particular for quantities of Sulphate of ammonia, Nitrate of soda, and Ammonium phosphate.

*Cultivation under Drought Conditions.*—One of the main problems, continually before us, is how to secure as good a crop as possible under the very precarious conditions prevailing in many parts of the Deccan and Gujarat,—which includes perhaps the most famine stricken parts of India. Experiments are being made on this problem in several directions. One of these,—the discovery or development of drought resistant varieties of staple food crops has been already referred to. Beyond this, the Soil Physicist is approaching the matter from another point of view,—and is trying to find a method of increasing the retentive capacity of the soil for moisture, and to apply to the Deccan methods of preventing evaporation from the soil. Both these methods promise to be of value. A very considerable increase in the retentive capacity of the soil has been obtained by green manuring and Mr. Tamhane is now hard at work to find the most practical methods of application of the principle. And in the other direction, the system of retaining moisture by thorough preparation of the land and repeated surface interculture of the crops has been found applicable on the black soil of the Deccan and to give in the best cases 30 to 40 per cent. over the average yield of surrounding areas in 1924. The work has, in fact, gone far enough to make me look forward to large scale propaganda in 1926, if the results of the present year (1925) confirm the results already obtained.

*Sind Experimental Scheme.*—At this point I may refer to the proposals—which are as yet only proposals—for the undertaking of an extensive scheme of experiments, in Sind, in connection with the best utilisation of the many lakhs of acres which will come under perennial flow irrigation on the completion of the Sukkur barrage. The importance of the matter is obvious,

and a committee presided over by the Commissioner in Sind proposed in 1924 that such experimental work should be undertaken at once. A good deal of time has been taken by the Agricultural Department in working out details of this scheme. Government have approved these, and it is intended that the actual work should be undertaken in 1925-26.

*Live Stock Improvement.*—The work of the Agricultural Department in the direction of cattle improvement consists in the maintenance of herds of cattle of high quality at Karachi (Red Karachi breed, with some Thar and Parkar Cattle), at Chharodi in Upper Gujarat and at Surat (*Kankrej* breed), and at Bankapur in Dharwar (Amirit Mahal breed),—in assisting other bodies to maintain high class herds of cattle, and in putting out premium bulls among the villages of the Bombay Presidency. In the matter of assisting private associations and other bodies who maintain herds of good cattle, I may refer on the one hand to the good work done by the Shirpur Taluka Agricultural Association in Khandesh, who have in the past few years built up an excellent herd of Tapti Khillari cattle, from which bulls of good quality are obtainable. The question of taking over this work and this herd on behalf of Government is now being considered. On the other hand, I must refer to the way in which the Gowrakshaks and other societies for cattle protection have come forward recently to offer their facilities for cattle improvement. Arrangements have been made with Gowrakshaks at Kandivli and Mulund, whereby they maintain herds of pure Gir cattle, the young bulls from which will be put out as premium animals,—the pay of the Manager being borne by Government. The whole scheme was formally launched in the year under report, and promises to serve a very useful purpose.

The other method of live stock improvement is by the putting out of bulls of pedigree stock or of high quality without a definite pedigree, in villages where they stand to serve the surrounding cattle, a record of service being kept, and the support of the bull being, at least partially, paid for by Government. The actual premium bulls now standing for service under this scheme is as follows:—Gujarat 31, Deccan 18, Karnatak 10, and Sind 4. The effect of such premium bulls on the cattle in an area is remarkable, and is so obvious that the demand for premium bulls is rapidly increasing.

#### PROPAGANDA AND ORGANISATION.

The discovery of improvements is a very small step in the greater part of Western India to getting them introduced.

But the first part of this report shows how this introduction can be and is being brought about in very many cases. The Agricultural Department has its officers in every district whose business it is to secure this introduction, and the number of these has been substantially increased during the year under report. Further in a number of cases, we have now got the very powerful co-operation of the officials of the Revenue Department for the introductions of certain improvements. The extension of the use of copper sulphate as a remedy for smut in jowar in the year under report has been largely the result of their activity.

Again, reliance is now being placed on the enthusiasm of local bodies, the Taluka Development Associations subsidised by Government, to get many improvements adopted and their activities have been very widely effective during the last year. There are now 48 Taluka Development Associations in the Bombay Presidency, and they have, all together, received a Government subsidy of Rs. 24,312. They have been very actively engaged in extending the use of improved implements of many kinds, of improved seed of cotton, wheat and other produce and of methods for the prevention of smut in *jowar* and of other diseases. They have organised shows,—have pushed the formation of co-operative societies for the sale of produce or the purchase of seed, and in one case at least have arranged an admirable system of fodder storage. And, generally, these associations, the first of which was only founded in 1922, have become a very essential part of agricultural propaganda in the country.

In the matter of rural organisation the Agricultural Department works in close co-ordination with the Co-operative Department, as it is the recognised policy that wherever possible any attempt to organise the rural community should be on co-operative lines. Hence the matter of the development of co-operation for the purchase of agricultural requisites or for the sale of agricultural product has a peculiar interest and every district officer of the Agricultural Department may in some sort be looked upon as a Co-operative organiser. The co-ordination between the work of the two departments—Agricultural and Co-operative—is secured by the fact of its being directed in each part of the Bombay Presidency by Divisional Boards of Agriculture predominantly non-official,—which meet once a quarter and control the propaganda and organising work of both departments in the various districts. The gentlemen who are on these Divisional Boards have worked

with enthusiasm and, in many cases, with considerable success and the thanks of Government are, I think, due to them for their disinterested work.

The results of the efforts of all concerned in the matter of co-operative purchase of agricultural requisites has not been great. A few societies exist for the co-operative supply of concentrated manures, seeds and the like, but they do not so far seem to have met much of a realised need. On the other hand it may now be said that societies for the supply of implements of all kinds on hire are an established success in many areas. One of the secrets of their recent success (as against much earlier failure) has been their organisation on a large enough scale to ensure business management.

On the other hand in the matter of co-operative sale of produce, great things have been accomplished and there has been much extension in the year under report. The co-operative cotton sale societies at Hubli and Gadag, existing primarily for the sale of improved cotton derived from seed provided by the Agricultural Department are a monument of what can be done in the co-operative organisation of sale. Their work has extended during the present year, and they have become not only sellers of produce but also growers on a large scale and distributors of improved seed. The organisation for cotton sale in Gujarat is not so advanced, and the societies there simply arrange for the ginning and sale of their members' produce in common, and reserve the seed for further distribution,—but they have much developed in 1924-25. The recent attempts at co-operative sale of *gul* in the Mutha Canal area seems to have become an established success in 1924, and this is an advance on the semi-co-operative method which has been in use in the Nira, Godavari, and Pravara Canal areas for some years, where a branch of the Bombay Central Co-operative Bank has advanced money and supplied manure to local co-operative credit societies, and sold produce on their behalf.

The development of co-operative sale of produce and other farms of non-credit co-operation is bound to be slow. There have been many failures in the past, and these (as is noted by the Deputy Director of Agriculture, N. C. D., as regards the Nasik district) increase the difficulty. But I feel that we are gradually working on to lines which promise success, and I anticipate a large, if slow, growth of this form of organisation.

I might perhaps refer to the very interesting experiment in co-operative fodder storage by the Taluka Development

Association at Athni in the Belgaum District which is, in part at least, a serious famine tract. The matter has only been taken up during the last year, and I reserve a more complete account for next year's report.

*Cotton Transport Act.*—The working of the Cotton Transport Act during the year under report has not been without difficulty, but has been on the whole a considerable success. In the southern areas, it has completely stopped the mixing of the good cotton at Hubli and Gadag with inferior Khandesh and Persian Cotton, and this is a great advance. I was able to meet the difficulties of the Gadag merchants regarding the traffic in good quality cotton from the adjoining areas in the Nizam's Dominions and Madras to the Gadag Market, and the arrangements have worked well and without friction.

In Gujarat, the difficulties have been greater, but at least the Act has secured that inferior cotton from north of the Narbada cannot now be brought into the Surat area for mixing,—and I hope very soon that the whole of the area south of that river will be growing only one type of cotton. If this can be secured it will certainly lead to a higher reputation for this cotton, and dealing in it with more confidence than hitherto.

*Rural organisation.*—As regards the general question of rural organisation, little progress has been made or attempted. The present situation in the rural areas is admittedly unsatisfactory,—the land is not producing what it might easily produce,—the labour involved in growing what is now obtained is unnecessarily large,—and yet, there is an enormous amount of spare time to the workers who are compelled to remain in the villages. In attempting to consider the rural reconstruction required it is not one man or one department that is concerned. It involves the consolidation of holdings, the communal or co-operative holding of implements which are beyond the power of individual peasant cultivators, and the development of secondary occupations. The necessity is beginning to be realised, and this is the first step towards that reconstruction which is needed, as a complement to the technical improvement, and the consequent possible increase in produce to which we are now in so many cases able to indicate the road.

#### SERVICE.

Apart from research and propaganda, there are certain services which the Agricultural Department performs for the agricultural public, the chief being the supply of certain kinds of seed in large quantities and of implements and manures

in certain cases, the boring of wells and the designing of pumping plants, and in recent years the designing of land improvement works for construction by individuals or by co-operative societies.

*Supply of seed and Implements.*—The supply of seed has been part of the work for the improvement of cotton in Surat, in the Southern Maratha Country and in Sind. In all these cases seed is produced under the Department's own control for a limited area, and this is multiplied either by the Department itself or by a Co-operative Society with the assistance of the staff. The most elaborate organisation for cotton seed distribution is in Lower Gujarat where in the year under report the quantity dealt with was 2,164,600 pounds of seed. This was distributed in the Surat, Broach and Ahmedabad districts, in the Baroda and Rajpipla States, and in certain talukas in West Khandesh while a small quantity was supplied to the Southern Maratha Country. The actual multiplication and distribution of cotton seed in the Southern Maratha Country, beyond the amount needed to grow about 5,000 acres each of improved Kumpta cotton and of improved American cotton, is in the hands of the Co-operative Cotton Sale Societies at Hubli and Gadag respectively and they do it exceedingly well. In Sind the Department runs a small Zemindari at Chellaro on the Jamrao Canal, essentially for the production of pure cotton seed of the best *deshi* type, and 120,000 pounds of seed were produced in 1924. These were placed in the hands of cultivators in the Hyderabad and Thar-Parkar Districts,—and the zemindary gave a profit of Rs. 12,560 for the year.

We have had to undertake the production and distribution of rice seed on a large scale in the North Konkan, as we have guaranteed to give out improved seed for 10,000 acres each year and this will be continued until we can get a co-operative organisation or a private person to undertake it. As new seeds are produced these works will have, probably to become, more extensive, but we shall always be very glad when we can get reliable people or societies to take this work off our hands.

As regards implements, the position of the Agricultural Department has been that the provision of implement depots under its control has been a stage in their introduction, and that such depots should be transferred to the control of local bodies of some sort, preferably co-operative implement societies or taluka development associations. This process of transfer



is going on generally now and the Department's direct work consequently becoming somewhat less important.

*Boring.*—Boring for underground water is now recognised as a means in some areas of increasing the water available in wells, and in others as a means of finding water where the digging of wells is under other circumstances a very risky undertaking. Hence during the year under report a very large extension of the activities of the Agricultural Department in connection with boring has been under consideration, and a portion of the scheme actually undertaken. The boring machines in the possession of the Agricultural Department were as follows at the beginning of the year under report and on April 1st, 1925, including two which have been lent to the Kaira District Local Board.

	April 1, 1924.	April 1, 1925.
Power boring machines (to 200 feet) ..	9	15
Hand boring machines (to 200 feet) ..	20	14
Exploratory boring machines (to 60 feet) ..	8	30

Since April 1st, 1925, orders have been issued for the further purchase of 16 power boring machines, and the conversion of practically the whole of the hand boring machines capable of going to a depth of 200 feet, to power. Further fifteen more exploratory boring machines are to be obtained, and we may take it that very shortly our boring capacity will be increased three or four times. The organisation of boring in the famine districts has been largely changed also, and the sites, in future, will to a considerable extent be selected by the Collectors of districts, and we shall simply carry out their orders.

The actual number of bores made during the year under report were as follows, and details of each will be found in an appendix.

Division.	Total bores.	Successful bores.	Unsuccessful bores.	Bores in progress.
1. Gujarat .. .. .	28	17	11	..
2. North Central Division .. .. .	16	8	7	1
3. South Central Division .. .. .	56	39	14	3
4. Southern Division .. .. .	42	28	11	3
5. Konkan .. .. .	26	16	6	4
6. Sind .. .. .	..	..	..	..
*7. Famine Boring Scheme .. .. .	20	2	15	3

\* These bores were made on indications by Major C. A. Pogson, and the test of success as in other cases with rock bores, was the pumping of 200 gallons of water from the bore per hour.

The proportion of success is not as high as usual, but is probably as high as can be expected. The rates charged for boring have been materially reduced during the year under report, and now stand at Re. 1 per foot, for borings to 50 feet and Re. 1-8-0 per foot for depths of over 50 feet, together with the carting of the machines and the supply of labour (and kerosene in the case of power bores) and fuel required for working the boring machine.

*Land Improvement.*—The loss which annually occurs owing to the run-off from the surface of the water which falls in our famine districts is very great indeed, and there have always been efforts by almost every energetic cultivator to prevent these losses, and to provide irrigation from tanks formed by such run-off water, or to embank valleys so as to increase the water in wells lying below the bund,—or to protect land by terraces or bunds across the surface. Technical skill is not always present, and to meet the need for this two men have been appointed. The first is an engineer whom we call a Land Development Officer whose duty is to prepare small schemes belonging to each of the above kinds. To show the demand for his services I may say that during the year under report,—first year of the appointment, no less than fifty-two schemes were placed before him for investigation. Of these the Poona district was responsible for 9, Sholapur for 18, Satara for 4, Ahmednagar, Khandesh and Nasik for 7, the Karnatak for 7, the Konkan with Kanara for 6 and Gujarat for 1. Of the schemes no less than 21 were for diverting streams for irrigation purposes, 8 were for storage reservoirs, and 12 were for help in making field embankments. The remainder were for miscellaneous purposes. The appointment promises to be of very great value, more particularly for the smaller type of work, and for those which deal with land protection rather than for irrigation schemes as such.

We have also a special man engaged in the Southern Division, who devotes himself entirely to the preparation of schemes for field embankments or *tals*, in this part of the Presidency. In the year under report he prepared plans for twenty new schemes of this character, chiefly in the Gadag taluka of Dharwar (eleven schemes) and in the Athni taluka of Belgaum. Most of these are for private owners, but co-operative bunding societies are being attempted. The whole work is attracting a good deal of interest and attention and the applications for the services of the bunding officer are far more than can be attended to. There seems a great opening for the extension

of work of this character, in areas where water is the most precious commodity a farmer possesses.

#### AGRICULTURAL EDUCATION.

*Agricultural College.*—The Poona Agricultural College has now entered on its seventeenth year, and it is as popular as ever. This year there are 85 new students, which is as much as the college can deal with. The total number now in the college is 184. The demand for admission from all parts of India and from many places outside continues, and now the question has arisen as to how far we can continue to accommodate students from outside until all applicants from Bombay have been admitted.

Dr. Burns remained as Principal of the College until May 1925, and on re-opening in June, Rao Bahadur P. C. Patil was appointed to act as head of the College. Various other minor changes in the staff took place details of which will be found in the Principal's Report (Appendix B).

A new professorship at the College,—that of Agricultural Economics has been established during this year and Rao Bahadur P. C. Patil has been appointed to it.

The results of the University Examinations in agriculture were fairly good in the degree examination where out of sixty-four candidates who appeared fifty-nine passed. In the intermediate examination the results were not nearly so satisfactory, for only thirty-six students passed out of a class of sixty-one, five passing in the first class.

During the year the Bombay University has considered, in response to many representations, the revision of the agricultural course at the College, and has finally approved of a draft syllabus recommended by a committee appointed to consider the matter. The main features of the new course are the increased importance assigned to agricultural engineering, the stress laid on agricultural economics, and the reduced amount of specialisation allowed to the students. I think it is an improvement,—and that with this as a guide the college will take a still higher position than hitherto among educational institutions of this type in India and the East.

*Agricultural Schools.*—The number of vernacular agricultural schools working remains six, as before. These are as follows, with the number of students in each:—

Marathi ..	{ Loni (Poona) 42
	{ Jambul (Thana) 22
	{ Dulia (West Khandesh) 22

Kanarese	..	Devi-Hosur (Dharwar) 26
Gujarat	..	{ Godhra 31
		{ Surat 26

These remain popular and all receive a certain amount of support from District Local Boards, and some from private bodies. The boys leaving them are in demand, and either go to their own farms or are snapped up by others who need lads with such training as we can give. During the year we have been approached to assist in the establishment of an agricultural school at Kopargaon to be conducted by the Ahmednagar District Local Board. An offer has been made by Government to hand over a large part of the buildings on our farm there for the purpose of the school, and this offer is now under consideration.

*Agricultural Bias Schools.*—The new type of primary schools with an agricultural bias, first established in 1922 has been extended during the year, and we have as a temporary arrangement, continued to train a limited number of teachers to take charge of them, on behalf of the Education Department, at most of our agricultural schools. We also, through the Inspector of Agricultural Schools, inspect the technical work done in these schools. The results so far obtained seem satisfactory, the schools are becoming popular, and there seems a very strong feeling in many District Local Boards and elsewhere to extend their number as fast as teachers trained to the work can be produced.

#### STATISTICS.

The Director of Agriculture is responsible for the agricultural and price statistics published in the Bombay Presidency, for the forecasts of crops issued periodically during the year, and for the preparation of the Statistical Atlas which should be brought out once in ten years. With regard to forecasts I may say that those issued are increased in number, as forecasts of three new crops have been introduced in recent years. Forecasts for the *bajri* crop, and for both the *kharif* and *rabi jowar* crops were first issued three years ago, and in 1924 for the first time a forecast of the castor crop was brought out, at the request of a number of commercial firms in Bombay.

As regards the Statistical Atlas, this will definitely be issued in November 1925, being based chiefly on the data for 1922-23. The work of compiling it was practically complete in April 1924, but the printing has taken long. It will be of great advantage to have a more up-to-date account of each district (and each taluka) in the Bombay Presidency, for the last edition

of the Statistical Atlas, published in 1906, is based on figures for the years 1903-04.

#### PUBLICATIONS.

The following publications, representative of the research activities, and, in part, representative of the propaganda activities of the Agricultural Department have been issued during the year.

##### *Memoirs.*

The Eradication of *Cyperus rotandus*. A study in pure and applied botany by Dr. W. Burns and Mr. S. B. Ranade. Published by the Pusa Research Institute.

##### *Bulletins.*

1. No. 116—Sugar Industry in Western India, and Methods of Sugar Manufacture by Mr. R. G. Padhye, B.Ag.
2. No. 117—Investigation on Fig Culture and Treatment by Messrs. G. S. Chema and S. R. Gandhi, B.Ag.
3. No. 118—Land Crabs as Agricultural Pests in Western India by Mr. P. V. Wagle, B.Ag.
4. No. 119—Year Book of the Agricultural Department in the Southern Division, 1924.
5. No. 120—Silage for Fodder in Western India by Mr. E. J. Bruen.
6. No. 121—Further Investigations in Potato Cultivation in Western India by Dr. H. H. Mann and Mr. W. V. Joshi, B.Ag.
7. No. 72—(Revised) Experiments with the Automatic Water Finder in the Trap Region of Western India by Mr. D. L. Sabasrabudhe, M.Sc., and Dr. H. H. Mann.

##### *Leaflets (with vernacular versions).*

1. No. 6 of 1924—Sugarcane.
2. No. 7 of 1924—Top-dressing cake manure to the Rice Crop in Belgaum.

#### FINANCE.

The expenditure of the Department amounted to Rs. 15,80,950 during the year 1924-25, as against Rs. 15,12,250 incurred in the previous year. The receipts amounted to Rs. 3,28,200 as against Rs. 3,39,000 in the previous year.

As regards the Personal Ledger Account, which is used for financing seed, etc., the total amount advanced amounted to Rs. 1,15,240, while the recoveries credited during the year were Rs. 1,65,125.

Subsidies were received from the Indian Central Cotton Committee, for the pieces of work mentioned in the report, to the amount of Rs. 54,431. And we were indebted to the Sir Sassoon David Trustees for Rs. 15,000 during the year.

#### ADMINISTRATION.

I was away from India from April to November 1924, during which time Mr. T. F. Main very efficiently carried on the duties of the Director of Agriculture. Shortly after Mr. Jenkins, Deputy Director of Agriculture, N. C. D., returned from leave and also Mr. W. M. Schutte came back from Europe. On my return Mr. Main went away on leave returning in May 1925 to the position of Deputy Director of Agriculture, S. C. D., and during 1925 we have lost, temporarily, on account of furlough, the services of Mr. E. J. Bruen, as Live Stock Expert (whose place is taken by Mr. H. G. Baluch), and Mr. G. S. Cheema as Horticulturist, for whom Mr. H. P. Paranjpye is acting.

During the year we have lost finally the services of Mr. T. Gilbert, who left us, on furlough, preliminary to retirement in September 1924. Mr. Gilbert will always be associated with the development of the operations of the Agricultural Department in the Southern Division where his organising power found full scope, and where the work he did will be long remembered. He had been connected with the Department since 1912, and had seen it grow from very small things to its present extent, and our thanks are due to him for his devotion to the work of agricultural improvement in Western India.

#### CONCLUSION.

I started this report by saying that I felt more hopeful than ever before that the purpose for which the Agricultural Department exists is being slowly but surely carried out. In the present report I have tried to illustrate the way in which efforts are being made and to show something of the results achieved. The spirit in which most of the staff of the Department are working, ensures, I think, success, and each year now ought to show a more and more rapid rate of progress.

HAROLD H. MANN,

Poona 23rd October 1925,

Director of Agriculture.

## APPENDIX A.

LIST OF TALUKA DEVELOPMENT ASSOCIATIONS ORGANIZED  
UP-TO-DATE.

According to the scheme laid down in Government Resolution No. 3378, dated 5th June 1922, Revenue Department, 48 Taluka Development Associations have been formed until now as shown below :—

*Gujarat Division.*

Surat District	..	..	..	..	1
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*Khandesh and Nasik Division.*

East Khandesh District	..	..	..	..	5
West do. do.	..	..	..	..	3
Nasik District	..	..	..	..	3

*South Central Division.*

Poona District	..	..	..	..	2
Sholapur do.	..	..	..	..	3
Satara do.	..	..	..	..	2

*Southern Division.*

Belgaum District	..	..	..	..	3
Bijapur do.	..	..	..	..	1
Dharwar do.	..	..	..	..	5

*Konkan Division.*

Kanara District	..	..	..	..	2
Ratnagiri do.	..	..	..	..	3
Kolaba do.	..	..	..	..	1
Thana do.	..	..	..	..	2

*Sind Division.*

Hyderabad District	..	..	..	..	3
Nawabshah do.	..	..	..	..	1
Larkana do.	..	..	..	..	2
Sukkur do.	..	..	..	..	2
Thar and Parkar do.	..	..	..	..	3
Karachi do.	..	..	..	..	1

Out of the 48 Associations 11 were formed in the year 1922-23 and 27 in the year 1923-24 in the talukas mentioned below :—

Year.	Taluka.	District.
1922-23	.. 1. Chorashi	.. Surat.
"	.. 2. Pachora	.. East Khandesh.
"	.. 3. Jalgaon	.. Do.
"	.. 4. Madha	.. Sholapur.
"	.. 5. Satara	.. Satara.
"	.. 6. Khed	.. Poona.
"	.. 7. Dharwar	.. Dharwar.
"	.. 8. Ron	.. Do.
"	.. 9. Gadag	.. Do.
"	.. 10. Chikodi	.. Belgaum.
"	.. 11. Athani	.. Do.
1923-24	1. Bhusaval	.. East Khandesh.
"	.. 2. Raver	.. Do.
"	.. 3. Dhulia	.. West Khandesh.
"	.. 4. Nandurbar	.. Do.
"	.. 5. Nasik	.. Nasik.
"	.. 6. Kadwa Canal Deve- lopment Association Ojhar Tambat (Ni- phad Taluka).	Do.
"	.. 7. Satana	.. Do.
"	.. 8. Sholapur*	.. Sholapur. *Ekruk Tank Bagayatdar Sungh.
"	.. 9. Walwa	.. Satara.
"	.. 10. Gokak	.. Belgaum.
"	.. 11. Indi	.. Bijapur.
"	.. 12. Mahim	.. Thana.
"	.. 13. Kalyan	.. Thana.
"	.. 14. Alibag	.. Kolaba.
"	.. 15. Dapoli	.. Ratnagiri.
"	.. 16. Ratnagiri	.. Do.
"	.. 17. Rajapur	.. Do.
"	.. 18. Sirsi	.. Kanara
"	.. 19. Karwar	.. Do.
"	.. 20. Hyderabad	.. Hyderabad, Sind.
"	.. 21. Hala	.. Do.
"	.. 22. Tando-Allahyar	.. Do.
"	.. 23. Shahdadpur	.. Nawabshah.
"	.. 24. Larkana	.. Larkana.
"	.. 25. Kambar	.. Do.
"	.. 26. Sukkur	.. Sukkur.
"	.. 27. Ghotki	.. Do.



The remaining ten Associations have been formed during the year 1924-25 in the following talukas :—

*East Khandesh District.*

1. Taluka Edlabad.

*West Khandesh District.*

2. Taluka Sindkheda.

*Poona District.*

3. Taluka Junnar.

*Sholapur District.*

4. Taluka Karmala.

*Dharwar District.*

5. Taluka Hirekerur.
6. Do. Hangal.

*Karachi District.*

7. Taluka Karachi.

*Thar and Parkar District.*

8. Taluka Jamesabad.
9. Do. Digri
10. Do. Mirpurkhas.

Subsidies amounting to Rs. 24,312 have been paid to 30 of the above Associations during the year 1924-25. Subsidies to the following Associations were not paid during the year :—

1. Edlabad.
2. Satana.
3. Madha.
4. Ekruk Tank Bagayatdar Sungh.
5. Satara.
6. Walwa.
7. Karmala.
8. Junnar.
9. Gokak.
10. Gadag.
11. Ron.

12. Alibag.
13. Ratnagiri.
14. Karwar.
15. Karachi.
16. Jamesabad.
17. Digri.
18. Mirpurkhas.

Out of the above 48 Associations, 43 have been registered under the Co-operative Societies Act and the following five are yet to be registered :—

1. Chorashi.
2. Pachora.
3. Satana.
4. Ekruk Tank (Sholapur).
5. Junnar.

## APPENDIX B.

*Summary of work done at the Poona Agricultural College  
for the year 1924-25.*

This is the seventeenth year of the existence of the College.

*Staff.*

Dr. W. Burns, D.Sc., the permanent principal was in charge of the College up to 30th April 1925. He went on six months' leave from 1st May 1925. Dr. Mann, D.Sc., the Director of Agriculture, held charge of the Principal's office till 4th June 1925 when I took charge of the post.

Mr. V. G. Gokhale, L.Ag., Acting Professor of Agriculture, reverted on 8th November 1924 to his post of Deputy Director of Agriculture, Konkan, on being relieved by Mr. B. S. Patel, B.Ag., N.D.D., N.D.A., permanent Professor of Agriculture.

In September 1924, Mr. M. N. Kamat, B.Ag., was appointed Acting Assistant Professor of Mycology. This post was vacant for nearly a year.

In the middle of November 1924 Mr. J. P. Trivedi, L.C.E., had an accident and went on privilege leave for one month. Later on in March 1925 he went on privilege leave again for one month and twenty two days. On both these occasions Mr. A. A. Vasavada, B.Ag., acted as Assistant Professor of Physics and Mathematics.

Mr. H. G. Baluch, B.Ag., Assistant Professor of Dairying, deputed to Bangalore for higher training in dairying was on his return appointed acting Live Stock Expert to Government, from the middle of January 1925. Mr. M. M. Desai, B.Ag., continued to act as Assistant Professor of Dairying.

A chair of the Professor of Agricultural Economics was created from 1st June 1925 and Rao Bahadur P. C. Patil, L.Ag., M. Sc. (Wis.), has been appointed to the Post.

Mr. T. N. Jhaveri, L.Ag., was on leave during vacation. This did not interfere with the teaching.

*Optionals.*

The Senior B.Ag. students elected optionals as follows:—

(a) Agricultural Economics, Land Development and intensive farming .. .. .	No. 20
(b) Advanced Botany .. .. .	10
(c) Advanced Chemistry .. .. .	4
(d) Stock breeding, feeding and management including Dairying .. .. .	4
(e) Advanced Entomology .. .. .	1
Total ..	39

*Examinations.*

Of the sixty-four candidates, who appeared for the B.Ag. Examination in March 1925, fifty-nine passed, one of them in the first class, forty-one in second class and the rest in pass class.

Sixty-one students appeared for the I.Ag. Examination. Of these five passed in first class, thirty-one in the second class and seven in pass class. One of the seven men in pass class was promoted to the Junior B.Ag. last year and had to take an examination in one subject only.

At the final College Examination for Diploma four students appeared, all of whom passed. Ten students appeared for the first examination in Diploma, out of whom six passed in all subjects, two of them securing first class marks. One more Diploma student in the first year, who got exemption marks in three subjects, has been promoted to the Junior B.Ag. Class.

*Terms.*

Till last year the College used to open on 1st June and close for midvacation on September 15th. It used to reopen on 15th October and close on 10th February.

The University changed the College terms from 1925 onwards as under:—

First Term:—10th June to 30th September.

Second Term:—1st November to 20th February.

The College, therefore, started work on June 10th this year.

*Courses.*

It had been felt that the course imparted to the students was not quite up to the times and hence the University of Bombay appointed a Committee last year to consider the possibility of improving the Agricultural Course. The Committee met in the College several times and recommended certain changes in the old course.

The Revised Syllabus has been finally adopted by the syndicate and the senate, and the students in the I.Ag. and Junior B.Ag. classes will undergo the course according to the new syllabus this year; while the students in the final year will follow the old curriculum.

This new course differs from the old in the following ways:—

(1) The I.Ag. students are brought much more in contact with the general aspects of Agriculture.

(2) Some portion of Agriculture which was formerly under Optional Agriculture will now be taught to all men. Some improvements are also made in the general treatment of this subject.

(3) Agricultural Engineering is made compulsory for all students. Much of this was formerly given as an Optional subject, under Land Development.

(4) Each student will specialise in one of the following subjects instead of a large group of two or three related subjects as was formerly the case.

- (A) Intensive study of certain crops.
- (B) Advanced Plant breeding.
- (C) Advanced Agricultural Chemistry.
- (D) Advanced Animal Husbandary and Dairying.
- (E) Advanced Agricultural Economics.
- (F) Advanced Horticulture.
- (G) Advanced Plant Pathology.

(5) At the expiry of the second year of study, the students in the Junior B.Ag. class are allowed to take a University examination in Botany and Plant Pathology at their option.

This will reduce their burden of study and the number of subjects for examination at the end of their final year and give them more time to devote to the study of subjects in the final year, and also for more Library and Practical work.

#### *Students.*

The College Census was taken at the end of June. The admission fee of Rs. 5 levied from last year has been continued this year also.

Ninety two students (seventy seven from Bombay Presidency including Sind and fifteen from outside) were newly admitted to the I.Ag. Class upto 23rd May 1925, after which date admissions were closed. The policy of admitting men from outside the Presidency after meeting Bombay demands has been kept up, and no Bombay students were excluded in favour of those outside the Presidency upto the final date for admission.

Twenty one failed men (including men for degree and Diploma) 16 from Bombay Presidency and 5 from outside were allowed to rejoin, thus the total number of men on the roll of the I.Ag. Class on the opening day of the College was one hundred and thirteen.

Some of these men thus admitted did not join and some left the College after joining, and hence the number on the roll on the date of census, was eighty five. This number included sixty nine men from Bombay Presidency including Sind and sixteen from outside. The number of Diploma students newly admitted to the I.Ag. Class this year is eight. This forms 9.3 per cent. of the men on the roll on the date of census. As a rule, students from the Presidency proper are not admitted under these special conditions unless they are deputed by a state or an institution.

Besides the above number one student sent by the Director of Agriculture, Ceylon, was admitted directly to the Junior B.Ag. Class as

a Diploma student. He has undergone two years' Course in Agriculture at the Tropical School of Agriculture, Ceylon.

Two more students who failed to join the Junior B.Ag. Class, last year, were allowed to join this year. These two together with the fifty one men passed out of the I.Ag. Class (Degree and Diploma) brought up the total number in the class to fifty three. Out of these, one student left for studies in England and another did not join, leaving a class of fifty one.

At this stage I would like to point out that we had to refuse admission to as many as 85 students. In this connection, I would like to bring out that Dr. W. Burns, before his departure on leave, addressed the Director of Agriculture to provide more Laboratory and Hostel accommodation with necessary equipment for various sections on this estate and I feel that if this is carried out and the necessary additional staff provided for we can take up a larger number of students and will not be obliged to refuse admissions as was done this year.

Amongst the students who were refused admissions there were twenty nine from Bombay Presidency and twenty one from outside. Besides, an intimation to the effect that admission was closed, was sent to thirty five men when sending the prospectus of the College, thus bringing up the number refused admission, to eighty five.

It seems necessary to lay down a policy as to what class of students from the Presidency proper should be admitted to this College. I personally am of opinion that preference may be given as far as possible to students from cultivating class and they should be encouraged to undergo the Course, so that we may get the proper class of men to tackle agricultural problems after they pass out.

#### *Short Course.*

Men, who wish one year's training mainly in Practical Agriculture with a small amount of training in the allied Sciences to enable them to grasp the principles underlying agricultural practice are, admitted to this course. We admitted eleven students this year out of whom two failed to come. There are therefore nine men in this class.

#### *Special Course.*

No students applied for such courses in technical subjects this year.

#### *Details.*

The details of students for the year 1925 are as under :—

First Year students	..	..	..	85
Second Year students	..	..	..	51
Third Year students	..	..	..	39
Short Course students	..	..	..	9
				184
		Total	..	184

Out of the 184 students in the College this year, 46 are from Deccan and Khandesh, 47 from Southern Maratha Country and Konkan, 37 from Gujarat and 13 from Sind, making up a total of 143 from the Presidency proper. Out of the 41 foreign students, there are 21 from South India and Ceylon, 5 from Nizam's Domains, 4 from Central India, 3 from Bengal, 2 from Burma, 2 from Travancore, and 1 each from Berar, Central Provinces, Goa and Mesopotamia.

The classification of students also shows that out of 143 students from the Bombay Presidency (including Sind) 32 (or 22·38 per cent.) came from the four chief Agricultural communities of the Presidency *viz.*, Marathas, Lingayats and Jains from the South and Patidars and Anavils in the north, 70 students (or 42·68 per cent) from the Brahmin community and the remaining 82 from Mahomedans, Parsis, Christians and other communities.

#### *Library.*

The library now numbers 12,510 volumes, out of which 260 were added in 1924-25.

#### *Other Institutions.*

The Diary, Veterinary Hospital, Manjri Farm, Ganeshkhind Garden, etc., continue to be used for the teaching of students.

#### *Inspection.*

The University triennial Inspection Committee consisting of Rev. Father Blatter, Principal Mackenzie, Professor P. A. Wadia and Dr. Mann visited this College on 15th December and went round the various sections of the College and Hostel. Their report is now before the Syndicate.

#### *Athletic and Social Activities.*

The various departments of the College Gymkhana have been well patronised in their respective seasons. We had a fairly good cricket team and good tennis players. Hockey and Foot ball are the favourite games during the second term. The decrease in the number of Burmese students at foot ball is very much felt.

In the Inter-Collegiate Sports, we have fared much better than last year. We carried off seven cups and a number of prizes and Mr. Bhide of our College was the champion therein. Our students also gave a good display of Boxing. Considering the small number of men from which we have to draw on, we have a very honourable place compared to the Arts Colleges.

The College Platoon of the University training Corps also showed itself quite up to the mark. It was the second best platoon in the camp as well as runner up platoon for Hockey. Besides this, a number of men from our College platoon carried off prizes in the University Training Corps Sports. Four Officers of the University Training Corps belong to the College staff. In the leave vacancy of Dr. Burns, Mr. Sane of our College is in command of the 'D' company.

The Students' Union, an unofficial body representing the students' interest and largely occupied in organizing social intercourse, continues to fulfil useful functions and is a great help to the life of the College.

The Esprit de Corps of the College grows daily : and the twin ideals of the College, Science and sport, continue to be pursued with increasing eagerness. This spirit will not only produce good farmers, but also good citizens.

*General.*

The College continues to be used as a place of interesting study by various schools and other bodies in Poona. The nature study club, the scouts and the scoutmasters and the members of the male training College utilise it for such purposes.

*College Veterinary Hospital.*

The number of patients being treated has on the whole increased compared to 1921-22 and 1922-23.

The various improvements in treatment and other methods mentioned in the last year's report, have been continued with success this year.

P. C. PATIL,  
Acting Principal,  
College of Agriculture, Poona.



## APPENDIX C.

*Annual Report on the work done under the Deputy Director of  
Agriculture, North, Central Division,  
Nasik, 1924-1925.*

## STAFF AND ORGANISATION.

(1) Mr. W. J. Jenkins, Deputy Director of Agriculture, N.C.D., was on long leave from May 1924 to January 1925. During this period, which covers the greater part of the year under report, the charge was held by Mr. C. S. Patel. Rao Saheb B. P. Wagholkar, Cotton Supervisor, Khandesh, went on leave in January 1925. Mr. N. V. Bhagwat, District Agricultural Overseer, Nasik, acted in his post till the end of the year.

(2) The district staff has been reorganised. New centres of work have been opened at Bhusawal and Parola, East Khandesh, Sakri, West Khandesh, and Sinnar, Nasik. An Agricultural Overseer is now stationed at each of these places. The Dang Forest area has now been attached to this Division for agricultural work. A trained kamgar has been appointed to this tract.

(3) The redistribution of the district staff has resulted in more intensive and efficient work. However an increase of personnel is essential to further expansion. The work of the Department must be extended to the important Trans-Tapti tract of Khandesh and to certain remoter talukas of East Khandesh and Nasik districts. To do this new work, additional district officers are required.

(4) The Annual Staff Conference was held at Nasik. Action is being taken on numerous resolutions passed at this meeting. These resolutions include the appointment of "agricultural agents" in selected areas; the concentration of agricultural improvements in "model" villages; the standardization of experimental plot records and a fuller co-ordination of the kindred activities of the Agricultural and Co-operative Departments in the Division.

(5) The Divisional staff has worked well. The well-merited honour of "Rao Saheb" conferred by Government on Mr. B. P. Wagholkar, Cotton Supervisor, Khandesh is particularly gratifying and encouraging.

## RESEARCH AND EXPERIMENT.

*A.—Cotton Improvement.*

(6) The Cotton Breeder, Khandesh, commenced his work on Dhulia Farm, West Khandesh four years ago. In this Division, the main object of investigation is to discover a cotton, suitable for Khandesh, which, while equalling the local N. R. in yield and ginning percentage, will be greatly superior to it in staple length.

(7) At the end of the year under report, the Cotton Breeder, had succeeded in segregating and fixing three or four promising strains out of a

complex heterozygous collection of so-called Bani X Comilla hybrids. The next step is an exhaustive trial of these strains, both on Government Farms and on the fields of cultivators, in different tracts of the Khandesh cotton-growing area.

Certain of these strains show considerable promise of providing a profitable alternative to the local cotton. After next season, when they will be grown on a much larger scale, further and more definite estimates of their value will be available.

(8) In addition to this work, the Cotton Breeder is conducting an investigation into the isolation and fixation of Neglectum strains. Only such strains, as possess at least one outstandingly desirable feature, are being retained and studied. Such work is directed towards obtaining a more effective combination of yield, ginning percentage and staple length, and is a prudent accompaniment to his other investigations.

(9) In view of the possibility that the limit of improvement by selection from existing varieties may be reached, a collection of strains, suitable as bases for crossing work in the future, is being made. These strains are being maintained and studied on the Farm.

#### *B.—Farm and Experimental Station Work.*

(a) *Jalgaon Farm, East Khandesh.*—(10) The following average crop yields per acre were obtained on Jalgaon Farm during the year under report :—

Cotton, 127½ acres.—537 lbs. seed cotton.  
 Groundnut, 20 acres.—1671·16 lbs.  
 Jowar and Udid, 22¼ acres.  
     Jowar—758 lbs. grain and 2,279 lbs. kadbi.  
     Udid—165 lbs. grain and 324 lbs. bhusa.  
 Wheat 18½ acres.—1,060 lbs. grain and 1,107 lbs. bhusa.  
 Gram, 2 acres.—948 lbs. grain and 720 lbs. bhusa.  
 Coriander, 1 acre.—556 lbs. grain.

The high yields of the above-noted crops, grown on the Farm in a none too favourable season, as compared with the yields obtained by the average cultivator, are due, firstly to good tillage, secondly effective manuring and thirdly, suitable rotation. In this connection, the importance of good tillage cannot be over-emphasised.

(11) The question of suitable manuring of the cotton crop in Khandesh has received the attention of the Department for the past few years. The use of castor cake—300 lbs. per acre—has been demonstrated profitable and the use of this manure is rapidly extending amongst the cultivators. As a result of the increase in demand, the price of castor cake is increasing. Therefore, during the year under report several experiments were laid down on the Farm with different manures to endeavour to find an economical substitute for castor cake as a cotton manure.

Without entering into details, the following applications gave promising results when compared with 300 lbs. of castor cake per acre.

- (a) Groundnut cake—200 lbs.+sodium nitrate—50 lbs.  
 (b) Sodium nitrate—150 lbs.  
 (c) " Ammo-phos "—60—80 lbs.

In view of the great increase of acreage under the groundnut crop in Khandesh, application (a) should be of considerable economic importance. There is a growing appreciation among the cultivators of suitable nitrogenous manuring for the cotton crop and any readily procurable manure will be made use of widely.

These experiments are being continued next year. An experiment in increasing the space between the rows of cotton from  $1\frac{1}{2}$  to 2 feet resulted in a decrease of yield with a higher ginning percentage.

(12) As complaints had been received of deterioration in the Khandesh groundnut crop, fresh seed was imported from America two years ago. This seed was sown for the second year on Jalgaon Farm. The fresh seed gave an increased yield of 300 lbs. pods per acre in comparison with local seed. The pods were decidedly larger in size.

(13) A series of six wheat strains were tested on a small scale for the Crop Botanist, Poona.

(14) The audited accounts for the year 1923-1924 of Jalgaon Farm, received during the year under report, show a total expenditure of Rs. 51,520-5-0, and a total receipt of Rs. 58,554-3-0, leaving a profit of Rs. 7,033-14-0 on the year's working.

(b) *Khed Nursery, West Khandesh.*—(15) The work of preparation of orange seedlings for distribution has not given the desired results and steps are being taken to ensure more efficient and better management of this branch in future.

An important subject of experiment in this nursery is to find out the most suitable times for "budding" in Khandesh.

(c) *Belgaon Experimental Plot, Nasik.*—(16) On this plot, last year's experimental work was continued.

Varietal trials of nagli, bajri, wheat and gram were repeated.

The wheat varieties, Pusa No. 12 and Pusa No. 4 are becoming popular in Nasik district.

Good results were again obtained by manuring the chillie crop with a dressing of 400—600 lbs. of castor cake per acre. The increased yield was most noticeable and this treatment is being extended in the district.

A spacing experiment on the bhendi crop gave promise of introducing an improvement on the local system of cultivating this crop. Further confirmation next season is necessary.

Good yields of kharip potatoes were obtained and the cultivation of this crop is steadily increasing in Nasik and Dindori talukas.

The silo, improved cattle byre and noria water lift, erected by the owner, Mr. Jategaonkar, at Belgaon have proved of *great interest to the cultivators of the surrounding district.*

(c) *District Work.*

(17) Space does not permit of a detailed report of the work of research and experiment carried on in the district. Much of this was in continuation and verification of last year's experimental scheme. It is gratifying to record the assistance given by Taluka Development Associations and private individuals in experimental work under the guidance and direction of the Department.

The following items of experimental work are worthy of special notice, as being most successful and most suitable for bringing to the notice of the public.

(1) *Cotton.*—Manurial experiments with groundnut cake, + sodium nitrate, blood manure, " Ammo-phos " and proprietary cotton fertilisers were conducted on cultivators' fields at several centres. These tests will be continued next season.

(2) *Wheat.*—The use of castor cake and nitrate of soda as a manure for irrigated wheat, was again tried and found satisfactory and profitable. The applications recommended are 300 lbs. castor cake or 150 lbs. nitrate of soda per acre.

In Nasik district varietal tests of Pusa No. 4 and No. 12 wheats were repeated. Both these varieties were found superior in yield to local varieties and also less susceptible to disease. The cultivation of Pusa varieties is extending.

(3) *Rice.*—In Khandesh, an application of 400 lbs. of castor cake per acre to the rice crop was found profitable. In Nasik district, rice variety known as Kolamba No. 42, was tried in Igatpuri taluka, in comparison with local varieties. The former gave an increased yield of over 500 lbs. per acre.

Much success has attended the use of ammonium sulphate as a substitute for the rice crop in Nasik district. 600 lbs. of ammonium sulphate was sold to cultivators and it is certain that ten times this amount will be required next season.

(4) *Chillies.*—An application of 400—600 lbs. of castor cake per acre considerably increased the profits from this crop.

This treatment is being recommended to the cultivators and is being widely adopted.

(5) *Other Crops.*—Beet was again grown successfully in Raver taluka, East Khandesh. Its extension is being considered by the local Taluka Agricultural Association.

Nitrate of soda—200 lbs. per acre—gave good results with the garlic and onion crops in Nasik district.

A considerable demand for this manure has been created in that area.

The kharip potato crop was successfully grown in Nasik district, though in Khandesh the rabi crop gave better results, especially in Raver and Nandurbar talukas.

*D.—Miscellaneous.*

(18) In view of the great increase in labour rates in the Division, research into the production of cheap labour saving implements and machinery is of primary importance. In addition the immense possibilities of increasing crop yields by the adoption of better tillage methods, make the improvement of indigenous agricultural implements and the introduction of new implements suited to local conditions, essential to further progress.

Such work is being conducted with the assistance of the Agricultural Engineer. A set of local implements has been sent to him with suggestions for improvements.

The Mechanical Assistant, N. C. D. is working on a new type of winnowing machine, which will soon be ready for trial.

(19) The protection of crops from wild animals again received attention. Experiments on the poisoning of wild pig in Sakri taluka, West Khandesh were moderately successful. Funds are necessary for the further development of this work.

(20) In concluding this section of my report, I would like to indicate several promising subjects awaiting experimental and research work in this Division. Certain of these have already been taken up, but others, through lack of staff and funds, still remain uninvestigated.

- (1) The Wheat crop of the Tapti Valley.
- (2) Groundnut harvesting in Khandesh.
- (3) Fruit cultivation, including the drying and preservation of fruit.
- (4) Sheep-breeding for wool production.
- (5) The improvement of inferior millets.
- (6) Power cultivation in Khandesh.

PROPAGANDA.

*A.—Divisional Board of Agriculture, N. C. D.*

(21) During the year under report, the Board held four meetings at different centres in the Division. It continues to prove most useful in focussing non-official interests in the work of agricultural and co-operative development in the Division. The enthusiasm of members both official and non-official remains unabated.

*B.—Taluka Development Associations.*

(22) In the North Central Division there are thirty-three talukas and petas.

At the end of the year under report, eleven Taluka Development Associations had been formed. That is to say 33½ per cent. of the talukas in the Division possess this form of non-official organization for their agricultural, co-operative and social development.

All these Associations are registered—or in process of being registered—under the Co-operative Societies Act. Each one receives an annual subsidy from Government and has engaged one or more fieldmen for propaganda and advisory work amongst their members.

(23) The limitation placed on the length of this report prevents me from detailing, even in a very brief manner, the activities of these associations. Their work includes on the agricultural side, the distribution of agricultural necessities, the demonstration of improvements in methods and material, the hire and sale of ploughs and other implements and, on the co-operative side, the organization of co-operative societies and the advancement of co-operative propaganda.

They render considerable assistance to the Agricultural and Co-operative Departments in the district work.

(24) The two main difficulties by which these associations are faced, are, firstly, the problem of finance, and secondly, the provision of efficient management. The first difficulty can be solved in my opinion, only by the affiliation of these bodies to Taluka Local Boards and by the recognition of their right to a definite percentage of the annual local revenues of the taluka. The present system of finance by the collection of voluntary subscriptions by honorary workers is not satisfactory and most unreliable.

The provision of efficient management is becoming more and more important as the activities of the associations extend.

Training in propaganda work, management of the Association, etc., is essential and should be arranged for members of the Managing Committees.

The future of such Associations depends upon their becoming a real influence amongst the cultivators of the taluka, who must be enabled to enjoy and appreciate the results of the work which is being done.

(25) In most of the Khandesh talukas and in many talukas of Nasik district there exist old "Agricultural Associations" in a dormant or semi-dormant condition. Steps are being taken to revive these and form them into active Taluka Development Associations.

#### *C.—Non-Credit Work.*

(26) The District staff of the Agricultural Department continued to give the closest attention to the fostering of non-credit agricultural co-operation.

In this work, much assistance was given by certain Taluka Development Associations.

Pachora Taluka Development Association assisted in the organization of two co-operative ginning societies and one irrigators' society. Attempts were made to organize land improvement societies in Nasik district, fencing societies at B. j. Kalwan taluka and cotton seed societies in Khandesh. The District Agricultural Overseer, Nasik has drawn attention to the necessity for an onion sale society at Nasik.

(27) I cannot overestimate the primary importance of co-operation in the agricultural development of this Division and I consider that it is only through co-operative agency that any real advance in rural development can be made.

The relations between the Agricultural and Co-operative Departments in this Division are most cordial and I am glad to report that there exists a growing tendency for closer co-operation between the officers of each department in the interests of the cultivators.

This augurs well for the future.

(28) D—*Departmental Work*.—In both Nasik and Khandesh districts, a large number of major demonstrations were held. In many cases, these were organised with the assistance of Revenue officers or Taluka Development Associations. They were invariably well attended by cultivators and gave a fresh impetus to the spread of agricultural improvements in the localities where they took place.

In addition the policy of holding numerous small demonstrations of such matters, as use of iron ploughs, copper sulphate steeping of jowar seed, etc., was continued and extended.

The chief items demonstrated by the Department were the use of ammonium sulphate for the sugarcane crop, castor cake for the cotton crop, nitrate of soda for onions and garlic and other approved manurial treatment of crops.

Also the advantages of growing better varieties of staple crops such as N. R. cotton, Akola bajri, Pusa wheats, Spanish and Big Japan groundnut and Kolamba No. 42 rice were demonstrated.

All such demonstrations were invariably held on the fields of the cultivators and have resulted in an extension of the practices advocated. Special attention was given to the demonstrations of improved cultural methods and to the use of improved implements.

The intensive demonstration work, carried on to introduce the practice of steeping jowar seed in copper sulphate solution was most successful. It is anticipated that about 30,000 packets will be used during the next year.

(29) Judged by the only real criterion of success, namely the extent to which agricultural improvements demonstrated, are adopted by the cultivators, the year's propaganda work has proved very successful. It is therefore all the more to be regretted that more funds are not made available for this work. A sum of Rs. 700 is totally inadequate for demonstration work in this Division and imposes a definite limit on expansion of this direction, even when non-official assistance is taken into account.

The work of the Agricultural Department does not end in the introduction of improvements as a result of research and experiment. Perhaps its most important function is to ensure that these improvements are incorporated in general agricultural practice. For this work, adequate provision of staff and funds is essential.

*Service.*

(30) A—*Extension of N. R. Cotton Seed.*—The extension and distribution of N. R. cotton seed was carried out almost entirely through co-operative agencies and the results proved very satisfactory. There are now definite centres in this Division where the extension of N. R. cotton is progressing on regular lines.

During the year under report 25,000 lbs. of pure N. R. Seed, supplied from Jalgaon and Dhulia Farms, was distributed to eight Taluka Development Associations, four Co-operative Credit Societies, and to the co-operative Bank branches at Dhulia and Parola for further distribution to co-operative societies in their areas. Smaller quantities of seed were sent to Poona, Rajkot, Bhavnagar, Dhar, Aurangabad and Indore. Very little difficulty was experienced in getting Taluka Development Associations and Co-operative Societies to arrange for further distribution to their members.

Future work will be conducted on similar lines with the addition of organizing community cotton growing centres with their own ginning facilities.

(31) B—*Implement Depôts.*—The Department maintained sixteen implement depôts in the Division and hire receipts amounted to over Rs. 1,300.

Much of this work is being taken over by Taluka Development Associations and private individuals.

(32) C—*Seed, Manure and Implement Distribution.*—This work also is being taken up by non-official agencies. However there is still a large demand for agricultural requirements which has to be met through the Department. The value of seeds, manures and implements supplied departmentally to cultivators during the year of report shows no signs of diminution.

(33) D—*Mechanical Assistance.*—The Mechanical Assistant visited many parts of the Division and took detailed surveys of pumping sites, etc. He also reported on schemes of power installations, prepared estimates and gave advice to Associations, and private individuals on mechanical projects.

(34) E—*Boring Work.*—There were three boring machines working in the Division during the year under report. Two of these only worked for part of the year as they were undergoing conversion to power machines.

Fifteen bores were completed. Eight of these were successful and seven unsuccessful.

The boring section, as at present organised, is not satisfactory.

There is constant difficulty in procuring labour, the boring mukadams are insufficiently trained and inadequately supervised. I foresee no hope of improvement until all the machines in the Division are concentrated in a small area, e.g., a taluka; until boring mukadams are employed and paid on a temporary basis according to the work done and until the Boring Assistant is empowered to engage casual labour and charge the



cost of the same to the applicant whose work is being undertaken. The present system is thoroughly uncommercial and requires very drastic alteration.

(35) *Education*.—Dhulia Vernacular Agricultural School has completed its second year since opening. The first year course numbered 12 students. The second year, 10, all of whom had successfully passed the first year tests. Six students come from West Khandesh, thirteen from East Khandesh and three from Nasik district.

The Annual Examination was held by Mr. K. M. Pawar, Inspector of Agricultural Schools, assisted by Mr. G. S. Moghe, Farm Superintendent, Jalgaon. Eleven first year students and eight second year passed successfully. The students showed weakness in practical work and this side of the training is being intensified.

Rs. 2,625 were collected by the Local Boarding Committee of the school from District Local Boards and Municipalities in the North Central Division. This sum is employed to defray the boarding charges of the students.

(36) It is greatly to be regretted that no advantage has been taken by graduates of Poona Agricultural College of the post-graduate course in farm management and economics, which was instituted last year at Jalgaon Farm. This Farm is a very suitable place for such training and it was thought that this course would fill a want which has long been realised. Up-to-date no graduate has appeared for the course, although applications have been received from others, which are now being considered.

(37) *Conclusion*.—I would like to conclude my report by acknowledging in full the sympathy, co-operation and help received from other departments of Government and the unflagging interest and assistance freely given by many non-official gentlemen, interested in the welfare of the cultivators of the North Central Division.

W. J. JENKINS,

Deputy Director of Agriculture,

N. C. D., Nasik.

Camp Deola, 9th November 1925.

## APPENDIX D.

ANNUAL REPORT OF THE DEPUTY DIRECTOR OF AGRICULTURE  
SOUTH CENTRAL DIVISION, POONA, FOR THE YEAR  
1924-25.

1. The operations of this Division may be conveniently reported under the following sections--

- I. Research.
- II. Propaganda.
- III. Agricultural Organization--
  - A. Taluka Development Associations.
  - B. Non-credit Co-operative Societies.
- IV. Agricultural Service--
  - A. Boring operations.
  - B. Engineering advice and assistance.
  - C. Pig killing operations.
  - D. Famine fodder supply.
- V. Agricultural Education.
- VI. Departmental Administration.

## SECTION I.

*Research.*

2. The year under report was on the whole a very good one for the cane crop. This is the second year of the experiments of the newly introduced cropping scheme at Manjri, which consists mainly of the following series :--

- (1) Time of application of top-dressing.
- (2) Quantity of nitrogen required to produce a heavy crop.
- (3) Efficient and economic substitute for Farm yard Manure, *e.g.*, sann manuring.
- (4) Suitable crops for rotation with sugarcane.
- (5) Quantity of irrigation water and the interval between two consecutive waterings.
- (6) Different methods of planting and cultural operations.
- (7) Selection of profitable varieties.
- (8) Botanical study in the field and chemical control of Gurhal operations.
- (9) Study of tillering and root system (new).

The results of the above experiments can be summarized as follows :--

- (1) The time of application of fertilizers is a new experiment and hence no definite conclusions can be drawn.

(2) Different amounts of top-dressings were given, supplying 75, 150, 225 and 300 lbs. nitrogen, to different plots to see their effect on the yield; last year the outturns were in the ascending order of the nitrogenous quantities but this year the same grade has not been found to hold true as expected. The variation of the results of this year, therefore seems to be due to some disturbing soil factor. To avoid this the same series have been duplicated, *i.e.*, both on deep soil and medium cane soil this year; the results of which arrangements are expected to assist in clearing up this phenomenon.

(3) The results of this series show that safflower cake alone (substitute of Farm Yard Manure) has given better results, and this corroborates those of last year.

(4) The cycle of crops in this series is not complete and hence no conclusions can be drawn at present.

(5) In the series of water experiments the interval between two waterings and the quantity of water required by the cane crop are the most important. The results obtained for this year and the last year are corroborative and show that the yield increases when the water is raised to 100 acre inches and still more so when it is raised to 125. Similarly the best interval between the two consecutive irrigations has been found to be 8 days. The quantity measurements were taken by the Cippoletti weir and the actual readings with the help of an automatic device (which Mr. V. G. Patwardhan has designed). In actual practice it was found to work very well.

*Results of the interval experiments for the year 1923-24.*

	Intervals.	No. of waterings per annum.	Quantity of water per irrigation in inches.	Total acre-inches plus rain.		Weight of cane in lbs. per acre.	Weight of gul in lbs. per acre.
				Irrigation.	Rain.		
1923-24.	8 days	38	2.16	82.2 plus	13.4	71,978	8,614
	10 "	31	2.57	79.8 "	13.4	62,107	6,003
	15 "	25	3.41	85.4 "	13.4	57,359	6,391

*Results of the interval experiments for the year 1924-25.*

1924-25.	8 days	42	2.1	88.2 plus	25.9	75,780	10,286
	10 "	34	2.45	83.3 "	25.9	73,572	9,113
	15 "	27	3.1	83.7 "	25.9	58,833	8,241

The above figures clearly show that the 8-days interval has got decided advantage over the 10 days and the 15-days.

The total quantity of water required in addition to rain (20 inches) is 95 or even 105 acre-inches, *i.e.*, about  $2\frac{1}{2}$  inches per turn of 8-days and 3" per turn of 10 days interval. The results are given below :—

QUANTITATIVE EXPERIMENTS, 1923-24.

Quantity of water.	Quantity of water per irrigation in inches.	Total acre-inches plus rainfall.		Weight of cane in lbs.	Weight of gul in lbs.
		Irrigation.	Rain.		
75 acre-inches	2.57	79.80 plus.	13.4	52,107	6,003
100 "	3.06	94.84 "	13.4	61,730	7,523
125 "	3.72	115.34 "	13.4	75,272	8,850

Results for the year 1924-25.

75 acre-inches	2.44	80.52	25.9	59,996	7,966
100 "	2.90	95.70	25.9	65,749	8,960
125 "	3.70	122.10	25.9	69,829	9,271

The above figures clearly show that the greater the quantity of water used the greater is the yield; the increment reaching as much as 15 per cent. over the yield on the usual check plot. In this experiment the interval was constant throughout of 10 days.

(6) The results are in favour of four feet method of planting.

(7) The main idea of the whole experiment was to try to find varieties equal to or better than Pundia. In all eight (8) varieties were tried repeatedly for a number of years to test their fitness for cultivation under field conditions. This year three more varieties were selected and these three have proved to be very promising. The results are as follows :—

Name of variety.	Year 1923-24.				Year 1924-25.			
	Weight of cane per acre in lbs.	Weight of gul per acre in lbs.	Extraction per cent.	Brix corrected to 17.5° C.	Weight of cane per acre in lbs.	Weight of gul per acre in lbs.	Extraction per cent.	Brix corrected to 17.5° C.
Red sports	74,837	8,123	69.0	16.36	79,492	8,975	68.7	16.50
D. 109	71,563	7,948	62.2	16.15	80,760	8,715	67.6	16.45
White transparent	61,762	8,024	68.5	19.46	66,423	8,186	67.0	18.70
Java	63,668	7,137	64.1	18.44	67,119	7,533	64.7	17.60
Manjav	41,894	4,863	67.0	17.61	56,794	7,595	72.3	18.80
B. 1628	59,474	7,381	68.3	17.12	75,825	8,196	62.5	16.97
Waxy red	60,053	8,153	70.0	19.14	62,037	7,367	65.7	18.61
B. 208	46,745	5,542	64.0	18.60	63,979	7,830	65.8	19.17
Pundia	47,926	5,585	71.0	18.50	58,539	7,451	72.3	18.02
H. M. 544	..	..	..	..	90,086	9,098	62.4	17.49
H. M. 600	..	..	..	..	71,053	7,609	62.6	17.38
S. 48	..	..	..	..	75,365	7,895	55.7	19.24

From the results of this year and last, it can be seen that the best four of last year, namely, Red sports, Waxy Red, White transparent and D. 109 have maintained their position this year but some newly selected varieties have gone very high in the list and are equal to or better than the best four of last year, and in particular H. M. 544 is far in advance of all. This indicates that the new selection of this year is another step forward from the standard of the existing selected varieties. H. M. 544 is highest both in the weight of cane and weight of gul and S. 48 which is a high yielder, has the highest brix and purity.

(8) The work of the botanical and chemical study in different experiments with *Pundia* and other varieties, have been given in the Manjri Station report, and in greater detail in the bulletin on the varieties recently prepared.

(9) Study of thinning of tillers and the selection of seed has been found to be very instructive and interesting. The results show that there is a great scope for getting the highest outturn in *Pundia* cane by individual selection of seed and for growing the same with thinning the tillers so as to get maximum growth of the remaining canes of the stool. The results are as follows :—

## 1924-1925.

Name of experiment.	Treatment previous to planting.	Treatment after planting.	Weight of cane in lbs.	Weight of juice in lbs.	Weight of gul in lbs.	Brix corrected to 17.5° C.	Extraction per cent.
Selected sets	F. Y. M. 200 lbs. N.	Ammonium sulphate and safflower cake 150 lbs. N. in 3 doses.	106,944	73,963	13,407	18.5	69.1
Unselected sets	Do.	Do.	100,473	71,101	12,890	18.4	71.0
Tillers removed at 4 months.	San green manure 100 lbs. N.	Do.	88,281	62,402	12,456	19.4	70.0
Tillers removed at earthing up.	Do.	Do.	76,588	52,284	11,365	20.4	70.0
Check with no tillers cut.	Do.	Do.	58,539	42,273	7,451	18.02	72.3

3. The holding of a sugarcane class is one of the special features of this year, since it was started in the face of many difficulties especially as regards accommodation. The applicants were from all the cane growing districts in the Deccan Tract. The number of attendants was greater than the average of the last seven years namely 31 and the proportion of attendance to the number of applications was much higher, compared with previous years. It can be said that the students who came, went back thoroughly satisfied and completely converted to the improved and economic method of cane cultivation and gul making worked out at Manjri.

The gul produced on this farm ranked mostly as No. 1 and was valued highly in the market this year. The following is the opinion of the Secretary of Haveli Co-operative Gul Sale Society :—

“ This goes to inform you that this year (1925) Gul sent by you to this shop for sale during the Gul season, ranked No. 1 in grade. The Bombay merchants specially preferred to buy your gul so also the Poona merchants for stocking as the same has been found by them to keep the whole year without becoming soft or liquid.”

4. *Profit and Loss.*—The cost of cultivation of Pundia cane at this farm per acre as incurred with the Manjri Method of cultivation and usual top-dressing supplying 150 lbs. Nitrogen only, taking into account all items as calculated in a statement worked out on the unit system, comes to Rs. 660-10-6 (with the cost of the unit of labour taken as annas eleven, being the prevailing rate this year).

The income obtained was Rs. 1,118-6-0 per acre taking the average sale rate of gul obtained during the whole season namely 8 lbs. per rupee ; and the average yield of the whole area was 36 pallas of gul per acre. The net profit per acre amounts to Rs. 457-11-6.

5. In connection with the central Research sugarcane station at Manjri the Department has a confirmation station at Baramati to serve the Nira Left Bank Canal. On this station results worked out at Manjri are confirmed or modified under local conditions ; and part of the area serves the purpose of demonstration of improvements found suitable for this canal tract.

In the year under report a new series of confirmation experiments was laid out and hence the results obtained require to be verified in subsequent seasons before being published.

Similarly on the Godavari Canal a part of the Department's fodder farm at Kopergaon is used as a confirmation area for that tract. The following statement summarizes the results of five years trials conducted on the Kopergaon Farm from which it will be seen that the three marginally noted varieties stand in front of Pundia, the standard variety.

Red sports.  
Manjav.  
B. 376.

the three marginally noted varieties stand in front of Pundia, the standard variety.

In addition to these varieties eight more varieties were under confirmation trial for the first time in the year under report—out of which D. 109 with a yield of 9,208 lbs. of Gul per acre and Java with a yield of 7,820 lbs. did best.

No.	Name of variety.	No. of canes per acre.	Weight of canes per acre in lbs.	Weight of gul per acre in lbs.	Nos. arranged according to yield.
1	Red sports	29,115	91,631	9,061	1
2	Manjav	22,717	91,671	8,574	2
3	B. 376	25,674	76,930	8,239	3
4	Pundia	26,204	74,312	8,116	4

## SECTION II.

*Prôpaganda.*

(6) The principal items of the programme of the district staff are as under:—

(1) *The popularisation of the copper sulphate treatment of Jowar against smut.*—In this connection a concentrated effort was made in co-operation with Revenue and Irrigation Officials in almost all the districts. In the Ahmednagar District 7,191 packets were distributed in the dry tract through the Revenue Department and demonstrations of steeping were conducted in 42 places. The Collector Mr. Smart rendered very great help with the result that every Mamlatdar took a prominent part in these operations. In the Sholapur District 3,378 packets were distributed while the Madha association distributed 1,000 packets. In the Poona District in all 2,084 packets were distributed and in the Satara District 833 packets were sold. In the canal tract 6,868 packets were sold on the Nira, Godavari and Pravara Canals with the help of the Irrigation Department. Thus the total number of packets distributed in the S. C. Division came to 21,354.

(2) *Introduction of new crops and varieties.*—The principal work in this respect has been the introduction of N. R. cotton into Ahmednagar and Sholapur Districts and the introduction of new ground-nut seed in the Satara and Poona Districts and the dissemination of Akola Bajri throughout the Deccan.

The work of the N. R. cotton is concentrated in the Sheogaon and Newasa Talukas from 1922. The seed is well appreciated by the people who are willing to pay good prices for the best seeds but unfortunately, pure seed could not be made available from Khandesh and hence 12,000 lbs. of second class seed were distributed in the year 1924-25. It was given to seven cultivators on condition that they would gin their produce and supply that seed to other cultivators but on account of the failure of the cotton crop only 5,000 lbs. of seed could be secured.

For the new season of 1925-26, 2,000lbs. of second class seed was again secured and distributed to seven different cultivators of Sheogaon and Newasa Talukas. At present the area of these seed growers is 150 acres from which the supply for future year will be available. The District Agricultural Overseer is now trying to solve the problem of the N. R. seed supply by inducing the tenants of the Belapur Syndicate to take up the production of the first class seed and a beginning is made in June 1925 with one of these men who has sown 30 acres with pure N. R. seed from the Jalgaon Farm.

The Department, in this connection, with its policy of advocating a diversification of cropping on the Deccan Canal, is recommending the introduction of this crop. It seems that in view of the peculiar economic condition of the sugar cane industry it will soon be necessary to grow some other remunerative crop on the canal area and perhaps cotton will

be found the most suitable crop for large scale adoption. The Irrigation Department has recently reduced the water rate to rupees three per acre for this monsoon crop and consequently the area under cotton on the canal tract has been increased from 300 to 1,000 acres.

N.R. cotton is increasing its popularity in the Sholapur District especially as an irrigated crop. This crop responds well to irrigation and manure. During the past season a plot at Wakhari near Pandharpur yielded at the rate of 2,400 lbs. of seed cotton per acre. The marketing of cotton is not well organised in this tract but through some intelligent cultivators the Department was able to distribute 22,000 lbs. of seed during the year. Cultivation of cotton under irrigation raises the problem of manuring and a trial is being made to experiment with the application of sulphate of Ammonia in co-operation with the Union Agency.

As regards ground-nuts, the crop is important in the Poona and Satara Districts. The existing varieties are very late and require irrigation for a longer period. In order to replace a late variety by an early one four demonstration plots of the new variety were arranged in the Junnar Taluka and Ambegaon Peta and their yield vary from 1,440 to 2,400 lbs. per acre. All these seed growers have reserved their produce for the sowing of next season. In the Satara area the local ground-nut has become mixed and degenerate and accordingly in the year under report fresh consignments of 11,112 lbs. of big Japanese and 4,156 lbs. of Pondicherry varieties were imported by the Department. A large quantity of these seeds was issued to the Walwa Taluka Development Association for distribution and multiplication. 2,481 lbs. of Pondicherry seed was distributed in the Karad Taluka and the remaining quantity was given on the canal tract (Nira Canal).

On comparison of the newly imported big Japan seed with the acclimatized variety, it was found that the nuts and kernels of the new seed were more than twice as large as those of the old variety and the percentage of oil of the former is lower than that of the latter.

As regards Akola Bajri picked from Deothan and Virgaon villages, the seed proved advantageous everywhere in the Deccan. During the year 2,000 lbs. were supplied to other districts.

*New Varieties of Sugarcane.*—On the Manjari research station half a dozen promising varieties were found and they were tried in the fields of selected cultivators on different canals. The general impression is that each tract will require its own variety of cane. The trials conducted by Mr. G. G. Shembekar of Baramati resulted as shown below :—

Variety.				Yield of cane per acre.
				Tons.
1. Red-sport	..	..	..	53
2. H. M. 544	..	..	..	48
3. Pundia	..	..	..	45
4. Manjav	..	..	..	44
5. Red Mauritius	..	..	..	42



The cost of production amounted to Rs. 855 per acre. Mr. Shembekar is satisfied with H. M. 544 and its cultivation is extended by him in 1925-26.

On the Godavari canal Manjav found favour with irrigators and the area under this variety was 100 acres. It is a shy-stooler variety and does not profit from the wide spacing recommended for Pundia. It is anticipated that this will prove useful for Adsali cultivation as it matures earlier by two months than Pundia.

The Department is popularising turmeric on the canal areas and potatoes in the Nagar district. The yields of Italian potatoes varied from 6,000 to 7,500 lbs. per acre.

*Implement—Implement Depôts.*

(3) Much of the work of the department in this connection has passed into the hands of other agencies. The Department encourages the organization of implement co-operative societies and the implement depôts will have to be closed as soon as the societies are organised.

The following list summarises the working of the Government Implement Depôts in the year under report :—

Name of District.	Name of Taluka.	Name of Depot.	No. of implements stocked.	Amount of hire charge realized in rupees.	Remarks.		
Ahmednagar	Sangamner	Nagar Sangamner	11	289 12 0			
			4	57 9 0			
	Shrigonda	Pimpalgaon Pissa	12	57 4 0			
	Newasa	Newasa	12	25 14 0			
	Kopergaon	Kopergaon		17		29 2 0	
			Derda	15		44 9 0	
			Shirdi	17		28 7 0	
	Bahrri		Bahrri*	..		1 8 0	* Closed and implements removed to Belapur.
			Belapur	9		25 1 6	
Kolbar			42	113 4 9			
Khandala			18	119 15 0			
Poona	Bhimthadi	Baramati	16	120 14 0	There was no demand for implements on hire.		
		Vadgaon	4	8 12 0			
Satara	Walwa	Bavda	7	39 10 0			
		Islampur	7	4 3 0			
Poona		Koregaon	14	82 4 0			
		Haveli	16	178 3 3			
		Junnar	Narayangaon & Ghoda.	11		47 8 0	
		Purandhar	Pandeshwar	9		5 13 0	
		Khed	4	26 8 0			

The tendency in the management of depôts and societies during this year has been the reduction in the higher rates charged to the cultivators. The Sheogaon society has lowered its charges from three annas to two annas per plough per day on account of competition of other societies. There are now 6,000 iron ploughs in the Ahmednagar District against 1,500 in 1920 and 200 in 1915. We have still however a long way to go as the number of ploughs (wooden) is estimated at 37,000.

(4) *Tractor ploughing*.—Owing to the success of the iron plough in the Nagar district arrangements were made to conduct tractor ploughing on a large scale at Sheogaon. A case Tractor and a three furrow Grand Detour plough were placed in this Taluka, and the technical operations were managed by the Agricultural Engineer, while the business arrangements were done by the Deputy Director of Agriculture. Indents for ploughing the land were readily forthcoming and the rate of ploughing per acre was fixed at Rs. 8. The actual performance of this tractor was most disappointing as the plough broke several times during the operations. In all 91 acres were ploughed with this tractor during this season. When the machine was working satisfactorily the tractor could plough 3 to 4 acres per day to a depth of 7 to 8 inches. The working expenses came to about Rs. 7 per acre excluding the overhead charges.

The public are keenly interested in the tractor work and the District Local Board (Ahmednagar) has purchased two Cletrac Tractors costing Rs. 5,500 per set. One of these machines has ploughed more than 100 acres in a couple of months and the cost of ploughing did not exceed Rs. 6 per acre to the Local Board.

(5) *Spraying operation*.—The potato crop in the Khed Taluka was affected by the Tamera disease and the Department took prompt action in spraying this crop in 13 villages in the fields of 30 cultivators. The effect was excellent and the treated crop escaped all damage.

The lucerne crop was also affected with aphid in the Nagar district and in five villages about 35 acres of the crop was sprayed with Fish oil and Rosin soap wash. This has also proved very effective.

In the Satara District chilies were affected with leaf curl disease and the Department sprayed the same with lime and sulphur wash. It had an excellent effect and the plants put up new growth and the yield was satisfactory. Similar work was done in Poona and Sholapur districts with equally good results.

(6) *Horticultural Operations*.—Ahmednagar District is famous for its orange and Mosambiques and their cultivation is extending. During the year under report 1,500 new plants were supplied in six villages while in the Nagar Taluka 4 new grape gardens have been laid out. The Agricultural Overseer reports an interesting method of protecting the grape from mildew in vogue in Pimpalgaon Ujjain. A second light pruning is conducted in November when the tender vines are again pruned at the 5th or 6th internodes from the bunches so as to force all the sap into the fruit. The object is to remove the most susceptible foliage to mildew, viz., tender growth.

(7) As regards the methods adopted for conducting propaganda they may be summarised as follows :—

1. Organised shows. 2. Implement demonstrations. 3. Manurial demonstrations. 4. Trial of new crops. 5. Steeping, spraying, etc. and 6. Organisation of depôts and implements societies, seeds and manure societies, etc.

A summary of the work done in each district is given below :—

*Poona District.*—During this year a show was held at Dehu in the Haveli Taluka and a Magic lantern lecture was given at Nighogi. Eleven implement demonstrations were conducted in the Junnar Taluka where the iron plough is not yet popular. In the Manjari village trials of (1) sulphate of Ammonia and castor cake, (2) Ammo. Phos. plus castor cake and (3) Union Agency's complete fertilizer were made in which the standard combination, viz :—(1) proved economical. In the Ambegaon peta, demonstration plots of Sulphate of Ammonia farm yard manure and cake combined together, proved advantageous to the cane crop and the profits varied from Rs. 100 to 150 against an expenditure of Rs. 22 per acre.

*Ahmednagar District.*—A very successful demonstration of the Manjari system of growing cane and Gul making was conducted at Akola where four plots were laid out. In the same taluka Satara method of growing tobacco was shown. The ridge system of growing lucerne and inter-culturing Jowar also proved successful. A large demonstration was organised at Akola which was attended by 200 cultivators.

*Satara District.*—In the Satara District the demonstration of improved furnace for Gul making was shown in 12 different places in which the saving of fuel and time was shown to the public. The Department opened a stall at Koregaon at the time of Maratha Educational conference and an exhibition was arranged at Satara and Bhoze at the time of Provincial and Co-operative conferences. It is a common belief among the cultivators of Krishna Canal that ground-nut cake produces softer Gul than that of Karanj Cake. Trials of ground-nut, safflower, Karanj cakes were made at Wadgaon on equal money basis and their results are given below :—

Name of Cake.	Brix test.	Weight of Gul in lbs. per acre.	Remarks.
Karanj ..	21	9,840	Colour rather reddish, consistency hard.
Safflower ..	21	10,780	Colour yellow much better than that of No. 1. Texture more crystalline.
Ground nut ..	20	8,640	Colour rather reddish but consistency not soft although the canes were taller and rather softer in crushing.

*Sholapur District.*—The work was much hampered on account of bad season; however implement demonstrations were conducted in 9 villages and artificial manures worth Rs. 600 were distributed. Silos were constructed at Sholapur and Wakheri in September and were packed

with the hundi Jowar. The silos were opened in February and the stuff was found very delicious.

### SECTION III.

#### *Agricultural organisation.*

##### A

(8) *Taluka Development Associations.*—In this division there are 7 Development Associations at Satara, Walwa, Madha, Ekruk Tank, Karmala, Khed and Junnar. Out of which the Walwa and Madha Associations have done good work. The chief work of these Associations consists in (1) purchase and sale of fodder, (2) distribution of superior cotton and wheat seed, (3) spraying of chilies against leaf curl, (4) Proposal for building dams, (5) Demonstration of steeping Jowar and Manjari furnace, (6) Cooperative sale shops and cattle shows. It is a very creditable performance but it is doubtful how far the average cultivator will appreciate the same. The Taluka Association is now working for 3 years, and it is possible to put forward some general conclusions about its working. The financial resources should be substantial and the overseer should not merely be a technical but also an experienced officer. There should be substantial enthusiasm among the people of the Taluka. Hitherto no Association has succeeded in collecting locally 1,000 rupees and hence it is desirable that some form of cess should be levied to finance such Associations along with the land Revenue. The Government should raise its maximum contribution to twice the local subscription. With regard to the calibre of the Overseer a Loni School boy is far below the mark in carrying out the work of these Associations. He cannot command the confidence of the general cultivators. It is therefore necessary that the Overseer should be a man of 5 to 10 years' experience with a salary of not less than Rs. 70. Further work depends upon the enthusiasm of the people which would undoubtedly render the work easier in the introduction of improvements. The Association should at least hold one general meeting per year and one quarterly meeting of the Managing Committee and should maintain the necessary records.

### SECTION III.

##### B

(9) *Non-credit societies.*—On the 1st of April 1924 there were 32 non-credit societies on the list. During the year, one sale society and one implement society were cancelled and two implement societies and water distribution society were added thus leaving the balance at 31 by one the end of the year.

It is now becoming generally realised that a non-credit society cannot be really successful unless it operates over a large area. The small societies of a single village seem to have little future. In this connection I may quote the work done in Nagar District in organising Implement societies. These have proved very successful. At Sheogaon Mr. Gadgil has organised a very successful society with a share capital of Rs. 4,800. A stock of 128 iron ploughs is kept for hire and two branches have been

opened in the Taluka. During the year 320 cultivators have hired these ploughs and the earnings amounted to Rs. 1,450. The reserve fund stands at Rs. 300 and the last dividend was 12 per cent. In the year under report two more implement societies have been organised at Pathardi Mahal with a capital of Rs. 2,000 and a stock of 70 ploughs and at Jamkhed with a capital of Rs. 852 and with a stock of 55 ploughs. In a short period of 5 months the Pathardi society realised a profit of Rs. 852 and the Jamkhed society collected a hire of Rs. 460. There is still a great scope for development of these societies in future.

## SECTION IV.

(10) *Agricultural service.*—The service under this head can be mentioned in the following items:—

A. *Boring operations.*—In the year under report 6 machines were working in the Poona and Sholapur district and one machine was handed over to the Mamlatdar of Shrigonda. In all 53 bores were made of which 39 were successful, and the total footage was 3,324 feet. The details of the working of these machines is tabulated below:—

*The details of the working of each of the machines is tabulated below from 1st July 1924 to 30th June 1925.*

Machine No.	Coolies and Holidays.	Idle for want of Repairs accident-transit.	Working days.	Average work done per day.	Number of bores in the year.			No. of feet bored.	Amount of bills for bores.	Remarks.
					Successful.	Unsuccessful.	In progress.			
<i>Poona District.</i>										
P. Machine No. 18.	49	120	196	3' 7"	11	..	1	701' 11"	Rs. a. p. 1,466 13 0	
H. Machine No. 25.	86	32	247	2' 0"	1	7	..	498' 7"	430 5 0	
H. Exploratory Machine No. 5.	2	12	11	1' 3"	1	..	..	16' 6"		
P. Machine No. 8.	27	113	99	4' 6"	..	7	..	448' 3"	843 9 0	Transferred to the Mamlatdar of Shrigonda on 24th February 1925.
<i>Sholapur District.</i>										
H. Machine No. 17.	134	40	3114	3' 9"	18	..	1	1,159' 6"	1,926 0 6	
H. Machine No. 28.	444	99	2214	2' 3"	8	..	1	499' 0"	772 8 0	
			1,086		39	14	3	3,324' 9"	5,439 3 6	

Average work done per machine in the year 554 feet.

H. Machine No. 13. Madha. Pandharpur	29	14	48	1' 11"	2	..	..	91' 6"	231 0 0	The machine is lent to the Implement Society, Pandharpur, from November 1924.
		39	52	3' 0"	2	..	..	156' 6"	....	

P. :—Power bore machine.

H. :—Hand power machine.

## SECTION IV-B.

(11) *Engineering advice and assistance.*—The mechanical Assistant has been looking after the plants at Manjari, Loni and Kopergaon and is rendering assistance to private plants of the mofussil. The power sugar cane crusher is becoming more popular and there are at present 19 crushers working on the Deccan Canals. The Department has kept three power mills for hire and the following remarks summarise their work.

*The 44 Chattanooga Mill.*—This was hired to the Chief of Kagal and its average out-turn of juice per day was sufficient for 18 pans. The hire charges recovered came to Rs. 328-5-0. This machine was also given to His Highness the Maharaja of Kolhapur where it crushed 16 acres of cane in 23 days. The hire received was Rs. 73-5-0.

*The 92 Chattanooga Mill.*—This was hired to Kholhar Co-operative Society and it worked only for 75 days. The cane crop of this tract was very poor and the area crushed was 50 acres. A concession rate of hire charge was Rs. 3-8-0 per day. The daily out-put was only 18 pans.

*The Ruston Proctor Mill.*—This mill was hired to Mr. Borawake of Mamadapur and it crushed 95 acres of cane in 117 days. The recoveries came to Rs. 380-4-0. This mill produced juice sufficient for 31 pans per day. The maximum number being 48 in a working day of 20 hours. The performance was very good.

These experiments have proved successful and led private individuals to purchase similar plants for crushing cane and pumping water. Mr. Krishna Khandu Patil of Manjri has purchased Chattanooga Mill No. 45 and seven B. H. P. Blackstone engine costing Rs. 3,350 which were installed in Hadapsar village. The same gentleman again purchased another mill and a four-inch centrifugal pump with the help of the Department.

There are considerable number of pumping plants in this division and the Mechanical Assistant rendered assistance to six of these plants. Two new installations of pumping plants were made during the year at Kamshet and Manjri.

## SECTION IV-C.

(12) *Pig killing operations.*—As a result of the recommendations of the wild animals committee's report a special Officer was appointed to undertake the campaign of pig-killing. On the Mutha canal people of Nanded and Wadgaon decided to engage a Shikari for attacking the pigs on moonlight nights. Three hunting parties consisting of Vaidus and dogs were organised on the Godavari canal. These men were paid at the rate of 1 to 2 rupees per pig killed according to the size of the animal. The operations were done under the control of Mr. Bhide. Experience shows that shooting is necessary for animals above two years old. On the Nira canal the pigs are few in number but large in size and hence shooting with the gun is more successful.

The following statement summarises the work done during the last six months :—

Canal.	Animals killed.	Animals wounded and escaped.	Total expenditure on beaters, dogs and ammunition.	Cost per kill.	Remarks.	
			Rs. a. p.	Rs. a. p.		
Mutha ..	20 pigs 1 porcupine 2 Jackals 2 Do. poisoned	34	49	204 0 0	6 0 0	Mostly work in moonlight "Lying in wait".
Godavari ..	112 pigs 1 jackal	113	21	169 0 0	1 8 0	Mostly work of dogs and spears.
Nira ..	10		4	196 2 2	19 6 2	Mostly work of guns.
Total ..	157	74		569 2 2	3 10 0	

13. Another line of action which has been followed has been the purchase of material for the construction of a pig proof demonstration fence. This fence which is a mile long will be erected very shortly near Khadakwasla. It will enclose an area containing some 16 acres of sugarcane and other crops where very considerable damage is liable to be done by pig. A recent piece of damage was shown to the writer where cane to the estimated value of Rs. 200 had been done in an area not exceeding a fraction of an acre.

This fence will be paid for by the Department in the first instance but the landowner will bear the cost of erection and will have the option of purchasing the fence outright within a period of six years.

#### SECTION IV-D.

14. *Famine fodder supply.*—The operations conducted at Kopergaon farm for the last ten years have been found unsuitable for the supply of fodder on account of the scarcity of manure; hence no shredding and baling of Kadbi was done during this year. The total quantity of dry fodder produced on the farm was 203,658 lbs. which was issued to parts of famine stricken talukas of the Satara District. The following statement summarises the Kopergaon fodder store operations during the year under report.

Serial No.	Name of fodder.	Receipts.			Disposal.	
		Balance in hand on 1-4-1924.	Quantity received during the year.	Total in lbs.	Sold.	
					Quantity	Price.
		Lbs.	Lbs.	Lbs.	Lbs.	Rs.
1	Nilva and Jowar Fodder.	623,620	238,451	862,071	578,087	12,106

Serial No.	Name of fodder.	Disposal—contd.				
		Distributed free.	Shrinkage in lbs.	Total in lbs.	Balance on 31-3-1925	Fed to Farm Cattle.
1	Nilva and Jowar Fodder.	50	20,357	614,182	247,889	15,688

## SECTION V.

*Agricultural education.*—The Marathi agricultural school at Loni was run on the same lines and a course of agricultural economics has been added to the curriculum. 24 boys were admitted to the first year course during this year and there were 18 boys in the second year. Out of the total 42 boys, 28 are Marathas and 14 Brahmins. With regard to boarding arrangements two clubs have been formed (1) for vegetarians and (2) for meat eaters and the students undertook the management; so far the club system is working quite satisfactorily. In the annual examination, out of 18 boys of the first year 16 have passed and in the second year 16 boys have come out successful from the same total. The expenditure of the year amounted to Rs. 14,855-1-10 and the farm receipts came to Rs. 1,809-11-11.

The training of primary teachers for the agricultural bias schools was conducted and six teachers from Poona, Nasik, Satara, Sholapur, Nagar and East Khandesh have been admitted in the class. Three batches of teachers have now passed through the course and they were attached to the following primary schools:—1. Peth. 2. Mohol. 3. Deolali. 4. Asoda. 5. Kusumba. 6. Narayangaon. 7. Ozar. 8. Kognoli. 9. Rahuri. 10. Kale. 11. Dabhadi. 12. Kem. 13. Wadgaon.



## SECTION VI.

5 *Departmental Administration.*—At the close of the year Rao Bahadur P. C. Patil, Deputy Director of Agriculture in charge was transferred to the Agricultural College as Professor of Agricultural Economics. He was succeeded by the writer of this report who takes this opportunity to point out that the year's work was controlled and directed by him. In June Mr. Joshi took over the charge of boring Assistant in place of Mr. Deval.

A special feature of the year under report was the suggestion of Government to devise ways for greater co-ordination of the Revenue and Agricultural Department for propaganda work. At the meeting held under the Commissioner, C. D., it was arranged that a conference of the Agricultural and Revenue officers of each district should be held under the guidance of the Collector in which the Agricultural Department should explain what work it was undertaking in each district and how the Revenue Officers could best help the propaganda work. Accordingly the meetings were held as follows :—

Ahmednagar	..	..	22nd December 1924.
Satara	..	..	15th January 1925.
Poona	..	..	3rd February 1925.
Sholapur	..	..	14th May 1925.

16. The Divisional Board met four times during the year and its chief work consisted of recommending the applications for loans for Agricultural improvements, and organising the taluka Development Associations and in carrying out the work of the district staff of the Agricultural and co-operative officers.

The following statement summarises the loans recommended, during the last two years :—

Year.	Number of societies applying for loans.	Total approximate amount recommended by the board.	Total amount sanctioned by the bank.
		Rs.	Rs.
1923-24	1	8,100	2,500
1924-25	41	1,38,185	67,550

Refusals to sanction loans were due, in the majority of cases, to insufficient security.

T. F. MAIN,  
Deputy Director of Agriculture,  
S. C. D., Poona.

## APPENDIX E.

ANNUAL REPORT AND SUMMARY OF WORK DONE BY THE DEPUTY  
DIRECTOR OF AGRICULTURE, SOUTHERN DIVISION,  
FOR THE YEAR 1924-25.*Staff and Organisation.*

1. I held charge of the office of the Deputy Director of Agriculture, Southern Division throughout the year and was out on tour for 280 days.
2. The organisation in sections each responsible through its head to the Deputy Director and reorganisation of the District staff brought about last year were maintained. The District staff did both propaganda and organisation work.
3. Mr. G. R. Deshpande was on leave throughout the year, Mr. H. B. Kulkarni who was on leave for 8 months returned to his duty on 1st October 1924. Mr. R. Y. Hulkoti, the Head Master Devi-hosur School was deputed to act as Inspector of Agricultural Schools from 13th June to 30th November 1924 during which period Mr. V. C. Pavate acted for him. Mr. M. A. Shetti, the seed organiser, who was on leave, I am sorry to express, died on 15th February 1925. He was a very senior organiser and his death has been a great loss to the movement of the Agricultural co-operation in the Southern Division. Mr. R. S. Patil continued to work in Mr. Shetti's place and Mr. R. K. Itagi in Mr. Patil's place.

*Season.*

4. The special features of the season were—good antimonsoon and monsoon showers but absence of late rains in October and November, continuous north-east winds from November to February, attack of grass-hoppers on jowar and rust on wheat, and outbreak of rinder-pest on cattle.
5. In Mallad the season for paddy crop was exceptionally good and harvests, were bumper. The outbreak of rinder-pest on cattle however was very severe and the cultivators lost much of their cattle wealth.
6. In Gadinad kharif jowar suffered from the attack of grass-hoppers when young, and long break afterwards. Wheat suffered from rust and cotton from continuous north-east winds. The yields of all these crops were below normal. The cultivators of Gadinad got just enough but could not make any saving. His cattle died from rinder-pest.
7. In Yerinad (dry tract) owing to good antimonsoon and early monsoon showers area under kharif jowar increased but the crop suffered from want of rains in October and gave poor yields of grain but sufficient quantity of fodder. The fate of cotton, wheat and Rabi jowar was also bad. The cultivator of Yerinad has been continuously suffering for the last 5—6 years but the year under report was better than the past.

8. The work done by various sections is summarised under the following heads :—

- (1) Investigation and Experiments.
- (2) Propaganda.
- (3) Organisation.
- (4) Agricultural Education and
- (5) Miscellaneous.

*Investigation and Experiments.*

9. Investigation was mainly done on Government Farms Dharwar, Gokak, Mugad and Tegur, whereas experiments were conducted on Government Farms as well as in cultivators' fields.

10. *Dharwar Farm*.—Continued to rise in importance as a plant breeding station. In cotton, selection in the cross between Dharwar No. I X Rosea and the study of the cross between Dharwar No. I X Wagale for wilt resistance continued. The cross between Dharwar No. I X Rosea has yielded some valuable strains. The strain No. 1 (1-A-18-3-3-15) combines all the good characters required. It possesses long staple and good yielding capacity which are the characters of Dharwar No. I and has also high ginning and good white colour of the Rosea. Observations on comparative trials are encouraging. The strain is tested to be pure and is proposed to be multiplied during the coming season on Gokak Farm where there is no wilt. Two other strains are also promising but are under further study.

11. The cross between Dharwar No. I X Wagale reached F3 generation. The progeny of 64 plants was studied and the percentage of wilt varied from 0 to 41. Results as far as wilt resistance is concerned seem to be very promising in this cross but observations made on the combination of other economic characters are not in any way encouraging. Thirteen plants have been selected for further study.

12. Attempts were made to cross Indian and American cottons repeatedly for a few years past with failures but this year the cross has succeeded in two cases. (Dharwar No. I X Rosea cross with Gadag No. I and Sea Island). The seed obtained will be sown and carefully watched. If the bolls obtained are really crosses they may create interest in the cotton world.

13. A careful study was made on the shredding of cotton bolls and its relation with the bollworm. It was observed that in early stages the shedding was more due to bollworm but later more on account of other causes. A thorough investigation of all the causes of shedding seems to be necessary. Studies in correlations have been taken up and will be summarised when complete. Selfing and multiplication of the seed of Dharwar No. I and Gadag No. I cottons which have been so very popular in Dharwar District continued as usual.

14. *Jowar breeding work*.—Ten varieties—Chavari, Aralin, Nandyal, Muddinandyal, Mahisal, Holgi, Wagar, Fulgar white, Fulgar yellow and

Handimasadi were maintained pure by protecting the earheads with bags against cross fertilization. Purification and selection in Kanvi and Hasarbiga has been undertaken for Gadag tract. Savaner has been found to be the most desirable among the early varieties. Selection for high yield was done in Fulgar white, Fulgar yellow Nandyal and Bilichigan. The selected strains were compared on a large scale with ordinary seed and were found to be promising. Mahisal strain No. 20 gave 1,300 lbs. grain, 2,750 lbs. kadbi and 360 lbs. chaff per acre. Four selections of Muddinandyal are also promising. The characters associated with yield and earliness are being studied. The attack of grass-hoppers spoiled jowar breeding work to a certain extent. It was observed that Holgi, Fulgars, Chowari and Ambebahar suffered more than Vagar Muddinandyal and Nandyal varieties.

15. *Ground-nut breeding work.*—This is a new special work undertaken by the Cotton Breeder. The types referred to in paragraph 26 of the last year's report were grown separately. Out of 24 plants selected as good yielding, 10 proved to be distinctly high yielding and these have been retained for multiplication and further test. It was further observed that the number of pods on the plant does not influence the yield so much as the size does. Correlations between the yield and the average number of pods and between the yield and the size of pods seems to be worth studying but need the attention of a separate hand. Proposals will be submitted after some more study of the crop. The promising strains were 18 per cent. better than the unselected general seed. The results are encouraging but need confirmation.

16. The other experiments conducted by the Superintendent of Dharwar Farm were mainly on crops and manures.

17. *Crop Experiments.*—Four varieties of jowar, viz., Nandyal, Fulgar white, Fulgar yellow and Mahisal were tried. Nandyal stood best both from the point of grain and kadbi. X Holgi variety of jowar tried again during the year did not give a ratoon crop. The trial of wheat varieties was vitiated by the attack of rust. Pusa varieties resisted the attack. The trial of Lucerne as a dry crop in lowlying black soil fields is on the whole encouraging. The trial of tobacco needs repetition. The Algaroba plants are making good progress.

18. *Manurial Experiments.*—The average results of Farm Yard Manure series for 4 years were tabulated in the last year's annual report. This year's results too go to confirm that an application of 10 tons every second year is the best method and that of 15 tons every second year is not economic. The heavy dressing of Crude night-soil in 1914-15 gave good results till last year but those of the year under report indicate that the manure is exhausted. Both yield and net profit are lower than those of the control plot. The results of ploughing the farm-yard manure either before or after cotton are not again this year encouraging. The experiments will complete three cycles next season, and will be summarised. At the request of an American Firm made to the Director of Agriculture B. P. Poona, Amophos manure was tried on cotton in

comparison with Ammonium Sulphate and cake manure. All these were applied at the rate of 28 lbs. nitrogen per acre. The results are not in favour of this new manure. Results of bone meal on cotton are not also encouraging. With a view to find out whether green manuring can be adopted in the cultivation of dry crops like cotton, wheat and jowar in the transition tract, an experiment of san-green-manuring was laid out. Results will be published after a cycle of three years. The spacing experiment on cotton is in favour of 3' between the rows over 2' or 4'. The experiment will be repeated.

19. The Garden work on Dharwar Farm is being remodelled. Mango cultivation and nursery which seem to have large scope round Dharwar is receiving greater attention. Fig cultivation stands next to mango. A few "Gooti" grafts of Chikkoo and seedless guava are being prepared for sale.

20. *Gokak Farm.*—Manurial experiments on cane, maize, turmeric and fodder jowar are important. Results of Amophos manure against the standard top-dressing of ground-nut cake (150 lbs. N) are encouraging. Maize continued to respond to cake top-dressing (40 lbs. N). Results of the top-dressing turmeric crop with cake manure are in confirmation with those of previous years not favourable. Results of pig manure on maize, sugar-cane and fodder jowar are very striking. The cultivators round Gokak have soon understood the value of it and there is now keen demand for it. These three experiments need no repetition. Slaughter house refuse (5 tons per acre) was compared with Farm Yard manure (5 tons per acre) and the results are in favour of the former. Application of bone meal to cane crop in addition to other top-dressing manures has not paid its way. The farm has contributed much towards solution of the manurial problem in the Gokak Canal tract.

21. *Cultural experiments.*—There has been very little to choose between Gokak farm and modified Manjri method of growing cane during the year. The experiment will be continued for a year more and results of 6 years will be summarised. Slow furrow irrigation (improved Manjri system) has given decidedly better results than local system with less quantity of water. The experiment is very encouraging and will be repeated. The system of growing a mixed crop of maize and tur in rows has again given decidedly better results than taking two crops of maize one after another. The system is both in the interest of the cultivator and the fertility of the land and it is attracting the attention of the cultivators in the Canal tract. A mixed crop of Rala and cotton in rows 18" apart has given a net profit of Rs. 143 against cotton alone which has yielded a net profit of Rs. 77 per acre. The experiment is very encouraging but needs confirmation. With a view to minimise the cost of turmeric seed which generally sells dear an experiment was conducted with cut versus whole sets. The sets were divided into two and 50 per cent. saving was effected. The yield of cured turmeric in the case of cut sets has been less but the net profits more than in the control plot. The experiment will be repeated.

22. *Crop experiments.*—In the trial of cane varieties, Khadya has stood best under the conditions of water supply during the year. A summary of several years' experience would be interesting.

(a) Khadya is a promising hard pig-proof variety resisting drought and is well suited to the conditions of Canal tract. Its adoption however means change in the Gural organisation.

(b) Yellow Mauritius is a semi-hard variety resisting drought and thriving well on kirl soils. It tillers less and gives lower yields than local pundia in good soils. It is a variety particularly suited to kirl soils which exist in canal tract.

(c) Red sports and Barbados are semi hard quick growing early varieties and give fairly good yields. They arrow and lodge however and produce inferior gul. The cultivators are not likely to take to them.

(d) Stripped Mauritius and Manjav need be rejected.

23. In the trial of cotton varieties Dharwar No. 5 stood first in point of yield giving 1,400 lbs. seed cotton per acre. Next to it was Dharwar No. I X Rosea cross which gave 1,352 lbs. In the trial of tobacco varieties, Sumatra stood first and local broad leaved second. In sweet potatoes, Ceylon white and American red have done better than local varieties. These foreign varieties are attracting the attention of the cultivators. Local red has again given the best yield of creepers.

The other crops which gave promising yields on Gokak farm were Lucerne and groundnut. Lucerne yielded 47,000 lbs. green fodder and groundnut 2,600 lbs. pods per acre.

24. *Garden.*—Santras bore a good Mriga Bahar crop fetching Rs. 450 for 20 gunthas. The garden did well on the whole and has yielded a net profit of Rs. 500. The nursery business is extending.

25. *Depôt.*—Besides field experiments the farm depôt sold articles worth Rs. 4,500 during the year and continued its close touch with the cultivators in various ways. The articles sold were mainly implements, manure, seed, seedlings and grafts.

26. *Mugad Farm.*—The land was levelled and made fit for breeding work. To preserve seed and important selected strains a rat proof shed was erected at a cost of Rs. 1,000. As regards actual work, 254 samples of Antarsal and 318 of Mugad were studied in general. On 25 in each of these, an intensive study was made on the economic characters described in paragraph 40 of the last year's report. On the basis of yield of individual plant characters of 142 cultures from Antarsal and 188 from Mugad have again been selected this year for general study during the next season. Out of these, 25 from each have been selected and preserved for replication and 10 best out of those 25 for very intensive study. These 10 selections in each variety show very promising improvement over the check but need corroboration in successive years.

27. About 30 samples of Gonag obtained from cultivators' fields were sown. Some were found to be pure wild rices while others indicated splitting. The problem of Gonag is being studied further.

28. *Tegur Farm.*—The season under report of cattle of Tegur Farm was a good one. Many cattle died of rinderpest in the neighbourhood but the farm was kept free from contagion. 37,300 lbs. maize 10,000 lbs. grass silage 120,000 lbs. hay were prepared. Grazing and supply of drinking water were also adequate and the cattle thrived well. 8 bull calves were sold for Rs. 850 and the total number of cattle on 31st March 1925 was 127. The fact that cross bred animals of Tegur farm are fetching better prices than local ones, in the very mallad tract and elsewhere proves its popularity.

29. *Experiments in cultivators' fields.*—The District staff conducted a number of experiments with good results and demonstrated them to the cultivators. The important among them were:—

1. Bone meal and cake manure on paddy crop in 12 places. The use of these manures is extending.
2. Cake manure and Ammonium Sulphate on cane crop in 10 places. The use of these is becoming very popular.
3. Trial of groundnut (Spanish peanut variety) in 8 places. The area under this crop is fast increasing.
4. San green manuring in 6 places. The experiments were successful but the succeeding crop of wheat was attacked by rust.
5. The trial of turmeric in mallad under tank irrigation and in gadinad under well irrigation—in 6 places. The progress round Bailhongal is marked. Demand for seed increased and the seed had to be ordered from Satara District.

#### *Propaganda.*

30. *Demonstrations of improved implements.*—(Iron ploughs, Circular chaff cutter, Disc harrow, iron scraper, wheat thresher and stone roller.) This was the main propaganda work of the general district staff. A series of demonstrations were conducted in all quarters of the Division. Ploughing competitions were held in 4 places and prizes were awarded. The demonstrations of circular chaff cutters have been appreciated by the cultivators. The Dharwar District Agricultural Association sold during the year 17 circular chaff cutters. Wheat threshers with 12 discs have been popular and the Dharwar farm prepared and sold 5 such threshers during the year. The use of stone-roller is largely extending.

31. *Demonstrations of Nahan cane crushing mill, Poona furnace and gul-making.*—These in the mallad tract of the Belgaum District have been very popular and our propaganda has been a thorough success there. In the mallad of Dharwar District some more demonstrations are needed. In Chikkodi and Hukkeri talukas of the Belgaum District, the Poona furnace is attracting the attention of the cultivators but not the mill and the pan.

32. Other demonstrations were of crops experimented in cultivators' fields and wider method of planting cane in Chikkodi and Hukkeri Talukas.

33. *Propaganda against smut.*—In most of the demonstrations above referred to, steeping jowar seed against smut was also a regular item. Besides these, separate demonstrations were arranged in all taluka centres and in many places in the interior, at sowing time. This propaganda was mainly done through the Revenue Officers. The total number of packets distributed was 42,100. The Mamlatdars of Dharwar, Ranabennur, Gadag and Paragad and the Mahalkari of Murgod worked better than others.

34. *General propaganda.*—This consisted in general advice to cultivators all over the division by the Deputy Director and his District staff by holding small homely meetings to which much importance was given during the year under report. The important subjects of advice were—items referred to in paragraph 41 fencing against pigs in mallad, cattle improvement, improvement in cane cultivation, extension of Dharwar No. 1 and Gadag No. 1 cottons in suitable areas and their co-operative sale the use and advantages of various improved implements and bunding on contour lines. Talks on rural economics were also frequent.

#### *Organisation.*

35. The District staff every now and then inspected the existing non-credit societies and Taluka Development Associations in their charge, did the needed propaganda for them in the neighbourhood and attempted to start new ones after preparing the ground required.

36. *Seed and implement societies.*—These are 34 in number. The business done by these societies in implements has not in any way been encouraging. This is mainly due to the fact that the prices of iron ploughs have considerably gone down and the cultivators are inclined to purchase rather than take them on hire. Only four societies (sulebhavi, Hosritti, Yalvagi and Amminbhavi) have done some fair work. All these 34 societies together own about 200 ploughs. The business done in seed has been better but by no means satisfactory. Six societies (Devihosur, Karjagi Gadga-Betigeri, Saswiballi, Panigatti and Muddebihal) have done fairly good work. The seed purchased and distributed by these societies in all was 2,500 bags. After doing all the needed propaganda for these societies I am definitely of opinion that small seed and implement societies cannot afford to maintain well paid secretaries to run their technical work and should better be amalgamated into one for each Taluka in a suitable centre. The Taluka Development Association where they exist should better take up this work to start with and should collect indents through credit societies.

37. *Manure societies.*—Kabbur and Bellad-Bagewadi societies distributed ammonium sulphate and cake manure. The District Agricultural Overseer Chikkodi took pains to revive them.

38. *Cotton Sale societies.*—Among all the non-credit agricultural societies these continued to serve the cultivators best. The total number of dokras sold by different societies in auction sales was 43,013 (Hubli



15,728, Gadag 21,286, Haveri 3,422, Dharwar 2,213, and Bijapur 364) Bailhongal and Annigeri societies disposed off their arrivals by private Treaty. The total number of dokras so sold by all the societies amounted to about 15,000. Prices realised in auction sales were far better than those in private treaty. Hubli and Gadag sale societies have now taken their root. Haveri, Dharwar and Annigeri should in my opinion serve as branches. Bijapur, Bagalkot and Bailhongal need further development as independent societies.

39. *Other sale societies.*—The Chilly sale society at Byadgi sold 209,760 lbs. produce worth Rs. 44,940 and realised a net profit of Rs. 921. The Hirekerur Taluka Development Association also worked for this society. The Nippani tobacco sale society sold 1,41,040 lbs. produce worth Rs. 67,328 up to 31st March 1925 and realised a net profit of Rs. 2,127. This society is not really a Producers' society and needs further development in that direction for which attempts are being made.

40. *Cattle Breeding societies.*—Two new societies—one at Haunsbhavi and other at Bhogavi—both in Hirekerur Taluka of the Dharwar District were organised and registered under the co-operative act. Some old societies have considerably improved. Sidenur Cattle Breeding society has increased the number of cows to 110 and is erecting a cattle shed outside the village. The total number of cattle breeding societies is now 13.

41. *Fencing societies.*—Dhumwad, Kurankop, Birawalli, Bendalgatti and Astagatti fencing societies have realised the benefits of their walls against wild pig. Their watching expenses have been saved and new waste land is coming under cultivation. The rental value of the land is also increasing. Three new societies Nelliharve, Bommgatti and Tavergeri have been formed and registered under the co-operative act and the building work is in progress. The Tadas scheme is almost ready for registration. The schemes at Tegur, Kittur, Bidi and Arbhavi met difficulties and have not yet matured. The one at Arbhavi will come out soon.

42. The campaign of the removal of the prickly-pear against pig in Mundargi petha with the help of the Deputy Collector III Dn. Dharwar continued during the year. The work is in progress in 9 villages, and the prickly-pear both in Government waste land and in cultivators' fields is being removed. A special Kamagar has been deputed to this work under the District Agricultural Overseer, Gadag. The relief from the ravages of pig has been substantial and the work has been much appreciated by the cultivators.

43. *Joint cultivation and Irrigation Societies.*—Maharajpeth joint cultivation society was registered under the co-operative act. The Mango joint cultivation at Amminbhavi was damaged by some people under private grudge and investigation is being made by the police. The importance of joint cultivation and irrigation schemes have been dealt with in para. 57 of the last year's annual report. Good many schemes are being worked out and some will mature during the coming season.

44. *Taluka Development Associations.*—Two new such Associations Hirekerur and Hangal were organised and registered under the co-operative act during the year. There are now in all 9 Taluka Development Associations in the Southern Division. Athani Association did good work in connection with fodderstorage against famine. Fodder worth Rs. 8,000 and subscription amounting to Rs. 7,000 have been collected, under the directions of Mr. Hiremath, the Deputy Collector II Division and a subsidy of Rs. 15,000 was given by Government for purchase of fodder. Stacks have been built under the supervision of Mr. Neginhal, the District Agricultural Overseer in charge of that Division. Chikkodi Taluka Development Association purchased a boring machine. All Taluka Development Associations except Ron did propoganda work in various directions but Indi, Chikkodi, Gadag and Dharwar Associations did more work than others. Hirekerur and Hangal Taluka Development Associations have good collections and their activities were manifold. Regular programmes of work were drawn for all these Associations by the Deputy Director in consultation with the District staff and the associations concerned. These associations have great future but the question of collecting local subscriptions has been very difficult and needs solution. A sort of levy on the agriculturists in good years which will bring in a capital that will yield an interest of Rs. 1,000 every year is what is really needed and a move is necessary in that direction. Six new associations (Hukkeri, Savadatti, Haveri, Navalgund, Bijapur and Sindagi) are being organised and it is hoped that Navalgund, Bijapur and Saundatti Associations will soon come into existence.

45. *The District Agricultural Association, Dharwar.*—Sold implements worth Rs. 3,914, realised Rs. 174 as hire proceeds on iron ploughs and arranged a Mango show during the year. The Committee which was appointed to consider the question of relation between this and co-operative bodies met twice and drafted a report which has been submitted to the Director of Agriculture and the Registrar, Co-operative Societies, for consideration.

46. *District Cotton work.*—The Cotton staff as usual distributed farm seed Dharwar No. I at Sherewad over an area of 758 acres and Gadag No. I at Gadag and Kurtakoti over an area of 370 acres. The seed raised on seed growers' farms were distributed Dharwar No. I in 5,000 and Gadag No. I in 6,200 acre blocks. Sowing and rouging operations were attended to and the produce raised was brought to the auction sales (Dharwar No. I to Hubli and Gadag No. I to Gadag) ginned separately and seed stocked for further distribution. Quantities available for next season are, Dharwar No. I seed 1,060,500 lbs. sufficient for 106,046 acres and Gadag No. I seed 952,300 lbs. sufficient for 95,230 acres. The District staff and the Cotton sale societies, Hubli, Gadag and Bijapur worked together for general distribution of the seed stocked last year. The distribution was done through seed societies and by opening independent depôts in respective areas. Dharwar No. I general seed of known origin had spread over an area 90,000 acres and Gadag No. I over 95,000 acres. Besides this merchants and Dalals distributed a lot. At the time of this propoganda of seed distribution, steeping seed in salt solution, sowing

with Surat drill clean picking and sale of the produce through co-operative sale societies were advocated. During the year under report 43,013 dokras of different types of cotton were graded and sold by auction by cultivators through sale societies 30 per cent. of the produce of the seed distributed came to sale societies and realised an extra profit of Rs. 3,30,000. The rest went to the markets.

47. The co-operative seed and sale organisation is not keeping place with the spread of these varieties. Adequate and more timely finance to the cotton grower described in para. 62 of the last year's annual report is yet a problem and needs solution by the Registrar, C. S., B. P., Poona. Cotton work is largely extending in the Southern Division and the appointment of a Cotton Overseer at Bijapur is an immediate need.

48. The Cotton Transport Act has worked very satisfactorily in the Southern Division. There were some difficulties regarding the import of cotton from adjoining parts outside the limits into Gadag and Bijapur markets, and the Director of Agriculture who is a licensing Officer settled them by his personal visits. Licenses were freely issued at Gadag for import of cotton from the adjoining parts of Nizam's dominions and Madras Presidency. This was an additional heavy work to the Cotton Overseer and very responsible work too ; but it was essential.

49. The Mechanical Assistant inspected 6 pumping sites in Bijapur District, 4 in Belgaum District and 2 in Dharwar District and prepared drawings and estimates. He turned one hand circular chaffcutter into power at Bijapur, assisted in erecting a Rice hulling machine at Kittur and repaired the pumping plant at Neginhal. He attended to all the machinery over the farms in this Division, overhauled oil engine, centrifugal pump, cane crusher, chaffcutter and counter shaft on Arbhavi farm and oil engine on Dharwar Farm, erected weigh-bridge chaffcutter and corn crusher on Bankapur farm. He had full work during the year.

50. *Embankments.*—The special bunding officer prepared 21 new schemes during the year, out of which 11 schemes are within the radius of 10 miles from Gadag. The schemes prepared last year were executed. Efforts are being made to concentrate the work in certain areas. A co-operative bunding scheme at Sirur is being attempted. Individual schemes extending over an area of about 200 acres in five villages are also under contemplation. Bunding on contour lines is attracting the attention of the cultivators and applications from all quarters cannot be attended to. It is necessary that all District Agricultural Overseers should develop this line of work and should possess levelling instruments.

*Paragraph 51.*—Boring work :—Five Machines continued to work, two in Dharwar, two in Belgaum and one in Bijapur District. The Machines in Dharwar District did very satisfactory work. Those in Belgaum worked only a part of the season as one was sent to Poona for being converted into a power machine and the engine of the other for repairs. The Bijapur machine did good amount of work but with less success. In all 42 bores were taken during the year the details of which are tabulated in a separate statement attached to the report. Of these 42 bores, 18 were

for agricultural purposes while the rest were for drinking. The working of different machines and their financial success is tabulated below.

District.	No. of Machine.	Number of bores taken.				Total.	No. of days worked.
		Successful.	Failure.	Incomplete.	Rejected.		
Dharwar	10	10	..	..	..	10	148
Do.	12	8	..	1	2	11	212½
Do.	22*	3	1	..	..	4	84
Belgaum	22	3	..	..	..	3	
Do.	7	3	2	1	1	7	116
Bijapur	23	1	5	1	..	7	256
Total	5	28	8	3	3	42	816

District.	Depth bored.	Expenditure.	Receipts.	Profit or loss.
		Rs. a. p.	Rs. a. p.	Rs. a. p.†
Dharwar	651' 6"	824 13 6	1,203 4 6	378 14 0†
Do.	652' 5"	841 8 6	1,378 6 0	536 13 6
Do.	415' 6"	1,085 2 0	1,025 13 4	59 4 8
Belgaum				
Do.	282' 0"	1,321 8 3	624 1 0	697 7 3
Bijapur	498' 6"	650 12 0	679 14 8	29 2 8
Total	2,499' 11"	4,723 12 3	4,911 14 6	188 2 3

\* After completing 4 bores in Dharwar District, the Machine was sent to Poona for conversion. It was worked in Belgaum District after its receipt from Poona.

† In addition to the profit of Rs. 188-2-3 miscellaneous receipts for repairing pumps were Rs. 136-1-0 making a total net profit of Rs. 324-3-3 for the year.

*Paragraph 52.*—Help given to Public Bodies in boring :—Two Departmental hands have been lent, one to Dharwar and the other to Chikkodi Taluka Development Associations. The boring work of these Associations, Gadag Taluka Local Board, Sangli State at Shirahatti and Bijapur District Local Board were occasionally inspected on request and necessary advice given. The new plant ordered by the Hubli Municipality was inspected and was placed in charge of a local man trained on Departmental Machine. The Local Boards are not freely responding to the call of the people and the number of the Departmental Machines is quite insufficient to meet the demand.

53. *Karjagi Fodder Baling Plant.*—The kadbi shredding and baling plant erected close to the Karjagi Station as a measure against fodder famine was worked for the first time during the year under report. The season for jowar in the tract round Karjagi was only fair and free purchases of fodder were not possible. The Machine was worked on hire system for a time and then purchases worth Rs. 4,000 were made. 1,21,770 lbs. of kadbi was worked on hire system and 4,23,418 lbs. was purchased. The hire proceeds were 20,340 lbs. In all therefore 4,43,758 lbs. of kadbi (5,282) bales has been stocked in the godown built near the plant. The cost of kadbi including cartage to the plant came to 0-11-6 per 100 lbs. and the cost of baling is being worked out by the Agricultural Engineer. The machine being new had many break-downs during the year.

*Agricultural Education.*

54. The Agricultural School at Devihosur completed its 11th year and during this whole period 112 students have passed out. As many as 62 applications were received during the year for admission and this tells the popularity of the school. 18 students were selected but 4 were sent back as unfit. 14 students in the 1st year and 12 students in the 2nd year received education during the year. Besides 4 teachers for agricultural bias schools and one kamagar for Konkan were trained to do their duties. All these were occasionally taken on tour to study various subjects which could not properly be studied at Devihosur. The school is now very popular.

55. Two agricultural bias schools were opened. One at Bhatgunki in Indi Taluka of the Bijapur District and the other at Hulkoti in the Gadag Taluka of the Dharwar District and the teachers trained in 1923-24 were sent to these schools. Hulkoti school has been more successful than Bhatgunki.

*Miscellaneous work.*

56. The Divisional Board held its quarterly meeting very regularly and all the members official and non-official were regular in their attendance. Good many important subjects were discussed in these meetings and the proceedings were submitted to the Joint Board. The Deputy Director of Agriculture, S. D. was the Chairman of the Board throughout the year. The Officers' Divisional Conference was held in the month of May 1925 when subjects concerning investigation, experiments, propaganda and organisation were freely discussed and programme of important work outlined.

57. Co-operative conference at Belgalpeth, Hiremallur. Haveri, Bailhongal and Shelwadi were attended and subjects on agricultural co-operation discussed.

58. Tagavi loan applications for amounts exceeding Rs. 1,000 amounting to in all Rs. 1,08,550 for land improvement were dealt with. Various sites were inspected and estimates of schemes prepared.

59. 1,300 Mango grafts were distributed round Dharwar through Rao Sahib M. L. Kulkarni, retired Deputy Director of Agriculture.

*General Remarks.*

60. Improvements and organisation in agriculture are awakening the people and their demand for advice and help on the Deputy Director and his staff has considerably increased.

61. My office is now required to work direct with 20 heads of sections with varied activities, 9 Taluka Development Associations and 66 Non-credit societies, besides Revenue Officers and individuals. The work of Divisional Board has largely increased and that of checking and counter-signing the Travelling Allowance Bills was newly added during the year. My office work is going out of control, and I cannot but reiterate that an additional clerk is an immediate bad need.

62. The staff in general has put in good year's work. The work of the Cotton Overseers Gadag and Hubli and that of Embankment officer deserve special mention. Mr. Brahme with the limited staff under him ably conducted my office and did his best to cope with the work which has so vastly increased.

63. Many Revenue officers and private gentlemen continued to help our demonstrations and organisation work. To the list of the persons that I have mentioned in para. 81 of the last annual report, I must add this year the names of Mr. Revanshiddappa Hipparagi, President, Taluka Development Association, Athani and Mr. S. S. Alur, Secretary, Taluka Development Association, Chikkodi who showed an amount of interest in their work.

64. In conclusion I am glad to make a mention that His Excellency the Right Honourable Sir Leslie Orme Wilson, P.C.G., C.I.E., C.M.G., D.S.O., visited Dharwar Farm on 26th August 1924 and spent an hour and half in inspecting the work of the Division arranged in different sections. His Excellency also interviewed the members of the District Agricultural Association there. His visit was a very encouraging one.

S. S. SALIMATH,  
Deputy Director of Agriculture,  
S. D., Dharwar.

## Statement showing the details of

Serial No.	Name of owner.	Name of Taluka.	Name of Village.	Diameter of Bore.	Depth of Boring.	Water before boring in gallons per hour.
	<i>Dharwar District.</i>			Inches.		
1	Mr. Tippanna Chitragar	Savanur	Savanur	3"	65'-0"	..
2	" Phay Ahamadkhan Pathan	"	"	3"	76'-0"	360
3	State work	"	"	3"	60'-0"	..
4	Gousumiya Husemiya	"	"	3"	95'-0"	160
5	Buddekhansahab	"	"	3"	79'-0"	200
6	Mostansahab	"	"	3"	44'-0"	200
7	Parakimiya	"	"	3"	75'-0"	160
8	Modinsab	"	"	3"	72'-0"	160
9	"	"	"	3"	44'-0"	360
10	Dongariba	"	"	3"	41'-0"	100
11	Chairman, Municipality	Kundagol	Kundagol	3"	28'-0"	100
12	"	"	"	3"	20'-0"	100
13	"	"	"	3"	50'-0"	..
14	Mr. R. K. Nadgur	"	"	3"	160'-0"	..
15	" V. M. Deshpande	"	"	3"	160'-0"	..
16	" Tejappa Hubli	Hubli	Hubli	3"	100'-0"	260
17	" N. S. Chitgubbi	"	"	3"	72'-0"	100
18	"	"	"	3"	82'-0"	200
19	" Krishapa Naik	Gadag	Mulgund	3"	20'-0"	..
20	" Govind Ramchandra	"	"	3"	41'-6"	..
21	" Rangappa Naik	"	"	3"	22'-5"	40
22	" Ramachandrapa karni	Kul-	"	3"	17'-6"	200
23	" Gangadhar Ganesh	"	"	3"	40'-0"	..
24	" Mallargowda Patil	"	Kurtakoti	3"	95'-0"	..
25	"	"	"	3"	2'-0"	..
	<i>Belgaum District.</i>					
26	Mr. Irapa Ramapa	Chikodi	Akol	4"	5'-0"	..
27	" Mahars	"	"	4"	46'-0"	..
28	" Magadam	"	"	4"	19'-0"	..
29	" D. P. Kulkarni	"	"	4"	55'-0"	..
30	" Bala Kamate	"	"	4"	73'-0"	..
31	" M. Patil	"	"	4"	33'-6"	..
32	" Bhaichand Gujar	"	"	4"	50'-6"	..
33	Sardar V. G. Desai	Bail-Hongal	Chaebdi	4"	21'-0"	100
34	"	"	"	4"	52'-0"	100
35	"	"	"	4"	84'-6"	100

## bores taken during the year 1924 25.

Water after boring in gallons per hour.	Departmental charges.			Labour charges.			Coal and fuel for engine.			Total cost of Boring.			Cost per foot.			Result.
	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	Rs.	a.	p.	
560	121	4	0	112	8	0	10	0	0	243	12	0	3	12	0	Successful.
1,500	146	0	0	129	6	0	11	8	0	286	14	0	3	12	5	"
240	110	0	0	151	14	0	13	8	0	275	6	0	4	9	5	"
2,000	194	4	0	73	2	0	6	8	0	273	14	0	2	14	0	"
2,000	155	8	0	90	0	0	8	0	0	253	8	0	3	3	4	"
3,000	79	12	0	69	8	6	5	8	0	154	12	0	3	8	3	"
1,800	148	3	6	69	7	6	6	0	0	223	10	0	2	15	8	"
2,000	141	2	0	115	6	0	8	8	0	265	0	0	3	10	11	"
1,500	77	0	0	45	0	0	4	0	0	126	0	0	2	13	10	"
2,500	72	10	0	112	8	0	10	0	0	195	2	0	4	10	1	"
400	96	8	0	48	2	0	4	2	0	148	12	0	2	12	1	Successful. Completed this year. Work done last 26'.
400	35	0	0	21	14	0	1	14	0	58	12	0	2	15	0	" "
..	50	0	0	30	10	0	2	10	0	83	4	0	1	10	8	Failure.
200	428	5	4	87	8	0	7	8	0	523	5	4	3	4	4	Successful.
200	426	0	0	87	8	0	7	8	0	521	0	0	3	4	1	"
..	211	6	0	35	0	0	4	2	0	270	8	0	2	11	3	"
600	144	14	0	55	0	0	4	2	0	203	0	0	2	13	1	"
1,500	169	9	0	60	0	0	4	8	0	234	1	0	2	13	8	"
..	20	0	0	120	0	0	40	0	0	180	0	0	9	0	0	Rejected.
..	41	8	0	275	10	0	90	0	0	407	2	0	9	13	6	"
300	39	4	0	83	2	0	23	8	0	150	14	0	6	11	4	Successful.
1,000	30	10	0	39	6	0	13	8	0	83	8	0	4	12	6	"
1,200	70	0	0	70	0	0	24	0	0	164	0	0	4	1	7	"
260	225	3	0	65	10	0	8	0	0	298	13	0	3	2	4	"
..	....			....			....			....			....			On hand.
..	75	0	0	60	0	0	64	0	0	199	0	0	3	15	8	Failure. Completed this year. Previous work done 45'.
260	103	8	0	35	0	0	44	0	0	182	8	0	3	15	6	Successful.
..	28	8	0	32	8	0	40	10	0	101	10	0	5	5	7	Rejected.
260	166	5	0	37	8	0	57	4	0	261	1	0	4	11	11	Successful.
260	175	12	0	52	8	0	65	10	0	293	14	0	4	0	5	"
..	75	0	0	42	8	0	43	2	0	160	10	0	4	12	9	Failure.
..	....			....			....			....			....			On hand.
600	57	9	0	29	8	0	36	4	0	124	5	0	5	14	9	Successful.
400	128	5	0	53	0	0	83	6	0	264	11	0	5	1	5	"
900	230	2	0	74	8	0	137	12	0	442	6	0	5	3	10	"



Serial No.	Name of owner.	Name of Taluka.	Name of Village.	Diameter of Bore.	Depth of Boring.	Water before boring in gallons per hour.
	<i>Bijapur District.</i>			Inches.		
36	Messrs. Patil Brothers ..	Bijapur ..	Bijapur ..	3"	2'-0"	..
37	" Harvey Sabhapati and Company ..	" ..	" ..	3"	50'-0"	100
38	Mr. R. B. Kembhavi ..	" ..	" ..	3"	50'-0"	..
39	Messrs. New Bearer and Company ..	" ..	" ..	3"	150'-0"	..
40	Merchant Ginning Pressing Company ..	" ..	" ..	3"	100'-0"	..
41	Laxmi Oil Mill ..	" ..	" ..	3"	100'-0"	..
42	Messrs. Harvey Sabhapati and Company ..	" ..	" ..	3"	48'-6"	..

Water after boring in gallons per hour.	Depart- mental charges.	Labour charges.	Coal and fuel for engine.	Total cost of Boring.	Cost per foot.	Result.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
100	112 8 0	105 0 0	15 12 0	233 4 0	3 5 3	Failure. Completed this year. Previous work 68'.
400	94 6 0	145 0 0	21 12 0	261 2 0	5 3 7	Successful.
100	50 0 0	115 0 0	17 4 0	182 4 0	3 10 4	Failure.
40	198 0 8	400 0 0	60 0 0	658 0 8	4 6 2	..
40	112 8 0	270 0 0	40 8 0	423 0 0	4 3 8	..
..	112 8 0	290 0 0	43 8 0	446 0 0	4 7 4	..
..	..	..	..	..	..	On hand.

.....  
Boring Assistant,  
S. D., Dharwar.

## APPENDIX F.

## SUMMARY OF WORK DONE BY THE DEPUTY DIRECTOR OF AGRICULTURE, GUJARAT, SURAT, FOR THE YEAR 1924-25.

## I. STAFF.

I was in charge of the Division throughout the year.

2. Mr. C. S. Patel was on deputation to Nasik Division as Deputy Director of Agriculture in place of Mr. Jenkins on leave for 8 months, from 12-5-1924 to 11-1-1925 and then he was on leave for 4 months. Mr. K. D. Naik acted in his place throughout the whole period.

## II. EXPERIMENTAL AND RESEARCH WORK.

(1) *Cotton Breeding at Surat and Broach.*

3. The crosses between I A Cylindrical Foll type (Female) and Goghari E5 (Male) and 1027 (Female) and Goghari E5 (Male) have now reached the fifth generation, and some of them show good promising signs.

(2) *Jowar Breeding at Surat and Broach.*

4. *Surat.*—Out of the five old Budh Perio strains tried, Althan Deshi 6 and Mohani Timberva 7 have proved superior both in yield and quality of grain, the former having plump and glossy seeds and the latter having flat and bigger ones. When tried on a field scale on the Surat Farm the former yielded 876 lbs. and the latter 1,125 lbs. of grain per acre against 756 lbs. of other types. Out of 61 new selections from local samples of three main varieties, 29 have been retained, of which 6 are more promising and will be further tested. Natural cross fertilization between adjacent rows of Jowar occurs upto 25 per cent.

5. *Broach.*—Out of 14 strains of Rabi Jowar 9 have been maintained, of which Nos. 5, 8, and 12 (which are being purified) are more promising and are on average 33 per cent. superior to the local mixtures of 6 sample grown on the Broach Farm. Important botanical and economical characters are also studied at both the places.

(3) *Cotton Breeding at Viramgam.*

6. During the year under report, out of the 5 strains of Wagad isolated at Broach and transferred to Viramgam for further trial, the white flowered Wagad which did not show any superiority over the local ones during the last two seasons' trials at Viramgam was dropped, and only 4 strains Nos. 14, 8, 12, and 4 were tried on a field scale in comparison with

local Mandal which is considered to be best variety among the local Wagad Cotton. Outturn results are summarized below :—

Plot No.	Strain.	Area in Gunthas.	Yield per acre in lbs.	Ginning percentage.	Length of staple in C. ms.
1 and 8	Local Mandal	10	554	36.25	1.88
3	Wagad Pt. 14	20	968	39.5	1.93
4	" Pt. 12	20	950	41.0	1.93
6	" Pt. 4	20	628	39.5	2.07
7	" Pt. 8	14½	436	42.0	1.99

All the strains bred true to the character as observed in previous years. Plants 4 and 8 have gone down in yield due to poor soils towards the east in their respective plots, and some 30 to 50 per cent. of the plants withered due to want of moisture without giving any yield. All these 4 strains are decidedly superior to any of the local variety of Wagad cottons. Every effort is made for further multiplication of their seeds. If every thing goes right, the Department will be able to secure seed from the produce of 150 acres covered by the seed of these four strains from the seed growers.

#### (4) Tobacco Breeding at Nadiad.

7. As observed in the last year's report (pages 85 and 86), selfed seed of only 12 promising strains out of 32 of the last year was planted in two sections (a) for the study of economic characters and the comparison of the yield among themselves, and (b) for propagating the selfed seed of the best plant after selection and for study of the flower characters.

8. One segregate from each of the 4 local varieties was tested for yield against its local. Selfed seed of a single plant was used in each case. Pusa 28 was also grown along with for comparison. As a result the yield of each individual strain was superior to its corresponding local from which the original selection was made. The quality of each of them was also superior than the local as judged by the local market.

9. Greatly encouraged with the results so far obtained, it has been decided to segregate pure strains of Tobaccos grown in other parts of Gujarat for improving their local varieties. In tobacco the difference in prices due to quality is almost as great as that in cottons. Therefore the primary object of this Station is to find out high yielding strains having good qualities also, suitable for the local market, and if possible for the foreign market also.

10. The study of manures has been taken up this year and a series of experiments with castor cakes, sodium nitrate and Sann as green manure, etc., has been laid out, but it is too early to draw any conclusions this year. The question of curing tobacco has been postponed for the present to be tackled at some future date.

(5) *Surat Agricultural Station.*

11. (1) *Cotton*.—The whole of the Farm area of 56 acres and 38 gunthas to be sown with cotton was sown with the selected strain of 1027 A.L.F. The average yield of cotton on the Farm was 604 lbs. as against 350 lbs. in the surrounding villages of the Athwa Group, and against 469 lbs. per acre of last year. Nearly 20,000 lbs. of pure seed was obtained by ginning on the Farm the whole produce of the Farm cotton for distribution in Athwa group villages. (2) *Jowar*.—The total area under this crop was 67 acres and  $3\frac{1}{4}$  gunthas, whose average yield came to 743 lbs. per acre as against 972 lbs. per acre of the last year.

12. *Ridging Experiments—Experiment No. 1*.—The original old experiment was still continued to see the after effect of manure, etc. The yield is still higher as compared with the average yield of the Farm.

*Ridge Experiment No. 2*.—As reported in the last year's report the same experiment was continued with a fresh doze of manure, as it had already finished one cycle.

The cotton results are in favour of ridging with shallow intertillage in furrows by 9.5 per cent. and ridging with deep intertillage in furrows by 26 per cent. over that sown on the flat. In the case ridged and manured plots an increase of 44 per cent. was effected, the manure given being 10 tons of F.Y.M. all given in trenches. In case of Jowar the yield over the flat sown plots was more by 18 per cent. to 34 per cent grain by simple ridging and shallow intertillage and ridging with deep intertillage in the furrow. In case of ridged and manured plots the increase in grain and fodder both ranged from 60 to 64 per cent. over the flat.

*Experiment No. 3*.—This was started in the year 1923-24, with an addition of castor cake manure given as top-dressing to cotton and jowar both. The same process was continued except that the application of the castor cake was made to both the crops, whilst F.Y.M. was applied in 1923-24, as it is to be given every second year. The yield of cotton when castor cake is given in combination with F.Y.M. is more by 55 per cent. over the flat plot, while in the case of F.Y.M. alone it is only 31 per cent. over the flat. Castor cake in case of jowar has yielded 28 per cent. more grain and 69 per cent. more fodder, when applied alone than the flat unmanured plot, while there is an increase of jowar grain and fodder by 48 per cent. and 51 per cent. respectively, due to the residual effect of 10 tons of F.Y.M. applied in trenches to the previous crop of cotton, and in the case of F.Y.M. and castor cake combined it gave an increase of 62 per cent. in grain and 78 per cent. in fodder.

13. The ridge cultivation is spreading quickly in the surrounding villages. The total area sown by them during the year was 712 acres as against 285 acres of the last year. In two years the Department purchased ridging implements worth Rs. 1,400 and the surrounding cultivators purchased them of the total value of Rs. 5,970. All the sets purchased by the Department and all the available trained staff of the Surat Farm were placed at the disposal of the cultivators, for

preparing ridges and showing them their methods. The total number of ridging sets including those of the Department now available for the work in the district are 52 Middle Busters and Middle Breakers; 53 Cultivators and 7 Disc-harrows. From the above it is plain that the cultivators are adopting this method with earnestness.

14. The trials with Case Tractor were made during the hot weather with the set of implements newly purchased for the purpose. The black soil of the Surat district is exceptionally hard at this time of the year. We have however succeeded to tackle this kind of soil with a heavy mould board plough with certain new adjustments for penetrating the soil upto a depth of 10" to 12". But even then there remains a great problem of how best to crush the big clods turned over by the plough immediately after ploughing. This will have to be worked up in the next fair season along with detailed data as to the cost of working the tractor at different seasons of the year.

15. *Breeding Herd.*—The strength of the herd on 1st April 1925 was 130 against 108 of the last year. The total milk yield was 82,234 lbs. 12 ozs. of 38 cows against 76,257 lbs. and 12 ozs. of last year of 32 cows. After deducting newly calved and old animals the average yield per cow comes to 2,542 lbs. against 2,618 lbs. of the last year. The main feature of the year under report was that only 2 per cent. of the milk produced was put into the Separator, all the rest being sold as whole milk. As regards the performance of the animals, out of the 6 families maintained in this Dairy, the Gopi cow family has shown a good advance over the others. Majority of the cows in this family has yielded more than 3,000 lbs. a year. The total deaths during the year were 4 against 5 of the last year. There was no serious outbreak of any contagious disease except that of foot and mouth but without any casualty. During the year 4 bulls were issued to cultivators of Surat and Broach on premium system.

A new oil engine has been installed for the Dairy, and it is hoped that by its help enough green fodder will be raised for keeping up the milk supply and healthy condition of the herd.

#### (6) *Broach Farm.*

16. A greater part of the area of this farm was leased out temporarily as it was only required for multiplying the seed of the type suitable for the Broach tract that was evolved and supplied by the Breeding Branch.

#### (7) *Dohad Farm.*

17. The selection work in maize, wheat and gram was continued. In maize mass selection has done better. Multiplication and distribution of promising selected strains is being pushed on. Pusa 4 has maintained its superiority in point of yield nearly 200 lbs. more per acre, and is grown by cultivators on a large scale.

18. *Cultural Experiments.*—The main object of the Station is to introduce better crops and practices and raise the standard of cultivation

of the Bhils rather than to do much experimental work. Wider planting of maize 2' apart as against the local practice of sowing 15" to 18" has given an average increase of 25 per cent. yield over the local method. Wider planting of wheat also has shown better results. But further trials are necessary to confirm the results so far obtained.

19. *Varietal Experiments.*—N. R. Cotton has passed its experimental stage on the Farm. It is spreading both in Dohad and Jhalod. The cultivation of variali (Fennel seed) has proved to be profitable after four or five years' trials and a trial will be made to introduce it in the tract wherever irrigation facilities exist.

(8) *Amalsad Farm.*

20. No appearance of Red-rot was either observed in any of the canes on the Farm nor in the vicinity. Out of the 6 promising varieties tried on the Farm, Red-Sports, Manjav and Stripped Mauritius have kept up their reputation in point of yield and other factors too. All the available seed of these three varieties to the extent of 12, 22, 710 sets was distributed in the surrounding tract at a premium price of Rs. 5 over the local rate of 1,000 sets. Of all these, Red-Sports is not only superior in yield, viz., 80,566 lbs. cane per acre, but is much superior in percentage of juice to cane and the sugar contents to juice. It was impossible to meet the demand of seed of this variety as it is also hardy and does not require so much water as the Malbari or other soft varieties.

21. *New Crops.*—Three new crops, viz., (1) Pan (Betel leaves), (2) Parwar and (3) Plantain varieties were tried on the Farm. Of these three (1) Pan does not seem to have done so well as the other two. Some of the creepers died out but those that exist are in good condition, from which I am led to believe that the knowledge of cultivation seems to be wanting in the Overseer or that the soil has proved to be too heavy for it. (2) Parwar is a very valuable and rare vegetable in Gujarat and fetches at least annas 4 per lb. when cheapest; or 8 to 12 annas per lb. when scarce in the Bazar. (3) Plantain varieties—about 20 new varieties—from Poona and Bassein have been imported and planted and they are all doing well, but no conclusions can be deduced before they begin bearing. In addition to the distribution of the Sugarcane sets and Parwar sets worth nearly a thousand rupees, the Farm has supplied seeds to others worth Rs. 3,000.

### III. AGRICULTURAL EDUCATION.

22. There are two Vernacular Agricultural Schools in this Division, one at Godhra started in the year 1920 and the other at Surat opened temporarily in the year 1923. From the satisfactory work shown by the Surat Vernacular Agricultural School, the Government has been pleased to make it permanent from 1925. The classes started with 31 boys at Godhra and 30 boys at Surat. Four of the latter left the school due to unavoidable circumstances.

23. The results of the annual examinations of the schools held in April 1925 were as under :—

Number of boys.	Godhra		Surat	
	Appeared.	Passed.	Appeared.	Passed.
1st year .. ..	14	13	13	13
2nd year .. ..	16	13	13	11
	30	26	26	24.

24. The total expenditure of the Godhra and Surat schools during the year was Rs. 8,562-1-0 and Rs. 8,756-15-0 respectively. The District Local Board, Panch Mahals and Surat contributed Rs. 300 and 1,700 respectively toward the expenditure. The total Receipts of the schools amounted to Rs. 426-1-3 and Rs. 221-15-7 respectively, excluding from the latter Rs. 300 received from the Sachin State for the expense of a Scholar from that State for the last two years. The average feeding charges per boy per month cost to Government were Rs. 6-10-0 and Rs. 9-12-0 at Godhra and Surat respectively.

(2) *Agricultural Education imparted by the Staff of the Agricultural Department to the students of the Primary Schools.*

25. This was continued as last year in the case of the Dharala Boarding School adjoining the Godhra Vernacular Agricultural School and the Bhil Central School near the Dohad Farm. At the Annual examination the number of boys passed was 5 and 5 out of 6 and 5 at Godhra and 5 and 6 out of 5 and 8 at Dohad in the 1st and 2nd years respectively.

(3) *Training of the Primary School Teachers for the introduction of the Agricultural Bias Course in Rural Schools.*

26. The second batch of 5 teachers taken up for special agricultural training at the Godhra Vernacular Agricultural School in June 1924 finished their course successfully and joined the 5 rural schools one in each of the 5 Districts.

(4) *Publication of Agricultural matters.*

27. The publication of the Broach Quarterly Magazine was continued as usual, 20 articles in all being supplied by the Agricultural staff in this Division, and also material is being supplied to the Publishing Committee for publishing articles on agricultural matters in the Public Press.

#### IV. PROPAGANDA WORK.

28. *Divisional Board.*—The Divisional Board of Agriculture, Gujarat, held four meetings during the year. In addition, the Gujarat Divisional Cotton Committee attached to the Board held its special meeting on 11th and 18th February 1925. Both the bodies worked satisfactorily.



29. *District Cotton work.* (1) The total area under the control of the Department was 11,557 acres 4 gunthas against 9,146 acres 6 gunthas of the last year, the whole area being under 1027 A.L.F. In all five Gins at Surat, Bardoli, Navsari and Sisodra were selected for ginning the produce of the controlled area with the help of the Local Cotton Committee which held two meetings one on 14th December, 1924 and the other on 15th January, 1925. The total quantity of Kapas handled by the Department from the controlled area was 3,329 Bhars 9 maunds = 79,905 maunds while the quantity of lint obtained was 1,521 khandis (one khandi = 798 lbs.) about 3,042 full pressed bales. This was sold in the open local market at a premium ranging from Rs. 17 to Rs. 25 per khandi.

(2) *Cotton Seed Distribution.*—The total quantity of seed purchased from the above growers and financed from the Director of Agriculture's Personal Ledger Account was 1,803 gallis and 25 maunds = 2,164,699 lbs. and which was distributed mostly in the tract south of the river Narmada as under :—

	Lbs.
*1. Surat and Broach Districts south of Narmada .. ..	1,078,030
2. Broach and Ahmedabad Districts above North of Narmada .. ..	35,550
3. Navapur and Nandurbar .. ..	60,150
4. Rajpipla State .. ..	911,850
5. Baroda State .. ..	63,900
6. Southern Maratha Country .. ..	15,120
Total ..	2,164,600

\* This includes the reserve quantity kept at the various depôts for re-sowings if necessary. The total quantity, however, does not include the cotton seed 20,000 lbs. grown and distributed by the Surat Farm. In all 13 seed depôts were opened in the tract south of the Narmada for cotton seed distribution purposes.

30. *District Agricultural Work : (a) Demonstration and Shows.*—This consists in bringing agricultural improvements and better practices to the notice of the Rayats, by giving them advice and help in order to improve the general agriculture of the tract. During the year 16 demonstrations were held at different places, viz., 2 in Broach and 14 in North Gujarat. Besides these demonstrations the Kamgars in Surat and Broach districts held small village demonstrations showing the use of various ploughs and implements by giving them free of hire to cultivators of the backward tracts, the total area thus worked being about 120 acres. Demonstrations of the working of the mowing machine were in addition held in grass areas of Pardi, Bulsar and Chikhli Talukas at 6 places and 48 acres of grass was cut in 12 days. As a result 5 machines were ordered out by cultivators, which are already supplied to them.

(b) *Implement and Seed Depôts.*—Like last year, 6 implement depôts were continued, mostly in the very backward tracts of Gujarat from which implements are issued at very normal rate of hire or it is not charged at all as at Bulsar Depôt.

(c) *Distribution of Seeds, Implements and Manure.*—In addition to cotton seed distribution distributed by the cotton staff, various kinds of seeds were distributed from the different farms and by the District Agricultural Overseers amounting to 75,975 lbs. consisting of new and improved types of cotton, wheat, groundnut, etc.; 157 implements worth about Rs. 7,875 excluding spare parts and artificial manures about 24 tons worth about Rs. 1,747 were also distributed.

(d) *Demonstration Plots.*—The District Agricultural Overseers and the Kamgars managed 167 demonstration plots on cultivators' fields covering an area of 634 acres to demonstrate different methods of tillage and manuring and improved varieties of crops recommended by the Department.

(e) *Measures to prevent Smut in Jowar.*—Owing to better help rendered by Officers of the Revenue Department in carrying out this propaganda, 17,132 packets of coppersulphate were distributed, which ensured the jowar crop in an area of about 68,528 acres from the damage caused by Smut.

(f) *Agricultural Associations :* (1) The Chorashi Taluka Development Association continued to do good work as before, but was handicapped for want of a permanent fieldman as the second one also left the Association after he was fully trained in the work. There were 472 members of the Association including 13 Patrons and 55 Life members. During the year, besides supply of seeds and hiring out of implements, 600 copper-sulphate packets for use against smut in jowar and 67 poison packets against pigs and other wild animals were distributed and 125 country bores were budded with Ajmeri variety.

(2) With great efforts another Taluka Development Association was organised in Jalalpur taluka with the help of the Mamlatdar, Mr. B. J. Patel, L.Ag., and was to start work from the beginning of June, 1925. The first general meeting to constitute the Association had, however, to be postponed till the next fair season owing to the unexpected early rains. Ground has also been prepared to start two or three more development associations in the Division. It is hoped they will start work during the current year.

31. *Agricultural Non-Credit Co-operative Societies.*—The total number of these Societies in Gujarat was increased from 22 to 32. Of the 4 Machinery and implements Societies the Kareli Ginning Society earned Rs. 3,938 on account of hire charges during the year. Of the other Societies, the Cotton Sale Societies occupied a prominent position, the number being increased from 9 to 18 during the year. All of them worked except the one at Dabhali which was started rather late. These had in all 1,421 members, who made cotton sale business to the total value of Rs. 12,66,954 during the season. For their further development, the All Gujarat Co-operative Cotton Sale Societies conferred on 21st December 1924 and a Federation was formed, and representatives from each Society met together every month, in the Cotton season. The Agricultural Organizer, Co-operative Societies, whose services are placed at my disposal for organising Agricultural Non-credit work, was restricted to

work only in Surat District and in Ankleshwar and Hansot talukas of the Broach District which gave better results in organising and developing his work in concentrated areas. Such non-credit organisation work in other Districts has been entrusted to the District Agricultural Overseers concerned, so that they could more easily do it along with their usual work.

32. *Insect and Other Pests : (a) Katra or Hairy Caterpillar (Amsacia mooreii).*—Katra controlling campaign was continued at Dohad Farm, Galalia Falia, Rakhial (near Dakor) and Prantij by dusting Paris Green with different sorts of flours and it was found that gram flour mixture was the most attractive for Katras. Further trials are being made to find out the most economical stuff to be mixed with Paris Green to control the Katras in the best way. The best results are expected from Mowra flowers if they are thrown broad cast in the Katra affected areas or are put in hills after they are mixed with a mixture with gram flour and Paris Green. A leaflet is being prepared and as soon as it is ready it will be distributed in Panch Mahals and North Gujarat along with the poison to all the cultivators who apply for it in time, *i.e.*, April and May. Further investigations as to which baits the Katras like most and which could be easily and cheaply had will be continued.

(b) *Granary Pests.*—To have a thorough investigation of this problem, a complete survey of local methods of storage in two typical villages was undertaken and a number of storage experiments were made during the year. The survey determined that the loss caused by different insects to the grains stored by the people at Mota-Varachha and Adajan amounted to about Rs. 3,582 and Rs. 1,345 respectively during the year. The results are ready for publication in the Pusa Journal or the College Magazine, Poona.

(c) *Jowar Stem Borer Investigation.*—This was continued by the Special Entomological Assistant, being financed from the Sir David Sassoon Trust Fund. The results are ready for being published as a Memoir.

(d) *Other Pests.*—The Entomological Assistant, Surat, attended and controlled other insect pests on various crops at 5 places. He observed two new pests, *viz.* (1) *Vejinulus suratansis*—slugs that appear at the beginning of monsoon, feeding on chauli leaves in October, 1924, and (2) a new species of aphid found on tobacco leaves, specimens of which have been sent to Pusa for identification.

33. *Boring.*—One Musto Power Boring Machine with the Boring Assistant working on it was transferred from Sind to Gujarat in April 1925. Two Musto hand machines already working here were converted into Power Boring Machines. One new 6" Armstrong Power Drill machine was purchased. Out of 9 Cawnpore hand machines one was converted into Power and 8 hand machines were sent back to the Agricultural Engineer, Poona, for adoption for use in the Famine tracts. Thus the number of machines working in this Division at the end of the year was 6 only. The 2 Musto machines converted into Power that were fitted with the Wizard type of 6 B. H. P. oil engine did not work satisfactorily.

In all 28 bores including one incomplete of the last year were undertaken, involving a total depth of 1,927 feet ; out of which 17 were successful, giving an increase of 27,185 gallons of water. Out of the remaining 11, six failed and five were left incomplete (*vide* detailed statement attached). Three old bores that were choked up by sand, etc., were cleaned and set right on application from the well-owners. The total expenditure including permanent boring establishment during the year amounted to Rs. 17,804-6-7 and the total recoveries of boring charges to Rs. 2,356-5-2, those in arrears being Rs. 2,895-3-2.

34. *Mechanical Help to Cultivators and others.*—The Mechanical Assistant's Head-quarters were transferred from Nadiad to Surat in January 1925 which facilitated his work which he got more from Surat and Broach Districts than from Districts of North Gujarat. The Boring Assistant transferred from Sind to Gujarat in April, 1925, was placed at Surat to help the increasing work of the Mechanical Assistant, but soon after his services being found more badly needed in South Central Division, the Boring Assistant had to be sent to Poona in June, 1925. The Mechanical Assistant during the year got 38 enquiries including 5 pending of the last year ; out of which 22 were completely attended, four were filed, 8 were in progress and 4 in arrears. It has now been decided to charge nominal fees for the help of the Mechanical Assistant so that he may not receive calls unnecessarily and too often from the same person.

35. *General.*—In conclusion I am glad to say that all with a solitary exception or two have continued to work hard to the best of their respective abilities. The work of Mr. G. P. Pathak, District Agricultural Overseer, Panch Mahals, and now Superintendent, Surat Farm, deserves special mention. My Office staff and specially my Head-clerk Mr. M. S. Bhatye worked very hard and satisfactorily.

BHIMBHAI M.,  
Deputy Director of Agriculture,  
Gujarat, Surat.

Surat,  
Dated 16th November 1925.

## APPENDIX

Serial No. of Bores.	Names of Land or Well Owners.	Name of Taluka.	Name of Village.	Date of commencement.	Date of completion.
	<i>Incomplete Bores of last year completed in this year.</i>				
	<i>Ahmedabad District.</i>				
13	Shah Maganlal Becharadas	Prantij	Talod	10th June 1924.	26th July 1924.
	<i>New Bores undertaken in this year.</i>				
1	Mehta Ranchhod Virchand.	Do.	Fatepur	25th July 1924.	12th Nov. 1924.
2	Chakuji Hathiji	South Daskroi	Kubadthal	2nd Dec. 1924.	31st Dec. 1924.
3	Khan Bahadur Rustomji J. Vakil.	Do.	Rustompura	31st Dec. 1924.	28th Feb. 1925.
4	Nathabhai Gokalbhai	Do.	Kubadthal	7th Jan. 1925.	22nd Jan. 1925.
5	Becharji Nathooji	Do.	Do.	20th Feb. 1925.	11th April 1925.
6	Khan Bahadur Rustomji J. Vakil.	Do.	Rustompura	4th Mar. 1925.	2nd April 1925.
7	Hosanji Barjorji Vakil	Do.	Vatva	4th April 1925.	14th April 1925.
8	Chaturbhai Kalidas	Do.	Kubadthal	18th April 1925.	9th May 1925.
9	Hosanji Barjorji Vakil	Do.	Vatva	21st April 1925.	.....
10	Jalamsing Becharasing	Do.	Kubadthal	10th May 1925.	18th May 1925.
11	Umedram Kalidas	Do.	Do.	21st May 1925.	....
	<i>Surat District.</i>				
1	F. C. Battiwala	Pardi	Kumta	8th Nov. 1924.	8th Dec. 1924.
2	Do.	Do.	Do.	9th Dec. 1924.	16th Feb. 1925.

F.

Actual No. of working days.	Reasons of Stoppages.	Depth of well.	Total Depth of Boring.	Diameter of Bore.	Footage of Pipes used.	No. of Shoes used.
38	1 erection 8 for labourers due to rain.	40'	131'	3"	131'	1
30	1 day erection 95 for labourers due to rains. 2 dismantling	36' 9"	70'	4"	33'	1
22	2 erection 1 labour 5 for piping	41'	153'	3"	142'	1
30	4 erection 1 test 25 tools for accident	40'	77'	4"	70' 4" 50' 2 1/2"	1
11	2 for erection 1 for labour 1 dismantling 1 Test	48'	124'	3"	124'	1
24	1 erection 6 repair 12 labour 4 test 2 cleaning of engine 2 dismantling	45'	158'	3"	155'	1
12	4 erection 8 1/2 oil for labour 3 test 3 diameter extraction.	40'	84'	3"	76' 4"	1
10	2 earth work 3 erect and filling 1 test	47'	71'	4"	71'	1
10	2 erection 6 repairs 1 tools 2 test 1 dismantling	54'	24'	3"	25'	1
..	....	....	86'	....	....	....
5	2 erection 1 test 1 dismantling	54'	25'	3"	25'	1
..	....	....	103'	....	....	....
10	2 earth work 3 erection 9 in wait of A.E. 5 repair 2 test	45'	20'	6"	....	....
32	4 earth work 3 erection 2 cleaning of engine 8 tempering tool 9 blasting 8 for mechanic	33'	44'	6"	....	....

## APPENDIX

Serial No. of Bores.	Names of Land or Well Owners.	Water before Boring in gallons per hour.	Water level before Boring.	Water after Boring in gallons per hour.	Water level after Boring.	Increase of water supply in gallons per hour.
	<i>Incomplete Bores of last year completed on this year—contd.</i>					
	<i>Ahmedabad District—contd.</i>					
13	Shah Maganlal Becharidas	....	....	....	....	....
	<i>New Bores undertaken in this year.</i>					
1	Mehta ' Ranchod Virchand.	....	3'	210	9'	210
2	Chakuji Hathji ..	250	8'	2,250	11' 4"	2,000
3	Khan Bahadur Rustomji J. Vakil.	1,000	6'	1,000	6'	....
4	Nathabhai Gokabhai ...	500	20'	4,500	21'	4,000
5	Becharji Nathooji ..	225	9'	1,000	12'	1,225
6	Khan Bahadur Rustomji J. Vakil.	1,000	6'	3,000	13'	2,000
7	Hosanji Barjorji Vakil ..	1,000	16'	3,000	16'	2,000
8	Chaturbhai Kalidas ..	500	15'	1,250	15'	750
9	Hosanji Barjorji Vakil ..	....	....	....	....	....
10	Jahansing Becharsingh ..	225	18'	1,225	18'	1,000
11	Umedram Kalidas ..	....	....	....	....	....
	<i>Surat District—contd.</i>					
1	F. C. Batliwala ..	N.A.	18'	1 Kos. 1,000	18'	1,000
2	Do. ..	1,000	9'	1,000	9'	....

F--contd.

No. of strata met with.	Flat charges.	Cost of Pipes and shoes.	Full charges.	Labour charges.	Total Cost.	Cost per Foot.	Result.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
3	262 8 0	148 0 0	..	200 0 0	610 8 0	4 10 0	Failure.
2	185 0 0	84 12 0	6 8 0	90 0 0	366 4 0	5 3 8	Successful.
2	462 0 0	176 12 0	26 8 0	91 8 0	756 12 0	4 15 0	Do.
2	148 4 0	114 8 0	50 0 0	200 0 0	512 12 0	6 10 7	Failure due to Accident.
2	359 0 0	145 0 0	11 4 0	68 0 0	583 4 0	4 11 3	Successful.
2	482 0 0	172 0 0	28 8 0	110 0 0	790 8 0	5 0 0	Do.
2	269 0 0	124 12 10	23 14 0	114 8 0	532 2 10	6 5 4	Do.
2	223 8 0	118 4 0	23 4 0	60 0 0	425 0 0	5 15 9	Do.
3	60 0 0	42 0 0	14 8 0	45 0 0	161 8 0	6 11 8	Do.
....	..	..	..	..	..	..	Incomplete.
3	62 8 0	42 0 0	7 4 0	20 0 0	131 12 0	5 4 4	Successful.
....	..	..	..	..	..	..	Incomplete.
1	60 0 0	..	43 4 0	40 0 0	143 4 0	7 2 7	Successful.
1	77 0 0	..	113 0 0	75 0 0	265 0 0	6 0 4	Failure.



## APPENDIX

Serial No. of Bores.	Names of Land or Well Owners.	Name of Taluka.	Name of Village.	Date of commencement.	Date of completion.
<i>New Bore undertaken in this year—contd.</i>					
<i>Surat District—contd.</i>					
3	F G. Batliwala ..	Pardi ..	Kumta ..	17th Feb.1925.	22nd Feb. 1925.
4	Do. ..	Do. ..	Do. ..	23rd Feb.1925.	4th Mar. 1925.
5	Do. ..	Do. ..	Do. ..	8th Mar. 1925.	16th April 1925.
6	Fordunji Barjorji ..	Do. ..	Chaila ..	17th April 1925.	24th April 1925.
7	Bhikhubhai Ramprasad ..	Do. ..	Do. ..	26th April 1925.	19th May 1925.
8	Motiram Baghavji ..	Olpad ..	Sayan ..	21st April 1925.	6th May 1925.
9	Do. ..	Do. ..	Do. ..	15th May 1925.	31st May 1925.
10	Kunverji Lalubhai ..	Pardi ..	Tulkawada ..	20th May 1925.	....
11	Lalibhai Kalyanji ..	Chikhli ..	Kharsali ..	30th April 1925.	....
<i>Broach District.</i>					
1	Ambaldas Bhikhabhai ..	Vagra ..	Ankot ..	24th June 1924.	23rd Oct. 1924.
<i>Panch Mahals.</i>					
1	Thakore Saheb of Dharf. ..	Pandullewas ..	Dharf ..	26th April 1925.	15th May 1925.
2	Kalaji Bhagwanlal Ganesi. ..	Rewa-Kantha. ..	Piplod ..	21st May 1925	....
<i>Baroda State.</i>					
1	Bhagubhai Dwarkadas ..	Kamraj ..	Antrolli ..	12th Nov. 1924.	28th Feb. 1925.
2	Do. ..	Do. ..	Pardi ..	10th Mar.1925.	17th April 1925.

F—contd.

Actual No. of working days.	Reasons of Stop-pages.	Depth of well.	Total Deptl of Boring.	Diameter of Bore.	Footage of Pipes used.	No. of Shoes used.
2	1 earth work 1 erection 1 test	26'	18'	6"	....	....
3	1 earth work 2 test 1 cleaning of engine 3 orders	26'	22'	6"	....	....
26	3 erection 2 labour 4 cleaning of engine 4 dismantling 4 extraction	45'	131'	6"	....	....
2	2 earth work 2 erection 1 test 1 dismantling	30'	24'	6"	....	....
16	3 erection 2 engine cleaning 1 test 2 dismantling	45'	142'	6"	5'	....
8	4 erection earth work 2 tools preparing 2 test	52'	19'	4"	9'	....
13	2 erection 1 dismantling 1 repair	52'	53'	6"	8' 6"	....
..	....	....	6'	....	....	....
..	....	....	15' 6"	....	....	....
11	4 erection 13 labourers 2 repair 86 rains 3 test 3 dismantling	45'	84'	4"	84'	1
13	6 erection and filling 1 dismantling	25'	21'	4"	....	....
..	....	....	1' 6"	....	....	....
69	9 erection and earth work 12 rock test 7 piping 6 repair 4 ropes 2 dismantling	72'	206'	4"	210'	1
18	2 earth work 4 erection and fitting 3 wheel 4 fire 3 test 2 dismantling 2 engine cleaning 1 trial	64'	66'	6"	8'	....
			1,977'			

## APPENDIX

Serial No. of Bore.	Names of Land or Well Owners.	Water before Boring in gallons per hour.	Water level before Boring.	Water after Boring in gallons per hour.	Water level after Boring.	Increase of water supply in gallons per hour.
<i>New Bore undertaken in this year—contd.</i>						
<i>Surat District—contd.</i>						
3	F. C. Batliwala ..	....	8'	1,000	10'	1,000
4	Do. ...	....	10'	1,000	10	1,000
5	Do. ...	1,000	21'	1,000	21'	Nil.
6	Fordunji Barjorji ..	....	12'	1,000	18'	1,000
7	Rhikhubhai Ramprasad ..	....	12'	....	12'	....
8	Motiram Raghavji ..	1,000	8'	2,000	10'	1,000
9	Do. ...	2,000	10"	3,000	10'	1,000
10	Kunverji Lalubhai ..	....	....	....	....	....
11	Lalbai Kalyanji ..	....	....	....	....	....
<i>Broach District—contd.</i>						
1	Ambaldas Bhikhabhai ..	500	9'	3,500	9'	3,000
<i>Panch Mahals—contd.</i>						
1	Thakore Saheb of Dhari ..	....	....	500	3 feet below bottom of well.	500
2	Kalal Bhagwanlal Ganesi ..	....	....	....	....	....
<i>Baroda State—contd.</i>						
1	Bhagubhai Dwarkadas ..	....	5' 6"	3,500	21'	3,000
2	Do. ...	1,000	11'	2,500	11'	1,500
					27,185	

F—contd.

No. of strata met with.	Flat charges.	Cost of Pipes and hoses.	Full charges.	Labour charges.	Total (cost).	Cost per Foot.	Result.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
1	48 0 0	..	11 14 0	15 0 0	74 4 0	4 10 3	Successful.
1	66 0 0	..	8 0 0	12 0 0	86 0 0	3 14 6	Do.
1	285 4 0	..	86 8 0	60 0 0	431 12 0	3 4 3	Failure.
1	72 0 0	..	11 4 0	12 0 0	95 4 0	3 15 6	Successful.
1	315 8 0	15 10 0	60 0 0	40 0 0	431 2 0	3 6 7	Failure.
1	57 0 0	15 12 0	19 4 0	40 0 0	132 0 0	6 15 2	Successful.
1	160 8 0	28 9 0	26 8 0	45 0 0	258 9 0	4 14 0	Do.
..	..	..	..	..	..	..	Incomplete
..	..	..	..	..	..	..	Do.
2	269 0 0	53 0 0	20 0 0	50 0 0	492 0 0	5 13 9	Successful.
1	61 0 0	..	30 12 0	50 0 0	152 12 0	7 4 3	Do.
..	..	..	..	..	..	..	Incomplete
4	519 8 0	280 8 0	139 8 0	250 0 0	1,198 8 0	5 13 1	A failure; water tapped is brakish and not fit for irrigation purpose.
2	206 0 0	25 0 0	42 8 0	75 0 0	348 8 0	5 4 6	Successful.

## APPENDIX G.

## SUMMARY OF WORK DONE UNDER THE DEPUTY DIRECTOR OF AGRICULTURE, KONKAN, DURING THE YEAR 1924-25.

*General.*

1. *Charge.*—Mr. V. G. Gokhale resumed charge of the Division from 17th November 1924 after the termination of his officiating appointment of the Professor of Agriculture, Agricultural College, Poona, during which period Mr. K. M. Pawar held the charge.

2. *Lines of work and organisation.*—The only change of importance in the detailed organisation is the scheme of co-ordination between the Revenue and Agricultural Departments for carrying on Agricultural propaganda.

3. *Staff.*—The strength of the superior technically educated staff of assistants stood in the year at 7 for Research and Experiment, 6 for Extension and Propaganda, 1 for Agricultural Education and 1 in training; the decrease by one under Research and Experiment staff is due to one post of graduate fieldman being kept in abeyance and the increase by one under Extension and Propaganda is due to the inclusion of the post of the Boring Assistant.

4. *Cost of the year's work.*—The total expenditure of the Division amounted to Rs. 1,05,338 as against Rs. 1,04,128 of the previous year, the distributions under each broad division of activities being Rs. 32,226 for Research and Experiments, Rs. 42,532 for Extension and Propaganda including boring and grants to Taluka Development Association, Rs. 12,836 for Agricultural Education and Rs. 16,534 for Direction and Superintendence.

The cash receipts during the year amounted to Rs. 8,634 as against Rs. 5,883 of the previous year.

5. *Physical and other conditions influencing the agriculture of the year.*—The rainfall of the year 1924 was on the whole better than in the previous year resulting into excellent crops of rice which were upto 50 per cent. more than in the last year in the South Konkan and upto 25 per cent. more in the North Konkan. The year was also characterised by an unusually cold winter which affected the rabi season crops adversely to some extent.

As regards pests and diseases, there has not been anything specially unusual during the year over what has been mentioned in the previous report.

6. *Results of the year.*—These are summarised below under the headings of the main lines.

**Research and Experiment.**

7. *Researches into the increasing of yield or bringing about an economy in the cultivation of rice by methods other than breeding.*—The physical

factors which contribute towards making up the yield, and the best and the most economic ways to influence their action have been under an intensive and exhaustive study at Karjat Rice Research Station for the last five years. The rice experimental work at Kumtha was continued to supplement the work at Karjat in order to represent quite different sets of conditions of soil and climate.

It has been found that chances of increasing the size of the ear-head without decreasing its number seem to lie in the following directions :—

- (i) A single rice seedling unrestricted in space is capable of giving 100 bearing tillers yielding 30 tolas of grain.
- (ii) Use of silt, phosphates as insoluble lime phosphate and sulphate of potash.
- (iii) Giving a dose of sulphate of ammonia at the stage of the plant at which it shows a sudden increase in nitrogen content, gives a decided increase in the number and size of bearing tillers.
- (iv) Transplanting twice with conditions of high fertility.

In regard to the second point of water-supply the results indicate that a rice crop uses up in the open natural condition as well as under artificially controlled supply, water equal to about 25 inches of rainfall for transpiration and evaporation giving a ratio of 600 times of dry matter produced and critical stage has yet to be found out.

The most important findings of rice investigation on the Kumtha Farm having laterite soil are that :—

- (1) Situations which are favoured with under-ground springs (these hardly represent 10 per cent of rice land) of water generally show very high fertility and give large returns for any special manurial treatment such as bone-meal.
- (2) Bone-meal alone or in addition to farm yard manure has given large increases from 50 to 75 per cent. under different conditions this year while in the previous one it had hardly any advantage when unaccompanied by farm yard manure. This different behaviour in different seasons cannot yet be explained.
- (3) That sulphate of ammonia can be effective on soils represented by Kumtha only when accompanied by farm yard manure is further confirmed.
- (4) The dry or green leaf which is commonly available and collected for manure in Kanara is not effective if not turned into manure along with cattle dung and urine, although green leaves of *Terminalia paniculata* and *Calatropis gigantea* act well in their natural state also.

8. *Other experiments on rice.*—Sowing of rice seed *in situ* in squares so as to admit of intercultivation by implements and thus to do away with the labourious process of transplanting is not generally successful except under exceptional conditions. Sulphate of ammonia is almost immediately fixed by rice soils derived from trap. The early strain of

Kolamba rice—Karjat No. 79—appears to be suitable for Ratnagiri conditions.

9. *Selection and breeding of higher yielding strains of rice for South Konkan.*—The work started at the Ratnagiri Agricultural Station underwent its second year's course of isolating the most promising ones. In the early group there are many which have yielded up to 35 per cent. higher than the local, while in the late one, only three giving an increase of 15 to 20 per cent. have been found. Sixteen strains from both groups giving the highest yields have been selected for further intensive study, while about 100 more have been continued as reserves for further observation. It is observed that for late rices at Ratnagiri the question of borer attack seems to be the critical factor in the success of any variety.

10. *Remedial measures against rice land crabs.*—The study of the life history and remedial measures against the land crab taken up since the year 1922, as requiring the first attention amongst several zoological problems of the Konkan, has during the year under report brought to light further information about the difference in the soils and situations of fields favourable for the different species of crabs and about the probable time of mating. As regards remedial measures, poison baits of paris green, white arsenic, lead chromate and barium carbonate with baits of boiled rice which were found effective in the laboratory trials were not found successful under natural field conditions. Liming at the rate of 3,630 lbs. of air slaked lime was found to be successful without any harmful effect on the rice crop. Two new substances—copper sulphate in very minute doses and tobacco decoction—were found to be fatal to crabs in the laboratory trials.

11. *Selection and breeding of higher yielding strains of Nagli (Eleusine coracana).*—This is being done at Hatkhamba, ten miles east of Ratnagiri. The year of report is the fourth of taking up this work. The relative position of the twelve promising strains under intensive study has remained more or less parallel in the three years and they are breeding pure; in replications under different soil conditions, they show wide range in yields. Six out of the twelve strains are substantially superior to local kinds, the increases varying from 25 to 50 per cent. and are fairly consistent with their previous performance. The first two out of these, namely E-31 and E-82 giving 45 and 32 per cent. increases in the year under report, are ready to be tested on a field scale and under cultivators' conditions. The reserve lot has yielded six strains which are as good as or some of them even better than the best ones mentioned above and are therefore worth promoting to the intensive study series.

More evidence has been noticed which leaves no doubt about the chances for natural cross-fertilization and also possibilities of artificial crossing in *nagli*.

12. *Experiments on manuring, distance of planting and new varieties of sugarcane in Kanara.*—The results with bone-meal in as small quantities as 200 lbs. costing Rs. 10 to 12 per acre given in addition to farm yard manure show on the Kumtha Farm 20 per cent. increase in yield, *i.e.*, at

least worth Rs. 150 per acre and more than corroborate the previous years' results with 11 per cent. increase. 150 lbs. of nitrogen per acre taken up for trial on the Kumtha Farm since last year has given increases of 25 to 40 per cent. over the yield from half the quantity in the case of Red Mauritius.

A three feet distance is found to be about as good as  $2\frac{1}{2}$  on the Kumtha Farm.

Two varieties, H.M. 544 and 312, evolved by and recommended by the Mysore Department of Agriculture have been taken up for trial for the first time in the Kanara district.

13. *Experiments in increasing the yields and profits from coconuts in Konkan.*—Farm yard manure has not produced any disadvantage as alleged by the coconut growers in Kanara; it is too early yet to get conclusive results of other manurial treatments tested.

The two dwarf and reputed varieties from Malay States and Cochin planted last year on the Kumtha Farm have been showing distinct signs of quick growth.

There is no relation between the size of eyebud and thickness of the kernel to the vigour of seedlings. It has come to light that an enormous proportion (70 per cent.) of the female flowers drop down in six weeks from opening of the spathe and if by extensive observation this is found to be general, the problem becomes of great and vital importance to be taken up in hand immediately.

14. *Bourbon tree cotton on varkas lands in Ratnagiri.*—The year's experience exactly corroborates the findings of the previous year that the only chance of success is on deeper well drained grades of varkas lands.

15. *Safflower as a rabi crop in moisture retentive rice lands.*—Safflower was again tried this year in unfenced fields with the result that the crop grew well but the spines in the young stage of the crop, when they are small, green and tender did not prove to be deterrent to cattle.

16. *New Garden Crops.*—*Parwar (Trichosanthes discica)*, a highly valued cucumber kind which was so long regarded as possible only in certain places of North Gujrath, was tried by certain enterprising cultivators in the Thana garden tract and has been found to grow successfully and fetching a very high value.

17. *Best way of utilising bare Minor Forest areas for supply of leaf manure.*—This is the fourth year of the experiments on the Kumtha Farm. During the year two more species of plants—*Vangueria spinosa* and *Cassia siamea*—were added; but the second could not survive through the dry season, while the former has done so. All the species which have survived so far have progressed slowly. In regard to the quantity of green matter obtainable, *Tephrosia candida*, if it could be established, will give the largest quantity amongst those so far tried. The local shrubs, *Memece-lon edule*, *Gardenia gummiifera* and *Eugenia corymbosa*, found dominantly



occupying these lands, are no more quick growers than the rest. The manurial value as tested on rice a second year is found to be as follows :—

As green, *Calatropis gigantea* tops the list with 100 per cent. increase over farm yard manure, *Strychnus nuxvomica* closely following; *Vangueria spinosa* comes next with 20 per cent. increase; *Terminalia tomentosa* and *paniculata*, *Eugenia corymbosa* and *Memeceleon edule* are less than, while the rest are about equal to farm yard manure. This agrees more or less with people's opinion about them with the exception of *Terminalias*. Dry leaves are invariably poorer than green except in the case of *Eugenia corymbosa*.

Last year's further experiments on *Calatropis gigantea* have not led to any more information which will ensure successful establishment of its plantations.

18. *Lac culture*.—Inoculations made successfully on *Ziziphus* and *Butya* shrubs at Karjat (at the foot of the Western Ghats) last year with brood-lac sticks on *Ziziphus jujube* obtained from Pusa gave another brood locally surviving the heavy rains and high May heat which is thriving fairly.

#### Extension work.

19. This work is principally carried on through the itinerent district staff who are called Agricultural Overseers assisted by Kamgars.

In addition to the institution of Divisional Boards and Taluka Development Associations for agricultural and co-operative propaganda, a new and welcome feature of the year is the Government Circular issued in January 1925 about the co-ordination between the Revenue and Agricultural Departments for carrying on agricultural propaganda.

20. *The work of the Konkan Divisional Board during the year*.—The Deputy Director of Agriculture, Konkan, continued to be the Chairman of the Board throughout the year. All the quarterly meetings were regularly convened and attended with quorum. The non-official members on the Board during the year were as follows :—

- |  |   |
|--|---|
| 1. Mr. K. T. Karulker, Umbergaon,<br>District Thana.   | } Representatives of<br>Agricultural move-<br>ment. |
| 2. Mr. V. V. Nilekani, Sirsi, District<br>N. Kanara.   |   |
| 3. Mr. V. K. Sanjanwala, Umbergaon,<br>District Thana. | } Representatives of Co-<br>operative movement.     |
| 4. Mr. V. V. Athalye, Shiposhi, District<br>Ratnagiri. |   |

21. In addition to the administrative work of exercising general control and supervision of the agricultural and general propaganda through the Government Departments and Taluka Development Associations, the Board considered during the year many important subjects. These together with the recommendations of the Board and replies from the

Joint Board of the Director of Agriculture and the Registrar, Co-operative Societies, Bombay Presidency, Poona, are given in the following statement.

Serial No.	Recommendation of the Konkan Divisional Board.	Joint Board's reply.
1	Non-Credit Agricultural Societies should be allowed to supply articles on credit where there are no co-operative societies for the same.	In the negative.
2	Appointment of Honorary Agricultural Organisers.	Do.
3	Improvement of the condition of Co-operation in Kolaba.	
4	Relaxation of the rigour of the existing rules regarding tapping of date palm for Gül manufacture in Thana District.	The Deputy Director is requested to make a case.
5	Need, scope and methods of improvement of cattle in Konkan.	
6	Special concession rates for the conveyance of town sweepings, etc., from Bombay for Agricultural purposes.	Under consideration.
7	Co-operative Societies for the consolidation of holdings :—	The case of Umbergaon recommended to Government for facilities and concessions.
8	Agricultural School for the Ratnagiri District.	Not accepted.
9	Exemption from flat charges for unsuccessful bores.	Government have sanctioned it temporarily.
10	Special concession rates for the conveyance of concentrated manures.	Under consideration.
11	Exemption from water cess granted to pumping installations should be extended to all kinds of water lifts.	Joint Board is making representation to Government.
12	Spread of information of Agricultural Improvements to the widest possible extent by the distribution of printed vernacular literature to all co-operative societies, to the village schools and to Talathies and to have these read by them to gatherings of villagers at least every three months.	The subject concerned is an administrative matter and would be dealt with in usual Departmental manner.
13	Insistence on a guarantee of sufficient funds from local contribution for the formation of Associations :—	Approved.
14	Special grant of Rs. 400 to Sirsi Association for poisoning wild animals and combating against Koleroga.	Sanctioned not as subsidy but for specific purpose of propaganda by the Agricultural Department.
15	Investigation of the problem of Improvements of colour of Gul in Konkan.	Reply awaited.
16	Year of the Taluka Development Associations, to be the financial year.	Do.
17	Necessity of a magic lantern for each district.	Do.
18	Appointment of an Agricultural Organiser C. S. for Kanara.	Not possible to arrange.
19	Protection of crops from wild animals.	
20	Special grant to Dapoli Association for pig-killing, and revival of rewards for pig-killing in the Ratnagiri District.	Reply awaited.

Serial No.	Recommendation of the Konkan Divisional Board.	Joint Board's reply.
21	Supply of copies of G. Rs., circulars and Publications bearing on Agricultural and co-operative movement to the non-official members of the Divisional Boards.	Reply awaited.
22	Demonstration of utilization of lands (varkas) growing grass for more remunerative crops.	Awaited.

*A. Through the direct Agency of the Agricultural Department*

22. *Staff and sphere of operations.*—These are indicated against respective districts in specifying the items of improvements for each.

23. *Co-ordination between Revenue and Agricultural Departmental staff for carrying on agricultural propaganda.*—This was done as much as possible according to the provisions of the Government Circular. The first annual meetings were held with the officers of the Revenue Department and members of the Local Boards for all the districts of the Konkan Division except Ratnagiri to discuss and adopt the programmes of improvements and the nature of assistance the Revenue Department can render. Distribution of improved strains of rice in the Thana and Kolaba districts and spraying against koleroga in the Kanara District were the items in which assistance of the Revenue Department was specially sought for and has been useful to some extent.

24. *Items of propaganda.*—The detailed items of improvements proved to be worth introducing which have formed the activities of the year are given below by each district:—the items shown in italics represent the major ones.

*Thana District.*—(Chiefly Dahanu, Umbergaon, Salsette and Bassein talukas and Mahim Taluka Development Association):—One Graduate Overseer and one Kamgar.

(1) *High yielding strains of rice*, (2) *Labour saving methods in garden cultivation*, (3) Manuring of plantains with a mixture of nitrate of soda and superphosphate, (4) *Use of artificial manures for garden crops*, (5) Extension of garden cultivation, (6) Improved breed of poultry and (7) Silage.

*Kolaba District.*—(Chiefly Karjat, Pen and Panwel talukas and Alibag and Kalyan Taluka Development Associations):—One Graduate Overseer, one Store-keeper and one permanent Kamgar and temporary kamgars employed for short periods for roguing and distribution of rice seed.

(1) Stimulation of irrigation farming on the Tail Waters of the Tata Hydro-Electric Works together with all improvements possible, (2) *Substitutes to meet the deficiency of rab for rice*, (3) Meston plough, (4) *High yielding strains of rice*, (5) Nitrate of soda for onions,

(6) Blade harrow for puddling, (7) Bulsar rahat, (8) Leg-horn breed of poultry.

*Ratnagiri District.*—(Chiefly Sangameshwar and Devgad talukas and Ratnagiri, Dapoli, Rajapur Taluka Development Associations)—One Graduate Overseer.

(1) Bone meal, fish manure and sulphate of ammonia for rice, (2) Mass selection of rice seed, (3) *Deccan harrow for puddling rice fields*, (4) New profitable crops of sweet potatoes and *kharif* chillies on *varkas* lands, (5) Guinea grass on *varkas* lands, (6) New and profitable crop of onion, (7) Extension of sugarcane cultivation, (8) Poisoning of wild animals, (9) Meston plough, (10) Sabul plough; (11) Hand weeding tools, (12) Mote, (13) Spraying against mango hoppers, (14) Improved breeds of poultry, (14) Silage, (16) Surti buffalo bull at Ratnagiri.

*Kanara District.*—(All over the district including Sirsi and Karwar Taluka Development Associations):—Two Graduate Overseers, two field-men and two kangars.

(1) Mass selection of rice seed, (2) *Bone meal manure for rice*, (3) Fish and ammonium sulphate in seed-bed for rice, (4) Sulphate of ammonia for paddy in East Kanara, (5) Mascaty variety of rice, (6) Planting fewer seedlings, (7) Half seed rate, (8) *Red Mauritius and other high yielding varieties of sugarcane*, (9) *Use of concentrated manures such as sulphate of ammonia, fish and undecake for sugarcane*, (10) Wider planting and efficient and more economic tillage by Sabul plough, (11) *Improved gul boiling furnaces and pans*, (12) *Groundnut on hakkal lands*, (13) *Vari on hakkal and kumri lands*, (14) *Onion cultivation together with top dressing with concentrates*, (15) Tobacco cultivation, (16) Improved rice land puddler, (17) *Spraying against koleroa of betelnut*, (18) Pig proof wire fence, *poisoning of wild animals*, and organisation of communal watching for the protection of crops from wild animals, (19) Extension of grafted mangoes, (20) *Silage in East Kanara*, (21) Introduction of new and more profitable *hakkal* land crops in East Kanara, (22) Surti buffalo bull at Kumta, (23) green manure crops in cocoanut gardens, (24) Guinea grass as a fodder crop in gardens.

*Well Boring.*—All districts.

*General Propaganda.*—All districts:—While carrying on propaganda in connection with specific improvements detailed above, dissemination of general knowledge of improved methods of agriculture, giving advice answering queries are also done by means of literature talks and discourses and magic lantern shows.

25. *Resume of Results.*—The resume of progress obtained at the end of the year under the items specified above is as follows:—

For the purpose of bringing the various improvements to the notice and into the practice of cultivators, the demonstration plots on cultivators'

fields numbered as follows in comparison with those of the last year :—

Year.	Thana.	Kolaba.	Ratnagiri.	Kanara.	Total.
1923-24 .. ..	Not reported	18	32	106	156
1924-25 .. ..	27	28	28	161	244

The year has added its quota to the progress under the various items with more or less rapidity as they fit in with the economic and temperamental conditions of the people to a more or less degree.

Spraying against *koleroga* (mildew) disease of betelnut in Kanara has continued to receive an enthusiastic response.

The higher yielding strain No. 42 of *kolamba* rice the distribution operations of which were extended to cover an area of about 5,000 acres in the Karjat, Pen, Panwel and Kalyan talukas of the Thana and Kolaba districts has maintained its increase of 20 to 25 per cent. and has become popular. It is estimated that automatic spread would come to thrice as much. Arrangements have been made to repeat the operations in the same talukas and extend them to Murbad, Shahapur, Mahim and the early strain No. 79 in the Umbergaon peta of the Thana District.

Red Mauritius variety of sugarcane has practically replaced the local less yielding kinds in the whole of Kanara District except a few difficultly accessible parts.

Onion cultivation is now well-known and fixed in the coastal belt of the Kanara District, its further extension depending on finding varieties immune to tip wither disease.

Artificial manures have caught the imagination of the garden cultivators in the Thana District owing to the high prices for oil cake and cheapening of artificials.

Bone meal manure for rice in the laterite districts of Ratnagiri and Kanara is going forward but slowly, the reasons being that it has not shown highly striking results under all conditions and that the small tenant cultivators of rice do not think the advantage to be enough to go in for it with borrowed capital.

Enclosures of blocks of fields with stone-walls or pig proof wire fencing have impressed the cultivators in East Kanara and are showing signs of serving as a strong factor in bringing about rehabilitation of the tract under decay. Their wide spread adoption on joint or individual basis is waiting for the availability of funds. A special bold and liberal policy is waiting for the prospective value of enclosed land seems necessary, as the present value of waste lands is practically nil.

The progress secured by the general propaganda is summarised in the following statement :—

District.	Number of villages.			Number of people.				
	No. got in touch during the year.		Progressive total by the end of the year.	Come in contact during the year.			Progressive total by the end of the year.	
	Total.	New.		Total.	New.	Taking up or likely to take up improvements.	Total.	Taking up or likely to take up improvements.
Thana ..	114	42	163	145	20	60	80	60
Kolaba ..	342	54	496	1,518	14	700	4,331	2,689
Ratnagiri ..	24	..	75	174	8	3	1,223	63
Kanara ..	298	66	473	8,270	1,206	235	8,272	3,387
Outside the Konkan Division.	10	4	37	29	11	information not available.		
<b>Total ..</b>	<b>788</b>	<b>166</b>	<b>1,244</b>	<b>5,136</b>	<b>1,259</b>	<b>998</b>	<b>13,886</b>	<b>6,199</b>

The following items have been now sufficiently popularised so that no further propaganda is necessary in them :—

*Kanara District.*—The crop of *vari* on *makki* and *kumri* lands.

It has also been conclusively proved that the following do not at all fit in with the agricultural, economic and temperamental conditions of the people and there is no need to go on further with them.

*Thana and Ratnagiri District.*—Ensilage.

*Kolaba District.*—Nitrate of soda for onions, as there is practically no onion cultivation in the present jurisdiction of direct work.

The experimental work has conclusively proved by the end of the year the suitability of the following *new items* of improvements which will be included in the programmes of propaganda work from the next year.

*Kolaba District.*—Sulphate of ammonia as a field manure for rice.

*Kanara District.*—Tapioca.

26. *Arrangements to supply implements, manures, seeds and other articles.*—In order to meet the demands which are created as a result of the propaganda work for articles which are not an ordinary market commodity, the organisation for sale and hire depôts and free agency work for arranging supply of others direct from the firms were continued. bonemeal manure, sulphate of ammonia, Meston plough, Poona gul boiling pans and sugarcane mills, pig proof wire fence, arm dynamites for making pits for mango planting and mango grafts were the most important of the articles thus dealt with amounting to a total value of

Rs. 34,106. Arrangements to supply denaturalised salt for manurial purposes duty free were continued.

27. *Well boring for cultivators.*—Two Musto hand machines were converted to work by oil-engines. Three of the power and one hand machines were allotted to the Thana District where there has been the greatest success and demand for well boring, while one hand machine has been allotted to each of the remaining three districts in which boring is yet in an exploratory stage. The total footage bored during the year amounted to 1,662 feet against 2,045 feet of the previous year.

The statement of detailed information prescribed in Government Resolution No. 7075, Revenue Department, dated 5th May 1925 is appended separately.

The capital and nett expenditure on well boring during the last financial year amounted respectively to Rs. 2,904 and Rs. 7,920 and the receipts to Rs. 2,508.

This year's work has been less than that during the previous year, on account of two of the hand machines being out of work during a period of five months when they were under conversion to power, and one of them being practically out of work during the course of the year, owing to its new engine having a defective piston. The works in the Kolaba, Ratnagiri, and Kanara districts are all under exploratory stage and the orders being few and far between, a good deal of time is wasted in transport and non-supply of labour. The work is somewhat short of the full normal capacity due to incompetence of the Boring Assistant for administration and organisation. Steps have been taken to replace him with a more competent person.

#### B.—Through Local Non-Official Organisations.

28. *Taluka Development Associations according to Government Scheme.*—No new associations were allowed to be formed during the year unless and until sufficient guarantee to raise the local share of contributions for at least five years' expenditure was forthcoming. Thus they stood the same as at the end of the last year, *viz.*

*Thana.*—Mahim and Kalyan, *Kolaba.*—Alibag, *Ratnagiri.*—Ratnagiri, Dapoli and Rajapur. *Kanara.*—Karwar and Sirsi, all registered under the Co-operative Act.

All of them were given advice and guidance and supervision. The programmes followed by them were generally on such items of the propaganda work as are suitable to the respective talukas out of those mentioned for each district above. Government subsidies as follows were paid by the Director of Agriculture on the recommendation of the Konkan Divisional Board :—

Mahim Rs. 900, Kalyan Rs. 250, Dapoli Rs. 700, Rajapur Rs. 800, Sirsi Rs. 600.

The Mamlatdars were on the managements as *ex-officio* Vice-Presidents of all the Associations except Rajapur in which Mr. K. R. Shitut, the

present Mamlatdar has been elected to be the President. Very few however have taken real, heart felt interest in the work of the Associations, the only outstanding exception being Mr. K. R. Shitut of Rajapur.

Sirsi has done the best work, Rajapur, Mahim, Dapoli and Karwar, come next, Alibag, Ratnagiri and Kalyan having very little work to their credit stand last. None of the Associations have been able to do any Co-operative work, for the reason that the one fieldman whom they can at the most afford to employ has more than full work in Agricultural propaganda and besides a paid man of the status and knowledge of a Non-Graduate fieldman can hardly possess the necessary influence required to stimulate Co-operative organisation.

The Associations find a great difficulty in collecting the local share of contributions and unless, some scheme of ensuring the supply of funds can be devised, it is apprehended that these Associations would be gradually defunct.

29. *Stimulation of Co-operation for promoting Agricultural Improvements* :—The Agricultural propaganda staff are side by side with individual persuasion, also expected to stimulate, investigate, assist and advise, Co-operative effort for promoting Agricultural improvements. The special paid Organiser for Agricultural Co-operation in Thana, Kolaba, and Ratnagiri districts attached to this Division since 1923 continued his activities in this direction. Unfortunately, however, there was again a change in the personnel by the middle of the year and the second half of the year was therefore occupied in acquainting and training a new recruit in the work.

In all 22 proposals of investigation and stimulation new as well as those continued from the previous years consisting of 8 enclosure, 5 Irrigation, 4 Agricultural requisite supply, 2 cultivation, 2 sale and 1 Dairy received attention during the year out of which 13 mostly in Kanara district were dealt with by the Agricultural propaganda staff. Only two schemes mentioned below out of these were completed and resulted into the final formation.

1. Enclosure Society at Nandikatti, Peta Mundgod, district Kanara.
2. Enclosure Society at Hungund, district Kanara.

There were thus 20 non-credit Agricultural Societies in the Konkan Division at the end of the year, which were given all possible assistance, advice and supervision to improve them wherever necessary and possible. All except most of the manure Societies in the Thana District are progressing fairly steadily.

The Agricultural Organiser had besides in hand the liquidation proceedings of three Societies entrusted to him one of which was completed during the year.

The stimulation and working of Agricultural Co-operative schemes is an extremely difficult and slow task requiring in most cases, such as enclosure, irrigation, consolidation and cultivation, etc., the combination of each and every person in the block, while sale and agricultural requisite supply are confronted with tremendous opposition from the existing middle-men.



*C.—Through Publications.*

30. A Bulletin on Land Crabs as Agricultural Pests in Western India was published under the authorship of Mr. P. V. Wagle, Entomological Assistant, Konkan.

Notes and articles were contributed to the various agricultural and other magazines by the members of the staff of which there were 48 extracts, abstracts and adaptations of information already published before and 36 original ones.

31. *The Konkan Agricultural Magazine*.—The monthly magazine in Marathi devoted exclusively to Konkan Agriculture under the name *Konkan Sheti Samachar* commenced by Mr. Y. G. Gurjar of Alibag in the year 1917 and the editing of which was taken over by the Konkan Agricultural Department was regular in publication under the editorship of Mr. G. B. Pandit, L.Ag. Agricultural Demonstrator, Mundgod, District Kanara, for which he and others who contributed and Mr. Limaye who published the same punctually deserve the best thanks. Its circulation at present stands 603 copies which is more by 30 copies as compared to the last year.

**AGRICULTURAL EDUCATION.**

32. *The Agricultural Middle School in Vernacular*.—The year under report is the eighth of the Agricultural School at Jambul near Kalyan, district Thana, for giving agricultural education of a primary nature through Marathi primarily for the Marathi speaking Konkan districts.

The year opened with 25 students, 18 in the first year and 7 in the second year. At the end of the year however, three from the first year dropped out. All of the senior class and 11 of the junior class passed in the annual examination.

The total expenditure of the school including the teaching staff and free boarding expenses amounted to Rs. 12,889 and the total receipts to Rs. 2,317 as against Rs. 12,793 and Rs. 1,308 respectively of the previous year.

Out of 54 boys turned out successful from this school up to now, 7 having just passed out have yet to start an occupation, 9 are managing their lands, 7 are in service connected with agriculture, 4 continuing ordinary secondary education, 13 are engaged in business other than that of agriculture and whereabouts of the rest are not traceable.

Thirty-five applications were received for the fresh class of next year; but only 18 (2 from Thana, 4 from Kolaba, 4 from Ratnagiri and 8 from outside Konkan) have actually joined. It is still the land holders of advanced class that are availing of agricultural education in this form.

33. *Agricultural Bias Classes in the Rural Primary Schools*.—The primary School teachers were trained in Agriculture in the Jambul Agricultural School. Agricultural bias classes have now been introduced in two schools in each of the four Konkan districts. These schools are under the control of the Educational Department but all of them were visited

by the members of the Agricultural Department and found to have made a good start with the exception of Tarkhad in the Thana District.

34. *Training of men for special agricultural purposes.*—Two Kamgars for meeting the demand from private farms or for carrying on agricultural propaganda of Taluka Development Associations were trained during the year.

One officer deputed by Coorg Agricultural Department for receiving training in Rice Research methods was entertained at the Karjat Rice Research Station.

*Crop Tests.*

35. In accordance with Government orders contained in Government Resolution No. 601 of 21st January 1914 Revenue Department the graduate staff took during the year crop tests on rice, nagli and sugarcane crops as usual.

**PERSONAL.**

36. Mr. Mokashi, Boring Assistant has been found to be definitely incompetent to do the work properly and steps are being taken to replace him with a better man. All others have continued to work faithfully and hard, to the best of their respective abilities and capacities. Amongst the clerical staff of my office, Mr. N. B. Limaye has shown outstanding abilities so as to merit a special mention and worth far more than the position he holds at present.

V. G. GOKHALE,

Deputy Director of Agriculture,

Konkan Division.

Ratnagiri, 18th July 1925.

Serial No.	Name of work or the name of the land owner.	Name of taluka.	Name of village.	Diameter of bore.	Depth of boring.	Water before boring in gallons per hour.
<i>District Thana.</i>						
1	Mr. Hirasing Dhansing ..	Kelva Mahim.	Palghar ..	5"	127' 0"	Surface bore.
2	Chitnis Gogross Bhiksha (1st bore).	Thana ..	Dombivall ..	3"	71' 3"	....
3	Mr. Manik Ramchandra ..	Do. ..	Thana ..	3"	80' 0"	....
4	Mr. G. G. Dandekar ..	Kelva Mahim.	Palghar ..	5"	66' 0"	280
5	Mr. M. A. Dandekar ..	Do. ..	Do. ..	5"	74' 0"	Surface bore.
6	Mr. Manekji Kawasji ..	Dahanu ..	Gholwad ..	4"	82' 0"	1,100
7	Mr. D. V. Salve ..	Kelva Mahim.	Saphala ..	4"	76' 0"	Surface bore.
8	Mr. Nathubhai Haridas ..	Dahanu ..	Gholwad ..	4"	64' 0"	650
9	Mr. Vasantlal J. Bhat (1st bore).	Kelva Mahim.	Saphala ..	3"	14' 0"	250
10	Mr. Vasantlal J. Bhat (2nd bore).	Do. ..	Do. ..	3"	19' 0"	1,200
11	Mr. V. V. Dandekar ..	Do. ..	Palghar ..	5"	93' 8"	....
12	Chitnis Gogross Bhiksha (2nd bore).	Thana ..	Dombivall ..	3"	119' 3"	Surface bore.
13	Mr. G. R. Samant ..	Kelva Mahim.	Saphala ..	3"	63' 0"	....
14	Chitnis Gogross Bhiksha (3rd bore)	Thana ..	Dombivall ..	3"	18' 0"	....
15	Mr. Vasantlal J. Bhat (3rd bore).	Kelva Mahim.	Saphala ..	3"	22' 6"	2,000
16	Mr. H. R. Phatak ..	Do. ..	Do. ..	3"	19' 0"	....
17	Mr. Cawasji Palanji ..	Dahanu ..	Gholwad ..	4"	74' 0"	....
<i>District Kolaba.</i>						
18	The Rice Specialist, Karjat (1st bore).	Karjat ..	Karjat ..	3"	102' 0"	Surface bore.
19	Do. (2nd bore) ..	Do. ..	Do. ..	3"	50' 4"	Do.
20	The Superintendent, Rice Breeding Station.	Do. ..	Do. ..	3"	75' 0"	Do.
21	Mr. Sulleman Valad Allibhai.	Do. ..	Do. ..	3"	64' 0"	Do.
<i>District Ratnagiri.</i>						
22	The Medical Officer, Devrukh.	Sangmeshwar	Devrukh ..	3"	33' 6"	....
23	Mr. P. M. Namjoshi ..	Do. ..	Burbad ..	3"	28' 0"	....
24	Mr. N. S. Bhave ..	Do. ..	Kalambushi	3"	8' 0"	....
<i>District Kanara.</i>						
25	The Superintendent of Police, Kanara.	Honawar ..	Bhatkal ..	3"	70' 0"	....
26	Do. ..	Do. ..	Do. ..	3"	99' 9"	Surface bore.
27	Do. ..	Kumta ..	Kumta ..	"	..	....

Water after boring in gallons per hour.	Departmental charges.	Labour charges.	Total cost of boring.	Cost per foot.	Result and remarks.
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
2,200	473 8 0	52 8 0	526 0 0	4 2 3	Successful.
....	195 0 0	244 8 0	439 8 0	6 2 10	Unsuccessful.
....	115 0 0	302 8 0	417 8 0	5 3 6	Do.
1,500	212 12 0	60 12 0	273 8 0	4 2 4	Successful.
1,500	240 8 0	146 4 0	386 12 0	5 3 7	Do.
No further supply.	118 8 0	75 12 0	194 4 0	2 5 11	Unsuccessful.
700	248 8 0	48 8 0	297 0 0	3 14 6	Successful.
1,850	202 12 0	76 8 0	279 4 0	4 5 10	Do.
1,200	36 8 0	27 8 0	64 0 0	4 0 2	Do.
2,000	49 4 0	31 8 0	80 12 0	4 4 0	Successful.
....	....	....	....	....	Work on hand.
160	193 5 0	220 8 0	413 13 0	3 7 6	Unsuccessful.
....	....	....	....	....	Work on hand
....	....	....	....	....	Do.
3,000	58 8 0	55 0 0	113 8 0	5 0 9	Successful.
650	50 12 0	38 8 0	89 4 0	4 1 2	Do.
....	....	....	..	....	Work on hand.
980	87 8 0 112 8 0 5 8 0	163 2 0	163 2 0	1 9 7	Successful.
460	87 8 0	113 0 0	200 8 0	2 3 11	Do.
800	152 10 0	212 2 0	364 12 0	4 13 10	Do.
....	67 8 0	199 8 0	267 0 0	4 2 9	Unsuccessful.
....	33 8 0	154 12 0	188 4 0	5 9 11	Abandoned at the request of the well-owner.
50	28 0 0	68 0 0	96 0 0	3 6 10	Do.
....	....	....	....	....	Work on hand.
40	88 12 0	295 0 0	383 12 0	5 7 9	Unsuccessful.
....	115 8 0	370 0 0	485 8 0	4 13 10	Do.
....	....	....	....	....	Work on hand.

## APPENDIX H.

ANNUAL REPORT OF THE DEPARTMENT OF AGRICULTURE, SIND,  
FOR THE YEAR ENDING 1924-25.*Organization and Finance.*

1. Mr. T. Gilbert permanent Deputy Director of Agriculture vacated the post on the 4th September 1924 and proceeded on 15 months' leave prior to his premature retirement from Indian Agricultural Service. He was relieved by me and since that date I have been acting in the post and Mr. Jafarali Ansari acting in my substantive appointment of Divisional Superintendent of Agriculture with Head Quarters at Mirpurkhas.

In the upper subordinate staff Mr. Alimahomed Ulvi Superintendent Sukkur Farm, was deputed to Banga'ore early in February 1925 for the post-graduate course in cattle breeding and Mr. Abdur Rehman reverted to the Department from propaganda work under Khan Bahadur Azimkhan.

2. The sanctioned strength of the Agricultural Department in Sind is :—

One Imperial Officer  
Two Provincial Gazetted Officers  
Twelve Graduate Fieldmen  
Eighteen Non-graduate Fieldmen  
Seven clerks.  
Five Kamgars, and  
Three Mechanical Establishment.  
Two Graduate posts are vacant.

3. The cost for 1924-25 was :—

	Rs.	a.	p.
Salaries including travelling allowance ..	90,593	1	0
Contingencies .. .. .	68,489	10	7
	<hr/>		
Total ..	1,59,082	11	7
and the receipts credited to the Treasury were ..	54,739	9	7

*Season.*

4. Inundation.—Normal inundation begins from the end of May and ends towards the close of the month of September. In the season under review however, the river levels continued to be alarmingly low right up to the end of June hence the inundation canals did not work in time to supply water for Kharif cultivation. Thus the sowings were delayed for nearly a month. But from 1st July onwards the levels began to improve reaching subsequently a point unparalleled in the available history of the river. Attock rose to the record figure of 56' and Bukkur to 16'-6".

This high level was maintained for a number of days, with the result that widespread floods were caused in low-lying areas. Villages after villages were washed away and several fields submerged. The floods

subsided with the fall of the river but the submerged areas were not dry till late in the Rabi season.

(a) *Rains.*—These were above normal in both Upper and Lower Sind; the latter recording about 14 inches and the former about 5 inches. There was absolutely no rain throughout the whole of the cold weather and as a result bosi wheats were adversely affected.

(b) *Frost.*—This was severer and of longer duration, killing outright the oil seed crops in certain areas and injuring the wheat crop, particularly the early ripening varieties.

(c) *Insect pests.*—Except a little jowar borer and a cotton boll-worm, these were not conspicuous in the year under report.

(d) *Crops.*—Of the kharif crops, cotton could not be sown in time, owing to late inundation. The area under cotton is therefore believed to be below the normal. Early frost damaged this crop very considerably. Jowar and Bajri crops were normal but there was much sterility in the paddy crop.

Sowings of wheat crop were considerably delayed except on high lands as the soil took very long to come into ploughing condition as the result of heavy floods. There was nevertheless a very considerable increase in the bosi cultivation and were it not to the serious damage caused to the crop by repeated spells of frost, the year would have been one of abundant harvest. Oil seeds though presented vigorous growth comparatively produced little grain as result of frost bite. The area under irrigated wheat on the Jamrao and Mithrao canals was practically nil due to the failure of the canals to supply rabi water.

(e) *Cattle.*—The condition of cattle was all round satisfactory and there was sufficient fodder available except in East Sind. There was no epidemic outbreak in the cattle worth mentioning.

*Health of the people.*—Owing to floods and excess of moisture in Mid and North Sind malaria was a more prolonged one than in the previous year.

*Prices of the agricultural commodities.*—Prices of cotton were below the 1923-24 rates, the highest in the year reaching to Rs. 18 per maund of 84 lbs. As a result of damage by frost to wheat and oil seeds their prices rose by about 10 per cent. of the last year's prices, while rice went up by 20 per cent. as a result of poor outturn due to sterility.

*Agricultural labour.*—The supply continues to be on the decline. The cost of harvesting and other agricultural operations is consequently growing high day by day.

#### *Research and Investigation—Cotton.*

5. Botanical work on this crop consists of:—

- (1) the maintenance of pure seed supply of a strain isolated from Deshi cotton and called 27 W. N. ;
- (2) comparison between each other of the 2 Punjab American varieties introduced by the Department for cultivation in Sind some

years ago as also tests with some of the imported United States varieties; and

(3) the production by hybridization or otherwise of a variety or varieties superior in staple and at the same time suitable under Sind conditions.

*27 W. N. Cotton.*—Enough has been said in the previous reports about merits of this strain. It continues to be in favour both with the trade and with the cultivator. Further observations made on this cotton on our farms show:—

(1) that 27 W. N. gives on an average 20 per cent. more outturn than the local Jamrao cotton;

(2) that this increase in yield is contributed mainly by first 2 pickings;

(3) and that it gives 5 to 6 per cent. more ginning outturn than the ordinary local mixture.

These results confirm the previous statements that 27 W. N. is superior in every respect to the Jamrao deshi. The feature of earliness being of additional value under the present conditions of water supply, the duration of which as a rule has become much shorter than is desirable for a full cotton crop.

6. In these circumstances the demand for seed by the public is growing out of proportion of supply and although our Chellaro seed substation is fulfilling its function to the fullest extent we find that our output of pure seed does not go beyond 2 thousand Bengal maunds. This quantity if most economically used will sow only 4,000 acres whereas the actual demand is 25 to 30 times as much. To reach this stage of supply purely through Departmental agency and by means of Government Fund is too much to expect; but the want must be supplied. In my opinion the solution lies in the co-operation of growers and trade. The former should co-operate to form an organization whereby they could deliver their produce of the said 4,000 acres in a pure condition to a similar organization of traders who would not only pay reasonable price but would also gin the produce carefully to sell the seed again to the prospective growers.

Under this arrangement an area of about a lac of acres could be secured under our improved strain and this should, of necessity, be the limit up to which both the trade and the grower could possibly follow. Unfortunately there are no co-operative organizations such as suggested above for the present, to successfully tackle this problem and hence the Department took the following steps to approach the above ideal during the year under report.

7. About a 1,000 maunds of seed were given out in a tract with a view to getting a full village or a unit of villages sown entirely with it so as to eliminate any chance of the seed getting mixed up with the ordinary deshi cotton in the field. Agreements were demanded from the recipients of the seed and were executed by some, to the effect that they would sell their produce only to a couple of leading gin owners whose co-operation was secured before-hand to buy up the produce in these villages and to

gin it separately. The object in taking this guarantee was to safeguard against the practice of advance sales which cotton growers commonly make to raise ready cash or to take advantage of high rates which speculators some time offer. In such sales the produce is disposed of in driblets to either petty dealers or to commission agents and as these purchasers generally buy all the lots together whether of deshi or of improved variety, considerable quantity gets separated from the superior produce finally offered for sale. The improved variety is thus either lost altogether or becomes so mixed up that the seed does not remain worth recovering. The year's trial of the scheme has yielded encouraging results but a definite opinion is not possible until it has been worked for at least a year more.

8. The departmental organisation in connection with the maintenance of pure line tradition of 27 W. N. has been described in previous reports. The year's output of self fertilized seed gave 'seed patch' of  $1\frac{1}{2}$  acres for current season (1925-26) and the year's 'seed patch' of 6 gunthas yielded seed for an 'increase block' of 3 acres now sown on the Experimental Farm and the year's 'increase block' of  $1\frac{1}{2}$  acres has supplied seed for sowing the Seed Farm area known as the 'Field scale plantings'.

9. The outturn of 27 W. N. seed from the Chellaro substation from the first 3 pickings amounted to 1,500 Bengal maunds; the fourth or the last picking being inferior in quality was rejected for seed. Of this quantity of 1,500 maunds, 130 maunds were utilized for sowing on the substation during the current season and the remaining quantity distributed partly under the seed multiplication scheme and partly to co-operative societies.

The Dhoro substation has again shown a net profit of Rs. 12,559-10-8 after paying for the karia clearances and other running expenses.

10. *American Cotton*.—Work on this cotton was continued on the same lines as those reported in the last year's report. Unfortunately the unsatisfactory irrigation conditions on the Jamrao, where this work is confined, greatly hampered the work.

Of the 2 Punjab varieties of American cotton known as F4 and 285F the latter has been found by experiments to give as much outturn as F4 with a slightly low ginning outturn. In the matter of staple however, 285F is superior, having a staple of  $\frac{7}{8}$ " to 1" as against  $\frac{5}{8}$ " to  $\frac{6}{8}$ " of F4 and therefore commands a premium of 1-5-0 on F4 prices.

In the matter of resistance to red leaf blight, both stand equal, and it has now to be seen whether F4 which occupied from 18 to 20 thousand acres on the Jamrao in the year under review will be abandoned in favour of 285F.

11. Further comparative tests between 285F and F4 and the other imported long stapled varieties, viz., Durango, Webber 49-4 Dixie, Cleveland and Mebane show that the first two, viz., 285F and F4 apart from giving



better germination and better stand give higher outturns. It is therefore a clear indication of the fact that none of the varieties imported from America fits in with the present local conditions of water supply and possibly other environmental conditions. This urgently calls for work in the direction of evolution of a variety possessing all the strong points of F4 or 285F such as prolificness, immunity to red leaf blight, earliness and in addition possessing a staple of 1 inch or above, for the present and the future needs of the country. Unfortunately the present conditions of water supply do not permit of this work being safely taken in hand and we therefore await a better and earlier supply of water on a pumping station which it is hoped will be started from the next year. In the meantime seeds of the imported varieties are being preserved and pure lines raised.

12. Selection work on 285F is being carried out with a view to getting a supply of pure seed from self fertilized material. 285 F cotton as grown in Sind from the seed originally obtained from the Punjab was found to show variation. Strain No. 1 selected out of the several individual plants of this cotton shows an improvement over the 285F 'mass' in as much as it gives 1-2 per cent. more ginning outturn and is earlier. Besides it has a longer staple by about 1/16" to 1/8". In point of yield, however, both are equal. The strain is being tested further.

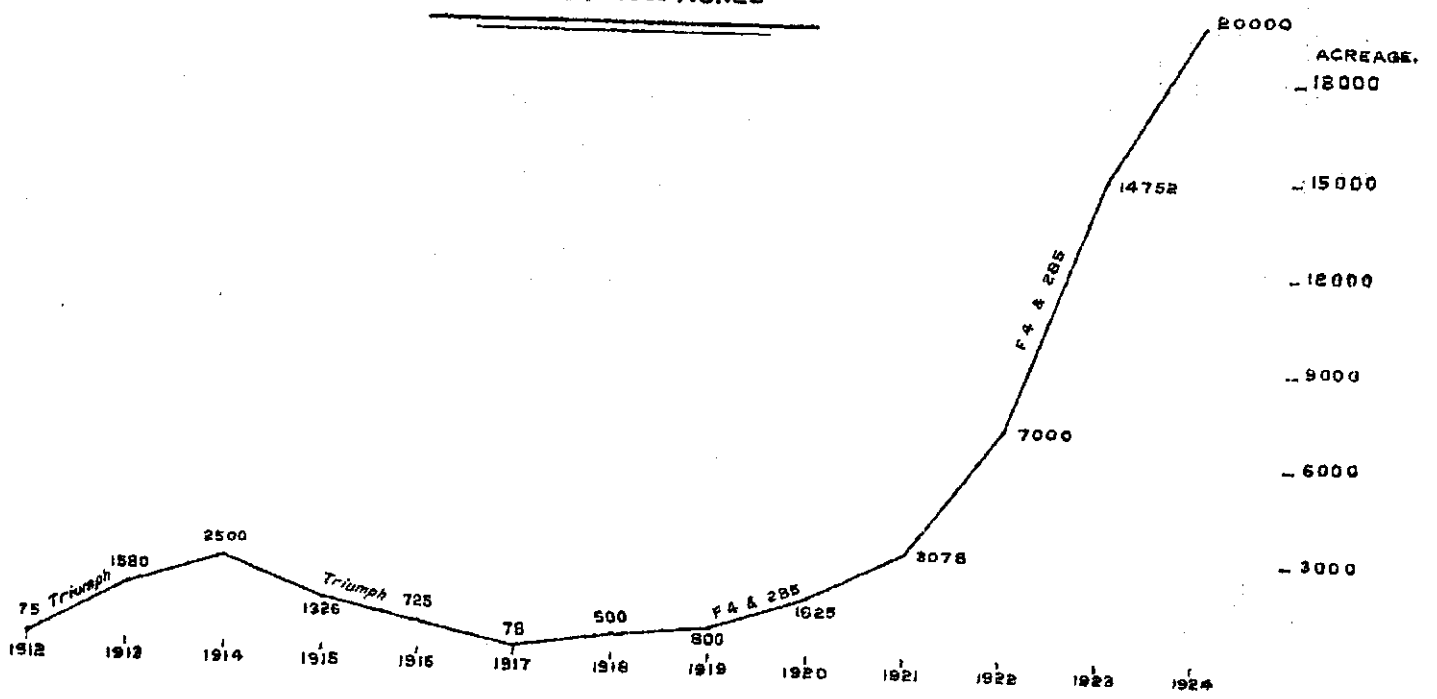
Similarly selection work on F4 is in progress. Four selected plants from this cotton are being maintained as separate lines to keep up the pure line traditions.

13. The results of the trials of small quantities of 285F and 289F seed received from the Economic Botanist Lyallpur point to the imported seed giving lower ginning percentage than the crop grown from home grown seed. This phenomenon is being investigated into; in the meantime I am calling for figures of ginning outturns of 285F and 289F as obtained in the Punjab itself.

Results of the trials of the various other imported strains together with the results of their comparison with each other as also the detailed observation on staple, ginning outturn, flowering period, etc., as studied by Mr. Thadhani have been dealt with by him in a detailed report. They are however not recorded here being mostly of academic value.

14. Position with regard to supply of American seed for district use is, that, beyond growing 24 acres on the Seed Farm we depend partly on the importation from the Punjab and partly on the supply from Local Firms. The Local Firms buy cotton certified by the Department to be reasonably pure, store and gin it separately from the other uncertified stuff. Experience shows that the seed obtained from Firms is generally adulterated and imported seed is botanically impure. This points to an immediate departmental organization for the production of seed up to a certain stage and now that we have self fertilized material available we hope to proceed with its large scale multiplication on the basis of 27 W. N. seed organization provided early water supply is available.

**GRAPH**  
 SHOWING  
**AMERICAN COTTON CULTIVATION IN SIND.**  
 SCALE 1"=3000 ACRES



15. The seed for 1924-25 crop was supplied from the sources as shown in the margin. The year under review was one of disappointment for F4 cotton as it was quoted even less than local cotton for some weeks and later on, premium ranged between 2 to 12 annas only per maund of seed cotton. The buyers' explanation about this state of affairs was that the demand for this type of cotton had temporarily ceased on the continent and as prices for Desi went suddenly up F 4 could not for the time being

	285 F.	F 4.
	Mds.	Mds.
Imported ..	2,500	..
Locally purchased from Firms and distributed ..	Nil.	500
Supplied direct by firms ..	806	1,997
Total ..	3,306	2,497

compete with it. This phase of market led to the majority of growers mixing their American with Desi and then presenting the mixture either as American or as Desi according to the condition of the market. 285 F on the other hand fetched a premium of Rs. 1-12-0 and commanded ready sale. This led to increased demand for the latter seed which had to be complied with as per figures noted in the margin above. It is not however a sound policy to handle two types simultaneously and I am watching the current year's developments with a view to deciding as to which of the two varieties should ultimately be retained for district cultivation.

#### Wheats.

16. Of about 2 million acres of wheat in the British districts of the Bombay Presidency, Sind shares about half a million acres but judged by the outturn, Sind figures come up to very nearly the half of the total crop, viz., 2 lakhs out of 5 lakhs of tons. Hence wheat is one of the most important crops in Sind.

The departmental work on this crop consists of (1) trial and introduction of some of the best wheats grown in the other parts of India, viz., Pusa 12 and Punjab 11 and (2) isolation of improved strains of important Sind varieties.

As a rule wheat field in Sind consists of a number of different types of plants with one or two types predominating. Some 17 such types have been found to exist which have been classified and the improved strains of the more important varieties, viz., Phundani and Thoree (awnless) for Upper Sind and bearded varieties for South and East Sind isolated. Of the several strains thus isolated from the above varieties only the most promising ones have now been finally retained after submitting each to severe tests. These are C. Ph. 47 from Phundani, A.T. 38 from Thoree, and G.S. 24 and G.S. 25 from the bearded wheats of Lower Sind.

These are being compared with Pusa 12 and Punjab 11 wheats. The last two form largely the basis of our seed distribution. Thus the selected strain of Thoree and Phundani were grown during the year under report in comparison, for the second time, with Pusa 12 on the Sukkur and Larkana Farms under irrigation.

17. Results of yield of strain A.T. 38 from nine replications, each measuring a 100' length of rows, showed at both the farms increase in yield amounting to 16 per cent. and 14 per cent. respectively over Pusa 12. Similarly strain C.Ph. 47 gave an increase of 6 per cent. at Sukkur and 30 per cent. at Larkana. The results so far as they go may be regarded as satisfactory but a confirmation of them seems desirable in view of the fact that last year's tests did not show any difference between the yields of these strains and Pusa 12. It may also be borne in mind that Pusa 12 being an earlier ripener had sustained much more injury from long spells of late frosts than our selected strains of local wheats.

18. On the Bosi area on the Jacobabad Farm experiments point to strain B.T. 36 (Thoree strain for Bosi cultivation) giving higher yield in 18 replications out of 21, than Pusa 12 by 10 per cent. but the ratio of difference to error suggests that the confirmation of results by further test is necessary. Similarly the difference in the outturn of C.Ph. 47 and Pusa 12 in 10 replications was 51 per cent. in favour of the former, beyond the limit of probable error; but in both the above tests Pusa 12 was at a greater disadvantage than our selected strains in being an earlier ripener and consequently suffering from the effects of late and repeated spells of frost to a greater degree.

In another experiment designed to compare Phundani strain with Thoree strain the difference in yield is far too insignificant to enable an opinion to be given in favour of any. Obviously the demand exists for both as separate varieties and both must therefore remain in a state of purity.

19. One of the serious defects of Pusa 12 that the seasonal conditions have brought to the front for the second time in its history is its producing flowers at a time when frost is likely to occur. In a normal season earliness is one of the most welcome qualities that it possesses but in seasons of late frost as was the case in the season under review when spells were of longer duration than the spells of 1919, this wheat being in flower suffered more than the other local wheats. Experience of 1919 suggested the delaying of its sowing till the mid of November so that it should flower after the danger of frost in February had passed. This was duly followed but the experience of the present season points to the desirability of further delaying the date of sowing of this wheat and I am consequently arranging experiments to find out, how far we could delay sowing without affecting the grain yield.

Comparative tests between the selected strains of awned wheats, viz., G.S. 25 and G.S. 24 with the Punjab 11 in East Sind (Mirpurkhas) have yielded some useful data and these have been duly recorded. They are not mentioned in this report; because they require further confirmation.

20. Work in connection with the maintenance of self-fertilized seed of Pusa 12 and its multiplication on the Wheat Farm is being continued and this is essential for the supply of pure seed.

Wheat Farm, Jacobabad, continues as usual producing wheat seed on large scale for distribution. 58 acres 29 gunthas were put under Pusa 12.

our main variety, and 2 acres under our three improved strains. The amount of seed available for sale in 1925 has not yet been weighed.

#### *Rice.*

21. Botanical work on Rice on the Larkana Farm is in the form of improving by selection the three important varieties out of a number in cultivation in North of Sind. This is in progress for the last three years. Of the several strains selected from each variety only 10 of each were retained from the last year's crop with one as "standard". This number was further reduced to 5 in the year under report with another as a standard. In the results of the tests recorded by Mr. Thadhani, Kangni strain 27 show an increase of 6.3 per cent. over the standard (also selected). In the case of Jajai, strains Nos. 77 and 43 have yielded 10.3 per cent. and 10.2 per cent. respectively over the standard and an increase of 61.9 per cent. by Prong 36 and 7.4 per cent. by Prong 51 have been recorded. These increased yields of the several strains even over "Standards" clearly demonstrate their superiority over the existing mass varieties.

In the matter of earliness there was no further progress beyond what had been attained in the preceding year in the case of Kangni and Jajai strains, but Prong strain No. 51 was much earlier than the remaining four strains and also "Standard".

Biometric study of various characters of agricultural and economic importance was made on the selected strains of Jajai, Kangni and Prong as also on other Sind varieties and the results have been duly recorded.

22. In comparative tests of the two prominent outside varieties, *viz.*, Kolumbia strain 79 (Karjat) and Dadkani (Bengal) with the local ones, a Kangni strain gave an increased outturn of 15.9 per cent. over Karjat while Dadkani beat Jajai and Prong by 9.4 per cent. and 23 per cent. respectively. The factors of earliness were almost equal. Both Karjat and Dadkani are fine rices and have extra small grain. Of the 37 miscellaneous varieties grown for study, 24 were from Sind, 6 were new types and 7 were foreign varieties. Observations were taken on each variety with reference to the following points:—

##### Fertilization.

Range of earliness in a single variety.

Range of earliness in a single plant.

Yielding capacity.

Biometric study of the various characters.

These have been duly recorded and the broad conclusions arrived at are, that Sathri, Ganjro, Torh, and Motiaro (Sind varieties) are very high yielding. The first two are early, the last two medium ripening varieties.

The six new types discovered from experimental fields some two years ago continue to maintain most of their original characteristics thus proving each to be a distinct variety. Their classification and further study may lead to their introduction as additional varieties or substitutes for the existing inferior kinds.

23. In the foreign varieties Kolumba 42, a fine white grained but late variety, gave promising results and will be tested further in comparison with the late local varieties. Dadkani (Bengal) and Kolumbia 79 (Karjat) have further proved their superiority over some of the best local varieties (*vide* para. 22 above).

Further study of the natural course of rice fertilization confirms the previous observations recorded in the last year's report except that the opening period of flowers became greater by a couple of hours from the end of September to the first half of November.

24. Work on the selected strains from each of the three most important varieties of local paddy, *viz.*, Kangni, Jajai and Prong, has now reached the stage of testing them under district conditions. This has been duly done by giving out 45 maunds of Kangni strain, 41 maunds of Jajai strain and 20 maunds of Prong strain among 12 growers in the current year. Organization of seed production on large scale will depend upon the results of district trials.

Other work on rice deals with the problems of—

- (1) Best seed rate per acre.
- (2) Best date of transplanting.
- (3) Rab material.
- (4) Dry ploughing *versus* puddling of rice lands.

Extended work on the first two problems though cannot be said to have assumed definite shape owing to varying conditions of water supply has nevertheless shown that 20 lbs. per acre is the best seed rate as against 104 lbs. used by cultivators and that seedlings transplanted in June give an increased yield of 50 per cent. over the crop transplanted after first week of July.

#### *Rab Experiment.*

25. This experiment has now been in progress for a sufficient number of years to admit of definite conclusions being drawn. Of the several substitutes for the usual cowdung, tested as Rab Material, *viz.*, (a) Drub grass, (b) Rice husk, (c) Sulphate of ammonia and (d) castor cake either in combination of two or individually, the sulphate of ammonia with drub grass as burning material has been found to be the cheapest and most effective substitute. This result is of a special value when we consider the cost and trouble involved in procuring cowdung or the rice husk, the latter now being extensively used as fuel for the Rice 'Josh' industry. From the figures of cost of each material worked out it appears that sulphate of ammonia apart from being cheaper than any other by nearly 50 per cent. gives much stronger seedlings resulting in better crop.

A leaflet is in the course of preparation to record the result of this experiment.

26. Further comparative trials of ploughing rice lands in dry condition *versus* local puddling method made in the year, have resulted in an

increased outturn by 20 per cent. in favour of the former. As a result of this and the past demonstrations our method of dry ploughing is being largely followed by the zemindars and it is now a rule with them not to give out land to the Harri who would not consent to plough the land in fair weather.

#### *Other Crops.*

27. Of the crops, other than those described above, Jowar is being submitted to detailed botanical study by the Larkana Farm Superintendent and various methods for the production of Berseem seed are under trial with a view to getting increased seed outturn of high quality.

Several improved varieties of gram evolved by Mr. Howard are under trial in comparison with the local types.

Preliminary work on Jowar is in the shape of classifying the existing types in Sind of which there are about 56 in number. These are being studied with reference to the density of their ear-heads grouped as compact, medium, and loose. The other character called in aid for classification is the length of the head and we distinguish long, intermediate, and short. Grain classification under each group of ear-head is studied with reference to its colour and shape whether white, yellow, or red and oval or flat. Selfed seed of each type is secured every year by bagging the ear-heads and our work in this connection has sufficiently advanced to enable us very shortly to fix the very best types for general cultivation.

Further observations in connection with Berseem production confirm the view that a couple of cuttings of green fodder may be taken before leaving the crop to seed without prejudicing the outturn and that a crop intended for seed should be sown timely, *i.e.*, not later than mid-October. Under these conditions the seed production ranges round 4 maunds per acre. In a year of prolonged spells of late frost as was the case in the year under review, berseem growth was found to have been considerably checked and this was reflected in the seed yield which is estimated to have fallen down appreciably.

In the matter of gram, the three Pusa varieties were under further tests. The crop was however hard hit by the unprecedented spells of frost and hence the result can hardly be relied upon. Type No. 6 has proved to be a late variety but this seems to be an advantage rather than disadvantage under Jacobabad conditions inasmuch as it supplies green feed to cattle during April and May when other varieties dry down.

#### *Fruit.*

28. The work on fruit is being continued, on a small scale on the Mirpurkhas Experimental Farm. The adverse irrigational conditions here have not allowed the economic aspect of the problem being fully worked out but under the reorganization scheme which provides for two big wells it is hoped that it will be possible to put the work on sound basis.

The present work consists of the growing and comparison of the several varieties of vines, citrus family and mangoes. Results show that from the point of prolificness and flavour Nagpur orange is the best and that Sylhet commonly known as "Mosumbi" is the next best. The highest number of fruit borne by Nagpur orange tree was 911 and the average per tree calculated from half acre orchard amounts to 236. A variety of orange called "Royal George Navel," though flowers copiously, does not set fruit and this experience seems to be in agreement with the results obtained in the Presidency with this variety. Of the pomelo variety the "March" imported from Saharanpur does not compare favourably with the common red fleshed variety both in size and in flavour. "Bedana" and large white fleshed variety has not yet fruited. Study of a large collection of limes with the object of finding out the best stock for budding and grafting oranges upon, show that Karna, Jamburi, Sharbati and Katharia are most suitable and that in the matter of fruit 'kagzi' round and long are the most prolific and remain in bearing practically the whole of year.

Of the varieties of vines, Motia (white) has proved superior in quality to Gulabi (rose) but is a shy yielder.

Varieties of Bombay grafted mangoes imported some years ago continue to give satisfaction. Hapoos, Cluster and Khasa have proved to be the best of the lot.

In the year under report the canal worked so badly as to supply no water for 4-5 months continuously and hence grapes failed to fruit and mangoes realized only Rs. 200.

The number of cuttings and young plants supplied to the public amounted to 1,063 plants and 412 cuttings worth Rs. 411-4-0.

#### *Implement and Machinery.*

29. The greatest need of the province is an efficient plough but such a plough should, apart from being within the means of an average cultivator, be such as to be easily pulled by an average pair of bullocks. A beginning made in this direction some years ago led to the introduction of a type called Egyptian plough. This was readily accepted by the people and in course of time it became so popular that there are now areas in which none but this plough is in use. Since then several minor changes have been effected in the original type according to the experience gained from time to time and accordingly it has assumed quite a distinct type of its own.

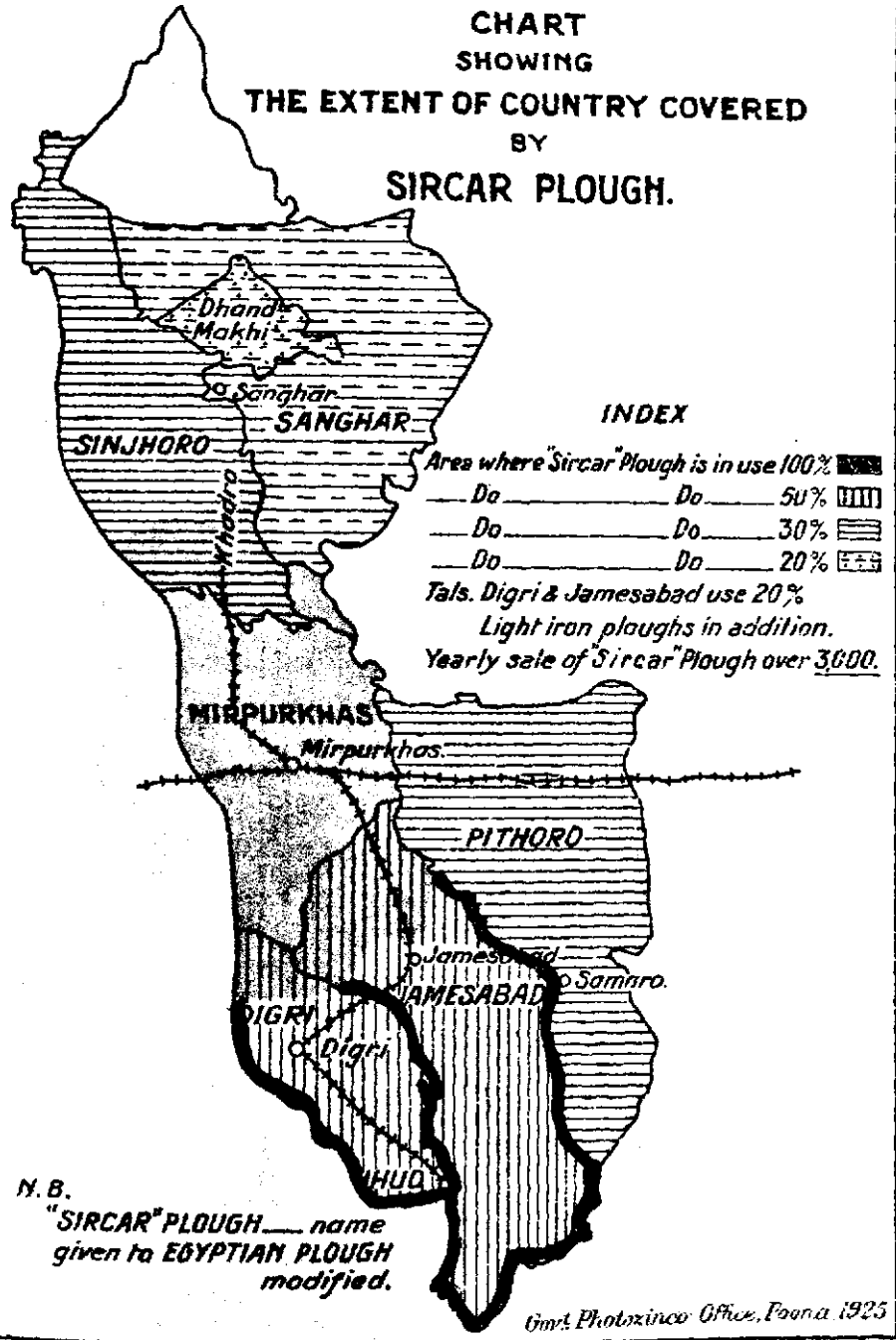
Under these circumstances and with a view to fit in its name with that by which it is popularly known I have decided to henceforth call it as "Sircar" plough.

The yearly sale of this continues to be over 3,000.

A step forward in the same direction resulted in the testing of several types of iron ploughs from heavy down to light ones and I have recently drawn up a list of those, whether in their original or the slightly modified form, which I consider by experience to suit cultivators' purse and cattle.



**CHART  
SHOWING  
THE EXTENT OF COUNTRY COVERED  
BY  
SIRCAR PLOUGH.**



N.B.  
"SIRCAR" PLOUGH — name  
given to EGYPTIAN PLOUGH  
modified.

These are :—

	Price.		
	Rs.	a.	p.
The Meston plough .. .. .	11	0	0
Chatanooga No. 32 .. .. .	27	0	0
Sirdar plough .. .. .	22	0	0

Thus our propaganda staff will for the present push the sale of only these till we have come out with other types the study of which is in progress on some of our farms. Orient plough manufactured by Messrs. Ransomes Sims and Jeffries is one of the most promising ploughs but the current price of this plough is Rs. 32. It is essential to reduce this price before its general introduction becomes possible. Mr. Schutte, Agricultural Engineer, is now working upon a design of a similar plough which he anticipates can be made in India with the same general excellence of the original type at Rs. 15.

30. After the plough, the implements which have brilliant future are the Cambridge and self-cleaning Nicholson Rollers. Messrs. Howard of Bedford who designed a special size of the Cambridge roller for Sind a few years ago to enable an average pair of bullocks to pull it and supplied it for Rs. 300, were again approached by me for still further reduction in price. To this they agreed and I accordingly sent an order for six. On arrival of the first consignment of three I however found that instead of the notched rings as in the original type they put spiked rings rendering the machine far less effective in breaking clods. I have therefore cancelled my order for the remaining three and have now put myself in communication with the proprietors of Implement Factories at Satara Road and Kirloskervadi through the Director of Agriculture with a view to getting this and the self-cleaning Nicholson roller together with the Norag thresher and Iron leveller cheapened without impairing their original excellence.

31. In the matter of Mechanical cultivation Cletrac tractor continues giving satisfaction on the Jacobabad Farm under the careful control of Mr. Barakzai, the Farm Superintendent.

Running expenditure for various operations done by the tractor as worked out by him stands as under :—

	Rs.	a.	p.
(1) Ploughing with two furrow 14" mould board plough in the Jacobabad soils per acre including overhead charges of Rs. 2-6-8 .. .. .	5	14	3
(2) Reaping with Omnimum self-rake reaping machine per acre .. .. .	2	5	3
(3) Threshing with De'Pole thresher per one maund of clean grain .. .. .	0	3	1
(4) Pumping with 5" to 7" watering per acre .. .. .	6	7	9
(5) Chaff-cutting (per 100 lbs. Kadbi) .. .. .	0	2	2

These figures show that the performances of the tractor except at the draw bar, are from the point of cost uneconomical. The pulley work when done by an oil engine burning crude oil instead of the high class

kerosine oil as used for the tractor as also the low initial capital outlay together with its  $2\frac{1}{2}$  times longer life will bring the cost to about half of what has been shown for the items of pulley work performed by the tractor.

32. Regarding the new type of winnowing machine specially designed by Messrs. Penny and Porter of Lincoln for separating Jowar grain from Bhusa received three years ago, the addition of a countershaft with suitable pulleys to increase the speed of the fan seems to have remedied its original defect of delivering grain with a large amount of Bhusa mixed with it. The Bhusa under this arrangement blows off clean and the grain falls to the ground in a cleaner state than used to be the case. The Agricultural Engineer now expects to have this modified machine made in India within Rs. 150 and if he succeeds I anticipate a very great demand for it.

Figures worked out in connection with the six-coultered Hoosier drill show that 6 acres can be sown with it in a day at a cost of annas 8 per acre as against Rs. 1-10-0 by the local method of sowing with one-coultered drill. The drill can be worked by a pair of bullocks but it has been found convenient to use two pairs, one working in the morning and the other in the afternoon.

Unfortunately the high price of the drill (Rs. 500) is coming in the way of its general introduction but I expect that something will soon be done to have an imitation of it made in India at a cheaper price.

Other machinery under trial on the Jacobabad Farm are De'Pole Wheat Threshing machine purchased from Holland and the Omnimum self-rake reaper manufactured by Messrs. Samuelson & Co. of England. These were for the first time tested during the year under review. The tests are however not yet complete and I am therefore reserving my opinion upon them for the next report.

#### *Dairy Herd.*

33. The strength of the dairy herd at Sukkur Farm was seventeen buffaloes of which sixteen were in milk. In addition to this number there were two heifers in calf, thirty young stock and one bull. Two cows were sold during the year, fourteen calves were born of which four were sold off.

Fifteen of the young stock are kept on the Larkana Farm. The number in milk ranged from ten to sixteen and the yield of milk was 59,224 lbs.

The best cow gave 4,659 lbs. in 300 days as against 6,476 lbs. of last year's best milker. This low yield was due to the whole herd having been attacked by the sickness called "3-day sickness" which prostrated them for nearly a month.

We have now a couple of premium bulls ready here to give out to the public and negotiations in this connection are going on with certain bodies in North Sind.

#### *Agricultural Education.*

34. Agriculture is being introduced in the Upper Standards of a few primary schools in Sind. The number started so far is one in Upper

Sind Frontier District, one in Larkana District, one in Sukkur District and one in Nawabshah District. Classes in Hyderabad, Karachi and Thar Parkar districts are in the course of introduction. The agricultural teachers for these schools have been given practical training on our farms and the schools are inspected from time to time by the Agricultural staff for giving expert advice at the request of the Educational Department.

*Rat pest Investigation.*

35. Probably there is no other animal so mischievous and destructive to crops as the field rat. Sometimes the damage done by them to paddy assumes such enormous proportions that wholesale remissions of land revenue have to be given. For instance in the year 1920-21 in Shahbunder Taluka the remissions amounted to Rs. 17,947-13-0 and in the year 1917-18 in Mirpur Bathoro to Rs. 24,703-14-0. The departmental investigations on this serious problem conducted in the year under review were in the following directions :—

- (1) Identification of the species of the rat and ascertaining its life History.
- (2) Observations of its social, breeding, dwelling and other habits.
- (3) Nature and extent of damage done by them.
- (4) Trials of various methods of control.
- (5) Determination of suitability of various poisons, their doses and their media.

Rice is the only crop which suffers the most and damage is done to the crop at three stages of its growth. First when the crop is 1½' to 2' high the rat cuts the plant at the succulent portion of the stem, and such damage covers several patches of the field. The plants thus cut however give out new shoots which mature their earheads and the loss is not much. The second stage is when the earheads develop milk inside. Rats go up the plant and suck the milk from the grain which never again develops. This loss is very heavy in some years. The third stage when the crop is fully ripe, the rat cuts the heads and stores it in the burrows. More than 600 earheads have been counted in some of the burrows when the work of collection was still in progress. It is said that in years of severe rat infestation the rats move from field to field actually harvesting the crop at night.

*Trial of methods of control :—Hand digging* is the method locally practised but is very costly. One man can dig and destroy from 15 to 20 rats in a day and is paid at the rate of 2 to 3 pice per rat. Snakes, jackals, wild cats and trained dogs to some extent kill the rats but none of these enemies effectively keep the pest under control. The departmental remedial measures were conducted on two lines, *viz.*, poisoning and fumigations. *Traps* as are used in case of house rats were discarded because no bait that could attract rats in sufficient number could be found.

36. The common *rat poisons, viz.*, Strychnine Hydrochloride, Barium Carbonate, White Arsenic, Copper Sulphate, and Vermin Destroyer were

tried and administered through the media of cooked rice flour, cooked wheat bran, and uncooked rice flour, and in different doses and the result is, that, of all these poisons Strychnine hydrochloride has been found to be the best and the quickest acting 0·025 grain being sufficient to kill the rat within 30 minutes. Another point elucidated from the experiments is that the addition of flavouring substances like gul, cocoanut oil, and aniseed oil instead of accelerating the rush for the bait deteriorate the value of the bait.

37. *Fumigation* on the other hand has given very promising results. Carbon bisulphide and petrol were used as fumigants and the fumes were pumped in the burrows by means of a machine called the 'Suddeth Rabbit Fumigator' imported from Australia. The results achieved show that Carbon bisulphide is a very useful fumigant and only  $\frac{1}{2}$  minute's pumping is sufficient to destroy the rats one and all. The best time for using this method is from July to October when the rats are all confined to the embankments and the burrows are very short.

Co-operation among the zemindars is very necessary for the wholesale cleaning of the pest from a tract. If only a few people resort to these means and their neighbours neglect, the rats from the untreated area will travel and reinfest the treated area. Legislation seems to be perhaps the only way of getting out of this difficulty.

The programme of the current year consists of further observations on all the points mentioned above for confirmation and for obtaining further data if possible. Extensive trials will moreover be given to poisoning and fumigating methods and some new poisons such as sulphur and Hydrocyanic acid will be tested. A separate block of field will be selected for fumigation treatment with a view to working out cost and the economy.

#### *Propaganda.*

38. Position with regard to propaganda work in Sind is that the following 8 talukas have been assigned to the Assistant Registrar Co-operative Societies, Sind, from January 1923 for carrying out intensive agricultural propaganda.

Hyderabad, Halla, Shahdadpur, Tando, Allahyar, Sukkur, Ghotki, Kamber and Larkana.

Propaganda work whether extensive or intensive in the rest of the province is dealt with directly by the Agricultural Department. Intensive work is confined to 3 talukas of Thar Parkar District, *viz.*, Mirpurkhas, Jamesabad and Digri but a proposal is being placed before the Divisional Board for the extension of the intensive work in the adjoining talukas of Sinjhor and Guni. This move has been made possible by the starting of Taluka Development Associations which will be competent enough to handle the work, solidly established as it has been by sustained efforts of the Department for the past 10 years. Proposals are also afoot to take up Jacobabad and Nawabshah for replacing the present extensive by intensive work.

39. The chief material of propaganda are, seeds, implements and improved methods of cultivation. The seeds handled are improved strains of desi named as 27 W. N. and American cotton. The merits of these seeds have been described in paragraphs 5, 6, 10 and 11 above.

Owing to chronic difficulty of cold weather water supply, wheat cultivation has been almost entirely suspended on the Jamrao but the Department distributed some 50 Bengal maunds in a couple of village and also distributed some selected strains and varieties in Badin (District Hyderabad) all of which were highly appreciated.

The variety of wheat which has met with most popularity on the Jamrao is Punjab 11.

40. The total quantity of 27 W. N. seed distributed by the Divisional Superintendent of Agricultural East Sind in the year under review was 918 maunds and that distributed in the current year amounts to 1,363-20.

These quantities were only sufficient to meet a very small fraction of the demand. The premium received by the growers of this cotton over the ordinary local ranged between 4 to 14 annas.

41. *American cotton.*—The quantity of seed distributed in the year under report was 4,000 maunds imported from the Punjab and 80 maunds produced on the Seed Farm. In addition to this a large quantity of seed was supplied by the local Firms. The variety was F—4. Figures of area under American cotton kindly supplied by the irrigation department show that these were between eighteen to twenty thousand acres under it. This is the highest area ever reached under exotic cotton since the Department began its operations and shows how very keen the people are on this cotton even in years when water supply is not available at the proper sowing time which is March-April. A copy of the accompanying chart will show how very steadily the cultivation has gone up. Future development of this cotton will depend upon the state of water and the seed supply. A scheme in connection with the production of seed locally has been discussed in paragraph 14 above but it must be noted that success of the scheme will largely depend upon the factor of early water supply.

42. *Implements.*—The most popular ploughs in the intensive area are the "Sircar" and the Meston plough. Efforts of the Department in training the local mistryes have led to a large number of these ploughs being now manufactured in several villages and sold direct to cultivators. Their annual output is estimated to be several hundreds. The use of Meston ploughs is at present confined to Jamesabad Taluka but steps are being taken to introduce them in the other intensive talukas.

The implements sold direct by the department are shown in the margin.

Meston ploughs ..	304	Orders from the talukas under extensive propaganda were transmitted to the local manufacturers for direct compliance. The accompanying chart will show the extent of the country covered by the "Sircar" plough.
Rajah ploughs ..	3	
Chaff cutters ..	4	
Cambridge roller ..	1	
Iron water wheels ..	13	

43. In the improved methods of cultivation, we had our usual demonstrations of sowing of cotton in lines. The area operated upon was 263 acres in Mirpurkhas, Digri and Jamesabad talukas. This was considerably below the original programme and was due to the late arrival of water in the canals which necessitated the sowing operations being done hurriedly. Hence many zemindars had to fall back upon broadcast system although they would have liked to sow by the line method. The drilled crops presented vigorous growth and were the outstanding demonstration of how costly hand weedings could be done away with, in a drilled crop, by making intercultivation possible by means of bullock power.

The small substation at Jamesabad for demonstration of cotton and wheat varieties and implements was successfully run by the Divisional Superintendent of Agriculture. It gave a net profit of Rs. 670 4-3.

The usual village to village demonstrations with implements were carried out in 6 villages but the work was checked in the middle by the staff falling sick from the effect of malaria.

44. Implement and Tractor demonstrations held after several years at Mirpurkhas and Jacobabad in which 2 private firms participated were very successful. The tractor demonstration was the first of its kind. The people and the press commented very favourably upon them and the marginally noted orders for seeds and implements were registered.

	Maunds	As a result of these demonstrations. His
27 W. N.	.. 73	Highness the Mir of Khairpur whose represen-
F 4	.. 10	tatives were present at the show purchased
285 F	.. 10	one 'International' tractor and also invited
Eagle Hand Saw gins	2	the department to hold a demonstration at
Howard Cambridge		his capital on similar lines. The request
Rollers	2	was complied with. A number of sample ploughs were purchased by
Nicholson Rollers	6	the Durbar for getting them made locally and they also placed an order

for a Hoosier drill costing Rs. 500.

A similar move was subsequently made by the zemindars' Association of Tando (District Hyderabad) inviting the department to organize a small show at Tando Mahomedkhan. This was duly done. There was a very large attendance of zemindars and cultivators at the show and impression created by the successful working of our implements, was very favourable.

#### *Miscellaneous.*

45. Of the other manifold activities, the organization of Taluka Development Associations and the beginning of preliminary work at Sakrand in connection with the reorganization scheme are worth mentioning. 3 such associations have been started in the intensive talukas with subscriptions noted in the margin. These have been duly registered

Mirpurkhas	.. 1,750	by the Registrar, Co-operative Societies, Bom-
Digri	.. 697	bay. Programme of work to be undertaken by
Jamesabad	.. 1,436	each association together with their budget

estimates have been drawn up for submission to the Divisional Board.

The Divisional Board of Agriculture held three sessions during the year two at Karachi and one at Hyderabad.

Preliminary survey of the Sakrand land was done by Mr. Abdur Rehman for the purpose of canalization who also attended to several other minor items in connection therewith.

The Mechanical Assistant with his fitter attended as usual to the Farm Machinery and other Departmental calls and erected two new pumping plants on zemindari holdings beside attending to ten enquiries from the public.

All the staff and office establishment worked satisfactorily.

GUL MUHAMMAD ABDUR REHMAN,

Acting Deputy Director of Agriculture, Sind.



## APPENDIX I.

## WORK DONE UNDER THE PROFESSOR OF AGRICULTURE DURING THE YEAR ENDING 30TH JUNE 1925.

*Charges.*—Mr. V. G. Gokhale, L.Ag., Deputy Director of Agriculture, Konkan, acted as Professor of Agriculture during my transfer as Live Stock Expert to the Government from July 1st to November 10th when I relieved him of the charge.

*Nature of work.*—The mainwork under me is the teaching of Agriculture and Dairying. From June 1925 the college course is overhauled to give greater facilities for teaching practical side of Agriculture. The new course will materially increase the hours of work for my section as it introduces field work in the first year and adds crop optional in the final year. It is felt that one more senior assistant at least will be badly needed to handle these additional practical classes.

Besides being the teaching centres, the college farm and the dairy serve as centres for demonstrating to a large number of visitors, improved methods of crop production, the use of improved implements, the proper methods of handling live stock, etc., and for stocking improved implements and various seeds for sale.

Research is another branch of work which is not neglected; during the year under report an amount of preliminary work has been gone through in connection with the investigations into "Economics of tillage and implements" with the help of a special assistant from Sir Sassoon David Fund. The experience gained has been of great use in formulating the scheme of work for 1925-26. It may be noted however, that research in tillage and its effects on soil and crop growth is a subject which is very complex and presents many inherent difficulties. It is however hoped that the revised scheme based on the experience of the year under report would considerably help the study of the whole problem of tillage and implements.

Mr. H. M. Desai, B.Ag., has been studying for the last two years the important question of a suitable method of growing turmeric successfully in Deccan soils. The ordinary bed-method practised in Gujerath is not so suitable for the black soils here. The ridge and furrow method of Satara can be improved. As a result of this work it has been found that what may be called the "Broad ridge method" is probably the best for Deccan soil conditions. In this method the water is given in channels five feet apart and is allowed to be absorbed by capillarity by the soil (broad ridge) in between the two water channels. The soil on the ridge remains in excellent tilth. Rhizomes grow very vigorously and a very large increase in outturn is obtained (*vide* statement further). If this method is followed it would mean a great advantage to the farmer in Deccan.

On the Dairy farm very valuable data on the methods of growing maximum fodder crops with minimum of expenses are being collected.

Besides, very valuable data on commercial management of a dairy farm are being collected which would be certainly very useful towards the solution of the problem of milk supply.

*The Agricultural College Farm.*—The total area of the farm is about 275 acres of which about 125 acres are cultivable, of which about 12 acres are set apart for the use of various Expert Officers at the College. The rest is utilised for teaching purposes and for growing fodder crops to supply fodder to a large number of bullocks maintained for teaching purposes.

*Season and its effects on Crops.*—The sowing of crop was delayed up to 28th July. Towards the middle of August all Kharif crops suffered from drought. But the rain in the last week of August was timely. There was again useful rain in the last week of September.

In addition to unfavourable rainfall we had the frost which had very serious effects on many crops. The minimum temperature suddenly dropped from 44°F on 21st to 35°F on 22nd of January and we had partial frost. On 23rd and 24th January the temperature came down to 33·5°F and the work of the frost was complete.

Crops of cotton (neglectum and herbaceum varieties) and tomatoes, that were still in blossom were completely lost.

Rabi jowar suffered in a strip more exposed to a cold wave from north east and the yield was reduced by about 50 per cent. In Rabi brinjals the upper  $\frac{1}{4}$  or  $\frac{1}{2}$  of the leafy growth was affected, which after pruning and irrigation produced a good crop. Chillies suffered in the last picking. Turmeric leaves were parched up but no effect was noticed on the Rhizomes.

Crops like lucerne, cabbage, onions, wheat, peas, did not suffer in any way. Pan (Betel leaves) garden which was well protected on all sides by wind-break showed no effect of frost.

*Insect pests and diseases.*—Thrips on onions, leaf curls on chillies in one part of the farm, leaf caterpillars on jowar and rust on wheat were the chief plant enemies.

*Some noteworthy features of this year's cropping.*

Crop.	Area Gunthas.	Outturn per acre in lbs.	Net profit per acre.
			Rs. a. p.
<i>Turmeric—</i>			
Bed method ..	10	13,512 (green)	120 3 6
Ridge ..	5	21,832 ( " )	510 11 6
Broad ridge ..	10	24,536 ( " )	620 12 9
<i>Suran—</i>	40	37,380 ( " )	559 6 0
<i>Double beans</i>	10	{ 7,448 Pods 336 seeds 7,296 fodder }	424 13 0
<i>Cucurbits</i>	10	20,720	465 8 0
<i>Onions for seeds</i>	20	{ 717 lbs. seeds 5,422 ,, bulbs }	613 3 6

Crop.	Area Gunthas.	Outturn per acre in lbs.	Net profit per acre.
			Rs. a. p.
<i>Bhendi and Guwar</i> ..	10	{ 5,472 lbs Bhendi 1,812 ,, Gowar }	92 15 0
Tomatoes ..	10	{ 154 ,, Coriander 10,590 lbs. }	76 8 0
Brinjals (rabi) ..	10	{ 19,320 ,, Brinjals 990 ,, Coriander }	879 14 0
Chillies (local) ..	90		

*Sale and repair of implements and distribution of seeds to the public.*—A large number of improved implements including plows, stone-rollers for threshing jowar, tooth cultivators, etc., were sold to the public, the plows and spares being the chief items. The total sale amounted to Rs. 6,920-15-10.

In addition to this, large quantities of seeds like early groundnuts, fodder jowars, onion, lucerne, cotton, suran and turmeric sets, etc., were supplied to the public amounting to over Rs. 3,558.

*Trials of implements.*—Messrs. Satara Industrial Works Company, sent us four of their plows for thorough trial and report. These were tried along with other makes of plows and a report on their plows was sent to the Director of Agriculture, Bombay Presidency, Poona.

#### THE AGRICULTURAL COLLEGE DAIRY, KIRKEE.

*Purpose.*—The Dairy is run on business line as stated in last year's report.

*Staff.*—Mr. M. M. Desai, B.Ag., acted throughout the year under report as manager of the Dairy and Assistant Professor of Dairying and Animal Husbandry at the Agricultural College in place of permanent incumbent Mr. H. G. Baluch, B.Ag., having been deputed to Bangalore for higher training in Animal Husbandry.

*Herd.*—The following is the statement showing the strength of the herd on 31st March 1925 :—

<i>Animals—</i>				
Cows	..	..	..	36
Cow-heifers	...	..	..	42
Cowbull-calves	..	..	..	20
Cowbulls-breeding	..	..	..	4
Buffaloes	..	..	..	44
Buff-heifers	..	..	..	55
Buff-bulls-calves	..	..	..	5
Buff-bulls-breeding	..	..	..	3
Bullocks	..	..	..	33
Horses	..	..	..	2
Total ..				244

*Breeds.*—The herd consisted of Sindhi cows, Surati Buffaloes and a few cross buffaloes. Breeding for higher milk production was continued.

*Statement showing the milk yield results of the herd.*

Year.	Average No. of Adult animals.	Average yield of the herd.	Analysis of column 2.		Average yield of cows.	Average yield of buffaloes.
			Cows.	Buffaloes.		
1923-24 ..	105.3	2,384.0	41.0	64.3	2,427.20	2,345.6
1924-25 ..	91.2	2,671.5	37.9	53.3	2,970.0	2,493.0

*Milk production.*

Year.	Average No. of adult animals.	Average No. of animals milked.	Total milk production in lbs.	Average milk yield per head per year.	Cost of productions of 100 lbs. of milk in Rs.	Total milk fed to calves lbs.	Total milk sold.	Value realised per 100 lbs.
1923-24 ..	105.3	71.0	251,078	2,384.0	*(18.7) 17.3	18,293	232,775	Rs. 16.8
1924-25 ..	91.2	63.8	243,643	2,671.5	*(18.9) 17.3	20,667	222,976	18.0

\* Figures in brackets show the cost of 100 lbs. of milk available for sale after feeding Calves.

It will be seen from the above statements that both the cows and the buffaloes fared better during the year comparatively in point of their respective milk yield. The cow herd taken as a whole shows an improvement by about 22 per cent. over the last year. The average milk yield of the whole herd cows and buffaloes combined shows an improvement by about 16 per cent. over the last year.

We could produce milk during the year at the same cost as that of the previous year and could realise a bit more on the produce.

*General remarks.*—In spite of a high pressure of work of teaching, administration, service and propaganda it must be said to the credit of the staff of the Agricultural Section that they did their work very satisfactorily and without any complaint.

B. S. PATEL,  
Professor of Agriculture.

## APPENDIX J.

REPORT OF THE WORK OF THE AGRICULTURAL CHEMIST TO  
GOVERNMENT OF BOMBAY FROM 1st JULY 1924 TO  
30th JUNE 1925.

1. The work under the Agricultural Chemist may conveniently be divided into five sections for report. They are :—

- (1) Analytical work done for the public and for other sections of the Agricultural Department and for other Government Departments.
- (2) Investigation work.
- (3) Teaching at the Poona Agricultural College.
- (4) General supervision of the Manure-mixing Laboratory attached to the Union Agency, and
- (5) Water-finder work.

2. *Analytical work.*—The number of samples received during the period under report was 1,240. This number does not include those samples which were analysed in connection with the investigation work carried on in the Chemical Laboratory. The 1,240 samples consisted of 290 soils, 272 manures, 491 waters, 53 feeding stuffs, 20 fruit samples, 17 oils, and oil seeds, 19 milk and milk products and the remaining 78 consisted of miscellaneous samples of various sorts.

3. The samples received from Government Departments numbered 752. The Government samples were analysed in connection with the various investigation problems which the Agricultural Department is carrying on.

4. Some time ago the District Agricultural Overseer of North Kanara observed that some patches of land along the sea coast were showing deterioration. Several samples in this connection were examined for their lime contents and hydrogen concentration values. They all showed deficiency of lime and acid reaction as compared with soils of normal character. Addition of lime to these soils was tried last year on a few patches of land and gave encouraging results. It was on this account that a number of samples were examined. Experiments with addition of lime are being tried on a number of plots to confirm the results obtained.

5. Some time ago a trouble arose in connection with the water charges on the Hathamatti Canal. The cultivators maintained that their soils contained more water than the soils on the Kharicut Canal and therefore they said that the water charges for them should not be raised to the level of those on the Kharicut Canal. To investigate the truth of what the cultivators say three villages on each canal were selected and soils from two fields in each village were taken at two different periods, once in January and then in April 1925, and the water contents of the samples were determined. A report on these determinations has already been submitted.

6. The real test of the success of the laboratory is not shown by the use which the Government Departments make of the laboratory. It is shown by the use which the public and especially the cultivators make in getting their samples analysed and their difficulties solved. A large number of samples were received during the year under report from actual cultivators and from men engaged in Industries depending on agriculture. The total number of samples was 488.

7. Out of 488 samples, 154 were soils, 212 manures, 38 waters, 8 feeding stuffs, 10 oil and oil-seeds, 17 milk and milk products, and 49 miscellaneous. Some time ago it was pointed out that the manures put on the market are sometimes adulterated and the cultivators lose much by not getting their manures analysed. The number of manure samples sent for analyses by private persons is increasing. In the year 1921-22 the number was only 37. In the year 1922-23 it was 92, which rose to 137 in 1923-24, while in the year under report the number went up to 212. One or two oil mills sent their oil seeds and oil cakes to determine the percentage of oil to enable them to check the yield of their oil. Amongst other samples were vegetable ghees, butter, insect powder, liquid insecticides, etc.

8. *Investigation work.*—Investigation of small problems referred to the Agricultural Chemist are generally included under analytical work and in this report they have been so included under that heading. Mention of other problems may, however, be made under the heading of Investigation work.

9. The study of the changes in the nitrogen contents of the soil in connection with the experiments of ridge cultivation of cotton at Surat was completed. The results will be included in the publication of work on ridge cultivation.

10. The investigation in connection with the recuperation of nitrogen in the Deccan soils was in part completed. The results obtained are interesting and valuable. These have been put together and sent for publication. Further work is taken on hand and will be continued.

11. The work in connection with the manuring of rice crop is being continued in co-operation with the Rice Experimental Station at Karjat. The study of the difference in effects of the phosphatic manures on the Kumta and Karjat soils is included in this investigation.

12. Mr. N. V. Kankar, M.Ag., B.Sc., Assistant Professor of Chemistry, continued his village survey work to study the economic condition of the Deccan villages.

13. *Teaching.*—I was responsible for the teaching of Geology and Chemistry to all the classes at the Agricultural College. On account of the increased number of students the teaching work has become very heavy in recent years, and the teaching staff in the chemistry section finds it extremely difficult to do much by way of continued research work. They utilise their spare time in working on small problems which are now offered by the public for solution.

14. *Manure Mixing Factory*.—According to Government Order No. 7790, dated July 27th 1918, Revenue Department, a chemical laboratory was attached to the Union Agency with a view to encourage the use of manures by preparing mixtures of manures for the various crops. Last year Mr. B. H. Patil was in charge of that laboratory. He analysed in all 310 samples consisting of 2 soils, 37 manures, 73 manure mixtures and 198 samples in connection with the investigation work he had on hand. The problems were (1) Fineness and uniformity of mixtures of manures prepared in the factory, (2) deterioration of manure mixtures and (3) the solubility and the action of Radiophos under field conditions.

15. *Water Finder Work*.—During the year under report Rs. 497 were received as charges for the loan of the machine. The machine was lent to 44 villages and 284 spots were tested out of which only 37 gave indications of under-ground water currents. The machine was specially sent to Bagewadi taluka of Bijapur District for over a month as the taluka is very short of water.

16. I am glad to say that all the assistants under me worked very satisfactorily during the year under report.

D. L. SAHASRABUDDHE,

Acting Agricultural Chemist to the  
Government of Bombay,  
Poona.

## APPENDIX K.

## WORK DONE UNDER THE ECONOMIC BOTANIST TO THE GOVERNMENT OF BOMBAY, POONA, FOR THE YEAR 1924-1925.

Dr. William Burns held charge of the work till the end of April 1925. Mr. G. B. Patwardhan, B.Sc., Assistant Professor of Botany, acted as Economic Botanist during the remaining period of the year. Mr. L. B. Kulkarni, M.Ag., Assistant Economic Botanist, is acting as Assistant Professor of Botany since May 1st, 1925. Mr. R. B. Deshpande, B.Ag., acts in Mr. Kulkarni's place. Mr. Narayanayya, Herbarium Keeper, was on leave for a month and half from 1st March 1925 to 15th April 1925. Mr. V. N. Sane, B.Ag., continues to act as Demonstrator and Mr. W. V. Joshi, B.Ag., as Assistant Economic Botanist. The Economic Botanist held charge of the current duties of the Plant Pathologist to Government, Bombay, Poona, also.

*Education.*

Teaching of Botany to the College classes is continued as usual.

Fifteen students specialised in Advanced Botany and Horticulture in the final year of which 12 were for the degree course. 11 passed including the three of the Diploma Course. One candidate scored *First Class*.

Mr. S. V. Godbole worked up a thesis for the M.Sc. degree in Bajri under the direction of the Economic Botanist. He was admitted to the degree.

Training was given to Mr. Contractor in special Horticulture regarding the planting, maintenance of a Botanical Garden.

Students of Agricultural Schools, of Training Schools for Men and Women of Poona and outside annually attend the College when demonstrations were held for their benefit.

Exhibits were sent to the Mahomedan Educational Conference held in Poona in October 1924.

*Seed Testing.*

The number of seed samples tested was 200.

*Effect of Sunlight on Germination of Papaya.*—Comparative tests under variation in exposure to light showed that seeds exposed to sunlight from morning to 11 a.m. only gave maximum percentage of germination, viz., 72.5 per cent., while under laboratory conditions the percentage varied from 0.5 per cent. to 3.5 per cent.

*Germination of Michelia Champaka.*—(Son Champa seeds). There is a great difficulty in raising plants from seeds. Several trials, made for speeding up germination failed to solve the difficulty.

*Longevity experiment.*—This is the fourth year of the experiment. Out of 17 crop seeds, it is only groundnut that has been showing a fall in



germination. At the start the germination of it was 96 per cent. but now at the end of three years it has fallen to 22 per cent.

*Plant Economics and Advice.*

Sixty-four enquiries connected with Economic Botany and plant products were received and answered. In the Herbarium 294 specimens sent by the public and department were identified. Fifty new sheets were added. 1,300 spare sheets were supplied to the Royal Institute of Science, Bombay, to form a nucleus of their Herbarium. Advice on pasture improvement and turf planting was sought and supplied to the Western India, Golf Club, P. Y. C. Hindoo Gymkhana, Poona, to an inquirer at Ambejavlgi (Barsi) and Hansot (Broach).

*Research.*

*Canal weeds.*—The experiments were closed this year. The results are being compiled into a couple of papers for publication.

*Safflower.*—Safflower breeding was continued with the object of confirming the fair amount of consistency shown by Nos. 7 and 6 strains, the former in the oil percentage and the latter in the yield. The original stock of 22 strains from Pusa is maintained. No. 7 variety which has been showing hopeful results for the last two years, was given a trial on a larger area than before. The area was roughly divided into two parts and one of which was given two irrigations and other was left without irrigation. The same method of cultivation as that of last year was being adopted in the so-called irrigated area, with excellent results again. The unirrigated area was sown as is done by the cultivators, but with no mixture of Jowar or some such crop. In order to have an idea of the performances of this No. 7 and compare it with the performances from seed grown out of cultivators' stock, the plan of cultivation fixed up in the unirrigated area was 16 rows of No. 7 alternating with 4 rows of the cultivators', the cultivators' rows functioning as check rows. In the unirrigated area, 4 beds were given to No. 7 alternating with cultivators and each of these beds having two rows.

The comparative yields of 100 plants of No. 7 were:—63½ ozs. and 32 ozs. in irrigated and dry areas respectively. While the corresponding cultivators' stock gave 41½ ozs. and 30 ozs. respectively. It can be seen that No. 7 has proved to be decidedly better strain than the cultivator's in yield. The crosses referred to in previous report have not proved hopeful.

*Fuller's Tease.*—Contrary to last year's expectation this has given heads in one year only.

*Bajri Research.*

This investigation was started in the year 1921 with a view to breed types of Bajri more drought resistant than the average crop grown in the Deccan. During the first year (1921) a selection of such plants as

were actually found to thrive better than their neighbours was made from fields that were affected by drought and this was grown year after year from 1922 onwards. The following are the important results:—

(1) Further selection on the basis of drought resistance has not become possible even though the plants were grown on extremely poor soils. Last year, *i.e.*, in 1924, though the selection were also grown without irrigation at Manjri (a place with smaller rainfall than Poona) the conditions were not severe enough to any of the strains to wilt. Hence, the committee controlling the research have decided to continue selection work mainly for yield, earliness and other qualities keeping drought resistance as the secondary object in view.

(2) Attempt at isolation of pure types as distinguishable by leaf-hairiness was continued during the last year. There is some amount of splitting yet occurring in the different strains inspite of the precautions taken to prevent cross-pollination by bagging.

(3) The non-hairy types have again shown themselves to be superior to the hairy ones in yield. This was found to be consistent during the last three years. Amongst the two hairy types, the superiority or otherwise of each of them has not become established as yet.

(4) The various selections that are being continued at present were found during the last year, to be somewhat superior to the Akola variety from point of yield.

*Drum Experiments.*—To investigate conditions of wilting continue.

#### *Lantana Eradication.*

A further experiment on 38 plants has shown that by painting poison on close cut (close to the ground level) stem facilitates the travelling of the poison to the tip of the roots 3 feet long while the same done at 6" above ground does not help the penetration of the poison beyond 2 inches.

#### *Grass Investigations.*

*Kalas Plot—General observations.*—The growth of the good perennial grasses on the hill portion is very hopeful. The main point is to speed up this colonisation. In the low lying part, the development of excellent grasses, *viz.*, *A. annulatus* and *Iseilema laxum* was greatly hampered by water logging which gave rise to a swamp like flora. The area though fit for grazing, is not in a condition to be overgrazed and trampled heavily. A close community of perennial tussock grasses holds surface water and prevents wash and erosion. Much dead matter however prevented the penetration of water into the soil. With proper management there would be no such dead material as grazing would remove all stalks up till the last moment.

*Burning.*—An accidental fire of February 1924 upset the programme to some extent. In the low lying portion, *Iseilema laxum*, *Andropogon annulatus* and *A. caricosus* began to sprout from the burnt stumps ten

days after the fire and made rapid progress thereafter. Some of the stumps of *A. annulatus* actually flowered within six weeks of the fire. The hot weather of April killed the new shoots and foliage. On the hilly portion the only grass to sprout was *A. triticeus* which gave new foliage. This also died in the heat of April. Of the non-graminaceous plants *Evolvulus alsinoides*, *Euphorbia coccinea*, *Tridax procumbens* and *Vicoa auriculata* rapidly put forth new foliage.

*Later Effects.*—There was early growth at the break of the rain and a greater development of foliage than in the unburnt portion. Germination of seeds of all kinds in the spaces on the burnt area was more dense than in other places.

*Grazed Area.*—Two bullocks were left loose to graze the stuff on the area, in the middle of September continuously for 4 days in the morning. It was observed that only on the high level little stuff from *A. contortus* (annual) having no awns, was eaten; while on the lower level area, only tender growth of *A. annulatus*, was attacked. In short much of the vegetation remained untouched by the animals probably on account of the hard stumps of the previous year as well as the coarseness of the vegetation. These observations premature as they are, indicate that it is not only economic to protect the area from grazing the whole year but it is also harmful to the further revegetation of the area since the accumulated dry stuff prevents moisture penetration and fresh growth.

*Quadrat Observations.*—In every quadrat except in group No. 3 there is an increase of population of plants from 1920. Also in the Scraped and burnt quadrats from 1921. The 1924 results show a markedly denser population.

*Kandiwili Plot—Silo.*—The green stuff of 37,500 lbs. from one and half acre of the enclosed area, was put in a silo of 17' diameter 11' depth dimensions in the middle of September. The stuff consisted mainly of *Polytoca barbata* and *Ischaemum aristatum*. The cutting and filling of the green stuff required 11 days and the cost was Rs. 75 from start to finish. The silo is not yet opened; the results will be reported in due time.

*General Observations.*—In the fenced area grass began to sprout earlier and produced a heavy yield at 30,000 lbs. green per acre during the season. The area cut in September produced a second growth up to six inches high and was sufficient for grazing. While the unenclosed area produced yield at the rate of 10,000 lbs. per acre and the stuff was also less in height. *Anthistiria ciliata* was dominant on the western side parallel to the railway line when the soil had been disturbed. This observation confirms the Tegur results. And the Gowraksaka people also have begun to appreciate the work done under the guidance of the G. C. and feel more and more the necessity of improvement of the pastures. With the help and co-operation of the Gowraksaka people and the Live Stock Expert to Government B. P. Poona much more improvement will necessarily be done as years pass on.

*General Observations.*

*Chharodi.*—Whenever there is a slight excess of water in the soil or where water tends to accumulate for a short time in the rains, there is a pure stand of *Ischaemum rugosum* and very marshy land produces *Eragrostis cynosuroides*. Under trampling and overgrazing the fine grasses, viz., *A. annulatus* *Aplida Varia*, *Polytoca barabata* and *Iseilema wightii* tend to disappear and their places being taken by ruderals and inferior grasses such as *Indigofera linifolia*, *I. cordifolia*, *A. contortus* *Chloris pallida* and *Aristida funiculata*.

*General Observation.*

*Bankapur.*—All grasses had been badly damaged by grass hoppers. *Ischaemum laxum* suffered especially, practically no flowering heads left on the plants.

*Potato Investigation.*

*Growing and Storage Experiments.*—These were conducted in the Rabi and hot seasons of 1924-1925 at three places, Agricultural College Farm, Mahableshwar and Benkanhalli (Belgaum) with three varieties of seeds. The method of cultivation followed was precisely what is customary in the localities concerned.

It has been found that the fresh Italian White Round variety has yielded more than the Great Scot which was of course freshly imported.

It was observed on the College Farm plots and the Mahableshwar Plots that the Italian White Round ripened about 10 days in advance of the Great Scot where as the Gulabi variety in its turn ripens at about the same time as the Great Scot. Thus the Gulabi and the Great Scot may be said to be late varieties than the Italian White Round.

*Storage Experiments.*—In order to ascertain which of the three places were best suited for storage, the potatoes as soon as harvested they were stored at the same places more or less after the usual manner in Belgaum and Mahableshwar and in the Union Agency's store with usual methods of lowering the store temperature, in the College Farm. Thus the Belgaum and Mahableshwar potatoes were stored in ordinary rooms by heap method without any special measures to lower the temperature. The potatoes in any of the stores were not fumigated because it was not possible in Belgaum and Mahableshwar and partly because it was not necessary for Poona potatoes as they seemed remarkably free from any infection of *moth* and as the fumigation if necessary could be done at any time. The College Farm potatoes were specially not fumigated as this would have been an extra factor with the College Farm stock the storage of which was to be compared with the Mahableshwar and Belgaum storages with which fumigation was not possible. Fortunately in any of the three stores, *moth* at any of the stages did not appear at all. Last year the attack of *moth* to Mahableshwar potatoes proved very serious at about the end of the hot season. It may be said, in passing that the

*moth* trouble was far from being serious to any extent this year even with cultivators at Mahableshwar, Belgaum and also almost throughout the Khed Taluka. This appearance and disappearance of *moth* in certain years is a peculiar phenomenon.

The results of these experiments indicate that on the whole Mahableshwar is a place better suited for the crop and the results of storage experiments show the same things but it appears that the place does not show any *striking advantages* over Poona improved method.

The Great Scot variety has shown better results in storage everywhere although it has not shown any specially high yielding capacity.

*Scab Disease.*—The results of trials clearly indicate that the *Great Scot variety* is the most resistant and the pink variety is the least so, whereas the Italian White Round variety stands midway between the two and is almost as good as the Great Scot in this respect. Then again, whatever number of tubers were seen affected with *Spongospora* from the Italian White Round variety (which is often a mixture of many purely white and a few more or less pink skinned tubers) were mostly from the pink coloured tubers, thus indicating that the pure Italian White Round strain is much more resistant to the disease than what is represented by Italian White Round mixture in the statement. Anyway, it can definitely be stated that both these varieties (Great Scot and Italian White Round) are very much more resistant though not immune of the Scab Disease. Now that the above phenomenon of greater resistance to Scab Disease is observed for two years with the Great Scot, a statement may definitely be made that the Italian White Round variety is much more resistant to Scab Disease than the pink Italian variety grown at Mahableshwar.

*Mite Disease.*—Dusting experiments were conducted at the Agricultural College Farm with a dozen small potato plots distributed all over the Farm each situated at least 500 yards away from each other. Nearness of the other crops likely to be affected with the mite disease was avoided. It was generally found that the percentage of sulphur content in the dusting mixture could be effectively reduced up to 10 per cent., and the quantity of such mixture required per acre of the normal potato crop was found to be 20 lbs. of the mixture of the above strength. Some poorer strengths also showed effects on the crops but duplicates of the above failed to show good effects. Thus 20 lbs. of the mixture with 2 lbs. of sulphur and the remainder of lime can be recommended finally for treatment of the crop against mites. The dusting in the experiment was made with the Vermorel "Torpile" Knapsack sulphuring machine.

Some observations regarding the life history of Tamera mite were made with special precautions to keep the affected plant in full control. The pot experiments indicated the following results which will have to be repeated before any final conclusions can be drawn:—

- (1) That the mite passes its off days on other crops and very largely on weeds not necessarily perennial.

(2) That the dry leaves and shoots having eggs laid on them in previous season are capable of producing the disease on Potato plants near which such dry leaves or moulds may have been kept.

*Castor Crop.*

This crop has gained importance since the Great War due to special qualities of the oil derived from its seeds. The oil possesses a property of non-freezing in most of the atmospheric temperature through which the aeroplane services are being run. The net oilput of seed and oil per acre can be profitably increased; with this aim a large number of different types of castor seeds is collected from almost all places in India for breeding desirable types.

*Plant Introductions.*

Seeds of selected species of plants were received from the Royal Botania Gardens, Edinburgh and were shown here with the following results:—

- |  |   |  |
|--|---|--|
| <ol style="list-style-type: none"> <li>1. Begonia Socotriana.</li> <li>2. Begonia ulmifolia.</li> <li>3. Grevellia glabrata.</li> <li>4. Hakea gibbosa.</li> <li>5. Psidium montanum.</li> </ol>   | } | Seeds of these failed to germinate.  |
| <ol style="list-style-type: none"> <li>6. Cyperus nutans grew up but failed to thrive further.</li> <li>7. Torenia flava grew well into plants but did not set seed freely and is not considered suitable here for ornamental purposes as it presented a creeping habit.</li> <li>8. Commelina pallida grow well. Its narrow leaves, small flowers and erect habit with lankiness are unfavourable character for its general adaptation to culture.</li> </ol> |   |  |
| <ol style="list-style-type: none"> <li>9. Acacia nerifolia.</li> <li>10. Dodonea triquetra.</li> </ol>   | } | These have thrived well and are likely to be of use for some purposes or another when they grow up still further and become well established. Their growth is being watched with interest. |
| <ol style="list-style-type: none"> <li>11. Cyperus luzulii.</li> </ol>   | } |  |

*Seeds from Hawaii.*—Biloi soy beans. These seeds grew well. The variety is early ripening but the branches are very fragile.

*Cajanus indicus.*—(New Era) The seeds grew into very vigorous, tall plants much better than our local ones but had the drawback of absence of simultaneous flowering and higher yield than the local. Two more varieties one from Palur and another from Chin hills showed the same defects.

*Cactaceæ-Plants.*—Pieces of the plants of

- (1) *Hylocereus monacantha* Lem,
- (2) *Cereus tetragona* Miller,
- (3) *Cereus Hexagonius* Miller

were received for identification from the Victoria Gardens, Bombay in July 1924. They have now sprouted forth into new shoots.

*New Grasses.*—Two grasses were introduced in the grass nursery and tried for their adaptability to the local conditions here. One was :—

*Kikiyu Grass* (*Pennesetum longistylum*) Sets imported from Peshawar and South Africa planted in beds at the end of June established themselves in a week. They were occasionally watered. It grows vigorously and spreads like Hariyali (*Cynodon dactylon*) grass and seems to be a good grass.

*Melinis Minutiflora.*—Seeds received from France germinated in 6 days in June. After growing 2 feet high, the plants flowered in November 1924. The plants are hairy and sticky to touch. Cattle were found to eat the grass inspite of the objectional odor, which the plants possessed.

#### *Miscellaneous.*

*Opuntia Ficus-indica.*—Seeds of these were sown in plots in 1923 by professor Patwardhan to see if propagation can be done by these. The seeds germinated well. The plants have now two long joints which show well up and bear no thorns. Propagation by seeds is a slow process.

*Algaroba.*—Last year's plants have now flowered and we are now having pods of these collected.

More plants were raised from seeds received a fresh from Hawaii. They were planted along the boundry lines of the tennis court and elsewhere and are thriving well.

*Investigation of the Adulterant Cumin.*—The investigation was undertaken at the instance of the American Consul at Bombay. The adulterant was found to the extent of 12 per cent. It was found that the adulterant was a weed seed which got up mixed during harvest of Cumin. The remedy suggested for the exporters to pay higher prices to the purer samples which will result in the elimination of the mixture.

*Groundnut.*—A study of the mixed varieties sown on the Manjri Farm was made and the result reported to the Deputy Director of Agriculture,

S.C.D., Poona. Incidentally the morphology of the groundnut flower was studied. This study revealed that the groundnut cultivated on this side bears showy yellow flowers which ultimately form the nut. This is contrary to Bailey who says "showy flowers are yellow and sterile, soon withering, fertile flowers on stout recurving stipes without envelopes" in his Manual of Cultivated plants. There are several sterile flowers in the same inflorescence.

*Publications.*

<i>Author.</i>	<i>Subject.</i>	<i>Publications.</i>
1. Professor G. B. Patwardhan.	Vitality in the seeds of "Aden-anthera pavonina".	Poona Agriculture College Magazine Vol. XVI, 3 December 1924.
2. Do.	Review of Practical Botany by Rangachariar.	Agriculture Jour. of India, Vol. XIX, Part IV, July 1925.
3. Dr. W. Burns and Mr. S. R. Godbole.	Further studies on Oecology of grass lands in Bombay Presidency.	Paper read at Science Congress, Benares, Jan. 1925.
4. Mr. W. V. Joshi	Introduction of Italian white Round potatoes at Mahableshwar as a mean of eradicating scab disease of potato.	Do
5. Do.	Behaviour of potato <i>molt</i> at low temperatures.	Do.
6. Do.	Influence of the condition of the potato crop as regards ripeness on the keeping quality of potatoes.	Do.
7. Do.	Further investigation of potato cultivation on Western India.	Bulletin No. 121 of 1924 of the Dept. of Agriculture, Bombay.
8. Mr. S. V. Godbole	Soils as a factor influencing tillering in Bajri.	Paper read at Science Congress, Benares, Jan. 1925.
9. Dr. W. Burns and Mr. S. B. Ranade.	Eradication of cyperus rotundus.	Memoirs of the Dep. of Agriculture in India Vol. XIII No. 5 Jan. 1925.

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## APPENDIX—L.

ANNUAL REPORT OF THE WORK DONE BY THE CROP BOTANIST  
TO GOVERNMENT OF BOMBAY, POONA, DURING THE  
YEAR 1924-25.

I held charge throughout the year. Work was done on Rice and Wheat.

*Rice.*

*Staff.*—Mr. R. M. Hegdekatti, B.Ag., was transferred to Kumta and Mr. V. L. Bhosekar, B.Ag., from the Hatkhamba Farm took his place as Graduate Assistant. Mr. G. G. Patil worked as non-graduate fieldman.

*Season.*—The rain started rather late. The total fall was 99·64 inches *i.e.*, less than last year. But it was pretty well distributed. The season was good for the late crop, but the early crop suffered.

Work of the year :—

(1) *Intensive study of cultures.*—In all 22 strains were studied. Almost all were pure for the important characters. Nos. 32, 35, 42, 79, 104, 226 may be said to be faultless. Nos. 104, 42, 226, 227, 35 and 32 have all along been very consistent in their yielding capacity. No. 42 is however the best all round strain. No. 223 had given good promise last year; it is also fine grained, but it did not come up very high this year. Nos. 226 and 227 seem to be taking its place. These are followed closely by Nos. 237, 225, 222, 121 and 39. No. 121 is very coarse grained. The effect of the season on the various characters has been noted. A record of the order in which the strains arrange themselves in period of growth, fineness and yield from year to year has been kept. This also includes the cultivator's samples. It shows that the very late strain No. 104 has given the highest and the very early ones, Nos. 79 and 184 the lowest yields. The high yielding late strains are only medium to fine grained while the very fine grained samples like No. 39 are among the medium to low yielders. Nos. 164, 240, 241 and 153 are intermediate in ripening and have medium to low yields. The first three are almost alike and coarse grained. No. 153 is rather fine grained.

(2) *Extensive cultures.*—Nos. 153, 164, 32, 35, 39, 42, 223 and 104 were grown on one guntha plot each to increase the stock of their seed as well as to test their comparative yielding capacity on a pretty large scale. Their respective ranks in yield were as follows 7, 8, 3, 5, 6, 1, 4, 2.

*Replications.*—In addition to the indications obtainable from the intensive and extensive cultures about the yielding capacity of the different strains an attempt was also made this year to get more reliable yield comparisons by growing replications or alternate cultures of our best strains with four different late samples of the cultivator. Thus 5 cultures of No. 42 (1, 2, 3, 4, 5) were grown alternately with six equal sized cultures (long narrow strips) A, B, C, D, E, F, of each of the cultivator's

samples as shown here :— A, 1, B, 2, C, 3, D, 4, E, 5, F, so that differences in soil fertility which are unavoidable should affect the comparisons as little as possible. The end effect on cultures A and F was also avoided by growing extra lines outside A and F which were not included in the comparison. Each culture contained about 150 plants. The spacing given was the same throughout. The test was made by adding A to B, dividing the sum by 2 and comparing the result with culture 1 and so on. Thus  $\frac{B+C}{2}$  was compared with 2,  $\frac{C+D}{2}$  with 3,  $\frac{D+E}{2}$  with 4, etc. As the number of plants in each culture was not necessarily the same, *i.e.*, 150 owing to damage in some cases by crabs the yield in every case was calculated for 100 plants on the basis of the yield actually got from a given number of plants. From the successive five differences either + or — thus obtained between the two comparable cultures the mean difference in yield and the probable error, etc., were then worked out, the final conclusion being based on the ratio of difference to error. Similar replications were also grown of our early and intermediate strains for comparing them with corresponding samples of the cultivator. Replications were also grown of our selected strains with 42 as the check.

From the results of all the 18 replications collectively it was found that 42 yielded higher in 14 cases out of 18, the ratio of difference to error being 4.29 : 1. This shows conclusively that 42 is superior to the imaginary composite sample of the remaining 17 cultures. Coming to details 42 was conclusively superior in 8 cases, its superiority was indicated in 5 cases. In one case only it was inferior and in three cases inconclusively so. The apparent inferiority of 42 in these few cases was due to an untoward circumstance.

That 42 is really superior can be seen also from the fact that the per plant yields of the cultivator's samples as well as those of others are poorer in almost all cases as compared with 42 not only this year but for several years. But these figures cannot be given here for the sake of brevity.

With regard to our early and intermediate strains it may be said that cultivator's Mahadi which is a coarse and late sample proved better than our Nos. 79, 184 and 153. Cultivator's Halwar a coarse sample and our strain No. 153 a fine one proved equal in yield, and No. 153 proved superior to cultivator's Ghosali. But on the whole it is essential to evolve early maturing and better yielding types than our No. 153 either through further selection or hybridization. In this latter direction some steps have already been taken during the year.

(4) *Trial on cultivators' fields.*—The high yielding character of No. 42 is also confirmed again this year as will be seen from the experience of some cultivators from whom it was possible to get comparative figures of yields obtained from the local seed and No. 42 grown side by side. In several other cases although the two were not grown side by side still the cultivators were favourably impressed by the yielding capacity of No. 42.

At Kamshet one Mr. Navalkar grew 42 and the local Chimansal in plots close by. After comparing the yields of grain on a common basis he reports an increase from 42 over the local to the extent of about 17 per cent., though he says that he got comparatively less straw from it than the local. One Mr. Ketkar from Shirawli near Khalapur had also grown No. 42 and the local side by side, the former in a plot of 23 gunthas and the latter in 17 gunthas yielding respectively  $21\frac{1}{2}$  and  $12\frac{1}{2}$  maunds. Compared on a common basis an increase to the extent of 27 per cent. in favour of 42 was thus obtained by him. He however thinks that the plot of 42 was slightly better in fertility than the plot of the local. Therefore making an allowance of about 5 to 10 per cent. 42 might yet be 17 to 20 per cent. better than the local. At Bhisegaon near Karjat one Mahadu Zuru Patil grew 42 on a plot of 32 gunthas and realised 1,750 lbs. of grain. In a plot near by one Nathu Disale of Bhisegaon grew his local seed in a plot of  $1\frac{1}{2}$  acres and realised 2,800 lbs. of grain. Worked to a common basis this means an increase of 17 per cent. in favour of 42. At Akurla near Dahiwli, Karjat, one cultivator grew 42 on a plot of 2 acres and 24 gunthas and realised from it 4,760 lbs. of grain. In a field close by he had grown the local seed in a plot of 2 acres and 10 gunthas and realised from it 3,150 lbs. of grain. Worked to a common basis this means an increase of 30 per cent. in favour of 42. At Dapiwli near Jambul several cultivators who grew 42 last year and also this year were favourably impressed with the performance of 42 as compared with the local but they could not supply any figures. In a personal talk with these cultivators they gave their experience that No. 42 does give them an increase over the local which may range from 15 to 20 per cent. With regard to No. 79 the cultivators at Dapiwli could not get any benefit from No. 79 this year, owing to the unfavourable condition of the rains for the early crop. Still they admitted that last year 79 proved to be very useful. They say that it gives the cultivators great relief by supplying them with food at a very early period and saves them from the sawkar to a certain extent.

Our early strain No. 79 was also tried on the Ratnagiri Farm where it is reported to have given about 10 to 15 per cent. more yield than the local. This means that this strain is likely to be very useful in South Konkan at least in the Ratnagiri District where the people require early maturing varieties. This strain was also supplied to the Director of Agriculture, Baroda State, for trial in certain places, and he reports that it is liked by the cultivators there. Unfortunately no definite figures were received from him yet. Our improved strains have also been supplied for trial in the Gwalior State, and the Agricultural Expert, Court of Wards, in that State reports that they yield about 10 to 15 per cent. better than the local kinds.

Area under the improved strains during the year. The cultivation of strains Nos. 42, 35 and 79 in the North Konkan now extends over 12,000 acres. Of this spread about 8,000 acres was due to Departmental efforts and the remaining 4,000 acres automatic. Strain No. 42 is however the most popular so far, and there are grounds to expect that next year it will alone occupy more than 20,000 acres.

(5) *Trial of new selections.*—Of the new panicles Nos. 199, 202, 221, 222, 223, 225, 226, 227, 237, 240 and 241 have already been included in the intensive study series. About most of these mention has already been made there. None of the selections from the bulk samples gave satisfactory yields as compared with last year's performance. It is true that the performance of the last year was that of a selected plant while that of this year is the average performance of the whole progeny of that plant. Still it seems to be much below last year's performance. But a few of the better ones of these will be tried again next year in comparison with 42 as the standard.

Some cultures of this year's new panicles and bulk series which look promising will also be grown next year for a further comparison with 42 as the standard.

(6) *Hybridization.*—Sixteen hybrid seeds were obtained from the crosses made the year before last. Fresh crosses were also made this year between No. 39 and K.O. 37; 39 and 164; 39 and 121 and between several other parents. The behaviour of the  $F_3$  generation of some of these crosses will be studied next year.

(7) *Publication.*—An article on "Variation in rice, *Oryza sativa*, Linn", was published in the Poona Agricultural College, Magazine, in December 1924. A paper on "Our experience in crossing different varieties of rice at Karjat", was read in the Botany Section of the Indian Science Congress held at Benares in January 1925, and the same was then published in the Poona Agricultural College, Magazine, in February 1925.

(8) In conclusion I have to place on record my appreciation of the way in which the work was carried on by Messrs. V. L. Bhosekar and G. G. Patil.

#### *Wheat.*

*Staff.*—Mr. B. Nazareth, B.Ag., worked as graduate assistant and Mr. G. H. Joglekar as non-graduate fieldman.

*Locality, Season, Cultivation, etc.*—Work on wheat was again done this year in the Ganeshkhind Botanical Gardens, Kirkee and partly at the Agricultural College Farm Poona. The seeds of some strains were tried again this year at the Government Farms at Dharwar, Jalgaon and Dohad, and in the fields of a few cultivators in Nasik. Land in the Ganeshkhind Botanical Gardens at Kirkee received all the necessary attention and tillage from May onwards. The rainfall received to the end of September was only about 17 inches. Dibbling of the seeds was commenced on 13th October. No watering was given at the time of dibbling. But many of the seeds failed to germinate, and resowing had to be done to fill the gaps. To help the germination a light irrigation was given on 30th October. Though given about a fortnight after the first sowing, it helped the germination of both the newly sown and dormant seeds. The sprouting thereafter was quick, the appearance of the plots pretty satisfactory, and very few gaps could be seen. There was

cloudy weather and very light rain, about 34 cents, in November, and a light irrigation was again given at the end of December, when flowering had commenced. In the interval when the soil conditions became suitable, interculturing was also practiced with the help of the hand-hoe to preserve the soil moisture.

*Cultures under intensive study.*—16 strains including Pusa 4 and the rust resistant Khapli were studied. The purity and the general capacity of these have been fully tested. The different strains were again grown in duplicate series to test their behaviour in more and less irrigated conditions. The twice irrigated series was badly affected with rust but the once irrigated cultures though short and stunted for want of enough moisture practically escaped its attack. A third series of all the strains which was hand-sown after the fashion of drill-sowing was also grown for comparison with Pusa 4 under the replication system. In this series an equal quantity of seed was sown in each culture. Pusa 4 was used as a standard in all the series. In this way it was expected to get very reliable comparison of the various strains with Pusa 4 from the point of yield. But this series being irrigated twice to insure good growth was affected with a severe rust attack, and gave practically no yield worth the name except from Pusa 4 and the resistant Khapli. In a different strip of land which was given optimum conditions of moisture for the appearance of rust, the rust resistant capacity of Khapli and Pusa 4 was compared. Khapli proved to be as resistant as, or even better than Pusa 4.

At the Agricultural College Farm only Nos. 103, 162, 167, 171, 186, 200, 210, 224 and 237 were replicated with Pusa 4. All these replications were grown in quite dry conditions. Some damage was done by stray animals to some of these but there was no appreciable trouble from rust so as to reduce the yield. The results show that Nos. 103, 162, 224, 167, 210 and 237 are pretty constant in their high yielding character. The following yields were obtained :—

*Results obtained at the Agricultural College Farm.*

Strains.	Yield in lbs. per acre calculated.		Rank.		Remarks.
	1922-23.	1924-25.	1922-23.	1924-25.	
Pusa 4	.....	810	..	9	} Soil poor. Damage by cattle much.
103	1,459	885	1	7	
162	1,319	913	2	4	
167	1,144	902	4	5	
171	1,124	766	5	10	
186	1,098	888	6	6	
200	1,031	830	8	8	
210	1,010	995	9	2	
224	1,244	998	3	1	
237	1,096	943	7	3	

In the above figures some allowance had to be made in some cases on account of damage done by the stray cattle.

*Trial of strains outside Poona.*—At Dharwar strains Nos. 103 and 162 which had given good results as regards yield last year were grown again this year. But there was a severe attack of rust at Dharwar this year and no comparable results could be obtained.

At Dohad the following results were obtained with the strains given below :—

*Results obtained at Dohad.*

Strains.	103	162	167	168	171	224	Remarks.
Yield in lbs. . .	44	51	41	54	49	33	All the cultures including the local were grown in two gunthas each.
Yield in lbs. local Baxi.	48	52	43	49	43	35	
Difference . .	-4	-1	-2	+5	+6	-2	

Here also the cultures were affected with rust, and there was practically no difference between the local Baxi and three of our strains, while two of our strains actually gave more yield than the local.

At Jalgaon 6 of our strains were grown with alternating cultures of the local Bansi as shown below :—

103 : L : 162 : L : 167 : L : 168 : L : 171 : L : 224 : L : (L=Local). Each culture occupied 5 gunthas. The following were the results obtained :—

*Results at Jalgaon.*

Cultures.	Yield in lbs.					Remarks.
	Per plot yield.		Per acre yield.			
	Grain.	Chaff.	Grain.	Grain.	Chaff.	
	1924.		1923.	1924.		
No. 103	187	177	512	1,096	1,416	Better than local.
L. Bansi	128	166	768	1,024	1,328	
No. 162	120	157	864	960	1,256	Do.
L. Bansi	108	130	832	832	1,336	
No. 167	104	167	812	912	1,280	Better than local.
L. Bansi	114	160	704	688	1,096	
No. 168	86	137	744	744	1,304	Better than local.
L. Bansi	93	163	672	640	1,064	
No. 171	80	153	844	844	1,024	Better than local.
L. Bansi	108	128	915	920	1,328	
No. 224	115	166	744	816	1,048	Better than local.
L. Bansi	102	131				

It will be seen from the above that No. 103 yielded more than the one local available, No. 162 yielded more than one of the two locals and more than their average, while No. 224 yielded more than both the locals. Nos. 224 and 162 had also proved to be so last year. No. 103 had somehow suffered last year but it seems to have shown its true performance this year. No. 167 seems to have suffered this year though it had done better than the local last year. Nos. 168 and 171 being more susceptible to rust and *Alternaria* have suffered in grain though they have given more chaff than the local. It is worth while trying these in very dry conditions where the above mentioned fungoid diseases may not effect them.

At Ganeshwadi about three miles from Nasik, No. 103 was the only strain tried. It was grown along with the local on plots of ten gunthas each. The following results were obtained :—

*Results obtained at Nasik.*

Culture.	Yield in lbs.				Remarks.
	Yield per plot of 10 gunthas.		Yield per acre.		
	Grain.	Bhusa.	Grain.	Bhusa.	
No. 103 ..	168	278	672	1,112	
Local Piwla ..	152	243	608	972	
Difference ..	+16	+35	+64	+140	In favour of 103.

This is a further corroboration of No. 103 which had not done well at Jalgaon last year but which showed its real performance there this year. The District Agricultural Overseer who was in charge of this trial reports that the lustre of the strain will fetch about two rupees more per bag.

*Hybridization.*—At Ganeshkhind Botanical Gardens with the object of breeding rust resistance into some of our desirable types, several crosses were made this year between Pusa 4 or Khapli as one of the parents and one of the promising types as the other parent. But owing to the attack of rust no good seeds were obtained except in a few cases. The F1 plants of last year's crosses also produced no seed except in some cases, and in these also the seed was much shrivelled. Attempts will be made however to grow these next year to see if they can produce any good plants at all.

The seed of the rust resistant Khapli strain has now been multiplied to some extent. Some of this has also been supplied in the Jamkhindi State.

In conclusion I must say that in the absence of good wheat land and favourable conditions for the wheat crop, I was not able to obtain as good results as I had anticipated. But I was satisfied with the manner in which Messrs B. Nazareth and G. H. Joglekar carried on the work under the existing conditions.

R. K. BHIDE,  
Crop Botanist to Government of Bombay,  
Poona.



## APPENDIX M.

ANNUAL REPORT OF THE PLANT PATHOLOGIST TO GOVERNMENT  
OF BOMBAY, POONA, FOR THE YEAR 1924-25.*Staff.*

(1) The Section of Plant Pathology continued to be in temporary charge of the Economic Botanist to Government, Bombay, Poona.

(2) Mr. G. S. Kulkarni, M. Ag., continued to work under the Indian Cotton Research Committee on the Cotton Wilt problem and Mr. M. N. Kamat, B. Ag., Lecturer in Mycology, was appointed as Assistant Professor of Mycology.

(3) Mr. J. D. Randive, B. Ag., Assistant Mycologist, resigned and his place has been taken up by Mr. J. S. Malelu, B. Ag.

*Educational.*

(4) The usual University courses in compulsory and Optional Plant Pathology were given to Students at the Poona Agricultural College.

(5) A lecture and demonstration in vernacular on Plant diseases in general and Diseases of Sugarcane in particular were given to the Sugarcane Class at Manjri in Christmas week.

*Routine Work.*

(6) The total number of specimens received and identified during the year under report were 92.

*Research.*

(7) *Gummosis of Citrus trees.*—A number of observations made in different localities have shown that the disease is confined exclusively to the Mosambi (*Citrus aurantium*) plants usually the collar and in severe cases the scale buds and branches; gum trickles down in great quantity through wounds, the tree is unhealthy, and gradually succumbs; the bearing is seriously retarded.

A number of gardens were treated at Baramati, Nanded in Poona District and Junnar Taluka, the total number of trees treated was 319:—33 at Baramati, 65 at Nanded and 201 at Junnar. Treatment consisted in first scraping off all wounded parts and then cleaning the wounds by a jet of pure water and then covering it by a solution of 50 per cent. crude Carbolic Acid; the whole part was then treated with coal-tar. The above treatment has given a fair amount of relief to the affected trees and about 50 to 60 per cent. of the treated trees have revived and withstood the disease.

So far no experiments have been carried out here to investigate the real causes and circumstances that lead to the disease. Several isolations

were made which gave a growth of a *Fusarium* and in a few cases *Bacteria*.

(8) *Fusarium Wilt of Potato*.—The work so far done does not give any indication of the parasitism of the five *Fusaria* isolated from wilted Potato Plants. Further work is being continued.

(9) *Sclerotium Wilt of Potatoes*.—Detailed observations on the outward symptoms have been made; the fungus *Sclerotium Rolfsii* sacc. has been studied in pure cultures and experiments so far have proved the parasitic nature of the fungus on plants as well as tubers. Direct inoculations of plants and planting of inoculated tubers in sterilized soil have both given complete success.

(10) *Fruit Rot of Pomegranate*.—This is a serious fungoid disease in the monsoon and causes a heavy loss to the cultivators. The disease is prevalent round about Poona; a wet rot sets in near the stalk and the fruits and flowers drop down in large numbers.

The fungus is a species of *Phoma*; the parasitism has been proved by inoculation experiments.

(11) Experiments were tried to determine the efficacy of Germisan (a German product) against grain Smut (*S. Sorghi*) of jowar as compared with copper sulphate. Good seed of jowar was divided into three lots, each being treated in the following way and then sown:—

Lot I Immersed in Germisan (4 ozs : 100 gallons of water for half an hour.)

Lot II Immersed in copper sulphate mixture (1 lb. in 50 gallons of water for 15 minutes.)

Lot III Control.

Germisan was found to be as effective as copper sulphate, but being foreign and not easily and readily obtained and further being a little more costly, it cannot be recommended as a substitute for the copper sulphate.

#### *Mango Blight.*

(12) Spraying trials were carried out in co-operation with the Entomological and Horticultural sections at Thana. There was a severe attack of hoppers but no mildew (*E. cichoraciuram*) appeared in the garden.

#### *New Diseases.*

(13) A number of cocoanuts, reported from Kanara, to drop down while still immature to the extent of 20 per cent. were examined and found to give a pure growth of *Diplodia*-a-fungus not so far reported to attack this palm in this Presidency. The disease is being studied in co-operation with the Konkan Agricultural Staff.

*Publications.*

(14) Koleroga disease of areca palms by M. N. Kamat, B. Ag., published in the Agricultural College Magazine, Vol. XV, No. 4, 1924.

G. B. PATWARDHAN,  
Plant Pathologist to Government,  
College of Agriculture, Poona, Bombay Presidency,  
5th November 1925. Poona.

## APPENDIX N.

ANNUAL REPORT OF THE WORK DONE BY THE SOIL PHYSICIST TO  
THE GOVERNMENT OF BOMBAY, MANJRI FARM, DURING  
THE YEAR 1924-1925.

The work of my branch is mainly so directed as to find out by research the best possible method of cultivation, to avoid or reduce, as far as possible, the occurrence of famine in areas of precarious and scanty rainfall. My Head Quarters, which were at Poona, have been transferred to Manjri, a place, which has comparatively much lower rainfall than Poona, Nagar or Sholapur and which is besides situated within easy reach of the Agricultural College, Poona, with its well equipped library and laboratories belonging to various branches of Agricultural research which have to be consulted frequently.

Help is also given to the public as well as to the other branches of the Department in matters relating to physical conditions of soils whenever these are referred to me. A number of inquiries from Sind were addressed to me regarding the nature of 'Kalar' or salts formed in the alluvial soils in Sind, which were attended to. To avoid repetition of Laboratory work reference was given to bulletin No. 96 of 1920 of this department which is not yet sufficiently known in Sind although it has a direct bearing on the question and much detailed information regarding analyses of soils, waters and different kinds of 'Kalars or salts' in Sind can be obtained in it.

The actual research work at the new quarters at Manjri commenced in the year under report on Rabi Jowar by methods known as Dry-Farming.

*Dry-Farming.*

To make the utmost use of rain-water, for the proper growth of plants, is the main object of Dry-Farming. This was aimed at by—

- (1) increasing the water-storing capacity of the soil by repeated ploughing and harrowing so that rain-water may well soak into the ground.
- (2) by levelling the plots and putting small bunds round each plot to prevent 'run-off' even when rain fell in heavy showers.

It was found that the highest rainfall at one stretch on the Kuran land at Manjri was 2.91" which fell on 17th October 1924 from 4-30 to 5-15 p.m., i.e., in 45 minutes. In the absence of bunds much of this rainfall would have been lost by surface wash or 'run-off' but small bunds nine inches in height and nine inches broad at the bottom were found sufficient to impound the water in the plots. Such temporary bunds are very useful especially on level lands and do not cost much.

- (3) by repeatedly stirring the surface of the soil by a hand-hoe to create a soil much so as to prevent evaporation of water that had entered the soil;

(4) by adding green manure so as to increase the water retaining capacity of the soil without lowering the water supplying power of the soil as indicated by previous laboratory experiments done by the dilatometric method of Bouyoucos.

A number of plots were laid down, each plot being one guntha (1/40 of an acre in area). In most cases three such plots were assigned to every experiment so as to get a better confirmation of results obtained in each of the plots. Seed (Kalbondi Jowar) was dibbled by hand in each of the plots at a distance of 18 inches so that the distance between any two rows as well as the distance between any two plants was 18 inches. This facilitated interculture on all sides of the plants, which helped a good deal in stopping evaporation and thus conserving moisture for the proper development and growth of plants.

In each plot all the plants on the two diagonals were marked and kept under observation throughout their growth. The result of this close study brought to light the fact that the more use of water the plants make, within certain limits, the more is the height and the girth of the plants but longer is the period of growth. The yield also increases with the increased quantity of water used by plants. Thus in one series of plots, in which no attempt was made to impound rain-water by putting bunds, but in which the water that entered the soil was conserved by soil mulch, the total yield per acre (calculated from three gunthas) was about 776 lbs., while in another series of plots, which had small bunds and where rain-water was not allowed to run off the surface the total yield per acre was 826 lbs., whereas in that series of plots where green manure was applied in addition to the precaution of putting bunds the yield per acre rose as high as 1,136 lbs. of grain per acre or about 35 to 40 per cent. over the usual average yield. It appears, therefore, that if the factors, which helped in increasing the yield by the application of green manure, be investigated perhaps fresh light may be thrown on the subject and the prominent factor or factors may be found out which have a direct bearing on the increased yield of the crop. This is being now investigated.

#### *Frost.*

A severe spell of cold weather extended over a great part of Poona District and elsewhere in the Presidency at the end of January and did a considerable damage to the standing crop of Rabi Jowar on a number of cultivators' fields; but fortunately not the slightest sign of any damage done could be traced on the Dry Farm experimental plots at the Manjri Kuran land, where the standing crop could give a bold stand and defy the severity of the cold weather.

It is a general belief that a peculiar cold dry blast of wind sweeps over a portion of the country and damages the crop over which it blows giving it a parched or burnt-up appearance. It may, however, be observed that in the affected area a number of plants could be seen which have withstood the severity of the cold blast of wind and have escaped damage, in spite of the fact that the neighbouring plants have

suffered very severely. This shows that there are certain factors which enable the plant to withstand the extreme weather. From the experience at the Manjri Kuran land it appears that keeping a soil mulch on the surface of the field and thus preventing the soil from cracking helps a good deal in maintaining a higher temperature near the root zone whose power of absorbing water from the soil is not materially impaired and which therefore supplies a fair amount of water to the aerial leafy portion of the plant from which water is abstracted by the dry cold wind. Plants whose roots have not been killed may show apparent signs of death but would gradually revive, death being only localised in certain portions of leaves, etc.

As the occurrence of frost in the Bombay Deccan is not so frequent as to warrant a close study of the problem in the open field only a few laboratory experiments will be undertaken to find out the effect of very low temperature on the underground and aerial portions of the plant.

#### *Experiments at Mohol.*

The Deputy Director of Agriculture, S. C. D., was kind enough to reserve for me a small area on the Mohol Farm for experiments in Dry-Farming. A few experiments were then tried at that station to see if the results obtained at Manjri are corroborated in the dry tract near Sholapur. The experiments corroborated the fact that small bunds on level land were efficient in stopping rain water from running off the surface with the result that the outturn in a bunded plot was always more than that in a plot without any bunds, interculture being common to both.

These experiments are being repeated during the year 1925-26 with a couple of plots more for green manuring experiments as these have shown to be promising at the Manjri Kuran land.

#### *Nagar Experiments.*

A few experiments on the lines of dry farming were started by me on a piece of land belonging to the late Mr. Patwardhan, pleader of Nagar, who was kind enough to place a small portion of his land and labour, etc., at the disposal of Mr. V. V. Gadgil, B.Ag., District Agricultural Overseer, who was good enough to co-operate with me in conducting the experiments. The results of the experiments, carried for two years, showed that next to Farm Yard manure, green manure, if properly attended to, had a fair chance of success. But the experiments could not be carried on further owing to the sudden death of the donor and also for want of an assistant who could always be on the spot to pay closer attention to the details of the experiments.

#### *Staff.*

My scientific staff which mainly consists of one graduate fieldman and one non-graduate field-man have put in a very good year's work. Mr. G. M. Bapat, M.Ag., has shown a great liking and a good capacity for research work and deserves encouragement.

The staff, however, is found inadequate to cope with the increasing work in the field and in the Laboratory in addition to pot-culture experiments which have to be undertaken.

*Accommodation at the Manjri Farm.*

Since the transfer of my Head Quarters from Poona to Manjri a great inconvenience is felt for want of accommodation for my staff. Some suitable permanent arrangement is badly needed to keep the staff contented.

V. A. TAMHANE,  
Soil Physicist to the Government  
of Bombay, Manjri Farm.

## APPENDIX O.

SUMMARY OF WORK DONE UNDER THE LIVE STOCK EXPERT TO  
GOVERNMENT, BOMBAY, POONA, FOR THE YEAR 1924-25.

*Charge.*—Mr. B. S. Patel remained in charge of duties till 8th November 1924 when Mr. E. J. Bruen returned. The latter worked till 14th April 1925 when he was relieved by Mr. H. G. Baluch to proceed on 8 months leave.

During the year the negotiations and final settlement of the co-operation of the Gowrakshans and Farms at Kandivalee and Mulund were brought to successful issue and an earnest start, the report of which is given under separate heading in this report.

*Northcote Cattle Farm, Chharodi.*

Mr. V. G. Desai continued to hold the charge as the Manager of the Farm.

*Season.*—The year under report was very fair in point of rainfall. The monsoon started at the right time and was on the whole well distributed although there were long breaks in the middle, which checked the growth of animals. The total rainfall was 26 ins. 74 cents in 32 days.

*Crops—Hay.*—The crop on the whole was good and the total grass cut and stacked was 803,461 lbs. at a cost of Rs. 3-2-8 per 1,000 lbs.

In addition the following crops were grown :—

		A.	G.			
Bajri	..	..	2 30	3,981	lbs.	dry fodder,
Jowar (Sundhia)	..	..	25 8	7,971	„	green.
Jowar (Deshi)	..	..	8 26½	3,630	„	dry kadbi.
Elephant grass	..	..	0 2½	40,480	„	green.
Lucerne	..	..	0 30	7,004	„	green.
Sun-Flower	..	..	0 25½	7,059	„	green.
* Jowar (Sundhia)	..	..	12 37 {	946	„	dry.
				185	„	green.
Summer Jowar (Sundhia)	..	..	0 29	14,325	„	green.

*Silage.*—In all 377,700 lbs. of grass were pit-ensilaged in addition to 212,527 lbs. of Sundhia and Deshi Jowar, which were chaffed by Pac Ensilage Cutter and blower and put into pucca pits. All mowing was done by the Daisy Reaper and it was found to be very useful and economical owing to the scarcity of labour and the wages round about being very high. It was found that 4 acres could easily be mowed by 2 men with one pair of bullocks.

(\* The land was newly opened and the crop was late.)



*Livestock.*—The following table shows the strength of the livestock :—

Serial No.	Name of species.	Number of animals.
1	Cows adult .. .. .	166
2	Breeding bulls .. .. .	5
3	Heifers .. .. .	66
4	Young bulls .. .. .	42
5	Male calves .. .. .	67
6	Female calves .. .. .	81
7	Working bullocks .. .. .	52
	Total ..	479

The breeding on the farm shows better signs of improvement in conformation, colour, etc., and it is hoped that the near future generation would be of a better type. Management of cows as to milking and feeding is continued on an extensive scale and the number of the milking animals has gone up to 115 and the total yield of milk in the year is 85,757 lbs. as against 52,740 lbs. of last year. The average monthly milk yield per cow is 208 lbs. as against 140 lbs. of last year. This increase in number of cows specially better monthly average yield gives an idea of what better management does.

The total number of births was 127 (68 males and 59 females) as against 92 of last year with a herd of 479 cattle. This shows that the cows and heifers are calving early and regularly owing to healthy condition due to proper care and nourishment. Many heifers did calve at the age of 4½ years.

*Disease.*—The foot and mouth disease the ever pest on the farm visited this year as well and almost the whole herd was attacked. The total number of deaths during the year was 22 as against 24 of the last year.

Some 121 animals of all sorts were auctioned for Rs. 2,177 as these were not true to type from breeding point of view.

During the year 8 bulls were put out on Premium System.

*General.*—The farm on the whole shows good signs of improvement under the management of Mr. V. G. Desai.

#### *Cattle Breeding Farm, Bankapur.*

Mr. A. B. Gadagkar was in charge of the farm almost the whole of the year except for 15 days in June when he went on leave.

*Season.*—The season commenced with light antimonsoon showers but with no subsequent showers and this was insufficient for any growth of grass. However, the situation on the whole was favourable as the subsequent monsoon showers were in time and well distributed.

*Crops—Hay.*—*Andropogon Contortus* (spear grass) which prevails on the farm gave good yield this year. It grew to a height of about 3' and was harvested after removing the spears in time.

The harvesting was done by hand labour and the total grass cut from the reserved area was 109,545 lbs. at a cost of Rs. 376-9-0 as against 215,400 lbs. during the last year. In addition to the above 118,730 lbs. of grass were cut green for silage at a cost of Rs. 65. This is the first time that grass from reserved area was cut for silage and the second growth was fed to cattle.

The gradual increase in the strength of the herd and the limited pasture in the fort area has necessitated to supplement the grazing area and accordingly an area of about 90 acres near Chandapur village about 8 miles from the farm was taken on auction for grazing purposes for Rs.10. This area supported the herd anyhow till the middle of January. Out of this area a part was reserved for cutting hay and the total outturn was 90,455 lbs. at a cost of Rs. 292-11-6.

*Livestock.*—The following table shows the strength of the livestock :—

Serial No.	Name of species.	Number of animals.
1	Cows adult .. .. .	59
2	Breeding bulls .. .. .	3
3	Heifers .. .. .	30
4	Young bulls .. .. .	17
5	Male calves .. .. .	8
6	Female calves .. .. .	8
7	Working bullocks .. .. .	6
	Total ..	131

In spite of the cast lot during the last year, the strength of the farm has gone a little over its maximum and the necessity of more housing arrangements is felt. There were 17 births during the year of which 10 were males and 7 females. The herd on the whole shows better signs of improvement both from breeding and rearing point of view and a general look impresses one of the marked characteristic which this breed is known for.

*Disease.*—During the year under report, Rinderpest made its appearance on the farm in spite of all the preventive measures. It affected 25 animals within 3 days, 7 of which ultimately succumbed. The total casualties were 11 in all. The rest of the herd was segregated and inoculated every 10th day.

Only one bull was put out on Premium System.

*Fodder Crops.*—A local variety of Jowar was sown in two plots measuring 2 acres 36 gunthas and the yield was 14,213 lbs. which was put into silo. Maize crop was also grown on an area of 1 acre 7 gunthas and gave an

outturn of 16,205 lbs. which was also turned into silage. Besides the above 118,730 lbs. of grass were ensilaged.

*General.*—No cattle show was held on account of the prevalence of Rinderpest round about the farm.

*Willingdon Cattle Farm, Pihai.*

Mr. B. B. Jamaspjina was Manager of the Farm till 21st January 1924, when he went on 6 months leave on account of a septic wound Mr. Kotumal J. Advani, a Non-Graduate Fieldman acted in his absence.

*Season.*—The total rainfall during the year was 4 ins. 69 cents and most of it was in July but the year was not so much favourable. The farm area is known for its pasture but this year it did not give the usual quantity of hay.

*Crops—Hay.*—Only 14,090 lbs. of grass were harvested. This year again 15 acres of more land was brought under cultivation and green fodder such as berseem, oats, maize and jowar were grown and fed to cattle. The land is being cleared of Kandoo bushes as it is found to cause injuries to the udders of most of our cows.

*Livestock.*—The following table shows the strength of the livestock :—

Serial No.	Name of species.	Number of animals.
1	Cows adult .. .. .	39
2	Breeding bulls .. .. .	5
3	Heifers .. .. .	32
4	Young bulls .. .. .	40
5	Male calves .. .. .	4
6	Female calves .. .. .	3
7	Working bullocks .. .. .	11
	Total ..	134

The herd on the whole is making good progress. Out of 35 that finished their lactation during the year, 6 cows gave over 5,000 lbs. of milk per lactation and 6 more over 4,000 lbs. All the yield is exclusive of the quantity sucked by the calves.

*Milk Disposal.*—The milk was sold at an average price of Rs. 5 per maund. The trouble of carrying the milk to a distance of 13 miles specially across the river with flowing sand bed still exists and cannot be overcome until a pasteurizer is set up on the farm.

*General.*—There were 37 births during the year of which 19 males and 18 females. The casualties on the farm were 6 in all.

During the year 39 animals of all description that were not true to type were sold at a total cost of Rs. 1,321-6-0 and only one bull was put out on Premium System.

A cattle show was held at Karachi in February. There was a very fine representation of better typed animals.

*Livestock and Dairying out-look in Sind.*

At present there is one pair of bullocks for 16 acres as against one pair of bullocks actually required for 5 acres of land in proper Presidency and for 7 acres in Sindh. This shows that for progressive cultivation, there is already shortage of as much number of bullocks not taking into account the importation of bullocks from Baluchistan and Rajputana States, which may grossly amount to 1/8th the present number of animals.

With regard to milk supply as calculated, hardly 4 ozs. of milk are available per head as against 20 ozs. per head in United States of America and 10 ozs. in United Kingdom.

After the Sukkur Barrage Scheme is complete there will be in addition to above alarming shortage, the very pressing and imperative need for bullocks and milch cows to an extent of 3½ lakhs of bullocks and nearly as many cows.

Our present provision as an experimental farm at Malir is given in the above statement. It stands to an alarming out-look that a more extensive provision of farms for cattle breeding and Dairying is imperative and urgent if all the land to be commanded under irrigation is to be exploited to best cultural and economical means and a sufficient and healthful provision of milk and its products is to be made for the hard worked tenant and landlord of an extreme hot place as that of Sindh.

**CO-OPERATION OF THE BOMBAY GOWRAKSHANS AT KANDIVALEE  
AND MULUND.**

*Introductory.*—The Honourable Sir C. V. Mehta, M.A., L.L.B., the late Minister of Agriculture initiated a scheme whereby co-operation can be sought between Government and the authorities of the various charitable Gowrakshans with a view to work for the material welfare of the country and at the same time to preserve fully their own charitable characters and objects.

Accordingly the Livestock Expert visited this institution on 13th January 1923 and submitted his report. On this report a definite scheme was put up and sanctioned in the budget for the year 1924-25. Consequently the work was started at once on the following conditions :—

- (1) That the Gowrakshan set aside 20 cows of Gir breed for breeding purposes.
- (2) Government also added equal number of Gir cows, *i.e.*, 20 to Gowrakshan and 1 bull.
- (3) These 40 cows to be separately kept and managed for breeding purposes and all the necessary breeding and management records are to be maintained.
- (4) The Gowrakshan to hand over all the male progeny from these 40 cows to Government for giving out as Premium Bulls.

(5) Government is to pay for the manager at Rs. 150—5—200 and the Gowrakshan to give him free quarters as long as all the work went on smoothly and satisfactorily.

(6) The Livestock Expert and the Economic Botanist to help in their respective branches to the Gowrakshan.

A Manager was appointed in June 1924 and purchases of cattle were finished by the end of December 1924.

At a cost of Rs. 13,000 received from the Trustees of Late Sheth Gordhandas Sundardas, a special cattle shed on the latest approved sanitary principles has been constructed.

An opening ceremony of this institution to be named as "Sheth Gordhandas Sundardas Moolji Jetha Cattle Breeding Farm and Gowshala" was performed by H. E. the Governor of Bombay on 17th March 1925 at Akurli, a village near Kandivalee station on B.B. & C.I. Railway.

*Cattle.*—Gir breed was selected to form the nucleus foundation stock.

*Disease.*—Rinderpest broke in, in January and February but none of the breeding cows succumbed to it as inoculations were carried out in time.

*Strength of herd.*—Kandivalee Gowrakshan.

	Cows.	Calves.		Bull.	Total.
		Male.	Female.		
Government cattle	19	9	7	1	36
Gowrakshan's cattle	13	5	7	..	25
Total	32	14	14	1	61

There were 17 births (11 male and 6 female) during the year.

In all there were 7 deaths in the herd—4 calves out of 17 born, 1 out of the calves that accompanied their mothers and 2 cows—one due to injury in transit and the other by a fall in a feeding trough.

*Pasture.*—The institution has an area of 1,000 acres in its possession. Out of these 500 acres are on hill and 500 are pasture land but 80 acres of land are reserved for the cattle to graze where they get ample grazing for 5 months.

From the other area 20,000 lbs. of green grass and 80,000 lbs. of hay were cut.

With an intention of fodder growing Wal was broad casted along with Bajri but for want of fencing all of it was eaten away as soon as it sprouted.

*Silage.*—87,000 lbs. of grass were turned into silage at a cost of Rs. 275 and it gave 56,000 lbs. of good silage, *i.e.*, 65 per cent.

*Buildings.*—The Gowrakshan has specious buildings for all its needs and 2 pucca silos.

There is also a Veterinary Dispensary maintained with full equipment by the institution itself.

*Establishment.*—To help the Manager, there is one assistant who inspects the jungle area ; besides there is all the menial staff maintained that is necessary.

*Feeding cost.*—Feeding expenses came to Rs. 6,870-4-3 (Concentrates Rs. 4,911-5-6 and Roughages Rs. 1,958-14-9).

*Milk production.*—On an average 50 per cent. of the cows were in milk and during the year (from 17th September to 30th June 25) 40,002½ lbs. of milk were produced exclusive of milk sucked by the calves. The average daily yield of a cow comes to 7·7 lbs. The cost of production of 1 lb. milk comes to Re. 0-3-5 including all the overhead charges excepting the pay of the Manager, interest on outlay and depreciation on buildings. The milk is sold at Bombay at Re. 0-3-4 per lb.

		Rs.	a.	p.
Realizations by sale of milk	..	7,197	5	9
Total expenses for the year	..	11,936	8	9

*Cattle Show.*—Along with the opening ceremony, a cattle show was also held and prizes distributed.

*General.*—The second Gowrakshan at Mulund on G. I. P. Railway comes under this scheme. No separate report is given here as the foundation stock has recently been removed there from Kandivalee.

*An Appreciation.*—The Honorary Joint Secretaries have rendered meritorious services in bringing about the co-operation, well-organised start and smooth working. They have by their untiring energies towards real, public and livestock welfare set up an example of better utilization of Gowrakshan and public funds. It is expected that various other Gowrakshans throughout Presidency would follow the example of these pioneers.

Mr. T. P. Shah, B.Ag., Manager at Kandivalee has been doing good work.

#### PROPAGANDA AND VILLAGE IMPROVEMENT.

The three Divisional Inspectors remained in charge of their own Divisions all through the year except that the Divisional Inspector, N. D., was deputed for 3½ months to select and purchase Gir cows from Kathiwar State for the Kandivalee and Mulund Gowrakshans and it will not be out of place to mention that he found it a very difficult task to procure best and typical animals as these are very scarce and scattered. The Divisional Inspector, C. D., was also sent out of his jurisdiction in Khandesh to attend to some urgent work as the Divisional Inspector, N. D., had been on a month's leave.

The Divisional Inspectors as usual carried on advisory propaganda, as to the promising results obtained through premium bulls issued and

maintained by Government, the importance of pure type bred bulls and better feeding and care in way of rearing standard stock from the progeny were explained to the cattle owners.

There was a good demand for premium bulls in all the Divisions but the wants for Khillar bulls could not be fulfilled as good bulls are very scarce. It is therefore suggested that the question of opening a farm for this breed will have to be seriously considered. The following bulls were given out on premium system :—

Northern Division	..	8 Kankrej and 5 Khargone.
Central	..	1 Khillar.
Southern	..	3 Krishna Valley, 2 Amrit Mahal and 2 Merino Rams.
Sind	..	1 Sindhi bull.

*Cattle Shows.*—This year there were 4 cattle shows held for the following breeds :—

Breed.	Place.	Attendance.	Prize money.
			Rs.
1 Kankrej	.. Chharodi (B.B. & C.I. Ry.).	366	440
2 Sindhi	.. Karachi	200	951
3 Khillar	.. Mahud Bk. (District Sholapur).	201	427
4 Krishna Valley	.. Athni	1,600	372

The Cattle show was held at Karachi on the Commissioner's Maidan and it was the first of its kind held by the Agricultural Department. It is worthwhile mentioning that the show was a huge success. The donations from private gentlemen and public bodies went over Rs. 1,000 and this very fact is sufficient enough to show the enthusiasm and love, which the people in Karachi have for the Sindhi cows and the renovation of this breed will not be far away if they continue to show the same towards this breed, which is so much valuable and known for its high milk yield.

The show at Bankapur Farm (District Dharwar) for Amrit Mahal breed could not be held as Rinderpest was prevailing on the Farm and round about.

Along with the show demonstration of silage making was shown and it has impressed the cultivators very much.

#### General.

*Publication.*—A bulletin on silage for fodder in Western India was published.

*Experimental work.*—It has been observed that the usual foodstuffs such as dry kadbi and hay do not contain the necessary phosphates and lime, which are so essential for the growth of livestock and especially of young stock. With this end in view, an experiment of giving *bone meal* for  $\frac{1}{2}$  oz. to 1 oz. to calves has been started.

## APPENDIX P.

*Annual Report.*

I was on leave from the 5th of July 1924 to the 14th of February 1925, and during this period my Assistant Mr. Paranjpe acted for me. I have nothing but praise for Mr. Paranjpe as he worked very hard and had to run a difficult Department during a very difficult period.

My Boring Overseer and Shop Superintendent also did well and I must admit that the three of them are hard working and conscientious men and deserve all the praise and encouragement that can be given.

Before going on leave I had drawn out a large programme of work in consultation with Mr. Main, the then Director of Agriculture, to be attended to, during my absence on leave as far as possible, in addition to the general routine work. Some of the principal works were as given below :—

1. Modification of 12 Cawnpore boring machines for adapting them for rock, including the training of men to operate them.
2. Conversion of six Musto Patent hand machines into Power Units including the training of men.
3. Completion of the Karajgi Power Baling Plant.
4. Overhaul of the 15-27 Case Tractor and Plow.
5. Running of Nangaon Pumping Plant.
6. Erection of a steel shed for housing the Famine Sets.
7. Repairs and overhaul to the Ingeco engine on Musto Patent Power Machine No. 7 in the South Division.
8. Repairs and overhaul to the Pumping Plant on the Septic Tank in the Agricultural College compound.
9. Fixing of the Pulsometer and Worthington steam pump on the Experimental Well with live steam-pipe line from the Boiler including testing. Mr. Paranjpe had not only completed all the works specified in the programme systematically and with great economy but also did several other jobs in addition with equal thoroughness.

I had reserved the subject of improvement to implements for myself as I treated it as a personal section of work and hence very little was done during my absence, but I was not idle whilst on leave as I visited many farms and works with a view to see how work was done under English conditions and also to investigate the possibilities of manufacturing implements in England for Indian condition.

Since my return from leave I have been able to get the work on a more substantial basis and the following work has been done and is in progress.

In Sind the orient plow is considered to be the most popular all round plow of any that has been tried and during one of my tours I saw the plow tested and was informed by Mr. Main that there would be a



tremendous demand if only the cost could be reduced, and he gave me the figure of Rs. 20 as the maximum (the present cost being Rs. 32) so I spent considerable time on this implement and have succeeded in making a plow similar in every respect to the orient and can put it on the Market for Rs. 20. A sample plow at Rs. 20 has been sent to Sind for trial and I shall in a subsequent report be able to describe its performance.

I have also taken up the question of plow shares and have designed a C. T. 2 plow share to be made in two parts, the wing part or body of the existing share is subjected to very little wear and tear but the point is worn away in a very short time. So I am having it made in two parts the point being manufactured from my own formula. My aim is to be able to renew the point for the sum of annas four to six instead of having to spend Rs. 3 every time for the complete share. Messrs. Kirloskar Brothers have very kindly undertaken to produce the article according to my design and formula.

Another important implement is the seed drill and I have been working on this for some considerable time.

Mr. Gilbert when Deputy Director of Agriculture, South Division, Dharwar, requested me to design an appliance to attach to the ordinary seed drill which should be worked by hand. This has been done and the drill tried on the College Farm, but although the appliance when worked regularly gives good results, we find the operator forgets to turn the handle so I am now fitting up the drill to be worked mechanically and with this give it another trial. Other implements which I have taken in hand are as under for the several Agricultural Officers.

Officers.	Particulars.
Deputy Director of Agriculture, S. D., Dharwar.	Seed drill for Jwar and Cotton; Turnwrest Plow 6 to 9"; Portable Power Chaffcutter for Kirbi; Portable Jwar threshing machine.
Deputy Director of Agriculture, Sind, Karachi.	Plows improved wooden, light iron, for dry and moist land work. Improved water lifts for bullock power. Winnowing machines for cereal crops. Threshing machine for cereal crops. Seed drills suitable for wheat, cotton and other cereals Rollars. Reapers for unirrigated wheat.
Deputy Director of Agriculture, S. C. D., Poona.	Reaper for Jwar and Bajri. Power driven water lifts for 30' to 40' head, with a capacity of 2,000 to 2,500 gallons per hour. Plows with special beams and hitches suitable for bullock power.
Deputy Director of Agriculture, N. C. D., Naik.	Seed drill for different grains and with an arrangement for variable depths. Improved Plow. Harrow for collecting weeds, cotton stalk, etc.

Officers.	Particulars.
Deputy Director of Agriculture, N. C. D., Nasik.	Cotton stalk remover. Groundnut harvesting and preparation implement. Chaffcutter for Jwar. Intercultural Hoes. Hand Implements for gardens and vines.
Deputy Director of Agriculture, Konkan Ratnagiri.	Small handy tractor for salt lands. Implement for puddling of rice. Bullock power clod crusher. A small water-lift useful for small holdings, and more economical than any in use. A cottage home fruit canning apparatus for Apples and Mangoes. Improvement in packing of Mangoes. Improvement in Meston Plough.
Deputy Director of Agriculture, Gujarat, Surat.	Cotton stubble digger for bullock power. Cotton picking machine. Improved shares for plows. Rice, wheat and jwar threshers suitable for bullock power. Rice, wheat and jwar threshers suitable for engine power mounted on one frame. Light Winnowers for above for bullock or manual power. Portable power chaffcutter. Motor Tractor for Surat soil.
Professor of Agriculture, Poona.	Seed drill with feed, rate and distance regulator and capable of dealing with mixed crop if possible. Improvement in Knight Churchill Kolpa. Winnower. A groundnut digger. A blade harrow which will not pack the soil. A cheap and reliable groundnut sheller for seed purposes. A ridging plow attachment. Disc Plows. Manure spreading attachment to a bullock cart. Treddie power cotton gin similar to a sowing machine.

This work involves much of the personal element, and I am afraid my other duties are not allowing me the time required to make real progress in this direction. I realise how very important this matter is, and I am only too anxious to get the very best results, but I am afraid the true significance of the responsibility of my entire work is not known. Take for instance the boring. I am technically in charge or soon shall be of 86 boring machines, 46 of which will be power driven and 15 of those of the F 3 Power Calyx type; the latter number being the full compliment of the Executive Engineer in charge of Boring, Nasik, who has two European Assistants and no other branch of work to attend to, whereas in my case I shall have many more machines than he, and in addition I am technically in charge of the following works.

Workshops and Experimental Well, Training of oil engine students, Nangaon Pumping Plant, Karajgi Shreading and Baling Plant, Tractor

experiments throughout Bombay Presidency including Sind, River Surveys throughout Bombay Presidency, Hire of Pumping Plants, Famine Pumping when required, Official and technical correspondence for all and sundry, and last but not least Improvements to Implements for the Presidency including Sind.

I shall now turn to a few detailed activities of the Department.

*Advisory.*—During the year under report we had 31 inquiries for pumping, 3 for cane crushing, 8 for tractoring, 2 for ginning, 86 in oil engine driving and several for site surveys, general advice and estimates for machinery. 15 Sites have been actually surveyed and 12 detailed estimates for different kind of machinery supplied to the parties concerned. 27 Students were admitted in the oil engine class attached to the Shops, out of whom 27 were successful.

*Executive.*—The Shops were very busy from the beginning on different works. Materials for the steel shed sanctioned under Government Resolution, Revenue Department, No. 9325 of 28th November 1923 for housing the Famine Sets were ordered from Dapuri Works during the previous year, and the actual erection of the shed for which no funds were available and for which Dapuri Works demanded Rs. 1,365 had to be done departmentally with a view to minimise expenditure and manage within our limits. The Shed built is 100 feet long and 26 feet wide and 14 feet to the eaves divided into 8 equal bays each of which is now devoted to an individual Famine Set. The adaptation of 12 Cawnpore machines and the conversion of 4 hand machines into power units sanctioned in Government Memo. No. 8353A of 31st March 1924 "43-Famine Relief" was taken in hand next, in addition, the conversion of 2 more machines received from the Deputy Directors of Agriculture, Konkan and Gujarath. It was not advisable to entrust these works to an outside-shop, as the machines were in an experimental stage and required a good deal of modification which had to be based on practical experience.

Eight Cawnpore machines were already scrapped from the Nadiad Boring Department and a later idea was to modify them for making very shallow bores (say 50 feet deep) for exploratory work in Famine-stricken areas. The idea was ultimately accepted as a good one and developed into an order from Government to do the work. Accordingly all the parts of these machines were brought into Poona, details of necessary alterations and modifications worked out and 12 improved machines (practically built on new lines entirely different from what they were before) each having a substantial girder frame, a complete set of rock boring tools, a crab and winch, set of smith's and fitter's tools, a forge, etc., were produced and five of them sent out to Jategaon 25 miles away from Poona, partly for experimental purpose and partly for training of mukadams.

As regards conversion of machines we had received 1 from South Division, 2 from Gujarath, 1 from North Central Division, and 2 from Konkan, out of which all, with the exception of the two machines in Gujarath, were converted in Poona, and the rest at Surat and Nadiad

respectively by sending along a Departmental mechanic. Each of the converted machine was fitted with an oil engine, a countershaft with belt striking gear, new cam shaft of ample size, new bearings, a widened winch, stays and tension rods, rotary circulating pump with a suitable cooling tank and connections and continuous derrick legs. The training of men to operate these machines was done during the work of conversion without additional staff and extra expenditure.

The Deputy Director of Agriculture South Division sent one 6 B. H. P. Ingeco engine belonging to Musto Power No. 7 machine for repairs and a thorough overhaul. He also wanted to have the main and big end bearings made of gun metal in place of the white metal bearings and a spare set of each supplied for stock purposes. Considerable time had to be spent at the shops on this job to see whether gun metal bearings could be introduced with advantage and ultimately after a good many trials the idea had to be given up on account of the constructional design of the engine being unsuitable for the purpose. The engine was therefore returned duly overhauled and refitted with white metal bearings.

The Pumping Plant on the Septic Tank at the Agricultural College, Poona, required repairs and were undertaken at the request of the Professor of Agriculture without any detriment to its daily work for which it has been installed. This work should rightfully have been sent to the Deputy Director of Agriculture, South Central Division, Poona, for being attended to by his Mechanical Assistant but as the work involved a good deal of machining and as it was inadvisable to stop the plant for even a day we had to undertake the work.

*Plants on Hire.*—During the year under report the Department had sent 9 Pumping Plants on hire to the various cultivators noted below partly for sinking and deepening existing wells and partly for irrigation purposes.

Name of Cultivator and place.	Description of Plants.
1 Mr. P. N. Bhide of Wadgaon, District Poona.	4 B.H.P. Kerosine engine and 2½" centrifugal pump both mounted on a special girder frame with piping.
2 Mr. S. V. Supnekar of Supna, District Satara.	14·4 B.H.P. Clayton Crude oil engine.
3 Mr. B. V. Wadkar of Manjri, District Poona.	7 B.H.P. Tangye engine and 3" centrifugal pump with piping both mounted on a girder frame.
4 Mr. R. N. Agte of Lawacha, District Surat.	16 B.H.P. Tangye engine and 3" Ruston centrifugal pump with piping, etc.

Name of Cultivator and place.	Description of Plants.
5 Mr. Sorabji Rustomji of Manjri, District Poona.	6·7 B.H.P. Wizard engine and 2½" centrifugal pump with piping, etc.
6 Mr. N. S. Patil of Wadgaon, District Nasik.	2½" Swaby centrifugal pump with piping, etc.
7 Mr. T. R. Chiplunkar of Naigaon, District Nasik.	14 B.H.P. Blackstone oil engine and 3" Tangy's centrifugal pump with piping, etc.
8 Mr. Bhausahib Jadhav of Vagholi, District Poona.	4 B.H.P. Blackstone engine and 2½" centrifugal pump with piping, etc.
9 Mr. R. K. Saswadkar, Poona.	7 B.H.P. Tangye engine and 3 Tangye centrifugal pump with piping, etc.

Out of the above plants No. 8 and 9 have been re-hired to the parties concerned. All the other plants with the exception of No. 3 and 9 which are retained for the current year have been returned by the cultivators concerned and revenue actually received before 1st April 1925 amounted to Rs. 1,697-0-5 on this account.

*Nangaon Pumping Plant.*—The pumping plant at Nangaon Peta Dhond, District Poona, on river Bhima has done very well this year. It was run for 283 days in the year, at 12 hours run for 231 days and at 24 hours run for 52 days and realized about Rs. 4,331-2-0 as water charges on a total acreage of 358 acres. The nett expenditure including the stock on hand on the 1st April 1925 amounted to Rs. 10,025-0-10 against Rs. 12,613-3-10 during the previous year. The amount of deficit is correspondingly reduced and when the water charges are increased to suit the actual expenditure according to the new organisation proposed to Government it is hoped that the plant will make two ends meet :—

*Drawing and Designs.*—About 50 drawings and sketches of different machines and parts have been made in the drawing office including 8 designs and working drawings for the following plants in particular :—

1. Pumping plant for the Court of Wards Hyderabad Sindh, consisting of a 10 B.H.P. Blackstone Crude oil engine and 6" Pulsometer Centrifugal Pump fixed on a well situate on a canal, with piping, etc.
2. Standard drawing for a Musto Patent Hand Boring Machine converted into power machine.
3. Steel trolley for a 5" Power Calyx Drill for Konkan Division.
4. Pumping plant at Alandi comprising a 2" Worthington Plunger Force Pump, a 9 B.H.P. Blackstone engine, a 16" Grinding machine, a Dynamo for lighting with countershaft, etc.

5. Pumping plant for Mr. Chaudhari of Faizpur consisting of a 16 B.H.P. Robson Crude oil engine and 4" Centrifugal Pump complete with piping, etc.

6. Pumping and Ginning plant at Government Farm Surat comprising of 13 B.H.P. Tangye engine, a Ohio Power Chaffcutter, 2 roller gins, a Flour Mill, one 3" Centrifugal Pump with piping, countershaft, etc.

7. Modified Cawnpore Boring Machine.

8. Modified Seed Drill Box.

*Tractoring.*—The old 151—27 Case Tractor and the Grand Detour 3 furrow plow were sent to Shevgaon Taluka in Ahmednagar District about 40 miles from the railway station for plowing purposes soon after the machines were completely overhauled at the Shops. The work was actually started on the 16th of January 1925. The tractor worked splendidly in the beginning but the plow gave a lot of trouble. When working with the three bottom the main axle used to bend and when one bottom was taken off it was found very difficult to keep the tractor on the land. There was another difficulty of the plow going too deep irrespective of its adjustment and the result was the shearing of one of the axles. The difficulty was ultimately overcome by introducing an idle or guage wheel to support the frame. All this took some time as there were very few or practically no facilities at site or any where near to undertake this work. Plowing was again resumed on the 27th of January 1925 and from that to the 26th of March 1925 the land plowed amounted to 91 acres 26 gunthas. Then the tractor began to give trouble and closed down the operations entirely. The differential gear Bull Pinion and rear axle broke while working and as they were not available in Bombay and could not be imported within a reasonable time the tractor had to be brought to Poona for repairs.

In short out of 56 days, the tractor worked for only 38 days losing 4 days as holidays, 12 as stoppages due to small breakdowns and 2 in shifting from place to place. The revenue realised on the work amounted to Rs. 733-3-3 at Rs. 8 per acre while the total receipts including this amount and some arrears of the previous year amounted to Rs. 2,499 by 1st of April 1925. I admit that the work turned out should have been much more. There are however several reasons for this slow progress. I have already reported that the tractor is old and constructionally defective and cannot compete with the latest and greatly improved models. Secondly the place where I was asked to conduct plowing operations was far away from my Head-quarter and 40 miles from Ahmednagar. There were very few facilities for repairs or resource in case of breakdowns and consequently a good deal of time had to be spent in obtaining parts and executing repairs from Poona. The operators had to be left practically to their own resources as it was impossible to give them close supervision and hence the work turned out was naturally slow. There is certainly a very great demand for these machines and it is very essential that different makes are tried in different localities or divisions under close supervision with different types of implements in order to ascertain their capacities on different soils and in different tracks. This

problem has been pending a long time and unless we have at least one set of an improved type working in each division we shall not be able to get accurate data as regards their usefulness in plowing as compared with bullock power. As regards implements there is a great difference of opinion, some advocate Mould Board Plows, while others prefer the Disc Plows and contend that the latter will break the soil under the most severe conditions. Our actual experience however proves the reverse. Of course there are several other factors which affect progress to a great extent. For instance the moisture in the soil, the nature of land and its conditions in different temperature, the local conditions and the way the machines are handled are some of the chief factors which play an important part in the success of tractoring apart from the right selection of implements. Then again it is essential to give some incentive like a bonus to the drivers handling these machines for the sake of obtaining more work and taking due care of their machines. A permanent man of this class is not so satisfactory as it matters very little to him what the progress is.

*Karajgi Plant.*—The Power Bruising and Baling Plant at Karajgi in Dharwar District was started in the first week of February 1925 for regular work and stopped by the 10th of June 1925 after finishing all the Kirbi purchased by the Deputy Director of Agriculture, South Division. The bales turned out after passing through the bruiser and then through the hydraulic press amounted to 6,409 ranging in weight from 80 to 100 lbs. according to density. All the machines with the exception of the Bruiser worked splendidly throughout the season without any stoppage of any kind. The Bruiser however gave trouble from the very beginning. Breaking of knives was the chief offence which was so frequent that the progress was very low during the first few weeks. Moreover the men were entirely new to this line of work and the continual breaking of knives and consequent stoppages made them nervous instead of getting them familiar and confident with the various operations. There was not sufficient Kirbi at hand to train the men before starting the operations and when it actually arrived at site it was full of stones and stones are fatal to this class of machine. Ultimately the matter had to be investigated with the help of the Maker's expert and the conclusions arrived at were that some of the Kirbi received was exceptionally hard and that the machine should be fitted with stiffened knives in order to overcome the difficulty. We expect to get these fitted before operations start next season and with the present arrangement to keep out stones I anticipate a good seasons work.

The machines have been tested individually many times and found to be turning out much more than the specified quantity. Therefore if the Bruiser works smoothly and keeps a constant feed to the press the plant can easily turn out more than the specified output. Secondly the coolies we get in the vicinity do not attend the work before 8-30 in the morning and leave before 5-30 in the evening. Consequently we have not been able to run according to estimate. I hope, however, to get the matter greatly improved next season.

*Famine Boring.*—Amongst the several activities of this department Famine Boring Scheme has added immensely to our works, both executive and office routine. The Devolution Scheme had relieved me of some responsibilities but the Famine Scheme has again added to them. I was immediately required to work without extra help 8 boring machines in Nagar and Sholapur Districts in connection with the Famine work in addition to the purchase and trial of 45 hand machines, 10 Power machines and training of sufficient staff for operating them. My principal men are simply overtaxed and it is high time now to take this matter seriously. The work turned out by the eight machines during the last few months with entirely raw men placed on newly modified machines without giving them a fit training, strange strata, and distant location of the machines from each other and also from a railway station, has been given in the attached statement. When these facts are taken into consideration it will be seen that the work turned out is certainly as much as could be expected in the circumstances.

The balance of power machines is yet to arrive and when they are received each of them will have to be fitted with extra equipment to meet local conditions and then sent out in the district. In short this extra work is likely to continue for over 12 months until we get the whole scheme going and all the machines are put into action with the requisite number of trained staff.

I submit that it is impossible to run all the above works successfully, give them proper supervision and work out the improvement of implements as it should be done with only one Indian Assistant. The work and duties involved are sufficient for three or four men and I shall be glad if Government will kindly consider the matter and sanction the necessary assistance to carry on this important branch of agriculture.

W. M. SCHUTTE,

Agricultural Engineer to  
Government, Poona.



## Statement of particulars of bores made

Serial No.	Survey No. in which bore is made.	Taluka.	Village.	Diameter of bore.	Depth of bore.	Water before boring in gallons per hour.	Water after boring in gallons per hour.
1	S. No. 138	Shrigonda	Limpangaon	4"	70'	Nil.	20
2	Do. 121	Do.	Pimpri	3"	60'	Nil.	Negligible quantity.
3	Do. 103	Do.	Do.	3"	52'	Nil.	200
4	Do. 13	Do.	Shrigonda	4"	50'	Nil.	24
5	Do. 241	Do.	Limpangaon	3"	73'	Nil.	Nil.
6	Do. 241	Do.	Do.	3"	55'	Nil.	Nil.
7	Do. 1057	Do.	Shrigonda	3"	48'	Nil.	Very small quantity.
8	Do. 349	Parner	Parner	4"	52'	Nil.	12
9	Do. 570	Shrigonda	Kalgaon	3"	40'	Nil.	Nil.
10	Do. 138	Do.	Chikhali	3"	49'-6"	Nil.	200
11	Do. 499	Parner	Parner	3"	50'	Nil.	18
12	Do. 129	Shrigonda	Gharghaon	3"	50'	Nil.	Nil.
13	Gavthan	Do.	Chambhurdi	3"	41'	Nil.	4
14	S. No. 101	Parner	Vaghunda	4"	89'-6"	Nil.	3.75
15	Mamlatdar's office	Sangola	Sangola	3"	116'-6"	Nil.	Very little water.
16	At Mr. Bhosekar	Do.	Do.	3"	107'	Nil.	Do.
17	At Mr. Gulmure	Do.	Do.	3"	104'-6"	Nil.	Nil.
18	S. No. 193	Shrigonda	Chikhli	3"	34'	..	..
19	Do. 786	Do.	Chorwadi	3"	24'	..	..
20	Do. 101	Parner	Vaghunda	3"	27'	..	..

In addition to the above 7 bores have been made at Jategaon Kharda for a Dam Project

by this Department in the year 1924-25.

Departmental charges.	Labour charges, oil, coal, etc.	Total cost of boring.	Average cost per foot.	Remarks.
Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
7 7 0	111 12 0	120 3 0	1 11 6	Unsuccessful.
....	120 8 0	120 8 0	2 0 1	Do.
58 0 0	140 0 0	196 0 0	3 12 3	Successful.
10 12 0	71 1 0	81 13 0	1 10 2	Unsuccessful.
Nil.	149 13 6	149 13 6	2 0 10	Do.
Nil.	119 14 6	119 14 6	2 2 10	Do.
3 0 0	137 12 0	140 12 0	2 15 0	Do.
72 12 0	123 10 0	196 6 0	3 12 5	Do.
15 8 0	198 0 0	213 8 0	5 5 4	Do.
56 11 0	151 9 6	208 4 6	4 2 8	Successful.
27 15 0	179 0 0	206 15 0	4 2 3	Unsuccessful.
5 12 0	193 0 0	198 12 0	3 15 8	Do.
15 0 0	154 6 0	169 6 0	4 2 1	Do.
27 1 0	239 1 0	266 2 0	2 15 3	Do.
Nil.	156 7 9	156 7 9	1 5 5	Do.
Nil.	100 0 0	100 0 0	0 15 0	Do.
Nil.	145 0 0	145 0 0	1 6 1	Do.
....	....	....	....	On hand.
....	....	....	....	Do.
....	....	....	....	Do.

to Yel river making a total of 134'-9".

W. M. SCHUTTE,  
Agricultural Engineer, Poona.

## APPENDIX Q.

## SUMMARY OF WORK DONE UNDER THE HORTICULTURIST TO GOVERNMENT OF BOMBAY, POONA, FOR THE YEAR 1924-25.

*Changes in the staff.*—Mr. G. S. Cheema, Horticulturist to Government went on leave from the 20th April 1925 and Mr. H. P. Paranjpye, District Horticultural Officer is acting in place of Mr. Cheema. Mr. P. G. Joshi was acting District Horticultural Officer from that date to 31st May 1925 when he went on leave owing to illness. Mr. Dani has taken his place.

Financial conditions for the year 1924-25 are as follows :—

	Sanctioned grant.		Expenditure.		Receipts.	
	Rs.	a. p.	Rs.	a. p.	Rs.	a. p.
(1) Office of the Horticulturist including District Horticultural Officer, Poona ..	2,003	0 0	2,003	0 0	.....	
(2) Ganeshkhind Botanical Gardens ..	8,030	0 0	7,693	11 7	1,083	12 9
(3) Modi-Bag, Agricultural College ..	7,587	0 0	7,587	0 0	2,813	7 6

*Teaching.*—As usual the teaching to the College students was conducted by the Horticulturist with the help of a Demonstrator. Besides this there were four Short Course students in addition to four students in special horticulture. The annual class in Elementary Arboriculture was held in November 1924 by the District Horticultural Officer and six men deputed by the Public Works Department and District Local Boards received training.

*Laboratory Investigations.*

*Fig-drying.*—The process of fig-drying recently introduced has attracted considerable attention of the public and particularly of the newspapers both in English and Marathi in which articles have appeared on this subject as well as on kindred horticultural matters.

*Jelly-making.*—When it is not possible to dry figs in the sun owing to rains, the figs which are very cheap at that time, can be profitably used for jelly-making. The fig jelly is a very beautiful product and is likely to command good market. Similarly *Jambul* fruits which are produced in large quantities can be used for jelly-making. The jelly of *Jambul* fruits however does not become, as far as this year's trials show, as hard as fig jelly. Guava fruits which are very cheap in the rainy season can be economically used for jelly-making. Guava jelly has a great future as guava and lemon fruits are equally cheap in the rainy season. Similarly marmalade from Citron peel can be very economically prepared. Certain other fruits are under investigation as to their suitability for jelly-making. In addition to various uses to which the mango fruit is popularly used, it can be used for mango-butter-making.

*Dehydration of vegetables.*—Drying in special ovan or dehydration of vegetables has been tried on a fairly large scale. Cabbage, Cauliflowers, brinjals can be dried very nicely and if they are blanched or dipped in hot water for about three minutes, they keep their original colour. Before use the dried stuff must be kept in hot water for half an hour when it assumes its natural form and can be cooked in the usual way.

*Drying of banana.*—The Rajeli variety of banana commonly grown at Bassein is pre-eminently suited for drying. In the Deccan and Karnatak the Rajapuri or Gujarath-bali variety is very largely grown. This type also can be dried into a nice marketable product when the fruit is full ripe and fit for table use.

*Cold Storage Experiments.*—In the mango season a small attempt was made to test the keeping quality of mango fruits in the Cold Storage in the Crawford Market, Bombay, where mangoes were kept in a temperature varying from 36°—40° F. It was found that the Alphonso mango is the best suited variety. The Pairi is a bad keeper in the cold storage as it is outside it. Fruits intended for ripening after being taken out of the Cold Storage should be perfectly developed on the tree before they are plucked. Fruits should be wrapped in thin tissue papers and tightly packed in many layers in ventilated boxes. Unwrapped fruits quickly suffer from a sudden drop in the temperature of the Cold Storage. At a uniform temperature between 38° and 40° F. green and raw Alphonso mangoes keep nearly for a month in the Cold Storage. Ripened or half ripened fruits are more liable to be influenced by a sudden drop in the temperature than the green and raw fruits. With a little higher temperature than 40° F. Alphonso fruits will probably keep longer than a month.

*Experiments with mango packing.*—In the usual commercial methods of packing mango fruits it has been found that fruits packed in trunks are as liable to damage in transit as those packed in baskets or those carried on head loads in suburban trains. The percentage of fruits damaged in transit ranges from 34—37 per cent. More improvement is desired in handling the mangoes while harvesting and loading on board the steamer rather than in actual packing them in baskets. About 10 per cent. of the fruits are packed immature so that they cannot be ripened satisfactorily. Not more than 20 per cent. of the fruits develop a really attractive colour. Sucking insects were mainly responsible for the dull and disfigured rinds of ripened fruits.

This year's experiments in mango packing indicate that bamboo baskets arranged in a deal wood crate are found to be better packages than loose baskets unprotected from outside. The crate protects the fruit baskets from the rough handling at railway stations. But it will not pay the exporter to pack mango baskets in returnable crates unless they are cheaply manufactured in large numbers and facilities are given by railway authorities to return the empties at a nominal charge. To make any sort of improved packing a success, sympathies of railway

authorities are greatly desired to carefully handle the packages particularly on junction stations and transport them to their destination in as short a period as possible.

*Modi-Bag.*

*Season.*—The cold season was abnormal and on the 23rd of January 1925 the thermometer dropped down to 33·5° F. Young leaves of banana, papaya, grape, were frosted but afterwards the plants revived. The development of young fig fruits was considerably retarded and the fruits never came up to the normal standard. Tomato and brinjal crops were permanently damaged, while citrus, guava, pomegranate, chickoo and mango trees were not affected at all.

*Fruit trees.*—Cultivation expenses, maximum and average yields of various kinds of fruit trees, particularly of fig, pomegranate, papaya and banana have been worked out. The two varieties of fig imported from Baghdad yield very sweet and soft-seeded fruits in large numbers. The crop however does not develop to its normal size and many fruits fall prematurely. From the last two years' trials we can definitely say that the Dholka or white and soft seeded pomegranate can grow successfully in the Deccan. This is a late variety but is much superior to the local one.

Out of the seedlings grapes of the Pandhari Sahebi variety the vine No. 35 has given promising results both as regards quality and quantity. The bunch is compact, with berries long, seeds few and skin thin.

*Mango budding.*—So far budding of mango plants is not appreciably practised in India. A special effort was made this year to bud on mango stocks two years old and as a result 35 budded mango plants are now ready in the Modi-Bag.

*Seasonal planting of banana.*—From experiments in seasonal planting of banana suckers (Rajapuri variety) it appears that suckers of this variety may be planted from the end of February to March or from August to December. Planting in March or April results in early flowering. Pruning of all the suckers to the ground every month till the harvest of the mother plant has given excellent results so far as the yield is concerned. Sword suckers are always considered the best for planting purposes but broad leaved suckers when given better treatment give equally good results as the former.

*Ganeshkhind Botanical Gardens, Kirkee.*

*Packing of mango plants for long distances.*—After three years trials at packing fruit plants for despatch by post to long distances, it has been found that grafted mango plants can be safely sent by post to any part of the British Empire which can be reached by 48 days' journey at a cost of Rs. 4-8-0 per plant excluding price of the plant. Similarly plants can be sent by post to any part of India which is not easily accessible by railway or by steamer.

*Bananas from seed.*—The fruit produced by a banana plant (Sonkel Chanda variety) raised from seed was of a poor type practically without any pulp but at the same time without any seed in it. A sucker from a seed plant gave a bunch of 57 fruits which were without seeds in them, somewhat better than those of the seed plant, but are not up to the standard of the normal type.

*Guava trees.*—The cultivator never prunes the guava tree for fruit bearing. The only method that he follows is to bend the branches every alternate year, so that the mature wood of the branches becomes horizontal. Fruit appears on the new growth which is formed on the arch of the branch, thus formed. If the tree is pruned it appears to produce much better fruit, the number of which is reduced by about 11 per cent. and the weight is increased by 30 per cent. per acre.

#### *District Work.*

Last year important inquiries were made into the question of marketing of mango fruits by a Committee appointed under Government Resolution, Revenue Department, No. 947-24, dated 15th May 1924 of which Mr. Cheema, the Horticulturist to Government, was the President. The findings of the Committee are embodied in a Report submitted to Government.

A scheme for development of the Fruit Farm at Mirpurkhas is now drawn up.

The nursery at Dharwar was very successful. In all over 800 grafts of various types principally Alphonso, Pairi and Mulgoa have been made. Besides these, 6,000 mango stocks are raised and will be ready for grafting upon in the next cold weather. In addition to these 75 chickoo plants are also propagated. All this is a great asset to the District Agricultural Association for whom the nursery was started. Several renovation and improvement works were undertaken for the public.

Gummosis of the mosambi tree is prominently coming to the notice and various calls for its treatment are being met with in collaboration with Mycological Section. Gardens at Baramati, at Nanded in Haveli Taluka and at Mangrool-Pargaon in Junnar Taluka were treated.

An experienced fieldman was deputed to Mirpurkhas Farm to propagate plants on a large scale to meet the demand for plants from the public as well as to keep a sufficient stock ready for planting when the Sind Scheme for Horticulture is sanctioned. Unfortunately the fieldman had to revert to Poona within three months owing to ill-health but during the three months he could do considerable useful work in the propagation of various fruit trees.

In September 1924 the well known pomegranate gardens of Alandi village and near about to the extent of 236 acres were severely infested with a large caterpillar of *Ophiusa melicerta* which devoured every leaf of the plantation. A garden at Alandi consisting of 1,500 trees was taken in hand to demonstrate eradication of the pest in consultation with the Entomological Section.

Drying of green figs was demonstrated to the public at Satara and at Bhose near Miraj in May 1925.

During the year under report 394 enquiries were received of which 15 were from foreign countries regarding various matters connected with fruit trees. Many of the correspondents gratefully acknowledged our help and the manner in which we solve their difficulties.

H. P. PARANJPYE,  
Acting Horticulturist to Government  
of Bombay, Poona.

## APPENDIX R.

## SUMMARY OF WORK DONE BY THE INSPECTOR OF AGRICULTURAL SCHOOLS, B. P., POONA, FOR THE YEAR 1924-25.

*Preliminary.*—The post of the Inspector of Agricultural Schools which was kept in abeyance was revived from 1st June 1924 owing to the necessity of the post on account of introduction of an alternative agricultural syllabus in the higher standards of Vernacular Primary Schools. The charge was held by Mr. R. Y. Hulkoti, B.Ag., from 26th June to 16th November 1924 and by Mr. K. M. Pawar, B.Ag., for the rest of the period under report.

*Nature of work.*—The work has mainly been of an advisory nature both in connection with the Vernacular Agricultural Schools and the Agricultural classes attached to the Vernacular primary schools. The former schools are controlled by the Deputy Directors of Agriculture, while the latter are controlled by the Deputy Educational Inspectors. In certain cases, the Inspector has to act as an *itinerant teacher* and give model lessons for the guidance of the teachers. More attention had to be paid in connection with the training of teachers for agricultural classes and supervision of agricultural classes.

*Vernacular Agricultural Courses.*—The object of the agricultural schools differs from that of the agricultural classes attached to the primary schools. While the agricultural schools aim at training adult sons of genuine agriculturists within certain restrictions as to age and educational qualifications with a view to enable them to go back to their farming and help their parents in increasing the yield both from land and livestock by improved methods of agriculture in so far as they are applicable to their conditions of environment, the latter (*viz.*, the agricultural classes) aim at adapting the rural education to rural needs as far as possible and making the boys good citizens and also at preparing the minds of boys in the primary schools irrespective of age for manual work which is so very essential for removing the current prejudices of the agricultural public regarding the object and utility of education and inducing the boys to go back to their professions which have greatly suffered owing to the tendency of boys to look down upon their professions and the consequent disinclination for physical labour which forms a very important factor in the successful undertaking of agricultural industry under the present environment. The alternative agricultural syllabus has been framed so as to suit the above object and the boys reading for this course have all the privileges of the ordinary Vernacular Final Examination. In the absence of the Agricultural Classes, both these objects had to be achieved by the agricultural schools though at a greater pecuniary cost to Government, when compared with the efficiency of the product obtained, and the syllabus framed had, of necessity to be in accordance with these two objects and has therefore been more elementary. But since an alternative agricultural syllabus has been introduced into the Vernacular primary standards, the course of the Agricultural schools will have to be revised in the near future with a



view to make the course a purely practical one and thus make it more appealing to the genuine agricultural public, and attract their boys to the Agricultural Schools in greater number.

With the opening of the agricultural classes in the primary schools, the initial burden of training the requisite number of teachers for the experimental agricultural classes has fallen on the agricultural schools which have therefore been part-time vernacular agricultural Training Colleges. A provisional syllabus has been framed so as to suit the needs of the present second year passed teachers who are now temporarily recruited to take up the agricultural teaching work in the primary schools. It is evident that a separate Training College syllabus will have to be introduced when the recruiting of such teachers will be stopped after the boys from the agricultural bias classes become available as they are expected to *have more aptitude for this type of work* owing to their systematic training in manual work from their very young age. The work of the agricultural teacher will be more facilitated if the Nature study syllabus approved by Government for primary standards I to V be regularly taught in all the primary schools irrespective of whether these schools have agricultural classes or not.

*Number of Agricultural Schools.*—There are six Vernacular agricultural schools in the presidency proper, one in each of the Agricultural Divisions except Gujarath which has two. Of the six agricultural schools, Dhulia and Surat schools have mainly been the out-come of local aid and enthusiasm, though other schools too are aided to some extent by Local Boards and private bodies.

There seems to be some genuine demand from the public for more agricultural schools. But as it is found advisable to wait till the introduction of the new alternative agricultural syllabus takes deep root in the rural environment, the acceptance of the offer has been postponed. With the development of the agricultural classes in the primary schools, it may be possible to cut short the present period of the agricultural school course and increase the number of agricultural schools practically with the same recurring expenditure now incurred on our schools.

*Number of Agricultural Classes.*—There are at present 34 agricultural classes which have been at work in the various parts of the Presidency of which 18 have been at work varying from one to two years.

The *number of boys* in the different *agricultural schools* is as shown below :—Loni school in Poona District 36, Devihosur school in Dharwar District 24, Ambali school in Panch Mahals 31, Jambhul school in Thana District 22, Dhulia school in West Khandesh 22, and Surat school 26. There has been rigid selection of boys in all the schools except perhaps at Jambhul where it has been difficult to make up the number. In the case of Devihosur school, personal interview and preliminary test is *insisted on*, a few months prior to admission and preparatory class for a period varying from one to two months is arranged for such of the boys who fail in the test but who are very promising from the point of practical agriculture. Such boys receive a scholarship of Rs. 5 per month during their stay at the school for the preparatory class. The

system of giving scholarships to boys is being gradually introduced instead of free boarding as has hitherto been done in order to ensure earnestness for admission and *reduction of cost of maintenance*.

The *number of boys in the agricultural classes attached to primary schools are as shown below* :—

Gujarat Division 104 boys for 5 schools, Central Division 150 boys for 6 schools, Bombay Division 44 boys for 3 schools and Southern Division 67 boys for 4 schools. From the experience so far gained, it seems advisable not to open these classes in places where there are local English classes since these latter classes tend to decrease the number of boys for the agricultural classes. Further it seems desirable to open group schools and hold classes from 10 A.M. to 5 P.M. with recess in the middle, so as to suit the convenience of boys from the neighbouring villages and thus attract more of them for these classes. The utility of these classes will thus be indirectly enhanced without appreciable increase in the cost of running these schools.

*Inspection of the work of the schools.*—During the year under report Surat and Jambhul schools have made good progress as compared with their previous record. In the case of Godhra school, the progress was not upto the mark probably owing to the illness of the Headmaster during the working of the school. Devihosur school has kept upto its mark while Loni school has gone down, as the examiners remark that the calibre of 50 per cent. of the boys appear to be below the mark.

As regards agricultural classes, it may be said that many of the classes have made a good beginning. As there are many initial difficulties in the way of the agricultural teachers, some time must elapse before we can expect good progress. It is gratifying to note that a majority of the agricultural teachers have tried their best to keep up the enthusiasm of the students and enlist the sympathy of the local public.

*General.*—Though the agricultural classes are under the administrative control of the Educational Department, all spade work in connection with these schools is to be done by the Agricultural Department owing to the Agricultural nature of these schools and the necessity of frequent attention of the agricultural staff to ensure their success. This is further complicated by the fact that the agriculturists expect of these agricultural classes what they really ought to expect from the agricultural schools. Though it is not the object of the agricultural classes to actually train the boys for field work, the village public will have to be somehow satisfied by at least growing staple crops of the locality in the school garden according to the improved methods, else boys will not be sent for the course. This necessitates more knowledge on the part of the agricultural teachers and more attention for garden work which they cannot afford to give as they have to look to other subjects also. However small, a plot may be, some time and energy will have to be spent in arranging for tools, seeds, etc., required for sowing or watering or for other operation. As the time of the different operations on the school plot must of necessity coincide with that of the cultivator's operations it is not possible for the agricultural teacher to arrange for operations with

the aid of the cultivators before the latter finish their own work. As timely operations in agriculture are of utmost importance, it seems advisable to take an acre or two from cultivators on condition to spend Government money for improved seed, etc., and give them the produce if they do the operations needing the aid of bullocks. But in return for the money spent by Government, some small portion of the produce should be given to the students by the owner as an encouragement to boys working on the area. If this is brought into practice, there will be probably no difficulty to secure land for the school gardens and much of the time and energy of the agricultural teacher and Government money now spent on the plots can be utilised for other purposes in connection with agricultural classes for their further development. As every thing is in the initial stage and as the educational officers are not expected to realise these difficulties, the Inspector himself has to go into every detail and help the agricultural teacher in the work. It has therefore been necessary for the Inspector to arrange for close supervision and proper guidance. But as these classes are distributed all over the Presidency and as the number is increasing every year, it is not possible for one officer to devote sufficient attention to the training of boys and teachers in the agricultural schools, and at the same time supervise the work of the agricultural classes which latter absorb the major portion of the time of the Inspector, to the detriment of the more important duties in connection with the agricultural schools, for which the post was originally created. In order to cope with the work satisfactorily, more staff is necessary. The Senior Vernacular teachers working at the Agricultural Schools may be given as assistants to the Inspector, their pay being met from the Educational Department. For the present, two such assistants will suffice. If this is arranged, the genuine work of the agricultural schools can be properly developed and theory portion now taught can be brought into closer touch with practice by the introduction of seasonal time-table and devoting more attention to the practical working of students' societies, etc., formed for the purpose, and the training of students may thus be made more effective and of immediate use to their parents and the village public.

R. Y. HULKOTI,

Ag. Inspector of  
Agricultural Schools.

## APPENDIX S.

*Annual Report on the work of Land Development for the year 1924-25  
(year ending 30th June 1925).*

The post of Land Development Officer was sanctioned under Government Resolution No. 6489, dated 30th May 1923 for a period of one year in the first instance. But it could not be filled up for want of a suitable man till September 1924. This new branch of the Agricultural Department was opened on the 22nd of September 1924 when Mr. N. C. Bapat the present incumbent took charge of the post. The annual report therefore gives the progress of work for a period of 9 months and 9 days only.

Actual survey work was commenced from the beginning of December when surveyors were appointed. For the purposes of this report the work of surveying, drawing, estimating, etc., extends over a period of 7 months.

The jurisdiction of the Land Development Officer extends over the whole Bombay Presidency excluding Sind and he is given two surveyors for survey and other works of investigation as well as the clerical work in office.

*Schemes.*—There were in all 52 schemes of land development placed before the Land Development Officer for investigation up to the end of June 1925. Their distribution by districts is—Poona 9, Sholapur 18, Satara 4, Nasik 1, Ahmednagar 3, Khandesh East 2, Khandesh West 1, Kolaba 2, Canara 1, Belgaum 2, Dharwar 5, Ratnagiri 1, Thana 2 and Broach 1.

The classification of these schemes from an engineering point of view is as under :—

- |  |               |
|--|---------------|
| (a) Diverting streams by putting dams across<br>nalas or rivers for irrigation purposes ..                                   | Schemes—21    |
| (b) Storing water by putting dams across nalas or<br>rivers and distributing it by means of canals<br>for irrigation .. .. . | .. Schemes— 6 |
| (c) Storing water by means of dams and allowing<br>it to percolate through the sub-soil, into the<br>wells below .. .. .     | .. Schemes— 2 |
| (d) Field embankments (providing tals and<br>waste weirs) .. .. .  | .. Schemes—12 |
| (e) Protecting land from the scouring action of<br>the nala and making it culturable by means<br>of silt deposit .. .. .     | .. Scheme — 1 |
| (f) Making use of the sub-soil water in flow-<br>irrigation of lands falling below the subsoil<br>water-level .. .. .        | .. Scheme — 1 |
| (g) Making use of the subsoil water in feeding the<br>well under a pumping plant .. .. .                                     | .. Scheme — 1 |
| (h) Design for a well for mohot .. .. .  | .. Scheme — 1 |

- (i) Repairing an old tank and using it for irrigation purposes .. Scheme —1  
 (j) Irrigation by pumping .. Schemes—3  
 (k) Making use of the tail water of the Tata Hydro Electric Schemes, flowing through the Ulhas and Patalganga rivers, in developing lands .. Schemes—2  
 (l) Providing a protective bund to prevent damage of culturable land by sea .. Scheme —1

The distribution by districts of the schemes so classified is as given below :—

Class (a) Poona 3, Ahmednagar 3, Khandesh East 1, Khandesh West 1, Kolaba 1, Canara 1, Belgaum 2, Ratnagiri 1, Sholapur 2, Dharwar 5, Thana 1 ..	Total—21
„ (b) Poona 4, Satara 1, Sholapur 1 ..	„ — 6
„ (c) Nasik 1, Poona 1 ..	„ — 2
„ (d) Sholapur 12 ..	„ —12
„ (e) Sholapur 1 ..	„ — 1
„ (f) Satara 1 ..	„ — 1
„ (g) Satara 1 ..	„ — 1
„ (h) Sholapur 1 ..	„ — 1
„ (i) Sholapur 1 ..	„ — 1
„ (j) Poona 1, Khandesh East 1 and Satara 1 ..	„ — 3
„ (k) Thana 1, Kolaba 1 ..	„ — 2
„ (l) Broach 1 ..	„ — 1

*Stages in investigation of Schemes.*—The work of investigation has three stages. In the first stage the Land Development Officer visits the site to ascertain how far the scheme is feasible, the extent of work to be done, local conditions, etc. In the second stage survey with fly levels is made and the rough cost of the work as well as the probable area of land that will be developed are found out. And a rough picture of the whole state of things concerning the scheme is placed before the parties concerned. This helps them in arriving at a decision whether or not the scheme should be carried out. In the third stage, detailed survey, drawing and estimating works are carried out. All schemes excepting very small ones such as field embankments, have to go through all these three stages.

*Progress of work.*—Up to end of June 1925 eleven schemes were completely investigated and surveyed and the disposal of papers concerning the same is made. The area of lands expected to be developed by them is about 300 acres. Six schemes have gone through the 2nd stage. The area expected to be developed by them is about 6,000 acres. Six more schemes have partly gone through the second stage. They cover an area of about 3,000 acres (survey of these schemes is made and drawing and estimating work is being done in office). Three schemes, on visiting the site were found to be purely pumping schemes and hence they were handed over to the Agricultural Engineer who deals with such cases. In

addition to the work described above nine schemes have gone through the first stage only.

Besides the work of schemes, advice on engineering matters in agricultural work was given in three cases.

The work of land development cannot be measured by the number of schemes some of which are so big that each will take more than six months of the whole staff including the Land Development Officer to make detailed investigation, survey, drawings and estimating; and some are so small that the whole work of each can be done in a week.

The Land Development work is expected to give such results which will give direct benefit to the Agriculturists concerned. Any scheme successfully carried out will remain as a monument of the department in general and of this line in particular before the eyes of the present and the future generations. And it is hoped that this branch when fully developed, will stand in the front rank in all the branches through which the activities of the Department are felt.

We must work and patiently watch the results.

N. C. BAPAT,

6th July 1925.

Land Development Officer, Poona.

## APPENDIX T.

SUMMARY OF WORK OF AGRICULTURAL PROPAGANDA IN NORTH  
& MIDDLE SIND UNDER THE ASSISTANT REGISTRAR OF  
CO-OPERATIVE SOCIETIES IN SIND.

I have the honour to submit a brief report on the progress of Agricultural Propaganda work in Sind for the 12 months ending 31st March 1925.

I remained in charge of the work for the entire period and the area of operations also continued to be the same 8 talukas as last year, *Viz.* :—

*North Sind* :—(1) Larkana, (2) Kambar, (3) Ghotki, (4) Sukkur.

*Middle Sind* :—(1) Hyderabad, (2) Halla, (3) Tando Allahyar, (4) Shahdadpur.

*Propaganda Staff.*

During the course of the year Mr. Abdul Rahman Agricultural Inspector Middle Sind was transferred to the Agricultural Department proper, and no substitute was appointed in his place. Mr. Mahomed Bux, a senior District Agricultural Overseer of Middle Sind, has been in charge of the work in addition to his own duties and the entire personnel for Agricultural Propaganda work is therefore as under :—

*North Sind* :—Mr. Lokram Agricultural Inspector ; and three District Agricultural Overseers.

*Middle Sind* :—Three District Agricultural Overseers only. One of them Mr. Mahomed Bux being in charge Agricultural Inspector.

*Programme of work.*

The following was the programme of work during the year :—

1. To popularize and distribute approved varieties of seed.
2. To popularize approved Agricultural Implements.
3. To propagate modern methods of farming.

During the year under report, however, there was one special facility, *viz.*, that much of the propaganda work was carried on through the agency of the Taluka Development Associations which have been organized in all the 8 talukas of the propaganda area.

*Part I* :—*Popularization and distribution of approved varieties of seed.*

*(a) Pusa 12.*

About 700 maunds of this variety of wheat had been purchased from the Jacobabad Farm and 1,570 maunds from the Sukkur District, and the entire quantity was distributed in the four talukas of the propaganda area in Upper Sind. About 400 maunds were also distributed in talukas Halla and Hyderabad of Middle Sind. In all, therefore, about 2,670 maunds of Pusa 12 were distributed in the propaganda area during the last Rabi season over and above the quantity sown by the zamindars out of their own stock of seed. The corresponding figure of distribution of Pusa 12 in 1923 is 1,000 maunds, *i.e.*, the quantity distributed has doubled itself in the course of one year. There has likewise been a

commensurate increase in the voluntary sowings of Pusa 12 among the zamindars. Several zamindars having appreciated the value of this wheat grow it of their own accord and preserve their own stock of seed for further multiplication.

As regards the area grown under Pusa 12 the figures obtained show a very satisfactory progress. In 1923 the area was about 5,000 acres only, while in the last Rabi of 1924, the estimated area under Pusa 12 was nearly 14,000 acres in North Sind alone, as detailed below :—

1. Taluka Ghotki	..	..	4,000 acres.
2. Taluka Sukkur	..	..	2,500 „
3. Taluka Larkana	..	..	1,000 „
4. Non-intensive talukas in Upper Sind	..	..	6,500 „
			Total .. 14,000 „

The above particulars show that while the demand of Pusa 12 seed has more than doubled in one year the area sown under it has nearly trebbled.

The prolonged inundation of 1923 gave little chance of recuperative aeration to the Rabi lands and the complete absence of rains during the last cold weather coupled with late frost from 15th to 25th February last, when the wheats were in the sheath or flowering stage damaged the crops to a great extent. The abundance of underground moisture however gave a fine start and growth to the crops and their immunity from rust or any other disease gave somewhat a fair yield and as the surviving crops fetched good prices in the market the agriculturists have no cause to complain about their wheat crop.

*Position of Pusa 12 wheat in Sind.*

The general opinion about Pusa 12 wheat is that it thrives very well in irrigated lands. In Kacha lands too it has given very good results where the underground moisture is ample. As for Bosi lands and those Kacha lands where there is not enough of sub-soil moisture, Pusa 12 cannot generally thrive so well. This fact was duly brought to the notice of the Deputy Director who is carrying on experiments to see if the complaint could be remedied.

While the success of Pusa 12 wheat from the point of yield under Bosi conditions is still a matter of controversy and experiment, its superiority in quality, tastefulness, high market value, early ripening and immunity from rust can never be gainsaid.

*(b) Cotton Seed Distribution.*

27 W. N. cotton seed not being available for distribution in the Kharif of 1924, I had to content myself with the Bhitshah variety only, about 2,000 maunds whereof had been purchased and distributed in the four talukas of the propaganda area of Middle Sind. The seed has given much appreciation to the zamindars. The gineries pay a premium of Re. 1 to Rs. 2 per maund of this variety. It has besides a ginning percentage of about 40 and yielding quantities higher than the ordinary Sindhi cotton. There is, besides, a saving in the seed rate also of about 20 lbs. per acre. During the present Kharif therefore the



demand for our seeds rose considerably and in all about 2,800 maunds both Bhitshah and 27 W. N. were distributed.

While inspecting cotton crops 'Bokhro' and 'wilt' disease were observed in several places and suggestions given to the zamindars how to avoid them. In many places the attacked plants were advised to be removed and burnt.

*Part II:—Demonstration and sale of improved implements.*

Demonstrations of Agricultural implements were, as usual, carried on with the Associations' pairs of bullocks at the fields of the zamindars and the popularity which our implements have acquired could be gauged from the following sales effected :—

Egyptian plough	.. 502	Archmedian Screw lifts	.. 25
Raja plough	.. 8	Monsoon ploughs	.. 13
Scrapers	.. 6	Meston ploughs	.. 36
Chaff Cutters	.. 3	Cambridge Rollers	at
Heavy Clod Crushers	.. 2	Rs. 150 each	.. 2

Plots were besides ploughed on rent at Rs. 2 per acre with the Egyptian plough, and Rs. 4 per acre with the Raja plough. In North Sind alone 400 acres were ploughed partly gratis for demonstration purposes and partly on rent. The amount of rent realized was Rs. 375 which was credited to the accounts of the Taluka Development Associations concerned. The system of thus ploughing up the zamindars' plots on the spot has the double advantage of giving them a first hand idea of the superiority of the Departmental ploughs on the one hand and showing them the advantage of Hot and Cold weather ploughing on the other.

In the course of their tour the Agricultural Inspectors and Overseers inspected the stock of ploughs and other implements supplied at various places and every attempt was made to execute repairs that were necessary and solve any doubts or difficulties that were experienced in the actual working of the implements.

*Part III:—Popularization of modern methods of farming.*

(a) *Drill system.*

Cotton cultivation is a speciality only of Middle Sind, and with a view to popularize the Drill System of cotton cultivation there the following number of plots were secured on the Zamindars' lands and cultivated on this system under the direct supervision of the Agricultural Inspector and Overseers :—

Taluka,	No. of plots drilled,	Acres,
Hyderabad .. ..	2	4
Shahdadpur .. ..	2	4
Tando Allahyar .. ..	4	8
Halla .. ..	5	7
Total .. ..	13	23

The plots were mostly intercultured twice with the Egyptian plough and this has saved the Agriculturists the time and labour usually spent on hoeing, and they therefore appreciated it very much. Some of the most advanced zamindars in cotton cultivation have furnished very good certificates about the superiority of the Drill system and these are available on our record. Apart from the saving effected in time and labour ordinarily spent on hoeing, it has also been found that the growth of the drilled cotton is much quicker and vigorous than that of cotton sown under ordinary conditions.

(b) *Practical demonstrations in rice plots.*

With a view to bring home to the Agriculturists the superiority of improved methods of farming in Rice cultivation 60 plots of flow land were secured from the zamindars in Larkana and Kambar talukas and arrangements made for their cultivation to demonstrate the following points of advantage:—

1. Economy in seed rate.
2. Early transplantation.
3. Bengal variety (dadkani) *versus* local variety.
4. Dry ploughing *versus* "Daph".

*Points 1 and 2.*—Good many zamindars in Larkana and Kambar talukas have adopted these improvements (1 and 2) wholesale. Certificates of some of the most prominent zamindars have been obtained which eloquently speak about these improvements. With regard to the economy in seed rate, the fact has been established that while the usual seed rate of rice is one maund per acre, the areas grown with half that rate, *i.e.*,  $\frac{1}{2}$  maund per acre have given equally good results. As for earlier transplantation of seedlings also, it has been found that if seedlings are sown before the inundation on the existing wells or on the banks of the main canals, at least 25 per cent. of the total area could be sown about 25 days earlier than usual. This 25 days earlier transplanting has been actually found to have remarkable effect on the yield to the extent of almost doubling it up.

*Point 3—Dadkani variety of Bengal rice.*—This variety of rice has continued to be appreciated in the low lands in particular. Grown under right conditions, it gives better yield and better price than the ordinary rough varieties of "Thorh" and "Larhi".

*Point 4.*—As regards this point, *viz.*, Dry ploughing *versus* 'Daph' the usual practice in Larkana and Kambar Talukas is to irrigate the rice land and then plough it. This process is called 'Daph', which is indeed a primitive method. Rice lands ploughed up in the dry condition a few months before sowing has been found to give better yield. Some plots were actually obtained from zamindars and ploughed up in dry condition and the results having been very satisfactory good many zamindars

are now actually insisting upon their Haris to adopt the system on pain of dismissal.

*Part IV. Taluka Development Associations.*

The Taluka Associations organized in the 8 talukas of the propaganda area did much useful work during the year and have proved themselves very useful organizations in carrying through the programme of intensive propaganda work.

The number of subscribers of the Associations has more than doubled during the year, having reached 2,492 as against 1,128 in the preceding year. Their total contributions during the year aggregated Rs. 5,163 and the amount was supplemented by a Government subsidy of Rs. 5,150 which though sanctioned during the year could not actually be disbursed before the 1st of June last.

The Associations are managed by select and competent bodies of leading persons of the talukas concerned who take great interest in them. They often go out in the villages to look into the condition of the people and the taluka. All the Associations maintain a well paid staff of their own consisting of a Supervisor and a Kamgar, who do regular tour, visiting Co-operative Societies and carrying on Agricultural Propaganda among them.

**SEED DISTRIBUTION AND SUPPLY BUSINESS BY THE ASSOCIATIONS.**

Three out of the four Associations of Upper Sind, viz., Ghotki, Sukkur and Larkana distributed about 2,270 maunds of Pusa 12 during the last Rabi. Kambar taluka being purely rice growing, no Pusa 12 was distributed in it. The four talukas of Middle Sind grow only cotton. About 2,000 maunds of Bhitshah cotton seed were distributed therein as there was no 27 W. N. seed available last year.

The Hyderabad and Tando Allahyar Associations have gone a step further and supplied Agricultural requisites to members to the extent of Rs. 20,000. The experiment having been well appreciated by the people, steps are being taken to organize Supply Societies.

*Implements.*

Each Association maintains a Depot of implements wherefrom implements are issued both on hire and sale. Rent realized during the year was Rs. 350 and the implements sold are already given in the report.

*Seed Societies.*

In order to relieve the Taluka Development Associations of their seed business, Seed Societies have been organized in six out of the eight talukas

of the propaganda area, *viz.*, Sukkur, Ghotki, Larkana and Kambar in Upper Sind and Hyderabad and Tando Allahyar in Middle Sind. They are doing well and the last year almost whole of the seed distribution business was carried on through the Seed Societies.

AZIMKHAN INAYATALIKHAN,  
Assistant Registrar, Co-operative Societies, Sind.

**List of Agricultural Bulletins published by the Department  
of Agriculture and kept for Sale at the Government  
Book Depot, Bombay.**

No.	Year.	Subject.	Price. Rs. a. p.
32	1908	Locusts in India, by H. M. Lefroy, Imperial Entomologist, Pusa	0 8 0
33	1909	Cultivation of Broach Cotton in Dharwar, by M. L. Kulkarni, Divisional Inspector of Agriculture, S. D.	0 4 0
"	"	(Kanarese)	0 4 0
34	1909	Night-soil—A Valuable Manure, by G. K. Kelkar, Assistant Professor of Agriculture, Agricultural College, Poona	0 4 0
35	1909	Kalar in Sind, by G. S. Henderson, Deputy Director of Agriculture, Sind	0 4 0
36	1910	First Experiments in the Treatment of Grape-Vine Mildew in the Bombay Presidency, by W. Burns, Economic Botanist	0 14 0
37	1910	An Examination of the Seed-Supply of the Broach District, by G. D. Mehta	0 4 0
39	1910	The Salt Lands of the Nira Valley, by Harold H. Mann, Principal, Agricultural College, Poona, and V. A. Tamhane, Laboratory Assistant, Agricultural College, Poona	0 5 0
40	1911	The Cultivation of Guavas near Poona, Dharwar and Limbgaon	0 12 0
41	1911	Groundnuts in the Bombay Deccan	0 4 0
43	1911	An Examination of the Seed-Supply of the Broach District, Part II	0 5 0
44	1911	Preliminary Study of the Red Rot of Sugarcane in the Bombay Presidency	0 8 0
45	1911	Second Year's Experiments in the Treatment of Grape-Vine Mildew in the Bombay Presidency	0 14 0
46	1911	Seed Selection Series I, Broach Cotton	0 8 0
47	1911	San Herap	0 4 0
48	1911	Poona Furnace (Marathi)	0 7 0
"	"	"	0 6 0
49	1911	An Examination of the Seed-Supply of the Ahmednagar District, Part I	0 5 0
50	1912	An Examination of the Seed-Supply of the Ahmednagar District, Part II	0 3 0
51	1912	Third Year's Experiments in the Treatment of Grape-Vine Mildew	0 3 0
52	1912	Muscovado Sugar Machinery and its scope for Gul Manufacture in India	0 8 0
53	1912	A Method of improving the Quality of Cotton Seed	0 7 0
55	1913	An Examination of the Seed-Supply of the Poona District	0 3 0
57	1913	Improvement of the Indigenous Plough of Western India	0 12 0
59	1914	Common Salt and its use as Manure in the Konkan Division	0 3 0
62	1914	The Value of Castration of Deccan Bullocks	0 3 0
63	1914	Substitutes for Rab	0 3 0
64	1914	Alkali or Kalar Experiments and Completion Report of Daulatpur Reclamation Station in Sind	0 14 0
65	1914	A list of diseases of Economic Plants occurring in the Bombay Presidency	0 4 0
67	1914	An Examination of the Seed-Supply of the Sholapur District	0 3 0
69	1915	The Rice Stem Borer in the Konkan	0 3 6
70	1915	Improvement of Cotton in the Bombay Presidency (except Sind)	0 3 6
74	1915	Well Waters from the Trap Area of Western India	0 6 0
78	1916	Some wild fodder plants of the Bombay Presidency	0 13 0
79	1916	The Cultivation of Guavas in Gujarat	0 5 6
80	1916	List of Seeds available on the Agricultural College Farm, Poona	0 5 3
81	1916	Note on Fencing Construction	0 6 9
82	1916	Cultivation of drilled paddy in South Bombay Presidency	0 8 0
83	1917	The Spice Gardens of Sirsi in Kanara	0 10 6
84	1917	Seed Selection Series—Kumpta Cotton	0 1 0
85	1917	Note on Cattle in the Bombay Presidency	0 11 0
86	1917	Establishment and Management of the Dairy Farm	0 7 0

No.	Year.	Subject	Price. Rs. a. p.
87	1918	The Utilisation of Inferior Grass Herbage, Experiments at the Tegur Cattle Farm .. .. .	0 9 0
88	1918	First Report on Fruit Culture as practised round about Tharushah (Sind) in Nawabshah District .. .. .	0 2 0
89	1918	Artificial Manures: Experiments on their value for crops in Western India .. .. .	0 3 3
90	1918	Work on the Manjri Farm for the years 1915-18 .. .. .	0 7 3
91	1919	The Cultivation of Berseem in Sind—Experiments at Sukkur .. .. .	0 1 0
92	1919	Classification and Description of the Jowars of the Bombay Karnatak .. .. .	0 10 3
93	1919	Palm Gul Manufacture in the Bombay Presidency (Principally Date Plum) .. .. .	1 3 9
94	1919	The Sugarcane Borer and its Control .. .. .	0 4 3
95	1919	The Cultivation of Oranges and Allied Fruits in the Bombay Presidency .. .. .	0 2 6
96	1920	Investigations into the nature of the Salt Lands of Sind .. .. .	0 12 0
97	1920	Prickly-Pear as a Cattle Food .. .. .	1 4 0
98	1920	Fruit Culture as practised near Shikarpur, Sind .. .. .	0 1 6
99	1920	Rice Cultivation in the Larkana District, Sind .. .. .	0 8 0
100	1920	Fodder Crops of Western India .. .. .	2 1 0
101	1920	Fruit Culture in Palitana and Jamnagar .. .. .	0 8 6
102	1920	Investigations on Potato Cultivation in Western India .. .. .	1 15 0
103	1920	The Book of the Mango .. .. .	3 5 0
		(Marathi) .. .. .	
104	1920	The "Ganeshkhind" Botanical Garden, Kirkee (Its Genesis and Development) .. .. .	0 15 6
105	1920	The Groundnut Bug and its Control .. .. .	0 2 0
106	1920	Dharwar American Cotton: Its History, Cultivation and Improvement .. .. .	0 7 0
107	1921	Gonag—a weed in drilled paddy .. .. .	0 5 0
108	1921	Summary of the Work done on Jalgaon Farm .. .. .	0 5 6
		(Marathi) .. .. .	
109	1921	The Crops of the Bombay Presidency—their Geography and statistics .. .. .	2 13 0
110	1922	Year Book of the Agricultural Department in the Southern Division .. .. .	0 5 0
111	1923	A Note on Well Boring .. .. .	0 8 0
112	1923	Improvement of Grazing Areas in the Bombay Presidency .. .. .	0 11 6
113	1923	Year Book of the Agricultural Department in Sind Division .. .. .	0 4 6
114	1923	Studies on the Rice Plant and on Rice Cultivation .. .. .	0 4 0
115	1924	Shevri as a Fodder Crop .. .. .	0 3 0
116	1924	Sugar Industry in Western India and methods of Sugar Manufacture .. .. .	1 2 0
117	1924	Investigations in Fig Culture and Treatment .. .. .	0 5 6
118	1924	Land Crabs as Agricultural Pests in Western India .. .. .	0 8 0
119	1924	Year Book of the Agricultural Department in Southern Division .. .. .	0 4 6
120	1924	Slage for fodder in Western India .. .. .	0 4 0
121	1924	Further Investigations on Potato cultivation in Western India .. .. .	0 6 0
122	1925	Sugarcane Varieties of Bombay Presidency, India .. .. .	0 2 6
72 of 1915	(Revised 1925)	Experiments with the Automatic Water Finder in the Trap Region of Western India .. .. .	0 4 0
123	1925	Ridge cultivation in Lower Gujarat .. .. .	0 8 0
124	1925	The Chemical Composition of the Food Grains, Vegetables and fruits of Western India .. .. .	0 3 6
125	1925*	Some of the promising exotic sugarcane varieties of the Manjri Farm .. .. .	
126	1925*	The Bhagnari Breed of Cattle in Sind and Baluchistan .. .. .	

\*In the Press.