



GOVERNMENT OF BOMBAY

Annual Administration Report
of the
Department of Agriculture
for the Year 1959-60

(From 1st July 1959 to 30th April 1960)

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This is the last Annual Administration Report of the erstwhile Bombay State and has been written in accordance with the orders contained in Government Resolution, General Administration Department, No. ADR-1060-B, dated the 15th September 1960. The report has been presented in two parts—Part I for the Maharashtra Region and Part II for the Gujarat Region of the Bombay State—for the period from 1st July 1959 to 30th April 1960 when the State was bifurcated to form the present Maharashtra and Gujarat States.

Both of the parts have been written on the hitherto accepted pattern comprising Chapters and Appendices. When, however, specific information to form some Chapters or Appendices in Part II was not available, those Chapters and Appendices have not been included in that part of the Report. Accordingly, Chapters on Sugarcane Research, Dry Farming Research and Administration & Finance, and Appendices in respect of the Agronomist, the Economic Botanist, the Horticulturist, the Millet Specialist, the Research Engineer, the Rice Specialist, the Soils Specialist, the Sugarcane Specialist and the Wheat Specialist, Department of Agriculture, Bombay State, have been excluded from Part II for the Gujarat Region. The material required for the Chapter on Seed Distribution as in Part I has been included in the Appendices reporting the work done under the Superintending Agricultural Officers, Ahmedabad and Rajkot Divisions in the Gujarat Region.

PART I
MAHARASHTRA REGION

**ANNUAL ADMINISTRATION REPORT OF THE DEPARTMENT
OF AGRICULTURE FOR THE YEAR 1959-60**

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CHAPTER I

THE SEASON, STATISTICS AND LEGISLATION

1. AGRICULTURAL SEASON

The season of 1959-60 was unfavourable to both the *kharif* and *rabi* crops over most of the State. The monsoon set in somewhat late but adequate rains were generally received in the State by the end of June and the sowing of *kharif* crops were in full swing. In July, heavy rains were recorded over many parts causing damage, to some extent, to the young standing crops and to the seedlings particularly in the low lying areas in the State. In the second fortnight of September and in the first fortnight of October, with solitary exception of Poona Division, there were unprecedented heavy floods in parts of all the divisions of the State, where damage to varying extent was caused to crops, life and cattle wealth. The situation, however, improved to some extent subsequently due to fair weather conditions. There were heavy showers accompanied by hailstorms in parts of all the divisions of the State during the months of January and March. Consequently damage to varying extents, was caused to the *rabi* crops, and to the orchards in parts of the divisions.

The climatic conditions experienced during the year were conducive to the development of insect pests and plant diseases, which caused damage to the crops. The control as well as preventive measures resorted to in time in the affected areas, however, saved the situation to a large extent.

(a) *Bombay Division*.—The monsoon commenced towards the end of June and sowing of *kharif* crops was generally in progress. Substantial rains were received during the months of July and August. In parts of West Khandesh and Nasik district, sowings were retarded and the crops already sown suffered for want of adequate soil moisture. In the second fortnight of September, in West Khandesh district there were heavy and unprecedented floods as the river Tapi was in spate. Consequently, extensive and heavy damage to cotton, groundnut, sugarcane, banana and other crops and to the cattle wealth was caused in several villages in Nawapur taluka of West Khandesh district.

On the other hand, the rainfall received during the month was below the requirement in Malegaon and Nandgaon talukas and the eastern part of Niphad taluka of Nasik district. Again in the first fortnight of October, there were continuous rains in West Khandesh district which caused further damage to crops and

livestock as the river Tapi was again in spate. The break of rains during the subsequent period improved the situation in the flood affected areas. There were hailstorms in parts of West Khandesh district during January and again in March, where standing and harvested crops were damaged to some extent.

(b) *Poona Division.*—The monsoon set in as late as last week of June and sowing of *kharif* crops was delayed. In July and August, there were continuous rains in North and South Satara and Kolhapur districts and break in rains was needed for the healthy development of crops. Crops in the low lying areas were damaged during the first week of August by floods in parts of Kolhapur district. Rainfall during these two months, on the other hand, was scanty in Sholapur and Ahmednagar districts and also in the eastern parts of Poona district where crops suffered due to lack of soil moisture. In September, fairly good rainfall was recorded in the division and the crops thrived satisfactorily except in the eastern part of Poona district where there were inadequate rains and sowing of *rabi* crops was retarded. The weather condition during the subsequent months was favourable and the *kharif* as well as the *rabi* crops thrived well.

(c) *Aurangabad Division.*—The monsoon started late but adequate rainfall was recorded at most of the places in the division and as such sowings of *kharif* crops were generally in progress. By the end of September, sufficient rainfall was received all over the division. In parts of East Khandesh and Nanded districts there were heavy rains during the months of August, September and the first fortnight of October. These rains proved detrimental to the general stand of the crops. Especially in the third week of September, there were heavy rains in East Khandesh district, all the rivers were in floods and caused damage to fields and the crops in the low lying areas and also to human life, property and cattle wealth to a varying extent. The situation, however, improved subsequently due to favourable break in rains. Normal weather conditions prevailed from November to March in the division except for East Khandesh district where there were heavy showers accompanied by hailstorms in January in parts of Erandol, Amalner and Jalgaon talukas and standing crops were damaged to a considerable extent.

(d) *Nagpur Division.*—The monsoon set in late. Adequate rainfall was, however, recorded towards the end of June in the division except in Akola and Bhandara districts, where sowing operations were retarded for want of adequate rains. Orange crop was considerably damaged due to heavy showers received towards the end of May, which caused shedding of flowers to a large extent

in orange growing districts of the division. Rainfall received in the months of July and August was adequate except in Amravati, Yeotmal and Bhandara districts where it was heavy and proved to be excessive. The monsoon took a furious turn in September and there were torrential rains during the first three weeks, all over the division. All the rivers were in floods and heavy damage was caused to cotton, *tur* and *kharif jowar* crops. The crops in the low lying areas were washed away while those in the heavy soil started rotting, due to over saturation of moisture in the soil in parts of Buldana, Akola and Chanda districts. Crops in the other districts of the division suffered in growth and turned yellowish due to excessive soil moisture. During the months of October, November and December, the condition of *kharif* crops in general improved to some extent, while the young *rabi* crops progressed satisfactorily. In January, there were hailstorms in the division. Consequently shedding of cotton bolls and damage to standing crops, to some extent, was caused in parts of Akola district. Standing *rabi* crops and harvested *tur* crop were damaged, to a large extent also in parts of Amravati district, in Warora *tahsil* of Chanda district, and in parts of Yeotmal *tahsil*. Standing *kharif* and *rabi* crops were adversely affected in parts of Wardha district. *Jowar*, linseed and *lakh* crops were considerably damaged by untimely rains in parts of Nagpur and Bhandara districts. There were thunder showers accompanied by hailstorm in parts of Buldana, Akola and Nagpur districts and unseasonal rains in parts of the other districts in the division, in March. Consequently slight damage to orchards and harvested crops lying on the threshing yards was caused.

2. AGRICULTURAL STATISTICS

The work done in the branch is briefly described in the following paragraphs under four heads *viz.*, (A) Crop estimation and other ad-hoc surveys (B) Design of experiments (C) Collection, compilation and publication of agricultural statistics and (D) other miscellaneous activities.

(A) Crop estimation surveys

The Statewide crop estimation surveys on six food crops *viz.*, paddy, *bajri*, *kharif jowar*, *rabi jowar*, wheat and gram, and on three non-food crops *viz.* cotton, groundnut and tobacco were continued. The survey was also continued on *ragi* in the district of Ratnagiri, on *tur* in the Vidarbha districts and on canal irrigated crops *viz.*, paddy, *bajri*, *rabi jowar*, and wheat in the major canal areas of the Deccan. Pilot surveys on non-food crops *viz.*, sesamum and linseed were undertaken as shown against them.

- | | | |
|------------|-----|---------------------|
| 1. Sesamum | ... | West Khandesh |
| 2. Linseed | ... | Osmanabad and Bhand |

The survey estimates of the average yield per acre were as under.

Crop		Average yield in lbs. per acre
Rice	...	889.5
<i>Bajri</i>	...	268.0
<i>Kharij jowar</i>	...	473.5
Groundnut	...	567.1
Cotton (lint)	...	46.9
Tobacco	...	546.2
<i>Rabi jowar</i>	...	410.4
Wheat	...	369.2
Gram	...	271.2
<i>Tur</i> (for Vidarbha only)	...	643.6

The average yield of *ragi* was estimated at 593.9 lbs. per acre for Ratnagiri district.

The survey estimates of average yield per acre of the irrigated crops in Deccan canal tract for the year under report are as follows.

Crop		Average yield in lbs. per acre
Rice	...	597.1
<i>Bajri</i>	..	392.4
Wheat	...	613.6
<i>Rabi jowar</i>	...	771.8

The above average yields being estimated from relatively small number of plots are subject to considerable sampling errors. In all, 34 plots, accounting for 3.6 per cent of the total number of plots surveyed, were supervised by the technical staff of the Statistics.

Section at the time of harvest, while an additional 803 plots i. e. 8.6 per cent. were supervised by other agencies.

Ad-hoc sample surveys

(a) *Crop estimation surveys on banana, onion and grape.*—The survey on banana in East Khandesh district was continued. The scope of the survey was extended to cover one more district viz. Thana where the crop is grown on a large scale.

The estimates of average yield per acre worked out for grape and *kharif* onion crops are presented.

District	Crop	Average yield in mds. per acre.	S. E.	% S. E.
1	2	3	4	5
Nasik	... Grape	128.8	8.7	6.8
Nasik	... <i>Kharif</i> onion	121.3	13.0	10.7

(b) *Survey for estimation of yield and cultivation practices of orange in Vidarbha region.*—The survey for the estimation of yield and collection of information on cultivation practices of orange was continued during the year in the four orange growing districts of Vidarbha region. The report for the survey for 1958-59 submitted to Government contains estimates of area, average yield and production, ancillary information on cultivation, manurial practices and of incidence of pests and diseases. During the *Mrig Bahar* of 1958-59, the average number of fruits per bearing tree was estimated at 275 and the average weight was 38.45 *seers*. The total production was estimated at 46,496 tons with a sampling error of 7.6 per cent. The analysis of the data of the survey of 1959-60 was in progress.

(c) *Pilot survey on sugarcane.*—During the year, a pilot survey for the estimation of production of sugarcane was conducted in the three important cane growing talukas of Osmanabad, Kallam and Latur of Osmanabad district. The average yield of cane was estimated at Rs. 31.9 tons per acre with a sampling error of 9.2 per cent. The cane to *Gur* ratio was estimated at 11.11 per cent.

(d) *Combined scheme for correct estimation of area under and production of coconut and arecanut in Bombay State.*—During the year under report, 95 villages for coconut and 65 villages for areca-

nut were selected for conducting crop cutting experiments, while 135 and 95 villages respectively were selected for area enumeration.

The harvesting of arecanut in the selected clusters was over while that of coconut was nearing completion. The recording of area under these crops, in the selected villages was in progress. From the preliminary statistical analysis of the yield data of arecanut, the average yield of dried unhusked arecanut was estimated at 2.6 lbs. per tree.

(e) *A pilot survey to ascertain the extent and causes of fallow area in Bombay State.*—During the year, the statistical analysis of the data collected from the survey, conducted in Kolaha district during 1958-59 was carried out. The main conclusions are as follows.

A study of fallow areas, (i) recorded by the field staff and (ii) that recorded by the *talathis* and (iii) cultivable area showed that there was high correlation of 0.94 between (i) and (ii) and 0.86 between (i) and (iii).

Using the ratio method of estimation, the estimated area under fallows, when corresponding *talathis*' area under fallows was used as an auxiliary variate, was 2,82,315 acres with a sampling error of 5 per cent as against the official area of 3,29,677 acres. The difference between the survey estimate and the official area is 16.7 per cent and it is significant. The estimated area was classified into (i) current fallows, (ii) other fallows and (iii) culturable waste. It worked out to 2 per cent, 11 per cent and 87 per cent respectively under above three categories, while the corresponding official estimates were 12 per cent, 66 per cent and 22 per cent. This suggests that the classification of the fallows by the reporting agency under different categories was rather arbitrary. The causes for keeping the lands fallow are mentioned in the report submitted to Government.

(f) *Scheme for collection by sampling of data on cultural and manurial practices adopted by the cultivators in Bombay State.*—The compilation and statistical analysis of the data collected during 1958-59 in the three districts *viz.*, Ratnagiri, Sholapur and Poona were carried out in respect of size and mode of operational holdings, extent of area irrigated and percentage of area covered by manures. The results of the analysis are summarised below.

The size of the holdings was determined on the following basis.

Acres	Size
Upto 5.0	Small
Upto 10.0	Medium
Above 10.0	Large

(i) The distribution of holdings in different size groups reveals that the percentage of small sized holdings is high in the district of Ratnagiri being 69.1 while the percentage of large sized holdings is high in Poona and Sholapur being 41 per cent and 63 per cent respectively. (ii) The area covered by large sized holdings is over 60 per cent in Sholapur, Poona and Ratnagiri districts. (iii) The classification of holdings according to the different forms of tenancy namely entirely owner cultivated, entirely leased or tenant cultivated and partly owned and partly leased, reveals that the percentage of entirely owner cultivated holdings is quite high, viz., over 80 per cent in Sholapur and Poona districts, while it is comparatively low being only 61 per cent in Ratnagiri district. (iv) The cropped area brought under irrigation was 9.6 per cent in Poona and about 11 per cent in Sholapur district. (v) A study of the percentage of manured area to the total cropped area, that of irrigated manured area to the total irrigated area, and of unirrigated manured area to the total unirrigated area, shows that the extent of total area manured varied from 9 per cent in Sholapur to 25 per cent in Ratnagiri district. The irrigated manured area was 42 per cent in Sholapur district and 52 per cent in Ratnagiri district.

(g) *Scheme for rationalised supervision of the crop acreages recorded by the Patuaris by the superior officers of the Revenue Department.*—The survey was continued during the *kharif* and *rabi* seasons of 1959-60 in the entire State. In all, 3,572 and 3,015 villages were planned for the survey during the *kharif* and *rabi* seasons respectively. The scrutiny and analysis of the data received so far are in progress. An independent supervision by the Statistical staff was carried out in 63 villages situated in nine districts of the State. The analysis of the data showed that the area under principal crops as recorded by the *talatis* and noticed by the statistical staff agreed closely and the two sets of figures varied within 2 to 5 per cent for different crops.

Independent estimates of area under principal crops for a few districts, based on the area reported by the supervising officers during 1958-59 were also worked out. The results indicated that it was possible to estimate the area under principal crops with a high degree of precision at the district level well in advance of the availability of actual acreage figures provided the returns are received in time.

(h) *Assessment of additional production of paddy due to Intensive Method of Cultivation.*—The sample survey for assessing the additional production of paddy due to intensive method of cultivation was continued during the year in 26 blocks covering 14 districts. Of these, 20 blocks were in the Maharashtra region. The prelimi-

nary analysis of the data in respect of 19 blocks in the Maharashtra region indicated that the additional yield of paddy was 9.10 B. Mds. per acre with a sampling error of 2.7 per cent.

(i) *Assessment of additional production due to various Grow More Food measures.*—A scheme to assess the additional production of crops due to various Grow More Food measures was sanctioned during 1959-60 and the following sample surveys were carried out.

(i) Assessment of production of paddy in the reclaimed 'khar Lands' of Kolaba district.

(ii) Assessment of increase in yield of *bajri* due to canal irrigation in the area covered by the Nira Left Bank Canal; and

(iii) Assessment of increase in yield due to improved seed over the local seed of paddy in Bhandara district.

The main findings of the surveys are as follows.

(i) The average yield of the paddy (dry produce) in the reclaimed *khar* lands of Kolaba district was estimated at 1,125.9 lbs. per acre with a standard error of 85.2 lbs. per acre or 7.6 per cent and the total production of 16,891 tons with a standard error of 1,278 tons.

(ii) The average yield of irrigated *bajri* was estimated at 354.9 lbs. per acre with a standard error of 53.9 lbs. per acre or 11.0 per cent. The average yield of unirrigated *bajri*, based on the crop estimation survey in Baramati and Indapur talukas through which the canal runs, is estimated at 134.2 lbs. per acre.

(iii) The average yield (dry produce) of improved seed of paddy worked out to 2,583.1 lbs. per acre as against 2,299.7 lbs. per acre of the local seed. Thus, the improved seed of paddy yielded 283.4 lbs. per acre more than the local seed with a standard error of 33.9 lbs. per acre or 13.7 per cent.

(B) *Design of experiments*

During the year under review, 103 new layouts were given and 161 plans of experiments undertaken on Agricultural Research Stations were scrutinised. The data of 73 experiments were analysed and collection of the data of experiments conducted for three or more years was carried out and twelve statistical reports were

presented to the Technical Committees of the Department. The important conclusions embodied in the above reports are summarised below.

(a) *Experiments to study the effect of time and method of application of sulphate of ammonia on the yield of kharif jowar.*—The experiment was conducted at the Agricultural Research Station, Jalgaon. From the pooled analysis of the four years' data, it is seen that yields due to broadcasting as well as drilling the nitrogen dose were about the same, while the yields obtained due to split application of N were significantly higher than whole dose application by 129 lbs. per acre. The yields obtained by broadcasting the whole dose, 15 days before sowing, yielded significantly lower as compared to other four methods by 197 lbs. per acre.

(b) *Experiment to study the effect of application of nitrogenous fertilisers in split doses at different times on the yield of cotton.*—The experiment was conducted at the Agricultural Research Station, Nanded, with cotton variety *Gaorani-6*. On the average of three years' data, it is found that 12" and 18" spacing between rows have given significantly higher yield than 24" by 23 lbs. per acre (or 18 per cent) and 35 lbs. per acre (or 28 per cent) respectively.

Out of the 8 treatments excluding the control each consisting of 20 lbs. N per acre, the response to split doses was not significant. However, application of 20 lbs. N per acre gave significantly higher yield of 30 lbs. of seed cotton per acre (or 25 per cent) over no manure.

(c) *Experiment to study the effect of different doses and forms of nitrogen on the yield of seeds cotton.*—The experiment was conducted at the Government Experimental Farm, Akola, with ammonium sulphate, ammonium nitrate and urea each at three levels *viz.*, 0, 20 and 40 lbs. N per acre. The three forms of nitrogen have responded differently during the quinquennium ending 1958-59. In 1955-56 and 1958-59, the differences in yields due to the three forms of N were non-significant. In the remaining three years, however, sulphate of ammonia was the best giving 74 lbs. or 31 per cent more yield than ammonium nitrate or urea.

(d) *Experiment to study the effect of varying seed-rates in combination with graded levels of N and P_2O_5 on the yield of unirrigated wheat.*—The experiment was conducted at Niphad with the three seed-rates, three levels of N and three levels of P_2O_5 . On the average of three years, differences in the three seed-rates *viz.*, 20, 30 and 40 lbs. per acre were non-significant. The increase due to 40 lbs. of seed-rate over 20 lbs. of seed-rate was small, being 44 lbs. per acre and non-significant. On the other hand, the three levels of N and P_2O_5 had significantly increased the yield. The 30 lbs. level of P_2O_5 had significantly increased the yield over 'No P_2O_5 ' by 58 lbs. per acre or 11.3 per cent. In 1955-56,

the increase in yield due to 15 and 30 lbs. N per acre was 30 and 73 lbs. per acre respectively while in 1956-57, it was as high as 209 lbs. and 277 lbs. per acre respectively. In 1958-59, the order of response was only 4 lbs. and 96 lbs. per acre respectively.

(C) *Collection, compilation, and publication of agricultural statistics*

During the year under report, eighty-six forecast reports were issued, on 29 crops. As in the previous year, the data of crop estimation surveys were utilised for framing the yield forecasts and for preparing the outturn table of the season and crop report. The Season and Crop Report for 1956-57 was finalised and sent to Press. The report for 1957-58 was under preparation and the data received for the report for 1958-59 were under scrutiny. The usual work of compilation and publication of periodical returns such as rainfall, prices, cotton ginned and pressed, annual census of cotton stock held by the trade on 31st August, was continued. Queries from Government and the public were attended to.

(a) *Crop acreages.*—The table below gives the final forecast estimates of area under principal crops during the season 1959-60 along with the corresponding revised estimates of area during the preceding year.

(Figures in hundreds)

Crop	Area during the year		Percentage by which area in col. 2 exceeds (i. e. +) or falls short (i. e. -) of that in col. 3
	1959-60 (final forecast or latest estimates)	1958-59 (revised estimates)	
1	2	3	4
	Acres	Acres	
Rice	30,661	30,069	+ 2.0
Wheat	22,223	21,889	+ 1.5
Jowar	1,40,876	1,41,833	- 0.7
Bajri	41,374	43,655	- 5.3
Maize	649	678	- 4.2
Ragi	5,586	5,742	- 3.6
Gram	11,170	11,050	+ 1.0
Tur	13,323	13,349	- 0.2
Cotton	62,693	63,517	- 1.3
Groundnut	27,852	28,091	- 0.9
Sesamum	3,201	3,023	+ 5.7
Linseed	6,041	5,945	+ 1.6
Castorseed	147	256	- 42.6
Sugarcane	2,951	2,633	+ 12.1
Tobacco	582	561	+ 3.7

110.

It is seen that area under rice, wheat and gram has increased while that under the *jowar*, *bajri*, *ragi*, maize and *tur* crops has declined when compared with that of the preceding year.

In the case of cash crops, the area under cotton, groundnut and castorseed has gone down while the area under sesamum, linseed, sugarcane and tobacco showed an increase over that of the preceding year.

(b) *Crop production*.—The table below gives the final forecast estimates of production of principal crops for the season 1959-60 along with the corresponding revised estimates of production during the preceding year. The regions and the crops in respect of which the estimates of production were based on the results of the crop estimation survey are mentioned below.

Crop	Region
Rice	Entire Maharashtra
Wheat	Do.
<i>Jowar</i>	Do.
<i>Bajri</i>	Do.
Cotton	Do.
Groundnut	Do.
<i>Tur</i>	Vidarbha only.
<i>Ragi</i>	Ratnagiri district only.
Tobacco	North Satara, South Satara and Kolhapur districts.

In the case of the remaining regions and crops, the estimates were based on the *anna* valuation figures reported by the Revenue authorities.

(Figures in hundreds)

Crop	Production of crops during the year		Percentage by which production in Col. 2 exceeds (i. e. +) or falls short (i. e. -) of that in Col. 3
	1959-60 (final forecast or latest estimates)	1958-59 (revised estimates)	
1	2	3	4
	Tons	Tons	
Rice ...	12,102	12,694	- 4.7
Wheat ...	8,646	4,133	- 11.9
Jowar ...	27,778	92,558	- 14.7
Bajri ...	4,909	4,534	- 8.9
Maize ...	128	138	- 7.1
Ragi ...	1,597	1,631	- 2.1
Gram ...	1,345	1,501	- 10.4
Tur ...	3,080	3,529	- 12.7
Cotton (bales) ...	7,297	11,838	- 38.4
Groundnut ...	6,543	6,367	+ 9.0
Sesamum ...	300	288	+ 4.2
Linseed ...	535	557	- 3.9
Castorseed ...	13	24	- 45.8
Sugarcane (Gur) ...	8,487	7,162	+ 18.5
Tobacco ...	140	109	+ 38.6

It will be seen that the production of most of the crops has gone down due to heavy and excessive rains received in September and October i. e. at the maturity stage of *kharif* crops and heavy showers accompanied by hail storms during the months of January and March in parts of the State. In the case of the sugarcane and tobacco crops, the production has increased by 18.5 and 38.6 per cent respectively over that during the preceding year and this is due partly to the increase in the area under the crops and partly due to favourable weather conditions for these crops, which prevailed in the major crop growing tract of the State.

(c) *Crop prices.*—The unfavourable character of the season was reflected in the reduced yields of most of the *kharif* as well as the *rabi* crops during the year under report, when compared to that during the preceding year. Prices of agricultural commodities continued to rule high. Details regarding fluctuations in the prices of important agricultural commodities will be incorporated in the Season and Crop Report for the year 1959-60.

(D) *Other miscellaneous activities*

(a) Refreshers' course in Agricultural Statistics for the seventh batch of nine Agricultural Officers posted at the Agricultural Research Stations of the State was held from 8th October, 1959, to 7th November, 1959, at the Agricultural College, Poona.

(b) *Sample survey to assess the extent of work done under wells scheme.*—As mentioned in last year's report, the analysis of the data of the sample survey, conducted in 1958, at the instance of the Technical Committee Wells Scheme, was completed and a report on the same submitted to Government has been recently published. The main conclusions emerging from the analysis of the data are as follows—

(i) Out of the total of 732 wells, 455 or 62 per cent were found to be functioning during the year under survey.

(ii) Inadequacy of water was the major cause for dereliction of wells and accounted for 6 per cent of the wells. Unsatisfactory or inadequate financial status prevented 6 per cent of the cultivators from availing of the irrigation benefits. Non-availability and unsuitability of water resulted in 3 per cent of the wells going out of use.

(iii) The analysis of the data revealed that the average area irrigated per new well and the average additional area brought under irrigation per old repaired well was 3.18 and 1.45 acres respectively.

(iv) Food crops occupied 2.85 acres or 90 per cent of the total cropped area. Of this, foodgrain crops accounted for 1.47 acres. Similarly, of 1.36 acres of additional area brought under food crops per old repaired well, food-grain crops occupied 0.84 acres.

(v) The total cropped area showed an increase of 7.3 per cent in the triennium subsequent to the construction of wells over that prior to the construction. Of this, 0.5 per cent was the result of cultivation of areas under the category of other fallows.

The remaining 6.8 per cent can, therefore, be considered as increase in the double cropped area.

(vi) Among the food crops, area under paddy and wheat showed considerable increase. Further, more than 50 per cent area under wheat and 30 per cent area under paddy was brought are under irrigation.

(vii) Crops like chilli, sugarcane, fruits and vegetables which were either grown in a negligible area or not grown at all prior to the construction of wells, were grown to varying extent subsequent to the well programme.

(c) *Index numbers of agricultural production.*—The index numbers of agricultural production of 21 principal crops, covering 83 per cent of the total cropped area, were worked out up to 1958-59 with 1949-50 as the base year. In conformity with the method adopted and recommended by the Directorate of Economics and Statistics, Ministry of Food and Agriculture, Government of India, the index numbers have been constructed by the chain base method. The indices of some of the principal crops for the period under study are given in the report submitted to the State Government and Government of India, Ministry of Food and Agriculture.

The all commodity index numbers showed an increase of 36 per cent during 1958-59 over that of the base period.

(d) *Cost of cultivation of cotton and rotation crops.*—With the object of estimating the cost of cultivation of cotton and the principal food and oilseed crops grown in rotation with it a scheme jointly financed by the Indian Central Cotton Committee, Indian Central Oilseeds Committee and Indian Council of Agricultural Research, was initiated in six major cotton growing districts of the State during the year under report. The data will be collected both in terms of physical requirements of cultivation, *viz.*, labour, materials etc. as well as their money value.

CHAPTER II

SUGARCANE RESEARCH

The scheme for extensive research on sugarcane in the State was sanctioned for a period of five years. The year under report was the fifth year from the date of its extension. The Sugarcane Research Station, Padegaon, is the main Station, where research on various aspects of sugarcane cultivation is conducted. The work carried out under different sections is summarised below.

(a) *Agronomy*.—The varietal investigations were carried out as usual with 231 varieties in different stages. The varieties in the final stage did not differ significantly. However, varieties Co. 853, Co. 740, Co. 798 and Co. 796 gave considerably higher yields as compared to Co. 419. In the 1957 batch, Co. 740 gave significantly higher yield than Co. 419. Under plant cane, the varieties Co. 986 and 1026 showed increased yields over other varieties.

The two years' data on inter-cropping with legumes in sugarcane showed that, the trend in yield was different in two seasons. 'No inter-crop' treatments gave higher yields than with inter-crops in contrast to last season. The trials taken with different nitrogenous fertilizers showed that the yields did not differ significantly in all the three seasons. The yield of *adsali* crop, grown according to 'crop log' technique revealed that manuring according to N indices gave significantly low yields than the control in all the three treatments. In NPK experiment, some response to graded doses of P_2O_5 and K_2O was observed, but no response to graded doses of N and compost was seen. The results of the long term experiment with different ratios of sulphate of ammonia to cake in nitrogen top dressing with different basals, showed a highly significant difference due to basal dressing, ratios and treatment of basal equivalents. Different ratios of sulphate of ammonia to cake have not differed significantly which indicates the possibilities of reducing cake in sugarcane manuring. It was also observed that the replacement of compost by inorganic equivalents would be possible without affecting the cane yields.

(b) *Soil Physics*.—The lysimetric studies on balance sheet of nitrogen showed that during the whole life cycle of the crop, 30 lbs. N was lost as ammoniacal N and 60 lbs. as Nitric N. In phosphate carrier experiment in *chopan* soil, compost proved to be a better carrier than the cowdung, the per cent increase in yield being 8.8 and 4.6 respectively, over control plots. The pot culture studies undertaken to see the efficiency of tensiometers for controlling

irrigation, indicated that about double the dry matter weight of maize crop was obtained where irrigation interval and doses were controlled by tensiometers.

(c) *Biochemistry*.—In an experiment to see the effect of application of N prior to harvesting of cane as seed material, best germination was observed in the treatment, in which 100 lbs. N was applied one month prior to harvesting of cane as seed material. In lysimeter studies, the yield data indicated a favourable trend with the use of sulphate of ammonia alone, combined with 100 lbs. of P_2O_5 in inorganic form, on all the six soil types. The pot culture experiments, carried out to see the effects of gibberelic acid on the growth and juice quality of cane indicated that either dipping of setts in gibberelic acid solution prior to planting, or its foliar application, prolonged the vegetative growth of the crop; but the purity of the juice was lowered by this treatment and it had no beneficial effect on cane yield.

(d) *Disease Investigation*.—The causal organism of sclerotial red sheath was isolated and its pathogenicity was proved. Varietal resistance tests were undertaken for the above disease on 73 varieties. Periodical observations on the occurrence of cane diseases were recorded on all the varieties. Effect of organo-mercurial compound on germination and control of primary infection of sclerotial red sheath and germination of urediospores of sugarcane rust were taken up for study.

CHAPTER III.

DRY FARMING

A. DRY FARMING RESEARCH

The rainfall at the main Agricultural Research Station at Sholapur was 32.36" being 23.4 per cent above the average of the last 25 years. There were 74 rainy days. Premonsoon showers were beneficial for the preparatory tillage. Normally *khariif* sowing starts during the third or fourth week of June. But during the year under report, sufficient rain was received in the first week of June and hence *khariif* sowings could be started earlier i.e. on 11th June 1959. The dry spell in the second and fourth week of July, and first and second week of August adversely affected the growth of legumes like *mug* and *udid* which finally failed completely. Rains during the fourth week of August proved very useful to other standing crops like *bajri*, *khariif jowar*, groundnut and *tur*. The rains received in the fourth week of September and the first week of October delayed the *rabi* sowing which was started from 11th October 1959. These rains, however, were very useful to standing crops such as groundnut and *tur*. In the month of November there was a shower of rain which helped the standing *rabi* as well as *khariif* crops. At the Agricultural Research Station, Jeur, the total rainfall was 20.6". Although the rainfall was normal, its distribution was not favourable with the result that *khariif* crops yielded less. For *rabi* crops the season was fair. At the Agricultural Research Station, Chas, the total rainfall was 27.26" as against the average of 24.44". *Khariif* crops were affected but *rabi* crops fared well.

The preliminary findings of agronomic experiments are briefly summarized below.

In the experiment on nitrogen and phosphoric acid requirements of *bajri*, it was observed that at all the three stations, viz., Sholapur, Jeur and Chas, there is a significant response to nitrogen. The response to phosphate is significant at Sholapur and Jeur only.

In the experiment on the dose and method of application of superphosphate, with and without the application of 5 Gwt. of sulphur to groundnut crop, it was found at Jeur and Chas that there is no response to the application of either phosphate or sulphur. The method of application also did not show significantly differential response.

In the experiment on finding out separately the effect of P, Ca, S and So_4 on the yield of groundnut, it was observed that the crop

has significantly responded to the application of phosphate, sulphur and sulphate, there being no significant response to calcium.

A rotational experiment on *bajri* crop has been in progress at all the three research stations. *Bajri* is rotated with groundnut and *matki* at Sholapur and with groundnut, *chavali*, *mug* and *hulga* at Jeur and Chas. The legumes are grown with and without the application of 20 lbs. P_2O_5 per acre in the form of superphosphate. At Sholapur, an application of 20 lbs. P_2O_5 in alternate years to *bajri* has given significant increase over control. At Jeur, *bajri* when rotated with any of the four legumes, has given significantly increased yields over continuous *bajri*. Application of P_2O_5 further recorded significant higher yields over control. At Chas, *bajri* after *chavali* has yielded better than the control i.e. continuous *bajri*. At all the stations there is an overall significant increase in the yield of *bajri* crop succeeding phosphated legumes as compared to *bajri* crops after non-phosphated legumes. Amongst the two legumes at Sholapur and four at Jeur and Chas, phosphate application is found to be beneficial in the case of groundnut at Sholapur and Chas and *china mug* and *chavali* at Jeur in so far as its effect on the succeeding *bajri* crop is concerned. As regards, the effect of P_2O_5 on legumes there is a significant response of groundnut at Sholapur, but no crops responded at Jeur and Chas.

In the experiments on NPK requirements of *rabi jowar* which were laid out at the three Research Stations, it was observed that the *rabi jowar* responded significantly to the application of nitrogen in the form of ammonium sulphate. There is no response to phosphate or potash alone.

B. SOIL RESEARCH

During the year under report, three districts viz., Bhir, Nagpur and Nanded were surveyed for the characterisation of soils as well as to ascertain the extent of damage done by soil erosion in different types of soil. The total area covered is 12,823 acres. A broad outline of the soils of the above districts based on field observations is presented below.

(a) *Bhir district*.—The soils of this district are derived from trap rock. Three types of soils exist in this district.

(i) Shallow soils include both very shallow (0"-4") and shallow (1"-3"). The soils are dark to reddish brown in colour, sandy loam to clay loam in texture. These soils are found on slopes varying from 4 to 9 per cent and even more. These soils require adequate soil conservation measures.

(ii) Medium soils include moderately deep soils (9"-16") and medium deep soils (18"-36"). The soils have grayish brown to black colour, sandy to clay loam texture and blocky to granular structure. These soils are suitable for irrigation.

(iii) Deep black soils are deep brown to dark brown in colour, clay loam to clayey in texture, granular to blocky in structure. These soils are highly suitable for *rabi* crops.

(b) *Nagpur district*.—The soils in this district are mostly derived from trap rock. There are three major types of soils.

(i) *Khardi-bardi*—as they are locally known are found on an undulating topography. The soils are grayish in colour, sandy loam to clay loam in texture, with blocky structure. The soils are suitable for irrigation and require suitable surface drainage disposal systems.

(ii) The second type of soil known as *Morand* lies on gentle slopes of about 2 per cent with depth of more than 36". These soils are usually brown to dark brown in colour, clay loam to clayey in texture and granular to blocky in structure. The soils are suitable for a variety of crops.

(iii) Deep black soils lie on almost flat topography. Soils are dark brown with grayish tinge, clay loam to clayey in texture and granular to blocky in structure. The soils are suitable for both *kharif* and *rabi* crops.

(c) *Nanded district*.—The soils of the district are entirely derived from trap rock. There are three major types of soils.

(i) The shallow soils include both very shallow (0"-4") and shallow (4"-9") in depth. These soils are grayish brown in colour, sandy in texture and are structureless. The soils are severely eroded and require intensive soil conservation measures.

(ii) The medium deep soils include the moderately deep (9"-18") and medium deep soils (18"-36"). The soils are dark brown in colour, clayey in texture and blocky in structure.

(iii) The deep soils are grayish brown to black in colour, clay loam to clayey in texture and blocky to columnar in structure. The soils are suitable for a variety of dry crops.

The laboratory analysis of the samples collected during the survey is underway and the field observations would be confirmed in the light of analytical results.

During the year, soil samples collected from selected treatments in the *kharif* rotational series were analysed for their available phosphate contents, organic carbon, nitrogen and available potash.

No significant differences were observed in the samples under different treatments in respect of all the properties above except available phosphate which showed a slight increase in phosphate applied plots.

Studies in the field run off plots at Sholapur have shown that groundnut is the best cover crop for conserving soil and water, the second best being *matki*. It was also observed that a mulch of *jowar* stubbles at the rate of two tons per acre considerably helped in reducing runoff soil losses. However, at Achalpur, the minimum soil loss was found to be under natural vegetation followed by a strip cropping pattern *jowar-mug* in the ratio of 3 : 1. The highest soil loss was found to be in the cotton plot. In canopy studies at Achalpur, groundnut (AK-12-24) with 1.5 times the seedrate has produced a maximum canopy of 86.72 per cent but the yields are found to be lower than the treatment of normal seed-rate with 10 lbs. of nitrogen, which has produced a canopy of 76.3 per cent.

This year the erosional behaviour of alluvial clayey soil (Paldhi in East Khandesh) was studied at 2 and 4 per cent slopes with a rainfall intensity of 3.3" per hour with the help of the rainfall simulator. It was observed that these soils are as highly erodible as the soils at Mulegaon (Sholapur). Doubling of the slope did not affect the runoff and soil losses.

For soil conservation work, permeability studies are conducted to find out the rate of infiltration in different types of soils. Of the different methods adopted, concentric ring method gave promising results.

Experiments to evaluate covers for deep black soils were conducted at Honmurgi (Sholapur). Maximum cracks were found on bare-bunds while least cracks were found on bunds with natural vegetation. With the artificial planting of grasses or with *murum* casing, the cracking percentage did not materially reduce. With reference to the study of shrinkage of bunds, it was found in the fourth year that the height of the bunds is reduced by about 35 per cent irrespective of the cross section. Further, it was observed that wherever grass cover was provided, the shrinkage in the height of the bunds was less when compared to bunds without grasses.

At the *khar* Land Reclamation Station, Panvel, preliminary arrangements such as construction of drains, strengthening of embankments and preparation of paddy plots were carried out and the experiments would be laid out during the year 1960-61.

CHAPTER IV

BOTANICAL RESEARCH

A. COTTON AND TOBACCO

COTTON

Research work on cotton was in progress in the various regions of the State. A concise account of the research work carried out in the year under report is given below.

Nagpur Division

Research work on *arboreum* cotton was in progress at Akola, Buldana, Yeotmal and Nagpur and that on *hirsutum* cotton was in progress at Achalpur.

In the co-ordinated district varietal trials with *arboreum* cotton carried out on Government Seed Multiplication Farms, the improved variety AK-235 (evolved at Akola) was found to be superior in yield to the remaining varieties in Akola and Amravati districts and in Warora *Tahsil* of Chanda district. In Buldana and Yeotmal districts, the improved variety AK-277 (also evolved at Akola) gave the highest yield. In Nagpur district, the variety AK-277 was found to be on par with the Khandesh variety *Virnar* (197-3) in respect of yield. In Wardha district, the improved variety *Gaorani*-46 (evolved at Nanded in Marathwada) recorded the highest yield of *Kapas* though in lint yield the variety AK-277 was leading.

Another set of major trials were conducted at Akola, Buldana, Yeotmal and Nagpur. In these trials the improved variety AK-235 was observed to excel the variety *Virnar* in all the three characters, yield, ginning outturn and halolength at Akola and Buldana whereas at Yeotmal it surpassed *Virnar* in all characters except yield.

Thus, the two improved *arboreum* varieties evolved at Akola *viz.*, AK-235 and AK-277 were observed to be superior to the control variety *Virnar* in several characters.

In the trials with *hirsutum* cotton, the improved variety *Buri*-147 gave higher yields than the control (*Buri*-0394) in Amravati and Nagpur districts. The improved variety *Buri*-147 is far superior to *Buri*-0394 in fibre length and spinning capacity. The fibre length of *Buri*-147 is 1.03 inches as compared to 0.98 inch of *Buri*-0394 and it can spin up to 44's counts as against 39's of *Buri*-0394.

Varietal tests in which seven varieties were compared against *Buri-0391* were conducted at Achalpur and at the three Sub-stations at Yeotmal, Buldana and Nagpur. At Nagpur, the two varieties A-42 and 0296-7 gave significantly higher yields than the control. At Achalpur, also the variety 0236-7 gave numerically higher yield than the control although the yield difference between varieties were not significant at this station. At Yeotmal and Buldana, no variety was observed to be superior in yield to the control. At Achalpur, three varieties were observed to be superior to *Buri-0391* in ginning percentage. Similarly, three varieties were found to be superior to the control in fibre length at Achalpur, Yeotmal and Nagpur.

In strains test, two strains *viz.*, 1007 and 1005 from the cross *Cotom* × *Buri-0394* have given 30 per cent higher yield than *Buri-0394*. Their halo-length is 23 and ginning percentage is 33. The blackarm grade of both the strains does not exceed 2.9 as against 4.0 of *Buri-0394*. Another strain from *Buri-0394* × 2196/4 was also observed to be high yielding but its fibre is coarse.

Bombay Division

Research work for Khandesh zone is in progress at Jalgaon, Dhulia and Chopda.

In the village trials conducted with the new Khandesh strains W-81 and Y-1 against *Virnar* as control, the two new strains were observed to be on par with control in yield. However, the strain Y-1 was superior to *Virnar* in halo-length.

Trials in which the two new Khandesh strains W-81 and Y-1 and the improved variety C. J. 73 from Amreli were tested against *Virnar* as control, were conducted at the three stations in the Khandesh zone. The variety C. J. 73 gave significantly higher yields than the remaining three varieties at Dhulia and Chopda. This improved variety is also superior to even Y-1 in spinning capacity. However, it is lower in ginning outturn by about 2 per cent than control variety *Virnar*. At Dhulia the new strain Y-1 gave significantly higher yield than *Virnar* and W-81. On an average, the strain Y-1 gave better spinning performance than *Virnar*.

The strains W-81 and Y-1 were also tried on cultivators' fields with the improved variety C. J. 73 from Amreli against *Virnar* as control. The improved variety C. J. 73 gave the highest yield of *Kapas*.

Three cultures have been isolated which manifested a high degree of resistance to wilt disease.

Poona Division

Research work for evolving a suitable strain for Barsi-Nagar area was continued at Shevgaon. However, the seasonal conditions at this station during the year under report were quite unfavourable for the cotton crop. Due to a spell of dry weather after sowing, the number of plants which survived was very small. Hence no valid conclusions could be drawn from experiments conducted during the year.

Aurangabad Division

The cotton research work in this division is in progress at Parbhani, Badnapur and Nanded.

During the year under report, district trials with the new strain 4822, *Daulat*, *Virnar* and local were conducted according to scattered block technique in the 8 talukas of Parbhani district. *Daulat* gave 16 per cent higher yield than local and 12 per cent higher yield than *Virnar*. The higher ginning strain 4822 also outyielded local by 14 per cent.

Among the three *Gaorani* strains tested in varietal trial at the Main Experimental Farm, Parbhani, the strain 6746 gave significantly higher yield and ginning outturn than *Daulat* (the variety recommended for the district). This strain was also found to be promising for wilt resistance as the wilt mortality recorded for the strain was only 5 per cent.

In the preliminary varietal trials, in which 14 strains were tested, 7 strains were observed to be superior to *Daulat* (control) in yield and ginning percentage.

In the main varietal test conducted at Badnapur, strain 1319 gave significantly higher yield than the two control varieties, local and 3591.

In the other varietal trials, six strains outyielded local. The two strains 2018 and 2019 have ginning percentages higher than those of local and *Virnar*.

Eight strains have been observed to be completely resistant to wilt.

In the district trials conducted in Aurangabad and Bhir districts, improved variety *Gaorani-22* gave the highest yield of *Kapas* per acre. The average yield of *Gaorani-22* was 525 lbs. of *Kapas* per acre whereas that of local was 364 lbs and that of *Virnar* was 470 lbs. At Nanded, in the large scale trial, all the 5 improved varieties gave significantly higher yields of *Kapas* per acre than *Virnar*.

In the district trials conducted in Nanded district, the improved *Gaorani* variety, *Gaorani-46*, gave as good yield of *Kapas* per acre, as *Virnar* although during the previous two years it had given higher yields than *Virnar*.

With a view to evolve an improved variety which will have a fibre length of 1 inch, ginning percentage of 39-40 and the non-shedding character, crosses were made at Nanded between varieties like *Virnar* (high ginners), the improved *Gaorani* variety 3883 (which has a fibre length of 1.03 inch) and the Saurashtra variety C. J. 73 (which has the non-shedding character). Some of the crosses have reached the F_3 stage. The indications obtained so far are that it may be possible to combine high ginning percentage with greater length, fineness and strength of fibre and non-shedding plant habit. As during recent years, heavy and untimely rains have reduced the yields of *Kapas* due to heavy shedding, it is necessary to introduce the character of non-shedding in the improved varieties which are being evolved so that their yields may not be abnormally reduced due to heavy or untimely rains.

The premium paid for the *Kapas* of *Gaorani-46* was Rs. 15.00 per *palla* (3 *maunds*) over the price of *Gaorani-6* *Kapas*. A similar premium was paid for the *Kapas* of the improved variety *Gaorani-22* over the price of *Gaorani-12*. A premium of Rs. 7/8 per *palla* was paid for *Daulat* *Kapas* over the price of *Virnar*.

TOBACCO

Research work on tobacco was in progress at Achalpur in Amravati district of Vidarbha.

In the varietal trial of *Bidi* tobacco under irrigation the varieties K-20, K-19 and 15.54 gave significantly higher yields over the control variety, *Saoner*.

Although the varietal trial for *Bidi* tobacco under rainfed conditions was non-significant, all the improved varieties included in this trial gave superior yields than the control variety.

In the replicated trial in which local *Bidi* varieties were tried against the variety K-20 as control, K-20 gave the highest yield.

B. RICE

A brief account of the research work done and results obtained at various research stations during the year under report is given below—

Bombay Division

(a) *Agricultural Research Station, Karjat (Kolaba)*.—Twenty-nine selections made in *Ghosalwe* were compared in replicated progeny

row trials with K-540 and K-156 as checks. None of the selections was significantly superior to K-540, although 3 selections have given 10 to 24 per cent higher yield over K-540.

Hybridization work has been taken up with two main objectives, viz. (i) breeding improved varieties with higher response to fertilizers and (ii) breeding blast resistant varieties. Under the former project, several crosses have been made between the *Indica* and *Japonica* varieties and the hybrid material is being tested in various generations. A few derivatives have been found to be quite promising. The performance of the selections in advanced generations under low (no manure) and high (60 lbs. N and 30 lbs. P_2O_5 per acre) fertility levels was studied.

The yield differences between levels of fertilizers, between selections, as well as their interaction with fertilizer levels are highly significant.

The selections 6-1-2, 9-1-1, 9-1-2, 9-1-3, 9-1-4, 9-1-5 and 9-2-1 appear promising.

A replicated trial of 14 F_3 progenies from the two crosses, viz., *Bikku-132* × E. K.-70 and *Norin-35* × K-42 was conducted in split plot design with 2 main plots and 18 sub-plots.

The yield differences between fertilizer levels and between selections are highly significant while the selections × fertilizer interaction is non-significant.

The progenies 8-4-1, 8-4-2, 8-5-2, 21-1-2, 21-3-1 appear to give high response to fertilizers.

A replicated trial of 22 F_5 selections from the cross E. K.-70 × *Norin-32* was conducted in a split-plot design with two main plots and 26 sub-plots.

The differences between fertilizer levels are significant, between selections are highly significant, while the selection × fertilizer interaction is non-significant.

The progenies 28-2-2, 28-5-1, 28-5-2, 28-5-3, 28-5-4, 28-5-5, 28-6-1, 28-6-2 and 28-7-1 gave high response to fertilizers. Five other progenies were found segregating.

A replicated trial of 7/ F_4 progenies from the cross *Norin-18* × K-42 in four replications was conducted with three checks of standard strains in a split plot design. The yield differences between selections were significant while those between levels of fertilizers and also the selection × fertilizer interaction were non-significant. The selection 31-6-2 was found promising.

The F_3 progenies from 2 crosses viz., *Norin-8* × K-42 and *Norin-8* × K-540 were tested in two trials.

In the trial of progenies from the cross *Norin-8* × *K-42*, it was observed that the differences between progenies were highly significant and between levels of fertilizers were significant but the interaction was non-significant. However, the progenies 52-11 and 52-19 were found to give higher response to fertilizers. In the trial of progenies, from the cross *Norin-8* × *K-540* the differences between progenies and between levels of fertilizers were highly significant, while the interaction was non-significant. The progenies 37-3, 37-5, 37-6, 37-15, 37-25 and 37-29 were found to be promising. Only progeny 37-6 is breeding pure for flowering and the rest are all segregating.

Hybrid material from various crosses made with the object of breeding for blast resistance is being tested in different generations for yield and other agronomic characters at Karjat and for the resistance test at the Agricultural Research Station, Lonavala.

The selections 5-1-1 and 5-3-2 have given about 1,200 lbs. higher yield over either *K-42* or *Z-14*. They may, therefore, be tried in the district of Kolaba and Thana with the late-maturing checks *viz.*, *K-42* and *Z-14* respectively.

Thirty-three selections in F_2 from the crosses *viz.*, *Co-25* × *E. K.-70*, *K-42* × *China-35* and *K-154* × *Co-26* were tried in four replications with three checks. The yield differences were significant. The mid-late selection 15-10-2 and the late ones 15-13-3, 15-13-4, 15-10-1, 15-10-3, 15-10-4, 15-11-1, 15-11-2, 15-11-3, 15-11-4 and 15-12-3 have given promising performance although none were superior to *K-42* in yield. These are resistant and mostly fine grained.

Forty-five selections in F_6 from various crosses were compared in four replications along with three checks of standard strains. The yield differences were highly significant. The blast resistant selections do not show significant superiority in yield. However, 4 early, 2 mid-late and 6 late selections are found high yielding as well as blast resistant.

Sixty-seven selections in F_5 from various crosses were tested in four replications along with five checks of standard strains. Yield differences were highly significant.

Replicated yield trials of high yielding varieties selected from the varieties maintained at the station on the basis of preliminary observations were conducted in early, mid-late and late groups.

In the early group, 17 varieties were tried with *E. K.-70* as check. The yield differences were highly significant. The varieties *T. 137* and *Askata* were significantly superior to the check. *T-137* is long, fine and pure while *Askata* is coarse and impure.

In the midlate group, 20 varieties were tried with Z-31 and K-156 as checks. The yield differences were non-significant. However, the varieties *Bankura*, *Varangal*, *Sheppa*, and *Kenitraffa* gave higher yield than Z-31.

In the late group, 45 varieties were tested with three checks. The yield differences were non-significant and only one variety viz., *Katty Bagdar* was significantly superior to K-42.

From the results of trials in Thana district for the last three years, it is observed that Z-63 has given an average yield of 2,662 lbs. per acre which is 9 per cent higher than Z-31. The strain is also superior in quality to Z-31. It was, therefore, proposed to release Z-63 to replace Z-31 in Thana district. The proposal was accepted by the 'Agresco' 1960.

Atomic irradiation of seed of improved strains and hybrids.—Seed of *Indica* × *Japonica* hybrids viz., 9-1 and 6-1 and that of E. K-70 was sent to the Atomic Energy Establishment, Trombay, Biology Division, for irradiation of the seed material. Similarly, seed of the improved strains K-42, Z-31, E. K.-70, *Bhadas*-1303, *Fatani*-6, *Ambemohar*-157, *Pankhali*-203 and the hybrid cultures 9-1-1 (*Indica* × *Japonica*), 5-3-1, and 4-3-1 (blast resistant) were also sent for irradiation at the United States Stall at the World Agricultural Fair, New Delhi. The resultant material as also other material received from Atomic Energy Establishment, Trombay, will be grown for observations during the *kharif* season of 1960-61.

(b) *Agricultural Research Station, Panvel.*—At Panvel, work of breeding saline resistant rice varieties for the coastal tract is in progress. The new selections from salt resistant varieties viz., *Kala Rata*-2-18, *Bhura Rata*-2-10 and *Morchuka*-3-15 are undergoing district trials. The promising hybrid selections viz., 47-22 from the cross *Mulkudai* × K-42 and 1-9 from *Kala Rata*-1-24 × K-42 were given out for district trials for the first time during the current year. They have given 20 to 30 per cent higher yield than local in both the districts. *Morchuka*-3-15, a late saline resistant selection has given promising performance during the last three years in Thana district.

Hybrid selections from crosses made with the object of obtaining high yielding saline resistant varieties were studied in F₅ to F₉. The early selection 39-7 from the cross K. R. 1-24 × 4-157 in F₇ gave 22 per cent higher yield than the check B. R. 4-10. Four midlate selections viz., 335-17, and 335-2 from the cross B. R. 4-10 × Z-149 and 260-4 from the cross B. R. 4-10 × K-42 gave 32, 26, 16 and 16 per cent higher yield over the check 1-9 (K. B. 1-24 × K-42).

Four early selections in F₈ were tested in replicated trials. In the highly saline soil, the yield differences were non-significant. In the moderately saline soil, the yield differences were significant and the selections 237-22 (B. R. 2-10 × Scented Paddy) and 278-10 (B. R. 4-10 × K-42) gave 23 and 20 per cent higher yield respectively over B. R. 4-10. Five midlate and 6 late selections in F₉ were compared in replicated yield trial in highly saline and moderately saline soils. In the highly saline soils, the differences were non-significant but two selections viz, 1-9 (K. R. 1-24 × K-42) and 47-22 (*Malkudai* × K-42) which have been released for district trials gave 14 and 17 per cent higher yield than *Kala Rata-2-18*. The selection 1- gave similar good performance in the trial in moderately saline soil.

(c) *Agricultural Research Station, Palghar*.—District trials of E. K.-70 with improved farm strain E. K.-161-62 were conducted at five Taluka Seed Farms of Thana district. E. K.-70 gave 30 per cent higher yield than E. K.-161-62.

One hundred forty three selections made from *Jirboti* and four *Futya* selections received from the Agricultural Research Station, Waghai, were compared in replicated progeny row trials, in 8 groups and four replications along with *Jirboti* local, E. K.-70 and E. K.-161-62 as checks. In all, 36 high yielding selections have been retained for further trial.

Fifty four selections from *Dodki*, and four *Futya* selections were tried in replicated progeny rows in three different groups and four replications along with E. K.-70, E. K.-161-62 and *Kada-176-12* as checks. Thirty two high yielding selections have been retained.

Hybrid selections from crosses made with the object of obtaining high yielding blast resistant varieties were studied in F₈ to F₁₀. In a small scale yield trial, 13 selections from five crosses in F₉ and 7 selections from the cross *Kada-176-12* × *Ambemohar-39* in F₁₀ were tested in replicated trials. The yield differences were highly significant and the selection 1-7-13 (*Kada-176-12* × *DXL Dular*) from F₉ and 14 (*Kada-176-12* × *Ambemohar-39*) from F₁₀ gave 24 and 11 per cent higher yield respectively over *Kada-176-12*.

(d) *Agricultural Research Station, Igatpuri*.—The new selections viz., *Varangal-1678*, *Varangal-85*, *Kamod-253*, 360, *Bholagira* and *Katribhog* are undergoing district trials in Nasik district. From the results of district trials of *Kamod* strains from 1956-57 to 1958-59 it is observed that *Kamod 360* gives an average yield of 1,872 lbs. per acre which is 29 per cent higher than local *Kamod* (1,445 lbs.). It is proposed to continue trials of these two strains along with *Bholagira* and local in Nasik district.

Promising selections from late *Kolpi*, early scented and non-scented, late scented varieties and *Varangal*, *Lal Dodki* and *Kamod* were grown separately in small scale replicated trials. In early scented, the selection *Kelhapur-10-15* was significantly superior and gave 40.59 per cent higher yield over *Ambemohar-59*. In early non-scented group, the selections *Sutarsal-1-39*, T. 21 and *Sutarsal-26* gave 22 to 23 per cent higher yield over E. K.-70. In the late scented group, the yield differences are highly significant and the selections viz., 36-11, *Katribhoq*, 4-83, *Kaminisal*, and *Krishnasal-10* are significantly superior to *Ambemohar-59*. The hybrid material from the crosses of *Indica* × *Japonica* types from F_2 was tested under low and high fertility in the two groups viz., early and late. In the early group, the progenies 135-13, 141-23 and 125-36 have shown good response to fertilizer as compared to E. K.-70 and in the late group, the progenies 125-34, 70-295 and 70-99 have shown good response to fertilizer as compared to Z-31.

(e) *Agricultural Research Station, Ratnagiri*.—The hybrid strains viz., *Bhadas-1-1621*, F. W.-1526 F. W.-1465, W-1136 and V-11-413 have been undergoing district trials for the last four years. The consolidated results show that none of the strains appear to give promising performance in the district.

Two *Bhadas* selections viz., F. S. 19 and *Bhadas-1-1621* were tried in small scale trial in seven replications with *Bhadas 79* as check. The yield differences are not significant. However, the selection F. S. 19 is promising and superior to the check *Bhadas-79*, since it gives 26 per cent higher yield.

Seven selections from *Panvel* and *Waksal* were tried in a small scale trial with *Panvel-61* and *Waksal-207* as checks in four replications. The yield differences are significant. The selections 1526, 1136 and S-1 are superior to both the checks.

The selections 1526, 1136 and 1465 were tried in the district for the last four years and the results are inconsistent from year to year. Hence, it is proposed to give out S-1, 15-2 and 26-1 for district trials instead of the above selections. The average yield of these selections for the last five years shows that they give 10 to 13 per cent higher yield than the standard strains *Panvel-61* and *Waksal-207*.

Sixteen hybrid selections from F_2 from *Indica* × *Japonica* cross viz., *Fukeku* × *panvel-61* were tried in replicated progeny row trial in three replications with *Panvel-61* as check. Seven selections have been retained for further study on the basis of high yield.

Twenty selections from another cross *Zuhio* × *Panvel-61* were grown in progeny rows with *Panvel-51* as check. Five selections have been selected for further study.

(f) *Agricultural Research Station, Phondayhat*.—The selections *Varangal-1-9*, *Varangal-1-15*, *Bela-3-8* and *Dodka-11-8* were given out for district trials in the Southern part of Ratnagiri district last year. Their performance on the farm for the last six years shows that they give 15, 12, 9 and 12 per cent higher average yield respectively than the respective local varieties.

Hybrid material from the crosses *viz.*, *Purple* × *E. K.-70* from F_2 and *Paini-6* × *Ambemohar-102* from F_2 was studied and selections have been made for further study.

Poona Division

(a) *Agricultural Research Station, Vadgaon*.—The improved strains *Dodak-35*, *Dodak-165* and *Varangal-9* are undergoing district trials in Poona and North Satara districts. They have given promising performance during the current year as compared to the respective checks.

Nine promising selection from *Krishnasal* were tried in small scale replicated trial in 4 replications along with *Krishnasal-1*, *Krishnasal-10*, *Ambemohar-99*, *Ambemohar-102* and *Chimansal-39*. The yield differences were highly significant. The selection 18-5-2-13 and 18-5-1-14 are promising.

Six varieties from other stations and States were tried in a small scale trial in 4 replications with *Ambemohar-102* and *Chimansal-39* as checks with a view to study their suitability for introduction. The yield differences are highly significant. The strains K-1-56 from Karjat and *Hansaraj* from Uttar Pradesh are superior to the check *Ambemohar-102* which are of equal maturity period.

Hybrid selections from the crosses made with the object of obtaining high yielding, scented, fine, blast resistant varieties were studied in different generations. In F_2 , 23 cultures from the crosses, *viz.*, *Chimansal-39* × *Antersal-90*, *Chimansal-74* × *Antersal-67*, *Antersal-90* × *Ambemohar-159* and *Antersal-90* × *Zinya-149* were studied in replicated progeny row trials in four groups, with farm strains as checks. Five cultures from the cross *Chimansal-39* × *Antersal-90* are high yielding resistant to blast. Two cultures from the cross *Chimansal-74* × *Antersal-67* are superior to *Chimansal-74* but are susceptible to blast. All the five cultures from the cross *Antersal-90* × *Zinya-149* are superior to *Chimansal-39* and inferior to *Ambemohar-157* in yield, and cultures 44-12-39 and 44-1-2-52 are resistant to blast.

Indica × *Japonica* hybrid material was under observation in F_3 and F_5 . In F_3 , the cultures were grouped in two groups early and late. In the early group, the yield differences between fertilizer levels are significant, between selections highly significant and interaction non-significant. The four selections viz., 1206-17-6-21, 318-3-21, 21-13-2-29 and 1550-2-5-18 gave much higher response to fertilizers as compared to the checks.

In the late group, the yield differences between 'N' levels, and selections are significant. The interaction is also significant.

The selections No. 680-10-5-94 and 61-4-2-18 gave high response to fertilizers.

In F_5 , 14 cultures from the cross *Zuhio* × *Ambemohar-157* were tried in split plot design in four replication with *Ambemohar 157* and *Zuhio* as checks. The yield differences for 'N' levels and selections are highly significant but the interaction is non-significant.

The selections 40-3-10 and 40-3-44 gave promising results.

(b) *Agricultural Research Station, Lonavala*.—This station was established during the current year with the object of testing hybrid material from crosses made with the object of breeding for blast resistance. The tests in the glass house were organised in co-operation with the Plant Pathologist. The material received from the Agricultural Research Station, Karjat, Vadgaon, Ratnagiri Igatpuri, Panvel and Sindewahi was tested. In all, 350 varieties have been tested in the glass house for blast resistance and observations on resistance recorded. These were communicated to the stations concerned for use in their further selection work.

(c) *Agricultural Research Station, Radhanagari*.—The drilled paddy strains M-161 and A-67 are undergoing district trials in Kolhapur district. Selection work in the local varieties viz., *Halave*, *Mothe*, *Sal* and black *Jeerga* is in progress. Thirty-six selections from *Halave* were tried in small scale replicated trials in four replications with *Halave* local and *Patni-6* as checks. Though the yield differences are non-significant, 8 selections are higher yielding as compared to the checks. Twenty-three selections from *Mothe* were tried in small scale trial in four replications with local *Mothe* as check. The yield differences are non-significant but 14 selections are higher yielding.

Thirty-one selections from *Sal* were tried in small scale replicated trial in 4 replications with local *Sal* as check. The yield differences are non-significant, however, 8 selections are promising. Thirty-one

selections from *Jeerga* were tried in small scale replicated trial in 3 replications with local *Jeerga* and A-159 as checks. The yield differences are non-significant, however, 13 *Jeerga* selections and *Ambemohar-159* gave higher yields than *Jeerga* local. Five selections from *Halave* were tried in large scale replicated trial in 4 replications with local *Halave* and *Patni-6* as checks. Though the yield differences are non-significant, selections H. S. 5 and H. S. 17 are superior to the checks local *Halave* and *Patni-6*.

In a trial of improved strains from other stations and states, 8 strains were tried in a large scale replicated trial in four replications with local *Mothe* and D-6-22 as checks. The yield differences are highly significant.

(a) *Agricultural Research Station, Kopergaon*.—Work on further improvement of *Krishnasal* and *Basmati-370*, varieties which are now being recommended for the Deccan canal tract is in progress at the station. Seven selections in *Krishnasal* were tried in a large scale trial for two years and the selection No. 1-20 gave 16 per cent more yield than *Krishnasal* check. In a trial of 5 *Basmati* selections, No. 1-8-5 gave significantly higher yield over *Basmati-370* check.

Nagpur Division

(a) *Agricultural Research Station, Sindewahi*.—The work at the station mainly consists of improvement of white *Luchai* variety. Fourteen selections from white *Luchai* were compared in replicated trials in two groups of 7 each, along with red *Luchai-8* and white *Luchai* local as checks. In one group, only one selection viz., WL-112 gave 6 per cent higher yield than local while in the other group the selections gave 7 to 21 per cent higher yield than local. In the trial of scented varieties *Katribhog* and *Bholagira* from Bengal, with their seed from the Agricultural Research Station, Igatpuri, have given the most promising performance with 51.4 per cent and 47.5 per cent higher yield than *Chinour* respectively. In a co-ordinated trial of 12 early varieties, *Dhaur-40*, gave the highest yield, but the grain is coarse.

Aurangabad Division

Agricultural Research Station, Tuljapur.—The station was newly established for the improvement of rainfed paddy varieties of the Marathwada region. Paddy is grown as a drilled crop in soils which are low lying, situated in valleys or waterlogged. The most important local varieties are *Pandharisal*, *Lal Sal*, *Maina Sal* and *Morisal*.

A large number of bulk samples of the above varieties were collected and grown for selection. Per plant yield of all the bulk samples was worked out and promising selections have been retained for further trials. The number of individual plant selections retained for further trials are 189 in *Pandhari Sal*, 131 in *Lal Sal*, 88 in *Maina Sal* and 73 in *Morisal*.

In a co-ordinated trial of early and mid-late varieties from other research stations it was found that the early varieties *Antersal-67*, *Waner-1* and *D-622* gave promising performance as compared to the local *Morisal*.

C. WHEAT

The genetic improvement work in wheat is taken up with a view to evolve high yielding, disease resistant and high quality varieties suited to the different regions of the State. To study the suitability of the varieties from other regions of the State as well as from outside the State, co-ordinated trials of such varieties were also arranged on different research stations of the State.

Aurangabad Division

At Badnapur, 34 early, mid-late and late selections from Kopergaon were compared with their respective checks. Only six selections gave 2 to 20 per cent higher yield than the checks. In the trial of *durum* and *vulgre* types from Niphad with their respective checks, only 20 selections proved their superiority in yield over the checks at Badnapur and Parbhani. NP strains of 700 and 800 series were compared with PW selections at Badnapur and Parbhani. None of them proved their superiority over PW selections under dry conditions. This was in conformity with past results. Only this year at Badnapur, NP strains gave higher yield than PW selections under irrigation. This is mainly due to the rust infection on PW selections. In a trial of short duration varieties, HY. 65 gave yield of 800 lbs. per acre. In the district trial of wheat varieties conducted at Parbhani Farm, HY. 11 gave 4.6 per cent higher yield than the check; but none of the *durum* strains could compete with PW selections. Nine rust resistant varieties from Niphad were also tested against PW selections. The results of the two years trials proved that none of them outyielded Marathwala strains.

At the Rust Research Laboratory, Mahableshwar, 425 cultures in their F_3 generation were tested under conditions of artificial rust epidemic. In all, 616 single plants and 116 bulks were selected from the above material. Selection was done on the basis of agro-

omic desirable characters and rust resistance. Twenty-two and 30 single plants along with 7 and 5 bulks from F_5 and F_4 generation respectively, were selected from Badnapur material grown at Padegaon. Out of 63 bulks grown in their F_3 generation at Padegaon, only 30 bulks of best agronomic characters were selected. In addition, 967 single plants and 258 bulks were isolated from the material in F_3 generation grown at Badnapur.

Bombay Division

At Niphad, out of 541 cultures under rod-rows, only 127 cultures were retained for further trials. From the progeny row trials, 12 progenies from dry and 318 from irrigated conditions were selected for next year's trial. In small scale trial under dry, 21 selections were retained for further test. From large scale trials of 63 and 114 promising strains under dry and irrigated conditions respectively, only 18 from dry and 16 from irrigated trials were finally selected for next year's trial. In a co-ordinated trial of Indian Agricultural Research Institute varieties NP-824 proved to be the highest in yield and confirmed the last year's results. At Mahableshwar, 881 hybrids from various crosses in different generations were tested against a mixture of 10 physiological races of stem rust under artificial epidemic conditions. In all, 387 single plants from 538 cultures in earlier generations and 82 cultures from 343 cultures from advanced generations were retained for further study. At Padegaon, out of 98 cultures grown in their F_6 and F_7 generations, only 28 cultures were finally selected. At Kopergaon, out of 685 hybrid cultures from various crosses in F_3 to F_{12} generations, 282 cultures and 115 single plants were finally selected for study during next year.

At Dhulia, co-ordinated trials of R. R. varieties from Niphad NP-710, NP-718 from the Indian Agricultural Research Institute HY-65 Form Powerkheda are in progress during the last few years. The average results proved the superiority of N-917, N-284 and N-284-S strains from Niphad over Hy. 65, N. 345, NP. 710 and NP. 718. In an independent trial of NP varieties, the NP strain 718 proved better in yield than NP. 710 and NP. 798. The fresh crosses between D-74-4 x *Gaza*, D-65 x *Gaza*, N. 345 x NP. 718 and N. 345 x NP. 710 effected during last year were grown as F_1 during this year.

At Jalgaon, 13 R. R. *durum* cultures from Niphad were compared with *Gulab*. N. 59 gave 17.3 per cent higher yield than its check. In a trial of 6 R. R. *vulgare* strains from Niphad with Hy. 65, NP. 710, NP. 718 and PW. 5, none of the selections proved superior to PW. 5. Seven R. R. *durum* selections from Niphad

were compared with *Gulab*, and PW. 5 proved superior to *Gulab*. In the trial of NP wheats, none of the NP varieties gave higher yield than *Gulab*. In the district trial of R. R. *durum* varieties from Niphad, the check PW. 3 gave the highest yield. Seven R. R. *vulgare* types were compared with PW. 5. None of the types gave higher yield than the check.

Poona Division

At Mohol a trial of 5 R. R. selections from Niphad with Hy. 65, NP. 710 and NP. 718 was conducted. N. 345, N. 973 from Niphad gave 56 and 51 per cent higher yield than NP. 710, closely followed by Hy. 65 and N. 917. In another trial R. R. strains from Niphad, NP. 718 gave the highest yield closely followed by N. 146 and N. 378. In a trial of short duration wheat varieties, K. 25 NP. 710 and Hy. 12-5-7 gave higher yield as a second crop. At Wadgaon (Maval), also a trial of short duration wheats, was conducted. In this trial NP. 761, NP. 52, Hy. 65 and K. 28 gave better yields, at Sangli, a trial of 9 R. R. varieties from Niphad was conducted with local as check. Only selections 221 and 409 gave higher yields than the check.

At Kopergaon, 5 *vulgare* selections were tried with N. 345, N. 179, NP. 710 and NP. 718 yielded more than the check. In another trial of *vulgare* types, almost all varieties proved superior to the check. In a trial of 6 R. R. strains from Niphad, C-271 and C-974 gave higher yield than the check. In a trial of 6 *durum* varieties, all varieties except *Kopergaon-5* proved superior to the check. A trial of 5 selections from Niphad was conducted in which C-973 and C-512 proved significantly superior to the check while in another trial of 15 selections, only 3 selections gave higher yield than the check. In a comparative trial of 17 *Kopergaon* selections with *Vijay* 14 selections proved superior to the check. A trial of 3 NP varieties and 3 hybrids from Madhya Pradesh was conducted against N. 4 and K. 28. None of the selections outyielded the check. Progeny row trials and small scale trials of the bulk seed of different cultures collected at Mahabaleshwar were conducted. Best ones from the same are under laboratory study.

Nagpur Division

At Washim, 8 NP varieties were tested against *Bansi* and *Baxi* wheats. Only 4 NP varieties gave higher yield than *Baxi* wheat. Trials of 3 R. R. strains from Niphad, 2 from Poverkheda and 2 from Badnapur were conducted at Washim, as well as at the Agricultural College, Nagpur, under dry and irrigated conditions.

all varieties under trial proved superior in yield to the checks under both the conditions of trial at Washim, while in the trial at the Agricultural College, Nagpur, P.W. 3 gave higher yield than the check. A trial of 7 wheat varieties from Niphad, Powersbada, the Indian Agricultural Research Institute and Badnapur was conducted at Washim Farm and at the Agricultural College, Nagpur, under irrigated and dry conditions. At Washim, all varieties proved higher in yield than local under both sets of conditions except Hy. 11 and N. 179 under irrigated conditions at the Agricultural College, Nagpur, P.W. 5 gave highest yield over the rest of the varieties under both sets of conditions.

At Sindewahi, a district trial of wheat varieties from Niphad, Badnapur and the Indian Agricultural Research Institute was conducted with Hy.65 as a check. Two NP wheats and 4 varieties from Niphad gave higher yield over the check.

D. JOWAR

(a) *Kharif Jowar*.—*Kharif jowar* predominates in Nagpur and Aurangabad divisions where it covers about 84 per cent of the *kharif* area in the State. The three improved varieties *viz.*, Improved *Saoner*, Improved *Ramkel* and N. J. 164 gave 10 per cent higher yield over the local *jowars* in Nagpur divisions where they are under general distribution. The improved strains distributed in Aurangabad division are P. J. 4-K, P. J. 8-K, P. J. 16-K and P. J. 24-K. These strains yield about 10-15 per cent more than the respective locals. For Khandesh tract, selection work in '*Satpani*' and '*Aispuri*' *jowar* is in progress at Jalgaon where 3 selections from the former and 6 from the latter are promising. For Poona division, selection work in the grain *jowar* varieties '*Kalbondi*' and '*Tambadbondi*' is in progress at Karad and that in fodder *jowar* variety '*Nihwa*' at Vadgaon.

(b) *Rabi jowar*.—*Rabi jowar* occupies major portion of the area in the Poona and Aurangabad divisions where it covers about 88 per cent of the *rabi* area in the State. Only two strains *viz.*, P. J. 4-R in the Aurangabad division and M-35-1 in the Aurangabad and Poona divisions are under large scale distribution. Two strains evolved at Dhulia *viz.*, D-2-14 and D-3-38 are undergoing district trials in West Khandesh and Nasik districts. Two new strains *viz.*, P. J. 16-R and P. J. 17-R from Parbhani have out-beaten the old strains P. J. 4-R and M-35-1 at Parbhani, Nanded and Badnapur for the last two years.

The work of exploiting hybrid vigour by crossing the farm improved strains in *kharif* and *rabi* *jowars* with A-385 and the

possibilities of production of hybrid seed is in progress of Parbhani, Jalgaon, Karad, Mohol and Kopergaon.

E. OTHER CEREALS

(a) *Bajari*.—The Poona division ranks first in area and production of *bajari* having about 50 per cent of the area in the State. The high yielding strain No. 28-15 evolved at Niphad is under general distribution to the cultivators in Nasik, Poona and Ahmednagar districts. Attempts are being made at Niphad to exploit hybrid vigour through different crosses with the male sterile type traced at Niphad. About 95 per cent sterility is obtained in the standard types. Hybrid *bajari* seed is already being produced and distributed in the Nasik district.

(b) *Maize*.—The Poona division ranks first also in maize having the largest area in Kolhapur district. As there was no maize breeding station in Maharashtra region, the work has just been initiated at the Agricultural Research Station, Kolhapur.

(c) *Hill millets*.—

(i) *Nagli*.—Work on *nagli* is in progress at Karjat, Hatkhamba, Igatpuri and Vadgaon. At Karjat, in a trial of 32 selections, selection No. 31-1 gave maximum yield but the differences were non-significant. In a co-ordinated trial of improved strains, the differences were non-significant. However, E-31 gave the maximum yield. At Hatkhamba, 4 strains from other stations were tried. The yield differences were highly significant but no strain was superior to the check B-11. Talod strains gave very poor yield. In a trial of 2 Igatpuri strains, the differences were non-significant and the check A-16 gave the highest yield. At Igatpuri, in a trial of the promising selections *viz.*, No. 41, 100, 192 and 174, the differences were non-significant. At Vadgaon, 18 strains were tried including those of other stations but none were superior to Vadgaon No. 5 and 59.

(ii) *Vari*.—Work on *Vari* is being carried out at Karjat and Igatpuri. In a trial of 9 promising selections in four replications, the differences were non-significant. However, the selection No. 4-3 gave the highest yield of 721 lbs. per acre which was 19 per cent higher than local. In a trial of 6 other selection with Hatkhamba 13-11 and Igatpuri Nos. 4 and 10, the yield differences were non-significant. The selection No. 13-11 gave the maximum yield of 976 lbs. per acre. At Igatpuri, in a trial of 6 selections Nos. 2 and 12 gave significantly higher yield over Nos. 4 and 10.

(iii) *Kodra*.—The strain 18-4 evolved at Hatkhamba has been released for cultivation in Ratnagiri district. In a trial of 14 selections from Waghai, 7 gave higher yield than 18-4.

F. OILSEEDS AND PULSES

OILSEEDS

(a) *Groundnut*.—The work on groundnut is in progress at Jalgaon, Parbhani, Nanded, Latur, Nagpur, Buldana, Kopergaon, Karad and Digrāj with the object of evolving groundnut strains of both bunch and spreading types possessing high yield, better shelling outturn, more oil content and resistance to 'tikka' disease. At Dhulia, *Faizpur-1-5* was significantly superior to the local but not to D-103-10. At Jalgaon, strains S. B. XI and *Faizpur-1-5* gave 52 and 47 per cent higher yield respectively than *spanish* local. Five more strains viz., A. H. 814-1, A. H. 814-20-8-16, 5144 and A. H. 32 were found significantly superior to the *spanish* local. At Parbhani, *Kopergaon-1* (semi-spreading) and T. M. V. 2 (bunch) were significantly superior to the local. In district trials in Parbhani, *Kopergaon-1* gave 4.7 per cent higher yield than the local. At Nanded, Karad-4-11 gave significantly higher yield than the local spreading type. In district trials in Aurangabad district, T. M. V. 2 and *spanish* Improved gave 35.1 and 34.7 per cent higher yield respectively than the local. At Latur, Karad 4-11 gave significantly higher yield (22.1 per cent higher) than the local. At Nagpur, the small podded strain N. G. 268 gave 28 per cent higher yield than Improved *Spanish* peanut. In district trials in Akola district, No. 70 and N. G. 337 gave 13.7 and 10.0 per cent higher yield respectively than the local AK-12-24. At Buldana, strains N. G. 268, N. G. 51 and N. G. 386 were found significantly superior to Improved *Spanish* peanut. In the trials on cultivators' fields in Buldana district, N. G. 53 gave 6.7 per cent higher yield than the local. At Kopergaon, the difference in yield between A. H. 814-20 and *Spanish* Improved was on the verge of significance. At Karad, Punjab-1, Narayanwadi-3-6-17 and Marlap-1-2-3 gave significantly higher yield than the local check. In small scale trial, three improved Junagadh strains viz., Gondal-221-31, A. H. 324 and A. H. 29-207 were significantly superior to Karad-4-11. At Digrāj, *Kopergaon-1* (semi spreading), *Uran-1-10-16*, *Jamkhed-2-6-12*, T. M. V. 3, *Narayanwadi-3-6-17* and Karad-5-86 were significantly superior to the local spreading type.

(b) *Sesamum*.—Research work on sesamum (*kharif*) is in progress at Dhulia, Niphad and Jalgaon with the object of evolving early maturing strains of sesamum possessing high yield, more oil content bold seed and resistance to 'Phyllody' disease. On cultivators' fields in West Khandesh district, the improved strain 7-11-1 and Dhulia-19-43 gave 26 and 14 per cent higher yield respectively than the local. At Niphad, strains N-58-2 and N-72-17 were significantly superior to T. 85. It was observed that these two strains were

drought resistant. At Jalgaon, three strains *viz.*, N-71-17, N-58-2 and N-106-5 gave significantly higher yield than the local. In a small scale trial, strain 5-23 from Nagpur gave 30 per cent higher yield than the local.

(c) *Niger*.—Research work on niger is conducted at Niphad and Parbhani.

At Niphad in a small scale trial, two strains 63-1 and 64-12 were found significantly superior to N-12-3, local and *Niger-B* but not to N-13-2. At Parbhani, selection number 235 and 261 gave 22.5 and 9.9 per cent higher yield respectively than the local.

(d) *Linseed*.—The work on linseed is in progress at Nagpur, Parbhani, Niphad and Mohol. At Nagpur, one culture of the cross (N-3 x R. R. 202) F₂-34 was found promising for its oil content which was 45.2 per cent as against 44.5 per cent of the check *viz.*, C-4/29. The improved variety C-4/29 was tried on cultivators' fields when it gave 6.0 and 18.8 per cent higher yield in Chanda and Bhandara districts respectively. At Parbhani, in a large scale trial *Schrynne* and K-2 gave significantly higher yield than the local. At Mohol, two Parbhani selections S-36, C-4/29 and local were tried. None of these selections was found significantly better than the local.

(e) *Safflower*.—Safflower research work is in progress at Niphad, Parbhani and Mohol. At Parbhani, in a large scale trial, three selections *viz.*, 535, 246 and 537 were found significantly superior to the local. Selections 51-13-10, 51-24-12 and 51-16-12 from Kopergaon were significantly superior to the local. At Mohol, two improved strains from Niphad and three Mohol selections were tried in a large scale trial. None of the selections was significantly superior to the local.

RABI PULSES

GRAM

Aurangabad Division

At Badnapur, bold, smooth and round selections of gram from Niphad and Nagpur were tested against early *Gulab*. Only N. 68 and Hy. 22-6 gave 26 and 11 per cent higher yield than the cheque. In the trial of 9 varieties of gram, 63-8-12-41, 53-86-92-102, AD U-V, D-3-6-1 gave 10 to 22.56 per cent higher yield than the check. Comparative trial of 25 bold wrinkled gram varieties evolved at various research stations was conducted. *Chafa* proved its superiority in yield over all the selections under trial.

At Parbhani, 8 selections of gram were compared for yield; 53-86 gave 7.3 per cent higher yield than the check.

Bombay Division

At Dhulia, 10 promising selections from this station were compared with 2 cultures from Niphad. Only selection D-31-5 gave higher yield than *Chafa*.

A ordinated trial of 6 cultures from Niphad and Dhulia was conducted. Selections D-2-69 and N-59 proved significantly superior in yield over *Chafa*.

At Niphad, 269 cultures were compared with 5 checks in 19 sets. The promising cultures were retained from the above cultures for further study. A small scale trial was conducted with 16 strains in which B-8-9 gave higher yield. In the large scale trial of 12 selections, 41-8 gave higher yield than the check. Row-trial of 186 cultures was conducted. Promising cultures were retained for further trials. In the district trials of gram conducted at 5 places, D-2-69 gave higher yield than *Chafa* but there was no marked difference in the yields of D-2-69 and *Chafa*. Comparative trials of gram varieties on three Taluka Seed Farms were conducted. D-2-69 and N. 31 outyielded *Chafa* at Stirpur and Pimpri respectively. Fifteen gram selections from Niphad, Dhulia and Bailhongal are being tested at Jalgaon since 3 years. Selection 2-69 proved consistently superior in yield for all the three years. On an average, it gave 20 per cent higher yield than *Chafa*. In the trial of 8 gram selections from Niphad, Dhulia, and Marathwada against *Chafa*, none of the selections outyielded *Chafa*.

Poona Division

At Karad, 3 selections from Kopergaon and 2 from Karad were compared with *Chafa*. Selections 252-4-14-17-4 and 51-21-4-812 gave 43.1 and 3.4 per cent higher yield respectively over *Chafa*. A trial of 15 gram selections from Niphad and Karad was conducted with *Chafa* as check. N. 59, N. 59-2, *Sindkheda-1* and *Khamamat* gave significantly higher yield than *Chafa*. In the trial of 3 selections from Niphad, all these selections gave higher yield than *Chafa*.

At Mohol, 3 selections from Niphad were compared with *Chafa*. Selections No. 31-1 and N. 74 yielded better than *Chafa*. A trial of 5 selections from Dhulia, Kopergaon and Mohol was conducted in which *Chafa* gram outyielded all the selections under trial.

Bulk samples were grown at Agricultural Research Station, Kolhapur (Uchegaon). Selections were made and after laboratory study the best ones were retained for further trial. A trial of 27 cultures was conducted in two sets. Only 6 cultures proved their superiority over *Chafa* in the first set, whereas in another set *Chafa* proved its superiority. A large scale trial of Niphad cultures was conducted in which 8 cultures found to be superior to *Chafa*. In the progeny row trials of 87 cultures, only 9 selections proved better in yield than *Chafa*.

At Kopergaon, a large scale trial of bold grained group was conducted. All cultures gave higher yield than the check. Another trial of medium to slightly bold types of gram was in progress in which all types except 7-30-1, 1-2-2 and 54-24-1-8-10, outyielded the check. In the trial of selections from Niphad and Kopergaon all the cultures yielded more than *Chafa*.

Nagpur Division

At Washim, 6 gram strains were compared with *Gulab* and *Chafa*. N-31, N-59, N-10, N-29 and N-63 gave higher yields ranging from 0.4 to 21 per cent over *Chafa*.

LAKH

A trial of 7 varieties of *lakh* was conducted at Badnapur Farm. All other varieties except *Indore T 2-12* gave higher yield over local *lakh*.

WAL

Work on *Wal* in progress at Karjat and Igatpuri.

At Karjat, the hybrid material of crosses between *Kadwa Wal-2-K2* and the virus resistant white *Wal-125-36* was grown in replicated trials. Eight selections in F_8 , 16 in F_7 , 6 in F_6 and 18 in F_5 were grown in separate replicated trials with 2-K2 proved superior in yield. In a replicated yield trial of two *Kadwa Wal* strains from Igatpuri Nos. 15 and 21 with 2-K2 as check, it was found that the yield differences were not significant but the Igatpuri strains gave about 50 lbs. more yield per acre than 2-K2 which gave 465 lbs. per acre.

At Igatpuri, 5 selections were tried in a large scale trial with Nos. 15 and 21 as checks. Two selections appeared promising. In a replicated row trial, 34 selections were tried out of which 13 were found promising.

KHARIF PULSES

Tur, mug, udid, matki and *kulthi* are grown all over the State but their cultivation is more extensive in Nagpur and Aurangabad divisions. In the Nagpur division, the new improved varieties of *tur* viz., No. 143 and 'Hyderabad' are under large scale distribution. The strain C-11, which is partially wilt resistant is being distributed in the Aurangabad division, whereas *Tur* No. 84 and K-132 are distributed in Nasik district and Deccan canal area respectively. The *udid* strain No. 55 and *Kopergaon mug* continue to be popular with the cultivators of Vidarbha. *Udid Sindkheda-1-1* and *China Mug-781* are distributed all over Bombay and Poona divisions in general and in the Khandesh tract in particular. Work on *matki* is in progress at Parbhani and Karad and that on *kulthi* and at Dhulia. *Kulthi-D3-7* from Dhulia is reported to yield as high as 41 per cent over the local and is 4 to 6 days earlier also.

G. VEGETABLE

(a) *Tomato*.—The synthetic material from many crosses was grown and tested for fruit size and light yield and resistance to the leaf curl disease, both in *kharif* and in *rabi* seasons. Promising cultures are retained for further work.

(b) *Bhendi*.—The 20 cultures divided into 4 groups were tried in simple randomised block design with 6 replications both in the *kharif* and in hot weather seasons. Two selections viz., 764-6 and No. 753-10 have given significantly more yield than the local.

(c) *Leafy vegetables*.—

(i) *Methi*.—Eleven cultures were tried with local in simple randomised block design with 4 replications for seed and leaf. Results are non-significant. Selection No. 47 has given higher yield than local. Selection No. 4 and 2 were multiplied in 4 gts. area.

(ii) *Palak*.—Old bulks and district samples were tried. Selection No. 73-1 has given significantly higher yield over local and other district samples.

(iii) *Chakawat*.—Secondary selections were made and tried with local. The results are non-significant.

(iv) *Rajgira*.—Secondary plant selections were tried and selection No. 5-3 has given higher yield than local.

(d) *Onion*.—Four cultures viz., No. 53, No. 404, N-491 and N-359 tried with local as a check on a large scale trial showed that culture No. N-491 gives the highest yield. On an average of the last two years, this strain has yielded 19 per cent more than the check. This difference in yield is significant.

(c) *Chilli*.—

(a) *Achalpur*.—This is the first year of the work. Forty-two selections were tried in rod rows and 44 selections were tried in a replicated trial. None of them proved superior to local. Fresh selections are made from each of the above sets of cultures.

(b) *Uchgaon, district Kolhapur*.—This is the first year of the work. Twenty-one bulks were grown and 210 selections were made in the field. Only 66, which have given more yield than the average plus twice the standard error have been retained for further trials.

H. GRASSES

A strain EB-8 of *Marvel* (*Dichanthium annulatum*) is being multiplied on a large scale. A yield trial of 14 *D. caricosum* selections was undertaken at Kothrud near Poona. Among the hybrids of *Pennisetum typhoides* (bajri) P.P. *Purpurcum* (*Thick Napier*), hybrid EB-4 gave the highest yield. It is proposed to multiply this hybrid on a large scale. Seeds of *Sesima nervosum*, *S. sulcatum*, *Chrysopogon montanus*, *Bothriochloa pertusa* and of *Phaseolus sublobatus* were collected and will be sown in the coming season.

CHAPTER V

RESEARCH WORK ON PESTS AND DISEASES OF CROPS

A PLANT DISEASES

An extensive programme of research work on the methods of prevention and control of plant diseases, breeding of disease resistant varieties of crop plants investigation into new diseases and advice and guidance to cultivators for control of plant diseases was carried out. Some of these investigations carried out were partly financed by the Indian Central Cotton Committee, the Indian Council of Agricultural Research and the Indian Central Oilseeds Committee.

Research results

(a) The following cotton selections, crosses and strains received from different centres have shown positive results towards resistance to wilt disease of cotton.

(i) *Jalgaon Section*.—All the 30 cultures from the old material consisting of progenies of crosses involved *Madras arborium*, *Virnar* and *Dhulia-2* selection, selections and bulks of y-1, *Virnar* (N. B.) and C. J. 73 showed better performance than that during the last year.

(ii) *Parbhani Section*.—Progenies of the cultures 4971, 9204, 4166, 4526, 4822, 5875, 5280, 5907, P. 47-3591 from Parbhani and Badnapur showed high resistance.

(iii) *Nanded Section*.—Progenies of the cultures 1716, 1952, 2146, M. 980, 6634, 2164, 1494, 723, 688, 1422 and 1946 showed high resistance.

(b) The wheat varieties, *New Thatch*, *Bowie* and *Kenya Farmer* were highly or moderately resistant in the seedling stage to eleven races of stem rust. They were even resistant to the virulent races 15C and 122. *New Thatch*, and *Bowie* have shown mature plant resistance to stem and leaf rust, whereas *Kenya Farmer* has shown moderate resistance to stem rust and high resistance to leaf rust at this stage. The varieties *Lee*, *Frontana* and *Helvia* have shown semi-resistance and susceptible type of infection in the mature plant test in the field.

Wheat variety NP. 200 was found to be resistant to 8 races but showed susceptibility towards the race 42-B in the seedling stage. It is, therefore, concluded that the wheat variety NP. 200 though

resistant to 8 races it is not useful for cultivation in the State where race 42-B is a commonly occurring race.

The wheat variety E-2158 has been found to be resistant in the seedling stage to 8 races inclusive of race 15C but susceptible to race 122. The wheat variety E. 2025 has shown positive resistance at this stage to 11 races including races 15C and 122.

(c) The following strains and hybrid selections of rice have shown resistance to blast disease of rice.

(i) *Karjat material*.—(T3 × Z. 149) F₃ - 49, (6498/1 × E.K. 70) T6-17-12-1, 17-12-3, 17-13-1 and 17-10-1, (Norin-43 × K. 42) F₆ -22-1-1, (Z. 14 × Bas. 370) F₆ -19-3-3, *Kada-68-1 × Londer* F₆ -16-1-1 and 16-1-2, (K. 540 × Co. 25) F₉ -4-1-3 and 4-4-1, (Co. 25 × 1-B-12-11) F₉ -5-3-5, 5-1-4, 5-1-3, 5-3-3, and 5-3-2, (Co. 25 × E.K. 70) F₇ -15-10-4, 15-11-3, 15-11-2 and 15-11-4.

(ii) *Igatpuri material*.—*Pelopar-2798* and *Krishnasal-10*.

(iii) *Vadgaon material*.—*Krishnasal Selection 17*.

(d) The fungicidal trials for the control of *Dahiya* disease of cotton in Vidarbha have given successful results. The results show that sulphur alone and sulphur plus D. D. T. 5 per cent (3:1) have given good control of *Dahiya*.

(e) The fungicides, copper dust 4 per cent, copper dust 8 per cent and Bordeaux mixture 2:2:50 have given good control of fig rust in Poona district.

(f) Seed treatment with one per cent mercurial seed disinfectant at 2 Ozs. for 15 lbs. of seed was effective in controlling seed borne as well as the boll infection of anthracnose of cotton in Khandesh.

B CROP PESTS

The teaching staff had conducted some research work in addition to their teaching duties. Investigations carried out, both in the laboratory as well as in field, to study the cause of sugary disease of *jowar* revealed that sugary secretion was associated with the presence of jassids and aphids. Plants kept free from the jassids and aphids did not show the presence of any secretion. Field trials were conducted at Agricultural Research Station, Mohol, to study the efficacy of different insecticides to control aphids and jassids on *jowar*. It was found that endrin, malathion and diazinon were equally effective in controlling the pests.

Survey of birds visiting different food and fruit crops was carried out in Aurangabad, Nanded, Ahmednagar and Sholapur districts. No new species were recorded. Field trials with recorded distress calls of parrots and weaver birds were conducted in Poona district. A reduction of 55.6 per cent in the visits of parrots in guava garden and 80.7 per cent reduction in visits of weaver birds visiting *jowar* crop was observed. However, no continued effect was observed.

Insecticidal trials were laid on field scale for the control of boll-worms, jassids, thrips and aphids on cotton at Shrirampur. The data are being analysed.

Survey work to demarcate endemic areas of *Nephantis serinopa* in Thana and Kolaba districts was in progress. Breeding of alternate hosts of larval and pupal parasites of *Nephantis serinopa* was undertaken.

In general, sugarcane borer incidence was low during the year under report. Laboratory trials with pupal parasites of *Tetrastichus* sp. on top shoot borer were in progress. It was found that the parasite parasitises naked larvae very easily while it could not parasitise the larvae remaining inside the shoot so easily. Severe attack of pyrilla on sugarcane was noticed at Ravalgaon which was kept under control by spraying with endrin E. C. at the rate of one lb. per acre.

From the experiment laid out to estimate the loss by fruit sucking moths of citrus, it was observed that the losses were ranging from 1.67 per cent to 3.01 per cent. A field experiment laid out to study the efficacy of various insecticides in reducing the losses due to fruit sucking moths showed that all the insecticidal treatments except 0.5 per cent DDT suspension were significantly superior to untreated. Trial conducted to study the relative efficacy of different insecticides for controlling citrus nursery pests *viz.*, leaf eating caterpillar and leaf miner showed that parathion, lindane (0.25 per cent) and endrin were significantly superior to other insecticides in controlling leaf eating caterpillar while endrin, parathion, and DDT 0.25 per cent were significantly superior to the rest of the insecticides tried in controlling leaf miner.

C. CROP PROTECTION AND OTHER ACTIVITIES

During the year, seven plant protection schemes were in operation in various parts of the State.

The important activities of the plant protection unit were as under:—

- (1) To demonstrate the insecticidal and other control measures for the important crop pests and diseases of the State.

(2) To provide insecticides and appliances to the cultivators at the subsidised rates.

(3) To issue crop protection circulars to the extension staff.

(4) To deal with all public enquiries pertaining to insect pest control.

In addition, the Agricultural Entomologist and the Plant Pathologist, used to receive a number of queries from the cultivators and advised them about the control measures to be adopted. Many demonstrations were held wherever necessary. The Agricultural Entomologist and the Plant Pathologist also issued large number of phytosanitary certificates for the consignments of plants, bulbs, seeds and other plant products exported from Bombay.

During the year, appliances worth Rs. 10.50 lakhs were purchased for giving to cultivators on hire and appliances to the extent of Rs. 33,002.00 to be sold at 50 per cent subsidised rates. The total number of appliances with the Department for giving on hire including those purchased during this year is given below :

(a) Hand operated dusters	...	5,650
(b) Hand operated sprayers	...	7,173
(c) Power sprayers	...	12
(d) Power dusters	...	4

In addition, insecticides worth Rs. 14,472.00 were purchased for selling at 20 per cent subsidised rates, worth Rs. 1,15,000.00 for selling at 50 per cent subsidised rates and worth Rs. 35,348.00 on the basis of no profit no loss.

A few appliances like 4 purivox machines (bird scarer) and 45 bucket pumps were also purchased for trial purposes and distributed to different divisions to find out their efficiency on field scale.

These appliances and insecticides were distributed to different District Agricultural Officers according to their requirements and an additional reserved stock was maintained at the central depots at Nasik and Poona for meeting the emergency requirements.

In addition to the 11 jeeps and 8 trucks already existing for plant protection work, one more jeep was purchased under plant protection scheme for Vidarbha region.

Aerial spraying operations were undertaken against Deccan wingless grasshoppers on *jowar* in South Satara district covering an area of 14,906 acres and against pyrilla on sugarcane in an area of 5,827

acres in Nasik and Ahmednagar districts. Besides this, aerial spraying on American cotton was also done in an area of 1,500 acres in Vidarbha.

The number of appliances purchased under various schemes during the year 1959-60

Appliances		Purchased for hire	Purchase for sale at subsidised rates
Dusters	...	5,650	115
Sprayers	...	4,925	115
Power sprayers	...	12	...
Power dusters	...	2	...
Seed dressing drums	...	...	43

CHAPTER VI
SEED DISTRIBUTION

A. COTTON

(a) *Khandesh*.—The Scheme for multiplication and distribution of the improved variety *Virnar* (197-3) was continued.

The object of the scheme is to replace *Jarila* with the improved strain *Virnar*. The total area under cotton in Khandesh tract was 7,45,311 acres, out of which 7,38,056 acres were under *Virnar* and 7,285 acres under 170-Co2. The total acreage under *Virnar* was 7,38,056 acres. The seed of *Virnar* stocked by the Department and its approved stockists was 71,727 B. Mds. for distribution.

The work of grading and Agmarking continued during the year under report and 13,570 bales were Agmarked, out of which 3,602 bales were Agmarked Red labels and 9,938 bales with Black labels.

(b) *Vidarbha*.—Scheme for multiplication and distribution of *Buri-0394* cotton in Vidarbha continued this year. With a view to replace *Buri-107* and *Cambodia* varieties by *Buri-0394*. The total area under cotton in Vidarbha was 35 lakh acres out of which 10,06,070 acres were covered by *Buri-0394*. The Department has procured 29,058 B. Mds. seed of *Buri-0394* for distribution to the cultivators. On an average, cultivators got Rs. 39 00 more per acre by growing *Buri-0394* as compared to local *Deshi*.

Scheme for multiplication and distribution of *Virnar* (197/3) in Vidarbha has been introduced from this year to replace H. 420 and 91 as a stop-gap arrangement. During the year under report, 7,191 B. Mds. of seed was procured for distribution. The variety was very heavily attacked by *Dahiya* disease due to which the crop was damaged to the extent of 60 to 70 per cent which had an adverse effect on the procurement of seed.

(c) *Marathwada*.—Scheme for multiplication and distribution of *Gaorani-22* (1422) cotton seed in Osmanabad district and Mominabad taluka of Bhir district was continued this year also with a view to replace *Gaorani-12* with the improved high ginning and high yielding strain 1422. The total area under cotton in Osmanabad district and Mominabad taluka of Bhir district was 2,15,233 acres, out of which 22,200 acres were under *Gaorani-22* strain. This was 10 per cent of the total acreage. The seed of 1422 procured by the Department was 4,103 B. Mds. The *kapas* of

Gaorani-1422 received a premium of Rs. 5.00 per B. Md. over *Gaorani-12*. On an average the cultivators who cultivated *Gaorani-22* got Rs. 36.00 per acre more than *Gaorani-12*.

The area under *Gaorani-12* variety was 1,42,450 acres and 5,068 B. Mds. seed of the said variety was procured for distribution by the Department.

Scheme for multiplication and distribution of the variety 2204 (*Daulat*) cotton in Parbhani district was continued during the year under report with a view to replace the existing varieties viz., G-6, G-12 and local with *Daulat* (2204). The total area under cotton in the district was 5 lakh acres out of which 10,000 acres were covered by *Daulat* strain. For distribution, 2,053.20 B. Mds. of seed was stocked by the Department. *Daulat kapas* fetched on an average of Rs. 7.13 more per B. Md. over the local varieties. The rate of multiplication of *Daulat* is unsatisfactory mainly due to the unfavourable climatic conditions.

Cotton seed distribution in Nanded district.—The area under cotton in Nanded district was 5 lakh acres. During the year under report, 33,275 B. Mds. seed of G-6 variety was stocked for distribution. The high ginning variety G-1946, is replacing G-6 in this tract. The quantity of 719 B. Mds. of G-1946 was procured for distribution during the year. The *kapas* of the variety 1946 received a premium of Rs. 5.00 on *Gaorani-6 kapas*. In the Kinwat taluka of Nanded district, 1500 B. Mds. of *Parbhani American-1* seed was procured.

Scheme for planned production of cotton in Bombay State.—Under the scheme, it was planned to increase cotton production by (a) spread of improved varieties, (b) increasing yield per acre by manuring with sulphate of ammonia and (c) cultivation of superior long staple cotton *Deviraj* (170-Co2) under irrigation. As regards the fertilizers, 10,130 tons were applied to the area under this variety. In all, 62,500 acres were under superior long staple cotton under irrigation as a result of distribution of seed by the Department and its natural spread.

B. OTHER CROPS

Taluka Seed Multiplication Farms.—During the Second Five Year Plan, it was decided to establish Taluka Seed Multiplication Farms with the object of increasing the supply of improved seed in sufficient quantities. Accordingly, it was proposed to establish 244 Taluka Seed Multiplication Farms covering an area of 15,372 acres in the State.

By the end of the year under report, 190 seed farms covering an area of 9,810 acres were in the possession of this Department. Cultivation was undertaken on 178 farms covering an area of 9,510 acres. The total quantity of foundation seed produced was 43,369 B. Mds. The details of the same are shown below—

Crop	Quantity in B. Mds.
(1) Paddy	... 8,996
(2) Jowar	... 12,801
(3) Bajri	... 1,192
(4) Wheat	... 6,625
(5) Gram	... 1,880
(6) Nagli	... 7
(7) Groundnut	... 4,866
(8) Cotton	... 4,392
(9) Other pulses	... 1,999
(10) Other oilseeds	... 611
Total	... 43,369

Distribution of improved seed of various crops.—All the foundation seed stated above i. e. 43,369 B. Mds. of various crops obtained from the Taluka Seed Multiplication Farms, was distributed amongst the Registered Seed Growers for multiplication and for further distribution to the cultivators.

CHAPTER VII

MANURES AND FERTILIZERS

A. SCHEME FOR THE PREPARATION OF ORGANIC MANURES
FROM FARM AND VILLAGE WASTES

The object of the scheme is to supplement the present output of farm yard manure by preparing compost from the rural wastes and to improve the quantity and quality of farm yard manure prepared by farmers by conservation of urine of cattle and by using the same along with dung and litter in the preparation of manure. In all, 16,763 village participated in the scheme. The total number of pits filled in was 1,43,522 against the target of 1,83,600 pits. The quantity of manure expected from these pits is 3,58,805 tons sufficient to cover an area of 71,761 acres. The additional yield of food grains estimated thereby is 7,776 tons.

B. TOWN COMPOST

The object of the scheme is to induce the Municipalities and village *panchayats* (above 5,000 population) to prepare compost manure from the routine disposal of town waste collected by them and thereby increase the output of organic manures in the State.

Under this scheme, out of 336 urban centres, 221 reported compost production during the year under report to the tune of 2,05,695 tons. The balance stock of the previous year was 1,21,623 tons. The distribution of compost manure is 1,87,083 tons which comes to 67 per cent of the target fixed for the year. The area benefited due to town compost was 37,417 acres, capable of giving additional production of foodgrains to the extent of 3,741 tons.

C. DISTRIBUTION OF SANN HEMP SEED FOR GREEN
MANURING OF FOOD CROPS

As per recommendations of the State Development Committee the scheme for distribution of sann hemp seed for green manuring was continued during the year under report. A quantity of 13,663 B. Mds. of seed was distributed in the State against the target of 12,000 B. Mds. The area covered was 13,663 acres, capable of producing additional production of 1,708 tons of foodgrains.

D. DISTRIBUTION OF FERTILIZERS

Distribution of nitrogenous fertilizers was made to the consumers, through the co-operative societies throughout the State except in Ratnagiri, Kolaba and Thana districts and in the Marathwada division where the co-operative structure is not yet developed. The distribution was so arranged that the consumers at any corner of the State would get the material at the controlled rate.

Ammonium sulphate, calcium ammonium nitrate, ammonium sulphate nitrate and urea were distributed during the period under report. The materials were supplied either ex-docks or ex-godowns, Bombay on cash and carry basis.

During the year 1959-60, a total quantity of 75,731 tons of nitrogenous fertilizers were distributed as under :

S. No.	Fertilizer	Target in tons	Supply made in tons
1	Ammonium sulphate ...	1,28,000	41,185
2	Ammonium sulphate nitrate.	23,334	15,243
3	Calcium ammonium nitrate.	5,334	3,918
4	Urea ...	11,000	13,894
5	Other fertilizers ...	...	1,488

Besides the above nitrogenous fertilizers, 33,334 tons of superphosphate were distributed against the target of 30,000 tons, to the cultivators during the year under report.

CHAPTER VIII
HORTICULTURE

Investigation on various fruit crops were continued during the year at the regionally situated horticultural research stations. Varietal collection of mango, grapes and citrus was strengthened both at the Ganeshkhind Fruit Experiment Station, Poona 7, and Fruit Research Station, Aurangabad. Hybridization with the object of evolving better table quality coupled with yield was carried out in grapes at both these centres. The breeding work on papaya to evolve disease resistant variety to leaf mosaic was initiated at the Ganeshkhind Fruit Experiment Station, Poona-7. The resistant species i.e. *Carica cauliflora* obtained from Venezuela was grown for use as male parent. Submatting was resorted to for purification of the cultures. Preliminary trials on the use of growth regulators for preventing preharvest fruit drop in *Alphonso* and *Pairi* varieties of mango were conducted under the hormone scheme. In banana, the collection of types for table, conducted on the planting material and season (time) of planting have given consistent results. The findings which could be passed on to extension workers are: (a) 1 lb. or 2 lbs. bits of corm is a good planting material, (b) February is the best season for planting of *Basrai* banana variety for early and high yield in comparison with April or June planting and (c) two months old suckers do not serve as useful planting material.

At the Regional Cashewnut Research Station, Vengurla (district Ratnagiri) the propagational, mulching and manurial trials have been initiated. Varietal collection of cashew types is being strengthened. At the Regional Coconut Research Station, Ratnagiri, the cultural and manurial trials on recently planted coconut palms are being continued. Also progeny row trial from high yielding coconut palms has been taken up. At the Government Orchards, Ajra (district Kolhapur), the existing orchards of mango, cashew and jack are being improved by systematic manuring and cultivation programme. Planting of coco and spice crops like pepper, nutmeg and vanilla as well as Assam hill oranges is also in progress. Trial of pineapple varieties viz., *Kew*, *Queen* and *Mauritius* is initiated at Government Orchards, Ajra.

At the Citrus Die-back Research Station, Shirampur, observations on the growth data of the recently laid out citrus root-stock trial with 16 rootstocks and 3 scions have been started. At the Citrus Fruit Research Station, Tharsa, Nagpur, under the rootstock trial, *Jambori* is showing promising results.

The scheme for the Development of Fruit Production in Bombay State came into operation in November 1958. The object of the

scheme is to increase fruit production by bringing new area under cultivation, rejuvenating existing orchards and renovating inferior mango and *bor* trees to superior varieties.

During the year under report, 5,002 acres of new area has been planted with different kinds of fruit trees, chiefly mango, citrus, banana, guava, grape and *ohiku*. Under the rejuvenation programme, 4,714 acres were treated and good results were obtained. Similarly, 3,942 country mango trees were side-grafted with commercial mango varieties. A campaign for dusting mango trees with DDT and sulphur was undertaken in the block and non-block areas and a total of 5,032 trees were treated. One of the important features of the development work was the planting of mango stones *in situ* at the Taluka Seed Farms, where irrigation is available for the purpose of building up a stock of mother trees for future propagation.

There is a provision under the scheme for advancement of long term loans to fruit growers for bringing new area under fruit cultivation. During the year under report, loans amounting to Rs. 3,68,544.00 were actually disbursed to the growers.

CHAPTER IX

AGRICULTURAL ENGINEERING

The agricultural engineering activities continued to remain under the control of respective Superintending Agricultural Officers of the four divisions at Poona, Bombay, Nagpur and Aurangabad. Each Superintending Agricultural Officer is assisted by one Deputy Director of Agriculture (Engineering) in Class I and one Agricultural Engineer in Class II. These activities comprise of land development, minor irrigation and research in agricultural implements.

LAND DEVELOPMENT

Mechanical cultivation is undertaken in two ways *viz.*, by bulldozing operations and by tractor ploughing. The following schemes in various parts of the State are sanctioned. All the schemes stand included in the Second Five Year Plan except the one for reclamation of waste lands (including forests land) by tractor ploughing in Marathwada. During the year under report, a number of machines worked and physical achievements made under each of the schemes are given below :

A. BULLDOZING OPERATIONS

(a) *Mechanical Cultivation Section in old Bombay State.*—Under the scheme, 40 machines (38 bulldozers and 2 motor graders) were operated through 10 operational units to undertake levelling, grading, bunding and terracing. During the year, 24,431 hours of bulldozing work was done. The charges are levied on hourly basis as Rs. 40.00 for 80 H. P., Rs. 30.00 for 60 H. P. and Rs. 25.00 for 40 H. P. machines.

(b) *Mechanical cultivation by State tractors in Marathwada.*—This is a new activity to be started by working 4 bulldozers in Marathwada. Four bulldozers have been purchased by the end of 1959-60. The actual operations would be started shortly.

B. PLOUGHING OPERATIONS

(a) *State machine tractor stations in Vidarbha.*—Under the scheme, 89 tractors were worked through 8 stations in the 8 districts of the region for ploughing operations on the lands of cultivators. During the year, 41,241 acres were ploughed. The cultivators were charged at the rate of Rs. 30.00 per acre.

(b) *Revival of tractor ploughing in old Bombay State.*—The scheme for tractor ploughing which was closed in old Bombay State in the year 1955 was revived on the lines of the existing scheme in Vidarbha. To start with 8 existing tractors from the old lot are to be worked under the scheme after repairs and overhauling. Five tractors were actually brought into commission and 6.7 acres of ploughing work was done during the year.

(c) *Reclamation of waste lands (including forests land) by State tractors in Marathwada.*—Under this non-plan activity, 13 tractors and one terracer were to be worked to undertake ploughing, levelling, and grading work. Eight tractors could, however, be repaired and brought into commission and 1,692 acres of ploughing work was done during the year. The rates sanctioned under the scheme are Rs. 30.00 per acre for ploughing and Rs. 25.00 per acre for levelling and grading.

C. OTHER ACTIVITIES

(a) *Mechanical work.*—During the year several enquiries on agricultural engineering problems were received and attended to. Technical help given to the agriculturists, Government Farms, Agricultural Institutions at the usual rate of Rs. 5.00 per day per technical man.

(b) *Water finding.*—All the water finding machines which were distributed in various districts could not be worked as these were out of order and are irreparable. These have, therefore, been discarded.

(c) *Training.*—Four oil engine classes each of 3 months' duration were conducted at Poona and during the year, 132 students were trained.

(d) *Building construction work.*—Small constructional works at various Farms, Institutions, Research Stations, costing upto Rs. 5,000.00 each, were undertaken departmentally.

CHAPTER X
MINOR IRRIGATION

A. WELLS

(a) *Construction of new wells and repairs to old wells.*—Under the scheme, a loan to the extent of Rs. 2,500·00 (maximum) and subsidy at 25 per cent subject to a maximum of Rs. 500·00 is granted for construction of a new well. In respect of repairs to old wells, only loans to the extent of Rs. 1,000·00 are granted. The work of granting loans to the cultivators was continued to be carried out by the branches of the Bombay State Co-operative Land Mortgage Bank in all the districts of the State except in eight districts of Vidarbha and Ratnagiri districts. During the year, 2,074 new wells and 754 old ones were taken up for the construction and repairs respectively in the above 9 districts where loans to the extent of Rs. 136 lakhs were granted to cultivators by the Revenue Department. In the remaining districts of the State an amount of Rs. 107·83 lakhs was advanced by the Bank for the construction of 5,287 new wells and repairs to 1,508 old wells.

(b) *Operation wells scheme.*—To reduce the shortfalls in the Second Five Year Plan expenditure 'Operation Well Scheme' on the pattern of 'Integrated Wells Scheme' was sanctioned by the State Government in December 1959. The scheme envisaged to grant loans for 20,000 new wells in the banded areas only in Nasik, Poona, West Khandesh, East Khandesh, Sholapur, Ahmednagar, Kolhapur, South Satara and North Satara districts at a total cost of Rs. 4,00,00,000·00 to be expended during 1959-60 and 1960-61. During the year 1959-60, loans to the extent of Rs. 161 lakhs were granted for construction of 17,973 new wells.

B. PUMPING SETS

The integrated scheme was sanctioned in January 1959 for the entire State. Under this scheme, a loan to the extent of Rs. 4,000·00 for the purchase of set or electric motor upto 20 H. P. and a subsidy of 25 per cent (subject to a maximum of Rs. 800·00) is granted through the Bombay State Co-operative Land Mortgage Bank in all districts except 8 districts in Vidarbha and Ratnagiri where loans were given through the Revenue Department. During the period under report, an amount of Rs. 35·83 lakhs for the purchase of 1,206 pumping sets was advanced as loans by the Bank. Besides this, Rs. 28·83 lakhs were advanced as loans through the Revenue Department for the purchase of 1,246 pumping sets.

C. TANKS

Scheme for construction of small irrigation tanks and repairs to old ones is restricted to Vidarbha only. Under this scheme, financial assistance to the extent of Rs. 150.00 per acre of area benefited (both for loan and subsidy) is granted to a cultivator, subject to a maximum of Rs. 10,000.00 per tank in case of new tank and Rs. 5,000.00 in case of repairs to an old tank. Of the total cost of the project, 25 per cent is given as subsidy and 75 per cent as loan. During the year under report, loans to the extent of Rs. 88,635.00 have been granted for the construction of tanks.

D. BORING

Old Bombay State area—The scheme sanctioned so far pertains to working of 12 percussive type boring machines in the area of Nasik, East Khandesh and West Khandesh districts. Under the Integrated Boring Scheme, which started in December 1959, 37 machines were in operation in East Khandesh, West Khandesh, Nasik, Poona, Sholapur and Ahmednagar districts. During the year, 127 bores were taken. In addition to the above, 23 boring machines were also worked in various districts by the District Local Boards.

E. BLASTING

(a) *Hand blasting*.—To help the cultivators in deepening the wells in hard rock, hand blasting scheme has been sanctioned in the three districts of Nasik, Poona and West Khandesh. During the year, 143 blasts have been taken.

(b) *Air compressor and blasting*.—Government have sanctioned purchase of 25 air compressors and equipment during the year 1959-60 for Maharashtra region to undertake the work of deepening of wells. The air compressors were purchased in March 1960 and are proposed to be worked in the following districts from the next year.

District	No. of machines
1. Sholapur	6
2. Ahmednagar	3
3. Poona	2
4. West Khandesh	3
5. Nasik	2

District	No. of machines
6. East Khandesh ...	1
7. South Satara ...	1
8. Vidarbha ...	5
9. Marathwada ...	2
Total ...	25

It is proposed to charge the following rates for undertaking air compressor and blasting operations :

Agricultural purposes.—

(i) Drilling and blasting at Rs. 8.00 per shot hole of 2 ft. depth containing one detonator and 5 cartridges.

(ii) Dewatering charges at Rs. 5.00 per hour.

Non-agricultural purposes.—

(i) Drilling and blasting at Rs. 10.50 per shot hole of 2 ft. depth containing one detonator and 2 cartridges.

(ii) Dewatering charges at Rs. 5.00 per hour.

F. CO-OPERATIVE LIFT IRRIGATION SCHEMES

The work relating to mechanical portion of the co-operative lift irrigation schemes is looked by the Department in respect of the following aspects:

- (i) Investigation of mechanical part.
- (ii) Issue of feasibility certificates.
- (iii) Preparation of plans and estimates of mechanical part.
- (iv) Preparation of the financial aspect of the schemes.

CHAPTER XI

SOIL CONSERVATION

(a) *General.*—The intensive activities of Soil Conservation work continued in Maharashtra State during the year 1959-60 in Ahmednagar, Sholapur, South Satara, Poona and West Khandesh (Dhulia) districts. The number of Soil Conservation Sub-Divisions in the State was raised to 41 out of which 26 Sub-Divisions were engaged in executive intensive bunding works. One Soil Conservation Division at Sholapur to carry out intensive bunding work in Sholapur district and another at Akola for scarcity works were opened in addition to the existing divisions at Ahmednagar, Poona and West Khandesh (Dhulia) to control the expanded Soil Conservation activities in the State.

A number of visitors and soil conservation trainees deputed by the Central Soil Conservation Board, were shown the soil conservation works and given short training in the methods of soil conservation followed in this State. Notable among these were from the Punjab Forest Department, Hazaribagh, Kotah, Ootacamand and Debra-Dun.

(b) *Bunding.*—The quantum of work carried out during the year under report and the cost incurred is as under.—

	Acres.	Expenditure. Rs.
1. Soil conservation contour bunding work (non-scarcity).	4,30,008	2,15,63,287-00
2. Rectification and completion of scarcity bunding works.	2,93,388	
3. Scarcity bunding work (only earth work)	30,128	

(c) *Scheme for introduction of dry farming methods in banded areas of the Bombay State.*—The scope of the scheme was expanded during the year 1959-60 and total number of plots to be located was raised to 7,420 out of which 3,714 demonstration plots were located. All the plots, gave higher yield than the control plots, and there were no instances where the dry farming plot failed or gave lower yields. From the available reports, it can be said that the dry farming plots gave increased yield over the local method of cultivation.

The scheme for demonstration of strip cropping practices was also sanctioned in the year 1959-60 and the demonstrations were carried out in 1,542 plots. All the demonstration plots gave higher yields over the control plots.

Intensive propaganda has been carried out by the field staff by holding meeting of cultivators and by contacting them collectively and individually to explain the benefits of the contour bunding to convince and persuade them to take up contour bunding works in their fields. Help of leading social workers and Members of Legislative Assembly and the staff of the Revenue Department was also taken in pushing up the scheme at as many places as possible.

(d) *Research in deep black soil bunding and evolving a suitable technique for the scheme.*—The bunding work in deep black soil in the area selected at Honmurgi in Sholapur district for experimental work was completed and the Soils Specialist, Department of Agriculture, Bombay State, Sholapur, has recorded observations on the behaviour of bunds. The work is now closed.

Similar work was taken up in a block of 236 acres at the Taluka Seed Farm, Thair, in Osmanabad district. The scheme was prepared with a plan of grade bund and alignments and the same was approved by the Department.

(e) *Scheme for levelling and terracing of hill slopes.*—No data are available to show how the soils in heavy rainfall areas should be economically conserved. With a view, therefore, to collect this data a scheme for levelling and terracing of hill slopes has been sanctioned. Some blocks in Nasik, Kolhapur and Poona districts were selected during the period under report. An area of 78 acres was covered and an amount of Rs. 74,546-00 was spent under this scheme. Observations were being recorded.

In addition to this, the scheme for terracing of lands was sanctioned in the year under report and the work was undertaken in hilly and heavy rainfall areas of Poona and Bombay divisions. An area of 944 acres was terraced at a total cost of Rs. 3,79,99-00.

(f) *Soil conservation survey in the catchment area of the Koyana Project.*—A scheme for carrying out rapid Soil Conservation Survey in the catchment area of the Koyana Project has been continued during the year under report. The survey aims at obtaining the physical inventory of the soil and environmental conditions with special reference to information on the vulnerability of the soils to erosion. During the period under report, an area of 21,391 acres has been surveyed.

(g) *Survey and classification of the cultivable waste lands.*—The scheme for survey and classification of assessed cultivable Government waste lands was continued during the year under report. An area of 1,17,216 acres was surveyed by the two units in 5 districts. In addition to this, a special survey of reserved forest of 12,630 acres for rehabilitation purpose was carried out in Nasik and East Khandesh districts by the Land Utilisation Survey Officer, Poona, and a

survey of 22,505 acres of Koyna forests was carried out by the Land Utilisation Survey Officer, Koyna.

The scheme sanctioned by the Trustees of Sir Dorabji Tata Fund for undertaking bunding works in the backward tract of Man valley in North Satara district, was continued upto September 1959 and an area of 255 acres has been bunded during the year under report at an expenditure of Rs. 10,779.50.

(b) *Record of Rights and Liabilities under the Bombay Land Improvement Schemes Act.*—The progress of the submission of recovery statements to the Revenue Department during the year under report is given below—

Recovery statements	Area covered	Annual instalment to be recovered	Total amount to be recovered
	Acres	Rs.	Rs.
419	63,215	1,40,886-00	18,79,679-00

CHAPTER XII

AGRICULTURAL EXTENSION

A. SCHEME FOR INTENSIVE CULTIVATION OF PADDY
BY JAPANESE METHOD

The scheme for intensive cultivation of paddy by Japanese method which started from the year 1953-54 in all the paddy growing districts was continued during the year 1959-60.

The following programme was fixed for the year 1959-60:

- (i) To arrange 6,700 demonstration plots on guarantee basis,
- (ii) To extend area under Japanese method to 31,700 acres (excluding the area under the pilot paddy scheme) and
- (iii) To advance *tagai* loans to the tune of Rs. 10 lakhs to the rice growers under the scheme.

The achievement under each of the above items was as below :

In all 8,432 demonstration plots each of about 10 to 15 gunthas were arranged in the paddy growing districts. An area of 62,165 acres was covered under improved method of paddy cultivation.

During the year 1959-60 a total sum of Rs. 13,51,500.00 (Rs. 8,35,500.00 for entire Maharashtra region of Bombay State excluding Vidarbha and Rs. 5,16,000.00 for Vidarbha region) was placed at the disposal of various Collectors under the head 'P-Loans and advances.' Out of this grant, a sum of Rs. 2,91,478.00 and Rs. 21,595.00 was distributed as *tagai* in the Maharashtra region of Bombay State excluding Vidarbha and in Vidarbha regions respectively.

In Vidarbha region, a separate scheme for encouragement to Japanese method of paddy cultivation was in operation since 1954-55. This scheme was continued during the year 1959-60 and the cultivators adopting Japanese method of paddy cultivation were granted *tagavi* loans for the purchase of *Tauchi Gurmas*. *Tauchi Gurmas* were supplied on *tagavi* as well as on cash payment.

B. THE PILOT SCHEME FOR INTENSIVE
CULTIVATION OF PADDY

With a view to step-up paddy production by bringing the largest possible acreage under intensive cultivation and to enable the average paddy grower to adopt the Japanese method of cultivation by making available technical advice and necessary finance, the pilot scheme, for intensive cultivation in paddy areas, was launched

in five blocks in the year 1957-58. Four more blocks were added, during the year 1958-59 and 17 additional blocks, were added during the year 1959-60, bringing the total number of blocks to 26, during the year 1959-60. The target of acreages fixed was 4,50,000 acres.

Out of 26 blocks, 6 blocks with a targetted area of 1,25,000 acres, were in Gujrat region and 20 blocks with a target of 3,25,000 acres were in the Maharashtra region during the year 1959-60. As against the above target fixed for Maharashtra region, the total acreage brought under intensive cultivation was 2,68,245 acres which is 82.53 per cent. This acreage was spread over in 5,756 villages, benefitting 1,31,235 cultivators under this scheme. A total of 10,674 tons of ammonium sulphate and 8,571 tons of single superphosphate were distributed to cultivators. The co-operative societies issued credit of Rs. 89,22,650.00 of which Rs. 54,47,055.00 was in the form of seeds and fertilizers and Rs. 34,75,595.00 was in cash. Demonstrations at the various stages of crop growth were arranged on 2,999 plots to educate the cultivators in the technical aspect of the scheme.

The average additional production of paddy per acre in the State due to adoption of Japanese method based on the results of the statistical survey was 9.16 B.Mds. The total additional production of paddy under this scheme, was 19,80,708 B.Mds. or 70,740 tons on the basis of per acre production of 9.16 B. Mds. for 1,64,224 acres covered under full Japanese method and at 4.58 B. Mds. per acre for 1,64,021 acres, covered under partial Japanese method.

The Department of Agriculture attends to the technical guidance propaganda and demonstrations to convince the cultivators to adopt Japanese method of paddy cultivation while the Co-operative Department looks after the financial side. The scheme, therefore, has been so devised as to make it a joint responsibility of both the Departments.

C. KHARIF AND RABI CROPS CAMPAIGNS

Khariif and *rabi* crops campaigns were launched by State Government as a part of nationwide campaign initiated by Government of India for increased production of principal food crops, during *khariif* and *rabi* seasons. Paddy, *khariif jowar* and *bajri*, the main food-crops and groundnut and cotton, the main cash crops generally rotated with these crops were included in the *khariif* campaign and *rabi jowar* and wheat were included in the *rabi* campaign. These campaigns were launched both for intensive and extensive cultivation in suitable areas in the State.

(a) *Kharif crops campaign*

(i) The following were the targets of acreages fixed and achievements under the intensive and extensive phases in the State.

Paddy

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	Nagpur	1,05,000	1,90,000	85,953	79,895
2	Aurangabad	...	40,000	...	28,554
3	Poona	1,05,000	1,00,000	1,10,525	70,257
4	Bombay	1,15,000	80,000	71,766	30,788
Total		3,25,000	3,20,000	3,68,244	2,09,484

Kharif jowar

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	Nagpur	1,35,000	2,40,000	82,579	2,62,678
2	Aurangabad	50,000	2,00,000	22,885	1,27,198
3	Poona	25,000	60,000	21,225	66,613
4	Bombay	5,000	15,000	4,969	13,922
Total		2,15,000	5,15,000	1,31,658	4,70,411

Bajri

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	Nagpur	...	...	...	...
2	Aurangabad	...	75,000	14,105	42,182
3	Poona	...	2,50,000	22,589	92,714
4	Bombay	...	2,00,000	40,786	1,55,724
Total		...	1,33,000	5,25,000	77,430

Groundnut

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	Nagpur	...	5,000	4,336	22,225
2	Aurangabad	...	20,000	12,399	65,469
3	Poona	...	15,000	13,265	56,076
4	Bombay	...	5,000	5,000	12,244
Total		...	45,000	1,79,500	35,000

Cotton

No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	Nagpur	...	1,01,000	60,701	3,34,956
2	Aurangabad	...	3,000	3,000	1,31,536
3	Poona	...	20,000	20,000	...
4	Bombay	...	2,000	1,500	13,280
Total		...	1,26,000	85,201	4,84,772

(ii) Under this campaign improved seed and fertilizers were distributed to the cultivators both in cash and in kind as given below:

Improved seed

S. No.	Division	Quantities of improved seed distributed in B. Mds.					
		Paddy	Kharij	Jowar	Bajri	Groundnut	Cotton
1	Nagpur	...	10,390	7,579	...	10,519	38,739
2	Aurangabad	...	575	2,938	242	663	61,132
3	Poona	...	1,261	99	1,014	756	4,422
4	Bombay	...	4,052	245	2,230	2,128	705
Total		...	16,278	10,861	3,486	14,068	1,04,997

Fertilizers

S. No.	Division	Quantities of fertilizers distributed in tons						
		Ammonium sulphate	Ammonium sulphate nitrate	Urea	Manure mixture	Triple super phosphate	Single super phosphate	
1	Nagpur	...	7,023	104	114	...	479	1,781
2	Aurangabad	...	3,029	...	...	...	...	793
3	Poona	...	6,852	...	...	...	...	2,038
4	Bombay	...	5,457	...	...	640	...	2,830
Total		...	22,366	104	114	640	479	7,442

(iii) Sufficient quantities of different insecticides and fungicides were stocked at convenient places for distribution to cultivators to control the pests and diseases under the campaign at 25 per cent subsidised rates. Following quantities were distributed.

S. No.	Division	Sulphur	Gammexene	Endrin	D. D. T.	B. H. C.	Agrosan
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1	Nagpur	6,95,744	...	8	2,815	12,059	1,987
2	Aurangabad	75,894	5,325	97	1,185	9,654	1,487
3	Poona	67,380	369	918	...	2,603	785
4	Bombay	25,526	6,149	220	...	51,831	950
Total		8,64,544	12,143	643	3,450	76,146	5,159

(iv) As a first step towards launching of campaign dummy demonstrations training programmes were arranged in the months of April and May 1959 to impart training in improved methods of cultivation of these crops to the development staff at different levels and to the cultivators. Under this programme, 13,967 such demonstrations were held at divisional, district, taluka and village levels. The divisionwise information is as below :

S. No.	Division	No. of demonstration	No. of cultivators attended
1	Nagpur	7,460	88,837
2	Aurangabad	1,217	29,628
3	Poona	2,664	51,806
4	Bombay	2,626	56,169
Total		13,967	2,26,440

(v) *Crop Finance*.—The total crop finance issued by the central financing agencies through the co-operative societies was to the tune of Rs. 3,83,61,594-00 including crop finance given under paddy pilot scheme. Divisionwise distribution is as below :

S. No.	Division	Crop finance distribution
		Rs.
1	Nagpur	... 2,76,94,167-00
2	Aurangabad	... 20,46,282-00
3	Poona	... 57,81,677-00
4	Bombay	... 28,39,468-00
	Total	... 3,83,61,594-00

(vi) *Estimated additional production*.—The estimates of additional production during the *Kharif* season under the campaign is about 1,45,836 tons of food grains, 11,830 tons oilseeds and 69,777 cotton bales as detailed below.

Statement showing the cropwise estimated additional production is given below :

Crop	Intensive	Extensive	Total
	Tons	Tons	Tons
Paddy	... 93,567	8,379	1,04,946
<i>Kharif jowar</i>	... 13,165	18,816	31,981
<i>Bajri</i>	... 3,097	5,812	8,909
Groundnut	... 3,505	8,325	11,830
	Bales	Bales	Bales
Cotton	... 21,300	48,477	69,777

(b) *Rabi crops campaign.*—The campaign was first launched in the year 1958-59 and was continued during 1959-60. Two important food crops i.e. *rabi jowar* and wheat were selected during this season under the campaign.

(i) The following were the targets of acreages fixed and achievements under the two phases in the State.

Rabi jowar

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	Nagpur	16,000	3,10,000	6,869	1,14,389
2	Aurangabad	40,000	16,50,000	25,898	10,29,837
3	Poona	50,000	2,00,000	78,903	9,01,445
4	Bombay	7,000	85,000	3,108	95,475
Total		1,13,000	22,45,000	1,14,278	21,70,646

Wheat

S. No.	Division	Targets		Achievement	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	Nagpur	16,000	4,00,000	14,883	2,99,330
2	Aurangabad	12,500	97,000	9,408	67,147
3	Poona	15,000	—	15,213	2,210
4	Bombay	34,500	80,000	41,912	89,832
Total		78,000	5,77,000	81,416	4,58,069

(ii) Improved seed

S. No.	Division		Rabi jowar	Wheat
			(B. Mds.)	(B. Mds.)
1	Nagpur	...	1,289	32,345
2	Aurangabad	...	10,611	6,488
3	Poona	..	13,923	1,823
4	Bombay	...	1,378	3,113
Total ...			27,201	43,769

(iii) Fertilizers

Serial No.	Division		Ammonium sulphate	Superphosphate
			(Tons)	(Tons)
1	Nagpur	...	651	328
2	Aurangabad	...	694	292
3	Poona	...	2,265	682
4	Bombay	...	3,048	1,236
Total ...			6,658	2,538

(iv) A training programme as executed during *kharif* season was organised from August 1959 to October 1959. The demonstrations executed under the programme, divisionwise, were as under:

Serial No.	Division	No. of demonstrations	No. of cultivators attended
1	Nagpur	2,766	32,582
2	Aurangabad	641	52,116
3	Poona	2,835	65,948
4	Bombay	2,743	86,501
Total		8,985	2,37,147

(v) Sufficient quantities of different insecticides and fungicides were stocked at convenient places for distribution to cultivators to control the pests and diseases under the campaign at 25 per cent subsidised rates. Following quantities were distributed:

Serial No.	Division	Sulphur	Agrosan	Zinc phos- phate	B. H. C.	Endrin
		lbs	lbs	lbs	lbs	gallons
1	Nagpur	2,316	221	15	49,813	13
2	Aurangabad	24,869	213	7	1,920	12
3	Poona	46,983	...	...	...	8
4	Bombay	65,438	774	338	1,493	...
Total		1,39,606	1,208	360	47,236	39

(vi) *Crop finance.*—The total crop finance issued by the Central Financing Agencies through the Co-operative Societies was to the tune of Rs. 1,06,28,726.00. Divisionwise distribution is as below:—

S. No.	Division	Crop finance	
		Rs.	nP.
1	Nagpur	14,18,163.00	...
2	Aurangabad	35,06,103.00	...
3	Poona	51,13,975.00	...
4	Bombay	5,90,485.00	...
Total		1,06,28,726.00	...

(ii) *Improved seed*

S. No.	Division		<i>Rabi jowar</i>	Wheat
			(B. Mds.)	(B. Mds.)
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4	Bombay	... 2,743	86,501
Total		... 8,985	2,37,147

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Serial No.	Division	Sulphur lbs	Agrosan lbs	Zinc phos- phate lbs	B. H. C. lbs	Endrin gallons
1	Nagpur	... 2,316	221	15	49,813	18
2	Aurangabad	... 24,269	918	7	1,920	12
3	Poona	... 46,983	...	...	...	8
4	Bombay	... 65,428	774	338	1,493	...
Total		... 1,39,606	1,208	360	47,226	38

(vi) *Crop finance*.—The total crop finance issued by the Central Financing Agencies through the Co-operative Societies was to the tune of Rs. 1,06,28,726.00. Divisionwise distribution is as below:—

S. No.	Division	Crop finance	
		Rs.	nP.
1	Nagpur	... 14,18,163.00	
2	Aurangabad	... 35,06,103.00	
3	Poona	... 51,13,975.00	
4	Bombay	... 5,90,485.00	
Total		... 1,06,28,726.00	

(vii) The estimates of additional production during the *rabi* season under the campaign is 1,27,982 tons of food grains as detailed below:

S. No.	Division	<i>Rabi jowar</i>	Wheat
		(Tons)	(Tons)
1	Nagpur	6,419	14,057
2	Aurangabad	43,782	4,003
3	Poona	43,947	2,219
4	Bombay	4,113	9,442
Total ...		98,261	29,721

**D. GRANT-IN-AID TO TALUKA DEVELOPMENT BOARDS
ASSOCIATIONS FOR AGRICULTURAL PROPOGANDA**

The grant-in-aid is given to the Taluka Development Boards/Associations where qualified fieldmen are appointed by the Taluka Development Boards/Associations. Associations have to do the following items of work:

- (a) To advise the cultivators for adopting various improved agricultural techniques.
- (b) To co-ordinate the activities of the Department with the Taluka Development Boards/Associations.
- (c) To organise demonstrations of improved practices in crops in the Taluka for which Taluka Development Association has been formed.
- (d) To organise trial-cum-demonstration centre at their headquarters.
- (e) To organise various weeks observed in the State from time to time.
- (f) To supply seeds and fertilizers if the work is not discontinued by the Development Boards/Associations.

An amount of Rs. 16,376.17 was given to 35 Taluka Development Boards/Associations during this year duly recommended by the Collectors and verified by the Co-operative Department.

E. AGRICULTURAL DEMONSTRATION CENTRES

The total number of Agricultural Demonstration Centres during the year under report was 306 as given below:

S. No.	Division	No. of Agricultural Demonstration Centres
1	Poona	153
2	Bombay	153
3	Nagpur	Nil
4	Aurangabad	Nil
Total ...		306

As usual these centres proved a great asset in promoting the cause of improved agricultural methods among the cultivators in general. Improved agricultural practices as advocated by the Department are adopted along with local methods for comparison. Loss, if any, incurred by the cultivator due to adoption of improved practices, is compensated to the maximum extent of Rs. 150.00 per acre.

F. AGRICULTURAL INFORMATION UNIT

Agriculture and Forest Department of Bombay State sanctioned a scheme for establishing 'Agricultural Information Unit' in September 1958. The scheme actually started in the month of December 1958 by the appointment of the Agricultural Information Officer. The object of this Unit is to give publicity to various activities of the Department, to form a connecting link between the research institutes, the extension staff and the cultivators by setting up of an organisation for disseminating technical information and to represent the activities of the Department in the exhibitions held in various parts of the State. It is contemplated in the scheme to revise

the leaflets, pamphlets, folders and posters issued by the Department from time to time in the past to bring them up-to-date for the guidance of departmental staff and the public.

The work of printing suitable literature on the *kharif* and *rabi* crops production campaign was undertaken and copies were supplied to all the extension workers and other Officers of Agriculture, Revenue and Development Departments. Pamphlets, leaflets and circulars were printed on offset press, attached to the Unit. Seventeen pamphlets on all crops included in the campaign were printed from Government Press and distributed. Besides, 36 leaflets printed on the offset press were issued.

Radio talks on various subjects were also arranged in the Rural Farm Forum Programme of Poona Station of All India Radio on *kharif* and *rabi* crops campaigns seasonal crops and allied subjects. Such talks were also arranged at All India Radio, Bombay and Nagpur. The total number of talks were 60. The Agricultural Information Officer, attended nearly eighteen exhibitions and extended help to the local officers. The important exhibitions were World Agricultural Fair at New Delhi, Grape Show at Nagpur and Mango Show at Poona.

An attempt has been made to prepare four move films on Poona method of *jowar* cultivation, intensive method of wheat cultivation, World Agricultural Fair at New Delhi and Grape Show at Nagpur. Besides, the photographer in the Information Unit moved in the State and collected photographs for publicity as per requests from the Specialists and Extension Officers.

The Unit is also dealing with a number of queries received from the cultivators and the extension workers. The demand of old and new pamphlets by the cultivators and extension workers is also met with by the Unit.

CHAPTER XIII

AGRICULTURAL EDUCATION

Agricultural Education forms one of the important activities of the Agriculture Department. The object of imparting Agricultural Education is to train young men to become efficient farmers and good research and extension workers at all levels.

During the period under report, there has been considerable expansion in every aspect of Agricultural Education.

A. AGRICULTURAL COLLEGES

There are four Government Agricultural Colleges at Poona, Nagpur, Akola and Parbhani in the State to provide educational facilities. The duration of the courses at the Agricultural Colleges, Poona, Nagpur and Akola is four years after S. S. C. In order to bring uniformity in the Agricultural Colleges in Maharashtra State with regard to standard of admission, college courses, etc. a four year course after S. S. C. examination has been introduced in the Agricultural College, Parbhani from the year 1959-60. Students have also been admitted during the year 1959-60 in the first year class of the existing 3 years course after Intermediate Science to maintain continuity of agricultural graduates passing out every year.

In order to meet the requirements in respect of agricultural graduates for manning the various departmental posts, the admission capacity of the existing four colleges has been enhanced from 374 to 632 during 1959-60 as shown below:

S. No.	College	Admission capacity	
		1958-59	1959-60
1	Agricultural College, Poona	150	200
2	Agricultural College, Nagpur	128	200
3	Agricultural College, Akola	61	128
4	Agricultural College, Parbhani	32	104
	Total	374	632

During the period under report, every effort was made to provide better educational facilities to meet the growing needs of the State.

The number of students admitted in the 1st year and the actual strength in each of the four colleges is as shown below :

S. No.	College	Students admitted in 1959-60	Actual Strength
1	Poona	200	477
2	Nagpur	200	466
3	Akola	128	291
4	Parbhani (four year course)	60	158
	„ (three year course)	44	...
	Total	632	1,392

The Agricultural Colleges at Poona and Nagpur continued to provide facilities for post-graduate training leading to the degree of M. Sc. (Agri.) in almost all the subjects in Agriculture.

Free studentships were granted to the students whose parents' income does not exceed Rs. 9,000-00 per annum in all the Agricultural Colleges.

B. AGRICULTURAL SCHOOLS

The number of Agricultural Schools in the State was 12 out of which two were grant-in-aid institutions and 10 were run by Government.

The total strength of students in all the 12 schools was 455 in the first year, and equal number in the 2nd year as against the sanctioned strength of 470 in each year. The details are given in the Statement No. 1.

C. BASIC AGRICULTURAL SCHOOLS

There were two Basic Agricultural Schools at Amravati and Parbhani, imparting Basic Training in Agriculture for one year. As per instructions from Government of India, the Basic Agriculture Course was discontinued and instead two year integrated course has been adopted. Thus, these 2 centres were converted into *Gramsevak* Training Centres imparting training in two year integrated course, from October 1959. The Basic Agricultural School, Shindewahi was already converted into *Gramsevak's* Training Centre in April 1959.

D. EXTENSION AND GRAMSEVAK TRAINING CENTRES

The Extension Training Centres at Manjri (district Poona), Kolhapur and Parbhani were in operation in the Maharashtra region of the State to train personnel required for the Community Development Projects/N. E. S. Blocks. Each centre imparts training in 6 months' course with exception of Kolhapur, where the duration of the course is of one year. The Extension Training Centres were later merged with the Basic Agricultural Schools and a fresh integrated course or *Gramsevak*s for a duration of two years was adopted. Thus, the two Basic Agricultural Schools and 3 Extension Training Centres were discontinued. The Extension Training Centre at Tharsa, was converted into *Gramsevak* Training Centre in April 1959.

By the end of the year under report, there were seven *Gramsevak* Training Centres in the Maharashtra region of the State as under :

Location.	Date of commencement.
1 Tharsa (district Nagpur)	} .. April 1959.
2 Sindewahi (district Chanda)	
3 Manjri (district Poona)	} ...October 1959.
4 Kolhapur	
5 Parbhani	
6 Amravati	
7 Buldana	

The capacity of each *Gramsevak* Training Centre is 70 in each year for the integrated course.

During the year, 468 trainees passed out from the Extension Training Centres and 140 were admitted, while in the 7 *Gramsevak* Training Centres, 399 trainees in first year and 121 trainees in second year were undergoing training.

E. HOME SCIENCE WINGS

There were three Home Science Wings at Amravati, Manjri (district Poona) and Sindewahi (district Chanda) in the Maharashtra region imparting training to *Gramsevikas* during 1959-60. The

centre at Amravati is run on grant-in-aid basis and the remaining two are run by Government. Total admission capacity of these three centres is 100 and in all 95 *Gramsevikas* underwent training during the year from these institutions.

F. WORK SHOP WINGS

In these institutions, the selected artisans are trained for a period of one year in smithy, carpentry and masonry work to enable them to establish modern workshop in villages with Government aid. Workshop wings are attached to the *Gramsevak* Training Centres at Manjri (district Poona) and Sindewahi (district Chanda), the latter being started in December 1959. The capacity of these centres is 20, and 15 trainees passed out from Manjri centre in September 1959. Thirty-three trainees were undergoing training at these two centres till April 1960.

G. GARDNERS TRAINING CLASSES

These classes which were started in the year 1957 are continued at Poona and Nagpur with the object of training the sons of cultivators in the technique of gardening. The education of the course is 6 months and each trainee domiciled in this State is paid stipend of Rs. 30.00 p. m. during training. The number of students trained successfully was 59 and 61 at Poona and Nagpur respectively during the year under report.

H. SOIL CONSERVATION TRAINING CENTRES

The Soil Conservation Training Institutes at Sholapur and Aurangabad were continued during the year under report for training candidates. The Soil Conservation Training Centre at Kelapur has been started from February 1960 for training candidates to meet the demand of Agricultural Assistants (Soil Conservation), required for the expansion of the activities of the Soil Conservation Section of the Department. One hundred candidates are to be admitted at each of the above institutions for each session of six months including the Senior Departmental Agricultural Assistants from Extension Wing. Senior Departmental Agricultural Assistants are trained at Aurangabad and Sholapur institutes only and not at Kelapur. In all, 161 fresh candidates were trained during the year under report at these institutes and 264 fresh candidates were admitted for training in batches commencing from February 1960. Also 31 Agricultural Officers, 49 Agricultural Supervisors and 34 Agricultural Assistants were trained at Aurangabad and Sholapur Soil Conservation Training Institutes, in refresher's course of three months and six months respectively.

During the above period, 25 departmental Agricultural Assistants were undergoing training at Sholapur and Aurangabad.

STATEMENT No. 1

No. of students on roll in each of the classes of the Agricultural Schools during 1959-60

S. No	Location of the School	District	Sanctioned strength	Students on roll	
				1st year	2nd year
1	Manjri	... Poona	... 150	67	73
2	Sholapur	... Sholapur	... 80	40	40
3	Borgaon	... N. Satara	... 100	50	46
4	Kolhapur	... Kolhapur	... 60	28	32
5	Digraj	... S. Satara	... 100	48	49
6	Puntamba	... Ahmednagar...	60	29	31
*7	Malegaon	... Nasik	... 80	40	40
8	Dhulia	... W. Khandesh.	80	40	40
*9	Kosbad	... Thana	... 80	40	40
10	Roha	... Kolaba	... 60	30	25
11	Mirjola	... Ratnagiri	... 40	18	18
12	Parbhani	... Parbhani	... 50	25	21
Total			... 940	455	455

*Grant-in-aid School.

CHAPTER XIV

GENERAL AGRICULTURAL RESEARCH AND AGRICULTURAL
ECONOMICS

A. AGRONOMIC RESEARCH

[Paddy]

(a) *Experiment on different forms of nitrogenous fertilizers.*—At Karjat, the experiment was conducted to find out efficacy of different types of nitrogenous fertilizers viz sulphate of ammonia, urea, Chilean nitrate, ammonium sulphate nitrate and calcium cyanamide. This is the fourth year of the experiment.

Ammonium sulphate has given the highest yield, but the results are non-significant.

(b) *Experiment on Chinese method of paddy cultivation.*—The experiment was conducted at the instance of the Indian Council of Agricultural Research, New Delhi, to determine the merits of Chinese method of paddy cultivation as against Japanese and departmental methods.

The yields in lbs. per acre obtained at Karjat are as under.

Chinese method	...	2,096
Japanese method	...	1,788
Departmental method	...	1,954

The Chinese method gave significantly higher yield over Japanese method only, but since the method involved high cost of cultivation especially for digging the soil, it is uneconomic.

At Sindewahi, the departmental method gave the highest yield of 3,751 lbs. per acre as against 3,581 lbs. by the Japanese method and 3,073 lbs. by the Chinese method.

(c) *Experiment on complex fertilizer.*—At Karjat, the experiment was conducted to ascertain the merits of complex fertilizer supplied by Government in the Agriculture and Forests Department, Bombay, as against sulphate of ammonia and superphosphate. The complex fertilizer contains 20 lbs. of N and 20 lbs. of P_2O_5 in 100 lbs. On equal N and P_2O_5 basis the complex fertilizer was found to be inferior to ammonium sulphate and superphosphate.

(d) *Soil correcting experiment at Panvel.*—The experiment was laid out in small plots to observe the effects of different treatments

n the soil improvement and yield of paddy. This is the fifth year of the experiment.

From the five year's results it is seen that addition of one ton of sulphur per acre has given 20 per cent higher yield over control.

(e) *Lateral movement of fertilizer in paddy fields.*—At Igatpuri the experiment was taken up with the object of studying the lateral movement of fertilizers in paddy fields. This is the third year of the experiment. Though there is slight increase in yields in the lines adjoining the manured lines the difference is non-significant. There is thus no lateral movement of fertilizers in the paddy fields. This also confirms the results of previous years.

(f) *The experiment to study the effect of different green manures on the yield of paddy.*—The experiment was conducted at Vadgaon to find out the merits of different green manure crops viz., Dhaincha, Sann hemp, Karanj, *Sesbania Speciosa*, *Mogali Erand* and *Glyricidia maculata*. The green material was buried at puddling stage at the rate of 10,000 lbs. per acre. The results of the experiment are highly significant. All green manure crops gave higher yield than the control. *Glyricidia maculata* has given the highest yield.

At Karjat, the green material was buried at the rate of 6,000 lbs. per acre and *Karanj* has given the highest yield. At Khopoli, the experiment was conducted with *Bhend* tree leaves only at the rate of 2,000, 4,000 lbs. and 8,000 per acre. The yield differences are significant. Two years' data show that a dose of 4,000 lbs green material per acre gives about 14 per cent increase in yield while the dose of 8,000 lbs. per acre gives 31 per cent increase over control. On hot weather paddy green material of *Karanj* leaves with 4 levels viz., 0, 2,000, 4,000 and 8,000 lbs. per acre was tried. The average increase in yield due to the graded doses of green manure was 47, 87 and 158 per cent respectively.

(g) *To find out optimum dose of N and P₂O₅.*—The experiment was undertaken to find out the economic doses of N and P₂O₅ for paddy in Mawal tract. There were 4 levels each of N and P₂O₅. The results show that there is response to N as well as P₂O₅. A dose of 20 lbs. N plus 20 lbs. P₂O₅ gave 2,570 lbs. of paddy per acre as against 1,714 for control.

The experiment will be continued next year.

(h) *Manurial experiment on hot weather paddy at Khopoli.*—There were 4 levels of nitrogen viz., 0, 20, 30 and 40, and 2 levels of P₂O₅ viz., 0 and 20 in the form of ammonium sulphate and superphosphate respectively. The experiment was conducted for three

years. The results show that there is a high response to nitrogen. During 1957-58 and 1958-59, there was no response to P_2O_5 but during 1959-60 response to P_2O_5 was observed. On an average for three years, 20 and 40 lbs. N gave an increase in yield of 627 and 839 lbs. per acre respectively.

(i) *Water stress experiment on hot weather paddy at Khopoli.*—The experiment was taken with the object of finding out whether the seedling which received less water on the seedbed give better yields after transplanting in the fields. This was ensured by giving them water at intervals of 1, 3, 5, 7 and 9 days. The experiment was conducted for three years from 1957-58 to 1959-60. The results show that yield differences due to various treatments of water stress (interval of irrigation) are not significant.

(j) *Irregular viz., line planting experiment on hot weather paddy at Khopoli.*—An experiment was conducted on E. K.—70 grown in the hot weather for three years from 1957-58 to 1959-60 to find out whether planting the crop in lines has any advantage over irregular planting. There were two spacings viz., 8" × 8" and 12" × 6" and number of seedlings per bunch used was 6 and 8. The results for the last three years showed that there is no significant difference between line planting and irregular planting provided that the plant population is kept constant.

Nagli

(a) *Nitrogen and requirements of nagli.*—This is the third year of the experiment at Karjat. The doses consist of 0, 20, 40 and 60 lbs. per acre each of nitrogen and P_2O_5 in the form of ammonium sulphate and superphosphate respectively. The year's results show that there is a significant difference between levels of N and also of P_2O_5 . There is, however, no significant difference between 20 lbs. and 40 lbs. of N.

(b) *Departmental V/S local method of cultivation of nagli.*—This is the third year of the experiment at Karjat. The departmental method consists of using a dose of 40 lbs. N and 20 lbs. P_2O_5 and a spacing of 12" × 6". The yield differences are significant. The departmental method has given significantly higher yield over control and over the treatment 20 lbs. N plus 10 lbs. P_2O_5 . The treatment 20 lbs. N plus 10 lbs. P_2O_5 is also significantly superior to the local method and gives 163 lbs. more grain yield per acre.

Wheat

At Badnapur, an experiment with organic and inorganic manures and treatments on wheat was conducted. The treatment viz., 30 lbs. N

From F. Y. M. plus 30 lbs. N from sulphate of ammonia plus 30 lbs P_2O_5 from superphosphate gave the highest yield.

A trial of seven different seedrates was carried out at Dhulia. The seedrate of 60 lbs. per acre gave the highest yield. A varietal-sowing date experiment was conducted at Washim Farm with two varieties viz., HY. 65 and *Hawara*. Sowing around 5th November was found to be the best time for both the wheat varieties.

Jowar

Several agronomic experiments are on hand at the various research stations but none of them is completed as yet. These include the mixed cropping of *kharif jowar* with *mug* or *udid* at Parbhani. Rotational, spacing-cum-number of seedlings per hill, time and method of application of sulphate of ammonia etc. at Jalgaon; best fertilizer dose, effect of green manuring of previous crop of cotton etc. at Akola; and the Poona method of cultivation of *jowar* and spacing-cum-numbering-cum-method of planting at Karad and Digraj. A majority of the agronomic experiments on *rabi jowar* are at the Agricultural Research Station, Mohol in Poona division. But they need still further trials before any conclusion could be drawn. The experiments in progress are spacing-cum-manuring-cum-method of planting, mixed cropping of *jowar* and gram and the rotational experiment. In *rabi jowar* too, the Poona method of *jowar* cultivation is under trial at different stations and in the district too. This method has yielded from 3 to 207 per cent more grain and 0.5 to 180 per cent more fodder over the local.

Gram

At Jalgaon, spacing-cum-seedrate experiment on gram is in progress since last four years. From the average yield figures of different treatments, it is seen that sowing of gram at 12" spacing with 30 lbs. seedrate per acre is suitable under East Khandesh conditions.

At Mohol, mixed cropping experiment was conducted. The yield of entire crop of gram and total yield where combination of gram and *jowar* was used in proportion of 3 : 1 in separate rows proved better as compared to yields obtained with other combinations. In rotational experiment the yield of gram was more when grown after either soflower or gram.

At Washim, manurial-cum-topping experiment was conducted, topping of gram after 20 days of sowing and manuring with 10 lbs. P_2O_5 and 5 lbs. N per acre gave higher yield than rest of the treatments.

B. AGRICULTURAL ECONOMICS

The Planning Commission's scheme for studies into the economics of farm management was conducted from 1954 to 1958. During the year under report, a comprehensive report for the data pertaining to the year 1956-57 i. e. last year of the Scheme, was prepared and submitted to the Research Programmes Committee of the Planning Commission. A very useful information pertaining to the economics of farm management has been collected in the scheme.

The scheme for studying economics of bunding was started during the year under report. The scheme aims at substantiating with facts and figures the important advantages claimed on account of bunding. Data from 500 cultivators from 50 villages spread over the State are being collected in the three questionnaire forms specially prepared for the scheme. Crop cutting tests and actual water levels in the wells are also undertaken from the sub-samples selected for the purpose. This will give an idea of increase in yield, increase in water levels etc. The scheme is partly financed by the Indian Council of Agricultural Research.

A short duration scheme for surveying advantages of the 'Poor Milk Supply Scheme' to producers and consumers was carried out during the year under report. Data from milk suppliers of the scheme in Maval and Mulshi areas as well as customers of the scheme in the Poona City have been collected in the scheme. Data are being analysed at present and report will be submitted shortly.

The scheme for award of prizes to cultivators for maintaining farm accounts was continued during the year under report.

C. CROP WEATHER OBSERVATION SCHEME

The scheme is operated under the technical guidance of the Director of Agricultural Meteorology, Poona, on the following crops at the research stations mentioned against them :

Crop	Research Station
(a) Paddy	... Karjat and Sindewahi.
(b) Sugarcane	... Poona and Padegaon.
(c) Jowar	... Sholapur, Jalgaon, Nagpur, Akola and Parbhani.
(d) Wheat	... Niphad, Jalgaon, Nagpur and Parbhani.
(e) Cotton	... Jalgaon, Nagpur, Akola and Parbhani.

Data on climatological factors *viz.*, rainfall, soil and air temperature, humidity, wind velocity, evaporation and sun-shine hour are being recorded. Work of the scheme is satisfactory at all the above stations.

CHAPTER XV

ACTIVITIES OF THE DEPARTMENT OF AGRICULTURE FOR
THE WELFARE OF BACKWARD CLASSES

A. MODEL AGRICULTURAL PROJECTS

(i) The scheme for organisation of Model Agricultural Project at Nawapur and Amoda in West Khandesh district was first sanctioned for a period of three years from 1st April, 1949 and has been continued further from year to year. The provision during the year 1959-60 was to the extent of Rs. 12,320.00 against which the actual expenditure incurred was Rs. 938.00.

(ii) The scheme for organisation of the Model Agricultural Projects at Alwand and Talsari in Nasik and Thana districts respectively was first sanctioned for a period of one year from 1st March, 1955 and has been continued from year to year. An amount of Rs. 18,370.00 was sanctioned during the year 1959-60 out of which Rs. 12,073.00 were utilised.

B. MAINTENANCE OF AGRICULTURAL PROJECT AT JAVLI
IN AKKALKUWA TALUKA AND BHIL-JAMBHOLI IN
NANDURBAR TALUKA IN WEST KHANDESH

The scheme for organisation of Model Agricultural Projects in Javli taluka, Akkalkuwa and Bhil-Jambholi in Nandurbar taluka in West Khandesh was sanctioned for a period of one year from 1st March, 1949 and has been continued from year to year. The amount of Rs. 4,060.00 was sanctioned during 1959-60, out of which Rs. 1,834.00 were utilised.

The object of the Model Agricultural Project is to hold demonstrations of improved methods and practices on cultivators' fields and to assess the economic advantages which result from the introduction of all the agricultural improvements followed on the holdings of cultivators in selected villages.

C. AGRICULTURAL DEMONSTRATION CENTERS

The scheme for maintenance of eight Agricultural Demonstration Centres in backward class area of West Khandesh was continued during this year also. An amount of Rs. 6,489.00 was spent during the year under report.

The object of these centres is to demonstrate the improved agricultural practices to the 'Bhil' cultivators by introducing agricultural improvements on the fields of selected cultivators.

**D. SUPPLY OF VEGETABLE SEEDS AND SWEET POTATO VINES
TO THE SCHEDULED TRIBES CULTIVATORS AT HALF COST**

The scheme for sanctioned at an estimated cost of Rs. 2,400-00. Under the scheme, vegetable seeds and sweet potato vines were raised at the six Agricultural schools in the vicinity of the scheduled areas and supplied at half cost to the scheduled tribes cultivators.

**E. SCHEME FOR RECLAMATION OF WASTE LANDS
BELONGING TO BACKWARD CLASSES**

Reclamation work of waste lands belonging to or granted to Scheduled Castes, Scheduled Tribes and Backward Class cultivators was undertaken at Government cost. The information regarding area covered and the expenditure incurred under this scheme is shown below :

Area Covered	Expenditure
Acres	Rs.
24,137	6,75,141-00

**F. SPECIAL MEASURES FOR SCHEDULED AND
UNDER-DEVELOPED AREAS**

(a) *Construction of irrigation wells in the scheduled areas.*—Under the scheme, a subsidy of Rs. 1,500-00 is granted to a cultivator belonging to scheduled tribes in three equal instalments of Rs. 500-00 each for construction of a new well. An amount of Rs. 2,46,601-00 was actually paid for construction of 405 wells.

(b) *Financial assistance to Scheduled Tribe agriculturists.*—The scheme was sanctioned at an estimated cost of Rs. 12,500-00. Assistance to *Katharies* in Kolaba district was given under the scheme for developing *Dali* lands for an area of 49 acres at a total cost of Rs. 4,993-60.

(c) *Centrally sponsored programme for the development of under-developed rural area.*—Under the scheme for development of agricultural lands for welfare of underdeveloped rural areas, an area of 1,636 acres was developed at an expenditure of Rs. 79,450-00.

(d) *Centrally sponsored programme construction of irrigation wells.*—During the year 1959-60, Government have sanctioned a scheme for construction of irrigation wells in underdeveloped areas. The scheme envisages construction of 170 new wells in 25 districts of the State. Under this scheme, a loan of Rs. 500-00 and subsidy

of Rs. 1,500-00 for each well are granted to a cultivator of backward class. During the year, amounts of Rs. 87,000-00 and Rs. 2,50,000-00 were provided for loans and subsidy respectively. The amounts of Rs. 13,125-00 and Rs. 2,29,011-00 were spent for loans and subsidy respectively for 407 wells.

A similar scheme was sanctioned by Government under centrally sponsored programme on the pattern of 'special measures in scheduled and underdeveloped areas construction of irrigation wells' for three districts in Marathwada for construction of 21 wells. An amount of Rs. 31,500-00 for subsidy purposes were provided for under the scheme. As amounts were sanctioned in March 1960, no expenditure could be incurred.

G. EDUCATIONAL FACILITIES TO BACKWARD CLASSES

(a) *Agricultural Colleges*.—Free studentships were granted to the students whose parents' income do not exceed Rs. 900-00 per annum in all the Agricultural Colleges.

(b) *Agricultural Schools*.—Ten per cent seats have been reserved for admission to backward class candidates in all the twelve Agricultural Schools of this State and the condition that a candidate must be a farmer's son has been relaxed in case of Backward Class students. As regards age limit, admission is open to all the candidates between 16 and 30 years of age and no special age relaxation is made for the backward class candidates.

In case of *Gramsevak* Training Centres and Home Science Wings, the following reservations of seats are made for *Gramsevak*s and *Gramsevikas*—

(i) Scheduled castes	...	6 per cent
(ii) Scheduled tribes	...	7 per cent
(iii) Other backward classes	...	9 per cent

The age limit of 30 years in ordinary cases is relaxable upto 35 years in case of Scheduled Caste, Scheduled Tribes and Other Backward Class candidates both for *Gramsevak*s and *Gramsevikas*.

Recruitment to the post of *Gramsevak*s and *Gramsevikas* is made by the Commissioners of Revenue Divisions. During the year, 91 and 151 Backward Class students were admitted in the Agricultural Schools and *Gramsevak* Training Centres, respectively.

**H. SCHEME FOR AWARD OF PRIZES TO SCHEDULED TRIBES
CULTIVATORS FOR TAKING PART IN CROP COMPETITIONS**

The standard of cultivation of Scheduled Tribes cultivators is generally much lower than that of the cultivators belonging to other classes. The Scheduled Tribes cultivators cannot, on account of their lower standard of cultivation, expect to secure the prizes offered for obtaining the highest yields of the staple crops under the crops competitions organised by the District Development Boards under the Crop Competition Scheme. Unless there is some hope of getting a prize, there can be no incentive to the Scheduled Tribes cultivators to take part in crop competitions and obtain high yields. In order, therefore, to induce Scheduled Tribes cultivators to take part in crop competitions, it is necessary to have a separate prize for a Scheduled Tribes cultivator who obtains the highest yield of the staple crop of the taluka from amongst the competitors belonging to the Scheduled Tribes.

Government have sanctioned an amount of Rs. 1,800.00 for organizing crop competitions among Scheduled Tribes cultivators. An amount of Rs. 450.00 was spent on prizes to cultivators who participated in this competition as detailed below:---

S. No.	Name of the district	Amount
		Rs.
1	West Khandesh	... 50.00
2	Nasik	... 150.00
3	Thana	... 250.00
4	Amravati	... ..
5	Chanda	... ..
6	Nanded	... ..
	Total	... <u>450.00</u>

CHAPTER XVI

ADMINISTRATION & FINANCE

A. ADMINISTRATION

(Both for Maharashtra and Gujrat Regions of the Bombay State)

(a) Transfers and appointments to B. A. S. Class I and II and General State Service Class I and II.—The following major changes took place in the staff during the year under report :

S. No.	Name of the officer	Post to which appointed	Date of appointment
1	2	3	4
<i>Supertime Scale</i>			
1	Capt. S. P. Mohite	... Agricultural Commissioner, Bombay State, Poona	17-2-1960
2	Dr. M. B. Ghatge	... Director of Agriculture, Bombay State, Poona.	17-2-1960
<i>B. A. S. Class I</i>			
1	Shri D. H. Gokhale	... Dy. Director of Agricultural Engineering, Poona.	1-7-1959
2	Dr. V. P. Bhide	... Dy. Director of Agriculture (IV) Poona.	1-7-1959
3	Shri S. V. Naikwadi	... Technical Officer, Paddy Pilot Scheme, Poona.	6-7-1959
4	Shri N. P. Deshmukh	... Principal, <i>Gramsevak</i> Training Centre, Buldana.	10-7-1959
5	Shri L. G. Pandit	... Divisional Soil Conservation Officer, Poona.	13-7-1959
6	Shri K. M. Desai	... Principal, <i>Gramsevak</i> Training Centre, Morvi.	16-7-1959
7	Shri S. T. Patil	... Principal, <i>Gramsevak</i> Training Centre, Tharsa.	16-7-1959
8	Shri K. R. Sahasrabudhe	... Principal, <i>Gramsevak</i> Training Centre, Jalgaon.	20-7-1959
9	Shri P. C. Mehta	... Principal, <i>Gramsevak</i> Training Centre, Junagadh.	21-7-1959
10	Shri K. I. Shaikh	... Dy. Director of Agriculture (IV).	1-8-1959

S. No.	Name of the officer	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class I—contd.</i>			
11	Shri S. T. Purandare	... Dy. Director of Agriculture (V)	1-8-1959
12	Shri A. F. Patel	... Principal, <i>Gramsevak</i> Training Centre, Surat.	1-8-1959
13	Dr. V. P. Bhide	... Dy. Director of Agriculture (II)	1-8-1959
14	Shri Y. K. Jawadekar	... Principal, <i>Gramsevak</i> Training Centre, Jalna.	12-8-1959
15	Dr. V. P. Bhide	... Plant Pathologist, Department of Agriculture B. S., Poona	14-8-1959
16	Shri V. V. Gokhale	... Professor of Agricultural Engineering, Agricultural College, Poona.	19-8-1959
17	Shri A. A. Memon	... Principal, Agriculture College, Parbhani.	31-8-1959
18	Dr. H. G. Pandya	... Agricultural Chemist, Department of Agriculture. B. S., Poona.	30-10-1959
19	Shri D. K. Ballal	... Soils Specialist, Department of Agriculture, B. S., Sholapur.	7-11-1959
20	Shri D. G. Kelkar	... Divisional Soil Conservation Officer, Sholapur.	18-11-1959
21	Shri R. Y. Pawar	... Dy. Director of Agriculture, (III)	19-11-1959
22	Shri N. K. Nerikar	... Principal, <i>Gramsevak</i> Training Centre, Sindewahi.	20-11-1959
23	Shri S. T. Purandare	... Principal, <i>Gramsevak</i> Training Centre, Parbhani.	23-11-1959
24	Shri. B. A. Deshpande	... Principal, <i>Gramsevak</i> Training Centre, Kolhapur.	28-11-1959
25	Dr. S. K. Dorge	... Agricultural Entomologist, Department of Agriculture, B. S., Poona.	8-12-1959
26	Shri M. Farooqui	... Professor of Horticulture, Agricultural College, Nagpur.	6-1-1960
27	Shri W. P. Sole	... Dy. Director of Agriculture (Engineering), Nagpur.	27-1-1960
28	Shri E. L. Zopay	... Dy. Director of Agriculture (Engineering), Poona.	7-2-1960

S. No.	Name of the officer	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class I—contd.</i>			
29	Shri S. M. Dahat	... Divisional Soil Conservation Officer, Akola.	2-3-1960
30	Shri Y. S. Rane	... Dy. Director of Agriculture (Engineering), Nasik.	8-3-1960
31	Dr. R. L. Nagpal	... Superintending Agricultural Officer, Nagpur.	30-4-1960
<i>B. A. S. Class II</i>			
1	Shri D. D. Makdani	... Lecturer in Animal Husbandry and Dairying, Agricultural College, Nagpur.	3-7-1959
2	Shri G. S. Patel	... Lecturer in Agricultural Extension, Gramsevak Training Centre, Morvi	7-7-1959
3	Shri N. A. Chaudhari	... District Agricultural Officer, Aurangabad.	13-7-1959
4	Shri L. B. Deshpande	... Cotton Superintendant, Nagpur.	15-7-1959
5	Shri N. M. Patel	... Assistant Oilseeds Specialist, Junagadh.	16-7-1959
6	Shri G. N. Dixit	... Bhal Reclamation Officer, Vallabhipur.	20-7-1959
7	Shri K. M. Patel	... Assistant Maize Breeder, Dohad.	21-7-1959
8	Shri M. V. Bholagir	... Sub-Divisional Soil Conservation Officer, Situr.	23-7-1959
9	Shri B. L. Udhalikar	... Principal, Gramsevak Training Centre, Buldana.	7-8-1959
10	Shri V. T. Chaudhary	... Sub-Divisional Soil Conservation Officer, Barsi (II)	7-8-1959
11	Shri S. G. Patki	... Assistant Statistician (V) ...	10-8-1959
12	Shri S. N. Elijah	... Assistant Horticulturist, Poona.	11-8-1959
13	Shri N. B. Shah	... District Agricultural Officer, Sabargantha.	11-8-1959

S. No.	Name of the officer	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class II—contd.</i>			
14	Shri R. K. Patil	... Sub-Divisional Soil Conservation Officer, Vairag.	12-8-1959
15	Shri Y. N. Kunte	... Lecturer in Horticulture, Agricultural College, Nagpur.	19-8-1959
16	Shri L. Moniz	... Assistant Professor of Plant Pathology, Agricultural College, Poona.	5-9-1959
17	Shri S. D. Janorkar	... Assistant Statistician (I)	5-9-1959
18	Shri P. S. Duduskar	... Professor of Animal Husbandry & Dairying, Agricultural College, Poona.	13-9-1959
19	Shri Y. R. Karnik	... Milk Costing Officer, Poona	14-9-1959
20	Shri W. Y. Gadre	... Assistant Plant Pathologist, Cotton Wilt Breeding Scheme, Poona.	14-9-1959
21	Shri T. N. Patel	... Officer I/C Indo American Cotton Scheme, Surat.	16-9-1959
22	Shri N. U. Patel	... Assistant Statistician, Ahmedabad.	17-9-1959
23	Shri M. A. Rashsed	... Assistant Horticulturist, Aurangabad.	17-9-1959
24	Shri G. S. Agas e	... District Agricultural Officer, Bhir.	19-9-1959
25	Shri S. K. Buzruk	... Extra Assistant Director of Agriculture, Nagpur Farm.	19-9-1959
26	Shri S. R. Gokhale	... Extra Assistant Director of Agriculture, Achalpur Farm.	20-9-1959
27	Shri M. B. Patel	... Cotton Superintendent, Baroda	20-9-1959
28	Shri P. S. Mahajan	... District Agricultural Officer, Thana.	22-9-1959
29	Shri R. B. Chaudhary	... Assistant Wheat Breeder, Niphad.	23-9-1959
30	Shri N. S. Sejpal	... Cotton Superintendent, Viramgam.	23-9-1959

S. No.	Name of the officer	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class II—contd.</i>			
31	Shri D. N. Pandya	... District Agricultural Officer, Surendranagar.	24-9-1959
32	Shri M. A. Moharil	... Superintendent, Agricultural School, Gangazari.	24-9-1959
33	Shri V. R. Kale	... Lecturer in Botany, Agricultural College, Akola.	24-9-1959
34	Dr. C. A. Mulay	... Lecturer in Animal Husbandry and Dairying, Agricultural College, Poona.	24-9-1959
35	Shri L. A. Patil	... Extra Assistant Director of Agriculture, Akola.	25-9-1959
36	Shri D. D. Deshmukh	... Superintendent, Agricultural School, Latur.	28-9-1959
37	Shri B. P. Joshi	... Assistant Statistician, Nasik ...	30-9-1959
38	Shri V. J. Gaikwad	... District Agricultural Officer, Kolhapur.	1-10-1959
39	Shri T. N. Puranik	... Lecturer in Agriculture, Gram-sevak Training Centre, Parbhani.	1-10-1959
40	Shri G. S. Mulani	... Personal Assistant to the Superintending Agricultural Officer, Ahmedabad.	1-10-1959
41	Shri C. G. Hardas	... District Agricultural Officer, Chanda.	1-10-1959
42	Shri S. G. Pathak	... Oilseeds Research Officer, Patan.	3-10-1959
43	Shri C. R. Talati	... Superintendent, Agriculture School, Surendranagar.	5-10-1959
44	Shri P. V. Deo	... Superintendent, Banana Research Scheme, Poona.	5-10-1959
45	Shri G. B. Kasad	... Officer I/O Seed-cum-Demonstration Farm, Abdasa.	5-10-1959
46	Shri K. V. Samsi	... Personal Assistant to the Superintending Agricultural Officer, Bombay Division, Nasik.	6-10-1959

S. No.	Name of the officer	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class II—contd.</i>			
47	Shri J. V. Kale	... District Agricultural Officer, Nanded.	7-10-1959
48	Shri V. S. Hingankar	... Assistant Statistician, Nagpur	7-10-1959
49	Shri R. L. Shah	... Assistant Statistician, Rajkot	9-10-1959
50	Shri S. N. Nandedkar	... District Agricultural Officer, Nagpur.	9-10-1959
51	Shri U. V. Bhatt	... Field Officer, I/C Scheme for estimating cost of cotton and its rotational crops, Baroda.	10-10-1959
52	Shri R. Y. Pawar	... Crop Competition Officer, Poona.	10-10-1959
53	Shri K. S. Pharande	... Soil Physicist, Sholapur ...	12-10-1959
54	Shri B. U. Chaudhari	... Superintendent, Agril. School, Yeotmal.	13-10-1959
55	Shri S. M. Patil	... Oilseeds Research Officer, Latur.	14-10-1959
56	Shri S. S. Phadnaik	... Assistant Statistician, Aurangabad.	14-10-1959
57	Shri J. P. Mirikar	... Superintendent, Agril. School, Sholapur.	15-10-1959
58	Shri V. N. Joshi	... Superintendent, Agril. School, Borgaon.	15-10-1959
59	Shri D. R. Desai	... Cotton Development Officer, Baroda.	15-10-1959
60	Shri T. A. Gharpure	... Field Officer, Akola ...	15-10-1959
61	Shri V. B. Rasal	... Lecturer in Agricultural Engineering, Agril. College, Nagpur.	15-10-1959
62	Shri H. R. Ramekar	... Tractor Engineer, Nagpur ...	16-10-1959
63	Shri T. W. Kalamkar	... Sub-Divisional Soil Conservation Officer, Amalner.	18-10-1959
64	Shri K. R. Deshpande	... Sub-Divisional Soil Conservation Officer, Sangamner.	19-10-1959

S. No.	Name of the office	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class II—contd.</i>			
65	Shri S. V. Kathwate	... Agricultural Engineer, Rajkot.	19-10-1959
66	Shri L. R. Kulkarni	... Sub-Divisional Soil Conservation Officer, Bhuj.	20-10-1959
67	Shri Y. G. Lokhande	... Sugarcane Development Officer, Kolhapur.	20-10-1959
68	Shri V. R. Dekhano	... Sub-Divisional Soil Conservation Officer, Chalisgaon.	20-10-1959
69	Shri S. J. Patil	... Superintendent, Agril. School, Dhulia.	20-10-1959
70	Shri M. N. Joshi	... Sub-Divisional Soil Conservation Officer, Dhulia.	20-10-1959
71	Shri P. S. Hattingadi	... Superintendent, Agril. School, Mominabad.	23-10-1959
72	Shri G. T. Oke	... Sub-Divisional Soil Conservation Officer, Jhalod.	24-10-1959
73	Shri G. P. Argikar	... Assistant Professor of Plant Physiology, Agril. College, Poona.	30-10-1959
74	Shri N. T. Sarasik	... Lecturer in Agronomy, Agril. College, Parbhani.	9-11-1959
75	Shri T. K. T. Acheri	... Assistant Plant Pathologist, Poona.	17-11-1959
76	Shri H. C. Mehta	... Principal, Soil Conservation Training Institute, Morvi.	17-11-1959
77	Shri B. M. Desai	... Lecturer in Agriculture, Gram-sevak Training Centre, Morvi.	18-11-1959
78	Shri R. M. Shende	... Agricultural Officer, Co-operative Farming, Poona.	19-11-1959
79	Shri C. J. Magdum	... Sub-Divisional Soil Conservation Officer, Surendranagar.	24-11-1959
80	Shri V. F. Majumdar	... Officer I/C New Pilot Scheme for cultivation of Hybrid Cotton, Surat.	27-11-1959
81	Shri G. S. Joshi	... Chief Instructor, W/s Wing, Gramsevak Training Centre, Sindewahi.	28-11-1959

S. No.	Name of the office	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class II—contd.</i>			
62	Shri R. S. Bhole	... Sub-Divisional Soil Conservation Officer, Amreli.	1-12-1956
63	Shri D. L. Purohit	... Tractor Engineer, Amravati ...	2-12-1956
64	Shri P. S. Thakur	... Cotton Development Officer, Ahmednagar.	19-12-1956
65	Shri G. S. Patel	... District Agricultural Officer, Rajkot.	24-12-1956
66	Shri A. M. Pandya	... Sub-Divisional Soil Conservation Officer, Palanpur.	24-12-1956
67	Shri S. P. Thawale	... Sub-Divisional Soil Conservation Officer, Mehsana.	31-12-1956
68	Shri K. L. Jadhav	... Sub-Divisional Soil Conservation Officer, Rajkot.	2-1-1957
69	Shri T. V. Kaushikkar	... Farm Superintendent, Purna Project, Golegaon.	12-1-1957
90	Shri D. K. Bhargave	... Soil Engineer, Sholapur ...	12-1-1957
91	Shri V. P. Dani	... Principal, Soil Conservation Training Institute, Kelapur.	21-1-1957
92	Shri K. D. Hansoti	... Sub-Divisional Soil Conservation Officer, Amreli.	26-1-1957
93	Shri A. K. Desai	... Bhal Reclamation Officer, Vallabhipur.	1-2-1957
94	Shri C. T. Shah	... Sub-Divisional Soil Conservation Officer, Surendranagar.	1-2-1957
95	Shri S. P. Shah	... Personal Assistant to the Superintending Agricultural Officer, Ahmedabad.	8-2-1957
96	Shri G. S. Mulani	... Crop Competition Officer, Ahmedabad.	8-2-1957
97	Shri C. J. Magdum	... Principal, Soil Conservation Training Institute, Aurangabad.	11-2-1957
98	Shri G. N. Dixit	... Khar Land Investigation Officer, Panvel.	11-2-1957

S. No.	Name of the office	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class II—contd.</i>			
99	Shri M. B. Patel	... Cotton Superintendent, Barcda.	18-2-1960
100	Shri R. S. Bhole	... Sub-Divisional Soil Conservation Officer, Bhir.	19-2-1960
101	Shri B. D. Kamat	... Soil Physicist, Sholapur ...	20-2-1960
102	Shri S. G. Limaye	... Assistant Statistician, Poona...	20-2-1960
103	Shri B. B. Ranade	... Biochemist, Rice Research Scheme, Karjat.	27-2-1960
104	Shri P. K. Taware	... Sub-Divisional Soil Conservation Officer (Terracing Sub-division), Poona.	27-2-1960
105	Shri B. P. Patel	... Sub-Divisional Soil Conservation Officer, Rajkot.	1-3-1960
106	Shri R. G. Desai	... Sub-Divisional Soil Conservation Officer, Wankaner (I).	1-3-1960
107	Shri S. U. Patel	... Sub-Divisional Soil Conservation Officer, Wankaner (II).	1-3-1960
108	Shri H. V. Rajmane	... Sub-Divisional Soil Conservation Officer, Karjat.	1-3-1960
109	Shri A. G. M. Shaikh	... Sub-Divisional Soil Conservation Officer, Surat.	5-3-1960
110	Shri K. N. Ambike	... District Agricultural Officer, Jalgaon.	5-3-1960
111	Shri M. K. Rade	... Sub-Divisional Soil Conservation Officer, Achalpur.	11-3-1960
112	Shri C. M. Dodia	... Sub-Divisional Soil Conservation Officer, Jhalod.	11-3-1960
113	Shri H. V. Desai	... Sub-Divisional Soil Conservation Officer, Kutch.	11-3-1960
114	Shri M. T. Parmar	.. Sub-Divisional Soil Conservation Officer, Rajkot.	11-3-1960
115	Shri M. B. Patel	... Sub-Divisional Soil Conservation Officer, Godhra.	11-3-1960
116	Shri R. K. Saoji	... Sub-Divisional Soil Conservation Officer, Darwah.	14-3-1960

S. No.	Name of the office	Post to which appointed	Date of appointment
1	2	3	4
<i>B. A. S. Class II—contd.</i>			
117	Shri R. G. Joshi	... Sub-Divisional Soil Conservation Officer, Sirur (East).	15-3-1960
118	Shri M. N. Patel	... District Agricultural Officer, Amreli.	16-3-1960
119	Shri N. A. Patil	... Crop Competition Officer, Poona.	17-3-1960
120	Shri S. B. Thawale	... Sub-Divisional Soil Conservation Officer, Katol.	17-3-1960
121	Shri P. N. Joshi	... Sub-Divisional Soil Conservation Officer, Pusad	19-3-1960
122	Shri D. G. Gupte	... Sub-Divisional Soil Conservation Officer, Ahmednagar.	20-3-1960
123	Shri G. T. Oke	... Sub-Divisional Soil Conservation Officer, Mangrulpir.	21-3-1960
124	Shri B. N. Kulkarni	... Sub-Divisional Soil Conservation Officer, Miraj.	22-3-1960
125	Shri S. K. Mahmood	... Crop Competition Officer, Nagpur.	26-3-1960
126	Shri P. R. Inamdar	... Sub-Divisional Soil Conservation Officer, Sholapur.	28-3-1960
127	Shri R. S. Melag	... Sub-Divisional Soil Conservation Officer, Wardha.	31-3-1960
128	Shri S. G. Kulkarni	... Sub-Divisional Soil Conservation Officer, Amravati.	1-4-1960
129	Shri C. T. Chokshi	... District Agricultural Officer, Dangs.	16-4-1960
130	Shri S. G. Pathak	... Oilseeds Research Officer, Latur.	16-4-1960
131	Shri B. K. Shinde	... Sub-Divisional Soil Conservation Officer, Karjat.	26-4-1960
132	Shri H. V. Rajmane	... Sub-Divisional Soil Conservation Officer, Sangamner.	26-4-1960
<i>G. S. S. Class I</i>			
1	Shri C. V. Deshpande	... Personal Assistant to the Agricultural Commissioner, Poona.	1-4-1960
<i>G. S. S. Class II</i>			
1	Shri K. N. Mudliar	... Assistant Accounts Officer, Dhulia.	11-7-1959
2	Shri K. N. Mudliar	... Assistant Accounts Officer, Rajkot.	20-7-1959
3	Shri N. V. Patel	... Assistant Accounts Officer to Divisional Soil Conservation Officer, Poona.	22-10-1959

(b) Officers sent on deputation for training abroad.—

S. No.	Name of the Officer with designation	Subject of training	Period of training	Name of the country
1	Dr. H. G. Pandya, Agricultural Chemist, Department of Agriculture, B. S., Poona.	Agricultural Chemistry.	6 months from April 1959.	U. S. A.
2	Shri G. P. Argikar, Assistant Statistician, Poona.	Plant Breeding.	6 months from June 1959.	Japan.
3	Shri G. M. Talgeri, Technical Officer (IV).	Crop Protection.	4 months from September 1959.	U. K.
4	Shri V. R. Rethrekar, Lecturer in Agronomy at Agril. College, Parbhani.	Cotton Breeding	9 months from September 1959.	Egypt.
5	Shri P. K. Gupta, Professor of Horticulture at Agricultural College, Nagpur.	Horticulture.	One year from 20th August 1959.	U. S. A.
6	Shri V. G. Sharma, Assistant Statistician (I), Department of Agriculture, B. S., Poona.	Statistics.	Do.	U. S. A.
7	Shri M. K. Desai, Plant Pathologist, Department of Agriculture, B. S., Poona.	Plant Pathology.	6 months from 20th August 1959.	U. S. A.
8	Shri G. K. Patwardhan, Agronomist, Kolhapur.	Agronomy.	3 years from December 1959.	Australia.
9	Shri T. K. T. Achari, Assistant Plant Pathologist, Blast Disease of Rice, Poona.	Agronomy.	Do.	Australia
10	Shri P. K. Khedekar, Lecturer in Agronomy, Agril. College, Akola.	Agronomy.	Do.	Australia.
11	Shri L. Motiz, Assistant Professor of Plant Pathology, Agril. College, Poona.	Microbiology.	Do.	Australia.
12	Shri P. M. Joshi, Assistant Soil Chemist, Soil Testing Laboratory, Agril. College, Nagpur.	Soil testing.	4 months from 20th February 1960.	U. S. A.
13	Dr N. B. Kulkarni, Sugarcane Disease Investigation Officer, Padegaon.	Crop Protection.	6 months from 20th April 1960.	U. K.

(c) *Officers sent on deputation for training outside the State.—*

S. No.	Name of the Officer with designation	Subject of training	Period of training	Place
1	Shri S. G. Patki, Assistant Statistician, Poona.	Agricultural Statistics Sr. Certificate course.	1 year from 1-8-1959 to 31-7-1960.	I. C. A. R., New Delhi.
2	Shri C. T. Patel, Botanist I/C Indo-American Cotton Scheme, Surat.	Do.	Do.	Do.
3	Shri J. V. Majumdar, Oilseeds Research Officer, Mehsana.	Do.	Do.	Do.
4	Shri C. N. Dafal, Assistant Statistician, Poona.	Do.	Do.	Do.
5	Shri S. D. Nimkar, Lecturer in Agronomy, Agril. College, Parbhani.	Agronomy leading to Ph. D.	2 years from 15-10-1959 to 30-9-1960.	I. A. R. I., New Delhi.
6	Shri V. S. Khuspe, Lecturer in Agronomy, Agril. College, Nagpur.	Do.	Do.	Do.
7	Shri V. R. Kale, Lecturer in Botany-cum-Bacteriology, Agril. College, Akola.	Botany leading to Ph. D.	Do.	Do.

(d) *Officers who went abroad and outside the State for higher training on study leave.—*

S. No.	Name of the Officer with designation	Subject of training	Period of training	Name of country
1	Shri D. K. Desai, Officer I/O Farm Management Scheme, Poona.	Agricultural Economics leading to Ph. D.	3 years upto May 1961.	U. S. A.
2	Shri N. S. Sheth, District Agricultural Officer, Sorath.	Agricultural Extension.	2 years.	U. S. A.
3	Shri M. S. Joshi, Lecturer in Agronomy, Agril. College, Nagpur.	Agronomy leading to Ph. D.	2 years from 17-10-59.	India, New-Delhi.

(e) *Officers deputed to other Departments/States outside India or Private Bodies.—*

S. No.	Name of the Officer with designation	Deputed to
1	Shri G. K. Phadtare, Professor of Agricultural Extension, Agril. College, Poona.	Revenue Department as Deputy Director of Agriculture on Fact Finding Committee up to April 1960.
2	Shri U. K. Kanitkar	... Mysore Government as Plant Physiologist, Dharwar.
3	Shri D. K. Desai, Professor of Veterinary Science.	Sudan Government.
4	Shri D. K. Patel	... Khedut Sahakari Khand Udyog Mandali Ltd., Bardoli, District Surat.
5	Shri D. H. Gokhale, Dy. Director of Agriculture (Eng.) Poona.	Revenue Department as District Supply Officer, Poona.
6	Shri V. Y. Kulkarni, Superintendent, Agril. School, Digraj.	Revenue Department as District Supply Officer, Kolaba.
7	Shri L. N. Kulkarni, Crop Competition Officer, Nasik.	Revenue Department as District Supply Officer, Buldana.
8	Shri N. M. Khair, Cotton Superintendent, Surendranagar.	Revenue Department as District Supply Officer, Junagadh.
9	Shri J. D. Patel, District Agricultural Officer, Kutch, Bhuj.	Revenue Department as District Supply Officer, Jamnagar.
10	Shri B. D. Patel, District Agricultural Officer, Amreli.	Revenue Department as District Supply Officer, Broach.
11	Dr. M. M. Kibe, Soils Specialist, Department of Agriculture, B. S., Poona.	Public Works Department as Agricultural Officer, Water Resources Investigation Circle, Poona.
12	Shri Y. R. Karnik, Milk Costing Officer, Poona.	Dairy Development Department as Director, Dairy Technology, Aarey, Bombay.

(f) *Officers who have been granted extension during the year under report.—*

S. No.	Name of the Officer with designation	Date from which extension granted
1	Dr. B. S. Kadam, Jt. Director of Agriculture (I)	... 25th October, 1959.
2	Shri G. N. Godse, Jt. Director of Agriculture (II)	... 5th November, 1959.
3	Shri L. H. Mirajkar, Superintendent, Agril. School, Kolhapur.	... 11th April, 1960.

(g) *Officers who were permitted to retire from Government service.—*

S. No.	Name of the Officer with designation	Date of retirement
1	Shri N. B. Pandhare, Agricultural Development Officer, Agril. College, Nagpur.	[1-7-1959.]
2	Shri B. G. Khandekar, District Agricultural Officer, Aurangabad.	6-7-1959.
3	Shri G. N. Wardadkar, District Agricultural Officer, Sangli.	18-7-1959.
4	Shri G. K. Govande, Cotton Breeder, Broach.	6-9-1959.
5	Shri G. S. Joshi, Chief Instructor W/S Wing at Gramsevak Training Centre, Sindewahi.	20-1-1960 Re-employed from 21-1-1960.
6	Shri N. A. Joshi, District Agricultural Officer, Banaskantha.	25-2-1960.
7	Shri V. K. Bedekar, Superintending Agricultural Officer, Aurangabad.	13-3-1960.

(h) Officers who are on deputation to this Department from other Departments.—

S. No.	Name of the Officers with their designation	Date
1	Shri R. G. Lothe, Lecturer in Co-operation at Gramsevak Training Centre, Sindewahi.	13-10-59
2	Dr. N. B. Kulkarni, Lecturer in Public Health at Gramsevak Training Centre, Parbhani.	24-10-59
3	Shri N. C. Joshi, Lecturer in Public Health at Gramsevak Training Centre, Tharsa.	3-11-59
4	Shri G. M. Kelkar, Lecturer in Co-operation at Gramsevak Training Centre, Parbhani.	14-11-59
5	Shri R. D. Paraskar, Lecturer in Co-operation at Gramsevak Training Centre, Buldana.	5-12-59
6	Shri V. M. Mehta, Lecturer in Co-operation at Gramsevak Training Centre, Morvi.	28-12-59
7	Shri J. V. Thoke, Lecturer in Animal Husbandry at Gramsevak Training Centre, Sindewahi.	28-2-60
8	Shri R. T. Talwalkar, Lecturer in Animal Husbandry at Gramsevak Training Centre, Jalgaon.	14-3-60
9	Shri V. N. Navangul, Lecturer in Animal Husbandry at Gramsevak Training Centre, Manjri.	20-3-60
10	Shri B. A. Joshi, Lecturer in Animal Husbandry at Gramsevak Training Centre, Tharsa.	9-4-60

B. FINANCE

*Finance and Budget

(a) Departmental expenditure and receipts (year ending 31st March 1960).—The expenditure of the Agricultural Department for the year under report amounted to Rs 7,69,61,861.00 under all

* The figures for Maharashtra region and Gujrat region, separately, are not available.

major heads so far as this Department is concerned. (This expenditure is provisional as the final figures of expenditure under 40—Agriculture are awaited from the Accountant General, Bombay and reports of the Collectors in respect of expenditure under 'P-Loans' are also awaited).

The receipts of the Department from all sources credited to XXIX-Agriculture amounted to Rs. 1,83,20,895.00.

(b) *Subsidies and grants.*—Subsidies and grants as mentioned below were received for research and development work during the year under report.

	Rs.
(1) From the Indian Council of Agricultural Research.	1,01,800.00
(2) From the Indian Central Sugarcane Committee.	1,05,570.00
(3) From the Indian Central Oilseeds Committee.	1,18,050.00
(4) From the Indian Central Coconut Committee.	— *
() From the Indian Central Tobacco Committee.	— *
(6) From the Indian Central Arecanut Committee.	— *
(7) From the Indian Central Cotton Committee for various research, multiplication and distribution schemes.	42,960.00
(8) From the Government of India from Central Revenue in furtherance of Food Production Campaign.	67,78,980.00

(* The approximate grants of Rs. 51,454.00, Rs. 26,390.00 and Rs. 8,348.00 were due to be received from the Indian Central Coconut Committee, Tobacco Committee and Arecanut Committee respectively. The adjustments, however, do not seem to have been effected during the year under report.)

(c) *Personal Ledger Accounts.*—The present position of the Personal Ledger Accounts of the District Agricultural Officer in the State is as under—

	Rs.
Balance in the Personal Ledger Account for improved seeds for Grow More Food Campaign.	12,39,175.00

The amounts as noted below placed at the disposal of the Director of Agriculture in the previous years remained with him during the year with certain modifications therein.

	Rs.
(1) Personal Ledger Account for financing Cotton Seed Distribution.	6,70,000.00
(2) Personal Ledger Account for financing the preparation of manure mixture.	25,00,000.00
(3) Personal Ledger Account for implements and seeds.	50,000.00
(4) Personal Ledger Account for manufacture of Winnowing fans.	1,200.00

The entire balance of Rs. 6,79,000.00 standing in the Personal Ledger Account for purchase of *Nandri* seed potato from Simla standing in the name of the Director of Agriculture has been surrendered to Government during the year under report.

The balance amounting to Rs. 9,64,297.00 remaining in the Personal Ledger Account sanctioned to the District Agricultural Officers for financing transactions of groundnut cake, remained with them during the year. Further sums for surrender are under consideration.

Note.—The information in this Chapter only pertains to the erstwhile Bombay State.

APPENDIX I

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, COLLEGE OF
AGRICULTURE, AKOLA DURING THE YEAR 1959-60

A. Staff

Shri R. C. Shrivastav continued to be the Principal of the College during the year under report.

B. Studentship

The details of the number of students on the roll of the college in different classes are as under:—

Pre-University Class	...	126
B. Sc. (Agri.) Part I	...	64
B. Sc. (Agri.) Part II	...	68
B. Sc. (Agri.) Final	...	33

C. Examination Results

Details of the number of students appeared for the examination of the University, number of students passed and percentage of passing are as under:

Examination	No. appeared	No. passed	Percentage of passing
Pre-University (Agri.)	... 122	32	26
B. Sc. (Agri.) Part I	... 58	32	55
B. Sc. (Agri.) Part II	... 63	45	71
B. Sc. (Agri.) Final	... 33	29	88

D. Post-Graduate Training

Nil.

E. Expansion of the College

Construction of hostel buildings is being completed. Electrification and sanitary fittings are in progress.

F. Equipment

Laboratory equipment and furniture worth Rs. 61,000-00 was purchased during the year.

G. Library, College Publications, etc.

About 375 new books were purchased and 20 periodicals were subscribed to.

H. The Students' Hostel

A rented building known as '*Gurukul*' was hired for hostel and there were 42 Students during the session.

**I. Special Activities Relating to College, such as
Social Gathering, College Gymkhana**

Social activities included Annual Social Gathering, observance of Independence and Republic Days, enacting a Marathi drama, celebration of *Ganeshchaturthi*. In all, 64 candidates were members of the National Cadet Corps.

APPENDIX II

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, COLLEGE OF
AGRICULTURE, NAGPUR, DURING THE YEAR 1959-60

A. Staff

Dr. E. P. Asthana continued to be the Principal of the College during the year under report.

B. Studentship

Details of the number of students on the roll of the college in different classes, are given below.

Class	No. on rolls at the end of		Number admitted to examinations of 1960
	July 1959	March 1960	
Pre-University ...	200	195	195
B. Sc. (Agri.) Part I ...	118	118	118
B. Sc. (Agri.) Part II ...	90	88	88
IV Year (old scheme) ...	64	65	65
M. Sc. (Agri.) Part I ...	48	47	47
M. Sc. (Agri.) Part II ...	43	42	42
Total ...	563	555	555

C. Examination Results

Details of the number of students appeared for the examination of the University, number passed and percentage of passing in 1960 are as under.

Name of examination	No. admitted		No. successful		Percentage of passing	
	Collegiate	Non-Collegiate	Collegiate	Non-Collegiate	Collegiate	Non-collegiate
Pre-University (Agri.)...	195	13	61	6	31.3	46.1
B. Sc. (Agri.) Part I ...	118	12	66	6	55.9	50.0
B. Sc. (Agri.) Part II ...	88	...	68	...	77.2	...
B. Sc. (Agri.) (Final old scheme)	65	12	54	7	83.0	58.3
M. Sc. (Agri.) Part I ...	47	1	45	1	95.7	100.0
M. Sc. (Agri.) Part II ...	42	...	42	...	100.0	...

D. Post-graduate Training

The scheme introducing post-graduate training for batches of six students in each of the subjects *viz.* Agronomy, Horticulture, Plant Pathology, Agricultural Economics, Agricultural Chemistry, Agricultural Botany, Agricultural Entomology and Agricultural Extension at this college was implemented during 1958-59. During the year under report, the subjectwise strength of students was as under.

M. Sc. (Agri.) Part I

S. No.	Subject	No. admitted	No. appearing at University examination of 1960		No. successful	
			Collegiate	Non-Collegiate	Collegiate	Non-Collegiate
1	Agronomy ...	6	6	...	6	...
2	Agricultural Economics ...	6	6	—	6	—
3	Horticulture ...	6	6	...	5	...
4	Agricultural Extension ...	6	6	—	6	...
5	Agricultural Chemistry ...	6	5	1	5	1
6	Agricultural Botany ...	6	6	...	6	...
7	Agricultural Entomology ...	6	6	...	6	...
8	Plant Pathology ...	6	6	...	5	...
Total ...		48	47	1	45	1

Strength of M. Sc. (Agri.) Part II

S. No.	Subject	No. admitted	No. appeared at the University Examination of 1960
1	Agronomy ...	6	6
2	Agricultural Economics ...	6	6
3	Horticulture ...	5	5
4	Agricultural Extension ...	5	4
5	Agricultural Chemistry ...	5	5
6	Agricultural Botany ...	6	6
7	Agricultural Entomology ...	5	5
8	Plant Pathology ...	5	5
Total ...		43	42

APPENDIX II

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, COLLEGE OF
AGRICULTURE, NAGPUR, DURING THE YEAR 1959-60

A. Staff

Dr. R. P. Asthana continued to be the Principal of the College during the year under report.

B. Studentship

Details of the number of students on the roll of the college in different classes, are given below.

Class	No. on rolls at the end of		Number admitted to examinations of 1960
	July 1959	March 1960	
Pre-University ...	200	195	195
B. Sc. (Agri.) Part I ...	118	118	118
B. Sc. (Agri.) Part II ...	90	88	88
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M. Sc. (Agri.) Part I ...	48	47	47
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Total ...	563	555	555

C. Examination Results

Details of the number of students appeared for the examination of the University, number passed and percentage of passing in 1960 are as under.

Name of examination	No. admitted		No. successful		Percentage of passing	
	Collegiate	Non-Collegiate	Collegiate	Non-Collegiate	Collegiate	Non-collegiate
Pre-University (Agri.) ...	195	13	61	6	31.3	46.1
B. Sc. (Agri.) Part I ...	118	12	66	6	55.9	50.0
B. Sc. (Agri.) Part II ...	88	...	68	...	77.2	...
B. Sc. (Agri.) (Final old scheme)	65	12	54	7	83.0	58.3
M. Sc. (Agri.) Part I ...	47	1	45	1	95.7	100.0
M. Sc. (Agri.) Part II ...	42	...	42	...	100.0	...

D. Post-graduate Training

The scheme introducing post-graduate training for batches of six students in each of the subjects *viz.* Agronomy, Horticulture, Plant Pathology, Agricultural Economics, Agricultural Chemistry, Agricultural Botany, Agricultural Entomology and Agricultural Extension at this college was implemented during 1958-59. During the year under report, the subjectwise strength of students was as under.

M. Sc. (Agri.) Part I

S. No.	Subject	No. admitted	No. appearing at University examination of 1960		No. successful	
			Collegiate	Non-Collegiate	Collegiate	Non-Collegiate
1	Agronomy ...	6	6	...	6	...
2	Agricultural Economics ...	6	6	...	6	...
3	Horticulture ...	6	6	...	5	...
4	Agricultural Extension ...	6	6	...	6	...
5	Agricultural Chemistry ...	6	5	1	5	1
6	Agricultural Botany ...	6	6	...	6	...
7	Agricultural Entomology ...	6	6	...	6	...
8	Plant Pathology ...	6	6	...	5	...
Total ...		48	47	1	45	1

Strength of M. Sc. (Agri.) Part II

S. No.	Subject	No. admitted	No. appeared at the University Examination of 1960
1	Agronomy	6	6
2	Agricultural Economics	6	6
3	Horticulture	5	5
4	Agricultural Extension	5	4
5	Agricultural Chemistry	5	5
6	Agricultural Botany	6	6
7	Agricultural Entomology	5	5
8	Plant Pathology	5	5
Total ...		48	48

E. Expansion of the College

The capacity of the Pre-University class was raised from 128 to 200. Added to this increase, the inception of part II of post-graduate classes put a squeeze on the meagre sources of class room accommodation which was not sufficient even prior to the introduction of post-graduate classes. The projected new buildings for the college and hostel have been still in the planning stage. The Government sanction for the construction of hutments as a temporary measure to relieve congestion has been received recently but the work will start only after the plans and estimates receive administrative approval. Till these temporary structures are ready for use, the existing over-crowded situation will linger on and may lead to the impairment of quality of teaching.

F. Equipment

Due to scarcity of accommodation, it is not possible to speed up the pace of equipping laboratories with necessary instruments or setting up new laboratories for the post-graduate teaching in relation to norms based on the number of students and requirement of curriculum. The problem of accommodation stands in the way of installing machines and apparatus in suitable places for deriving optimum benefit of their working and retards the physical growth of the institution which should essentially keep pace with the rising number of students. During the year under report, 13 instruments valued at Rs. 2,616.49 were supplied by the Indian Council of Agricultural Research under T. C. M., U. S. A. programme of Inter-Institutional arrangements with the Kansas State University.

G. Library, College Publications Etc.

In all, 1,090 books and 1,292 issues of magazines, journals and other scientific periodicals were added to the library thus raising the collection to 8,241 books and 3,521 periodicals. Also 7 dailies and 3 weeklies were provided for the Reading Room. The College Magazine was published in one issue comprising two numbers containing 64 pages.

H. The Students' Hostel

The number of inmates in the hostels attached to the college was 226 against their capacity of 170. About 17 students were residing in outside hostels. As the pressure of demand for accommodation in the hostels had greatly increased due to enhancement of admission

to Pre-University class and addition of M. Sc. Part II class, there remained no alternative but to permitting over-crowding in the hostel in order to provide shelter to students coming from rural areas. The scheme of constructing new buildings for college and hostel continued to remain in the planning and estimating stage. This phase of development needs to be tackled on top-priority basis so that the existing congestion is mitigated and the normal standards are restored at the earliest.

(I) Special Activities relating to College such as Social Gathering, College Gymkhana Etc.

The students' Union organised as usual, the *Janmashtami* and *Ganesh Utsavas* and staged Hindi and Marathi Dramas. The Indian Independence Day, Republic Day, Tilak Commemoration Day and Mahatma Gandhi's Birth Day were also observed by the students and the programmes included *Bhav-geet*, elocution competitions, cine shows and discourses. Students also participated in tree planting for *Vana-Mahotsava* and *rabi* campaign during their extension training periods. The College teams participated in the University tournaments of foot ball, Volley ball cricket, hockey, *kabbadi*, *kho-kho*, badminton, swimming, wrestling and athletics. The *kabbadi* team annexed the trophy of *Vidarbha Krida Mandal* and won several friendly matches. The swimming team won second position in the University and the wrestling team was declared champion in welter-weight category. The volley ball team won the first round in the University tournament and the *kho-kho* team won two rounds in the *Krida Mandal* tournaments. The Audio-Visual Society arranged the showing of 5 cine-sound films lent by the United States Information Services. The Annual Social Gathering was celebrated from 18th to 23rd December 1960 and the inauguration was performed at the hands of Shri Vasant Rao Naik, the Minister for Agriculture.

APPENDIX III

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, COLLEGE OF
AGRICULTURE, PARBHANI, DURING THE YEAR 1953-60

A. Staff

The following officers held the charge of the post of Principal for the periods shown below :

Shri T. K. T. Acharya	27-6-1959 to 30-8-1959
Shri A. A. Memon	31-8-1959 onwards

B. Studentship

Details of the number of students on the roll of the college in different classes are as follows :

<i>Four Year Course—</i>		
Pre-Agriculture Class	...	60
<i>Three Year Course—</i>		
(i) I Year B. Sc. (Agri.)	...	40
(ii) II Year B. Sc. (Agri.)	...	27
(iii) III Year B. Sc. (Agri.)	...	27
Total	...	<u>154</u>

C. Examination Results

Details of the number of students appeared for different examinations of the University, number of successful students and percentage of passing are as under :

Class	Number appeared	Number passed	Percentage of passing
1. Pre-Agriculture	57	35	63.0
2. I Year B. Sc. (Agri.)	42	27	64.3
3. II Year B. Sc. (Agri.)	25	22	87.0
4. III Year B. Sc. (Agri.)	27	25	92.6

D. Post-graduate Training

The post-graduate training has not yet started in this college.

E. Expansion of the College

Four year-degree course was introduced in the college during the year under review and this will replace the three-year degree course. Two new temporary sheds were completed for housing laboratories and class-rooms temporarily to meet the growing demand for space. One more block of six rooms was completed and made available to the students for hostels purposes. Land acquisition proceedings in respect of additional area of 120 acres were completed and the area was taken into possession. Land acquisition proceedings for 41 more acres, adjacent to the land already taken into possession were in progress. The work of the construction of main college building, hostels, residential quarters for staff etc. was started on 15th February, 1960 when the foundation stone of the main building was laid by Sri Y. B. Chavan, Chief Minister of Bombay State. The work of converting all the fair weather roads on the college campus into *pucca* roads has been completed during the year.

F. Equipment

Laboratory equipment was purchased for the various sections at a cost of Rs. 67,262 under 'Non-recurring contingencies' and worth about Rs. 11,000 under 'recurring'. Of this, equipment worth Rs. 17,622 was purchased through the Central Stores Purchasing Officer.

Live-stock including poultry, buffaloes, bulls and cows valued at about Rs. 9,000 was also purchased for the College Dairy during the year.

G. Library, College Publications etc.

During the year under report, 843 books worth Rs. 11,567 were purchased and 68 periodicals were subscribed for. The College Library was a recipient of 99 U. S. gift books. The first issue of the College Magazine was published during this year.

H. The Student's Hostels

Although no special hostels have been built up for the students, 76 students were accommodated in the existing farm buildings. Adequate furniture has been provided for every hostel inmate and four messes were run for boarding.

I. Special Activities relating to College such as Social Gathering, College Gymkhana, etc.

(a) *Laying of the foundation stone of the main building.*—The foundation stone ceremony of the new college building took place on the 15th February, 1960. The Chief Minister of Bombay State, Shri Yeshwantrao Chavan, laid the foundation stone. The distinguished guests present on this occasion included Shri V. P. Naik, Minister for Agriculture, Shri B. G. Gadhe, Minister for Forests, Shri S. B. Chavan, Deputy Minister for Revenue, Shri Devisingh Chauhan, Deputy Minister for Agriculture, Capt. S. P. Mohite, Director of Agriculture and Dr. V. G. Vaidya, Joint Director of Agriculture (II).

(b) *Annual Social Gathering.*—The Annual Social Gathering of this College was held on the 15th February, 1960, when Shri V. P. Naik, Minister for Agriculture graced the function as its Chief Guest.

(c) *College Gymkhana.*—The College Gymkhana, which is primarily a students' representative body carried out the various extra-curricular activities such as games, sports, cultural programmes etc. The College participated in the first inter-collegiate tournaments held under the auspices of the Marathwada University at Aurangabad wherein this college won a number of prizes and trophies.

**J. Aid and Assistance to the Public from Veterinary Hospital,
Details of work done under Medical aid**

Nil.

K. Other Activities

(a) *Independence Day.*—The twelfth anniversary of India's Independence was celebrated at the college campus on the 15th August 1959.

(b) *Republic Day.*—A pageant-cum-procession was taken out by various institutions of the Parbhani town on the 26th January, 1960 depicting mainly the Departmental activities, progress made by the nation during the First and Second Five Year Plans, etc.

(c) *Children's Day.*—Children's Day was observed on the 14th November, 1959 at the college campus.

(d) *Planning forums.*—Films on the Five Year Plans were exhibited in the schools of Parbhani town.

(e) *Farmers' Day.*—A series of lectures on various topics of Agricultural interest were delivered to the farmers on the 24th January, 1960.

(f) *Kharif food drive*.—Method demonstrations on the dibbling of food crops etc. were given to all the district officers in the Aurangabad division at the main Farm attached to the College.

(g) *Rabi food drive*.—Method demonstrations on thinning of *jowar*, spraying of insecticides, interculturing etc. on the crops of *jowar* and wheat were arranged on the cultivators' fields in 18 villages in the Parbhani block. The staff and students participated in these demonstrations.

(h) *Extension camps*.—Two extension camps of the III year B. Sc. (Agri.) class were arranged at villages Takli and Aundha when the farmers were made conversant with the improved agricultural methods.

(i) *Study tours*.—Students of all the classes were taken on study tours. The staff and students also visited the World Agricultural Fair at New Delhi.

(j) *Research Club*.—A 'Research Club' has been established at this college in order to promote interest in research activities in different fields of agricultural research.

APPENDIX IV

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, COLLEGE
OF AGRICULTURE, POONA, DURING THE YEAR 1959-60

Introduction

This is the 52nd year of the College of Agriculture, Poona. This being one of the oldest colleges in India, has done pioneering work in the field of agricultural education and research for over half a century. The College aspires to push further in its path of progress and reputation. It has planned this year to develop further into a full fledged post-graduate institute.

A. Staff

Shri P. N. Driver continued to be the Principal of the College during the year under report.

B. Studentship

The following students were on the rolls of the College during the year under report—

F. Y. Sc. (Agri.)	...	195
I. Sc. (Agri.)	...	111
Jr. B. Sc. (Agri.)	...	91
B. Sc. (Agri.)	...	80
M. Sc. (Agri.)	...	43
Ph. D.	...	6
Total	...	526

C. Examination Results

Class	No. appeared	No. passed	Percentage of passing	
<i>(a) Examination held in October 1959—</i>				
B. Sc. (Agri.) (New rules)	...	5	5	100.0
B. Sc. (Agri.) (Revised rules)	...	10	8	80.0
M. Sc. (Agri.)	...	7	7	100.0
<i>(b) Examination held in April-May 1960—</i>				
F. Y. Sc. (Agri.)	...	186	105	56.4
I. Sc. (Agri.)	...	127	95	74.8
Jr. B. Sc. (Agri.)	...	103	57	55.3
B. Sc. (Agri.)	...	83	70	83.2
M. Sc. (Agri.)	...	11	8	72.7

D. Post-Graduate Training

The College of Agriculture, Poona, conducts post-graduate courses leading to the degree of M. Sc. (Agri) and Ph. D. of the Poona University in all the important branches of agricultural science. The admissions to the post-graduate courses for M. Sc. (Agri) are, on an average, 30 only. There are no fixed admissions to the post-graduate courses for Ph. D., the same being dependent on the availability of technical advisors. There are a number of factors limiting the admission capacity *viz.*, staff, laboratories and equipment. Proposals are underway for expansion of training facilities.

E. Expansion of the College

Consequent on the increase in admissions to the degree course from 150 to 200, it is contemplated to improve facilities by way of additional staff; expansion of the present laboratories, new equipment and apparatus. A few teaching and other posts have already been sanctioned by the State Government.

F. Equipment

Proposals for supply of additional equipment due to increase in admission from 150 to 200 to the degree course and the expected increase in admissions to the post-graduate courses from 30 to 100 are already under consideration. As a participating institution under Inter-Institutional Arrangements, the College is receiving some equipment and books from the U. S. A.

G. Library, College Publications, etc.

Budget grant of Rs. 10,188-00 was at the disposal of the Principal for the College Library. The following is the position of books in the library :

(a) Total number of books	...	15,016
(b) Total number of bound volumes	...	7,519
(c) No. of scientific journals and other periodicals to which the library subscribes—		
(i) American	...	19
(ii) British	...	33
(iii) Indian	...	36
		93
(d) No. of books added during the year	...	210

Poona Agricultural College Magazine.—Four issues of the magazine were published during the year and the total pages were 280. The number of subscribers to the magazine was 657. In all, 24 foreign and 40 Indian magazines were obtained on exchange basis. Recently the State Government have granted a subsidy of Rs. 900 for improving the financial condition of the magazine.

H. Students' Hostel

In all, 310 boys and 2 girls were provided with hostel accommodation. Seventeen of these students belonged to backward classes. A number of parties of students and farmers visited the College during the year and lodging and boarding arrangements were made for them. A new hostel block is nearing completion and is expected to provide accommodation to 168 more students.

I. Social Activities relating to the College

The College provides facilities for playing almost all Indian and several foreign games. A debating society is also attached to the gymkhana. The present Reading Room of the gymkhana provides a variety of light reading material like dailies, weeklies, fortnightlies and monthlies. Plans are afoot for slowly building up a large "Books Section" to the Reading Room.

The college takes part in most of the inter-collegiate tournaments. The following prizes were won by the College :—

Tag-of-war	...	Winners
Wrestling	...	Second best
Hockey	...	Second best
Football	...	Second best

(a) *Annual Social Gathering.*—The 52nd Annual Social Gathering was celebrated by the College this year. Shri Vaikuntlal Mehta was the Chief Guest. The students took very keen interest in the annual sports held on the occasion. Marathi, Hindi and English dramas were staged by the boys with all success.

(b) *National Cadet Corps.*—Sixty-nine cadets were enrolled in the N. C. C. platoon of the college which forms part of the D Coy. of the 2nd Bombay Battalion, N. C. C. / 2Lt. S. V. Ketkar, Lecturer in Agricultural Engineering was in charge of the platoon.

The platoon attended the annual training camp at Kolhapur, Sgt. K. K. Chavan (Sr. B. Sc. student) stood first in 'C' certificate examination. Two members of the staff, Sarvashri B. B. Patil and S. N. Desai, Lecturers in Agronomy, were sent for Pre-Commission N. C. C. training and are now working as Officers in the N. C. C.

J. Aid and assistance to public from the Veterinary Hospital, details of work done under Medical Aid etc.

Veterinary Hospital.—Shri M. M. Kurlisenapati held the post of the Professor of Veterinary Science and Officer in charge of the Veterinary Hospital.

Clinical work.—The following work was done during the year under report—

Out patients	...	6,436
In patients	...	404
Castrations	..	334
Major operations	...	25
Daily average attendance	...	58.68
Post-mortem examinations	...	25

K. Other Activities

(a) *Medical Dispensary.*—The annual medical examination of the students was held in August and September 1959. About 824 cases were treated at the dispensary during the year for various diseases.

(b) *Extension Wing.*—Prof. N. P. Sinnarkar was in charge of the Wing throughout the year under report.

The Extension Wing undertook a scheme of socio-economic survey in the selected Paddy Pilot Blocks in the State in collaboration with the Statistician, Department of Agriculture, and the Technical Officer (paddy pilot scheme). The data from 13 blocks have been collected in special proforma and the work of processing the same is in progress.

The Extension Wing also conducted a Refreshers' Training Course for Agricultural Assistants.

Various development activities such as crop improvement, horticulture development, soil conservation, crop protection, cattle improvement, poultry development, organisation of *Bal-vikas Mandals*, conducting farmers' study tours and exhibitions were taken up in the College Development Block.

APPENDIX V

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, GRAMSEVAK
TRAINING CENTRE, BULDANA DURING THE YEAR 1959-60**General**

This institution started working as Basic Agricultural School since 1st May 1958 and the integrated course was subsequently introduced since 16th June 1959.

Out of the 70 selected candidates for first batch, only 61 candidates joined the training and afterwards 4 out of 61 candidates left the Centre. Final number of candidates in first batch undergoing training is 57 only. Six candidates out of 57 are departmental.

A. Location

Buldana, District Buldana.

B. Staff

Shri N. P. Deshmukh held the charge of the post of the Principal throughout the year under report.

C. Brief Information of each Course, its Syllabus and Duration

During the two years integrated course, training in theory, practical and extension on the various subjects is imparted to trainees. Total duration of integrated course for each batch of 70 is of two years.

D. Facilities

(i) *Demonstration farm.*—Government Garden which is transferred to this institute from 6th January 1959 has proved to be immensely useful for imparting practical training to the trainees in Agriculture. Also, administrative control of the Government Demonstration Farm, Buldana, has been recently transferred from the District Agricultural Officer, Buldana, to this Institute for the convenience of practical training of the trainees.

(ii) *Demonstration equipment.*—Demonstration equipments purchased and available at Government Garden, Buldana, and Government Demonstration Farm, Buldana, were utilised for the purpose. Additional equipment will be purchased as and when the incoming tutors would join their vacant posts and submit their requirements.

(iii) *Class-rooms.*—At present theory classes are being conducted in one of the lecture halls of the school building of the Education Department.

(iv) *Hostel*.—The trainees have been accommodated in the Peace Memorial buildings as the construction of departmental school and hostel buildings has not yet been completed. Hostel building under construction is meant for 100 trainees only and will fall short for 40 trainees for which plans and estimates for additional buildings are administratively approved. Technical sanction is awaited.

(v) *Reference material*.—A library for this centre has been set up and it is growing in size gradually. However, it may be pointed out here that an annual provision of Rs. 500 in the budget falls abnormally short in the initial period of the library. For the use of 140 trainees, it seems proper to have at least 10 copies of each book of utmost utility to the trainees. A museum is being set up with the help of various models, charts and teaching apparatus.

There are no text books prescribed in Marathi for the following subjects as a result of which teaching staff experienced some difficulties.

(1) Animal Husbandry, (2) Rural Industries, (3) Public Health, (4) Social Education and (5) Minor Engineering Works.

(vi) *Recreation facilities*.—Library having a number of books, different magazines and newspapers has already been set up. Museum is being set up. In-door and out-door sports material has been purchased and is being used by the trainees. Also, different kinds of musical instruments have been purchased and the trainees organise different programmes.

(vii) *Transport*.—At present, this Centre has been supplied with one cargo personnel carrier only through T. C. M. programme. This single vehicle of 15 seat capacity is quite inadequate for the transport and shifting of trainees to villages for practical training in reasonable time. Frequency of trips by this single vehicle for shifting of trainees becomes costly. Hired local buses for the purpose is still more costly and as such it is essential to have two buses of 20 seats each and one Willys Jeep.

(viii) *Visual-aids*.—Models, charts, blackboards and flannelographs etc. are being used. Slide projector has recently been supplied through T. C. M. programme.

E. Training Programme

(i) *Objective*.—To prepare self reliant, practical field workers for extension work in the Development Blocks.

(ii) *Work plan*.—To impart theory and practical training in the subjects to the Gramsevak trainees.

(iii) *Teaching methods*.—Besides theory and practical training, trainees are taken on study tour and for village practicals. Also, charts, models etc. are being used at the time of teaching.

(iv) *Admissions*.—Minimum qualification for recruitment of *Gram-sevak trainees* is 'Matriculate or Vernacular Final examination passed with Diploma in Agriculture'. As per Government's advertisement, applications are called for by the Collectors.

(v) *Stipends*.—As per Government's sanctioned rate, direct recruits are paid stipend at Rs. 40 p. m. and the departmental candidates at Rs. 25 p. m. during the entire period of their training.

(vi) *Examinations*.—At present, periodical tests have been conducted in the subjects of Agriculture, Co-operation, Veterinary and *Panchayats*. The number of examinations falls short in agriculture as the actual teaching of integrated course has been started late at this Centre and absolutely no examinations could be held in the following subjects because teaching staff for the subjects has not yet been appointed.

(1) Public Health, (2) Social Education, (3) Rural Industries, (4) Minor Engineering Works.

(vii) *Selection of villages for field work*.—Villages from the Buldana Block have been selected for village practicals of the trainees.

F. Practical work done in the project area by the trainees

Practical work in the project area will be done for 3 months at the end of the second year.

G. Miscellaneous Activities

(a) *Dairy unit*.—A scheme for establishing dairy unit at the Government Demonstration Farm, Buldana, has been submitted.

(b) *Co-operative poultry unit*.—A proposal for establishing one poultry unit of 50 laying birds on co-operative lines is underway.

(c) *Youth clubs*.—Material to the extent of Rs. 1,480 was purchased for providing to six youth clubs in the six blocks.

It is worth mentioning that the trainees of this Centre have visited the World Agricultural Fair at New Delhi during the year under report at their own cost from study point of view.

Trainees had number of occasions to attend the lectures of various experts and specialists who paid courtesy visits to this Centre during the year under report.

Students took part in various activities which were arranged on 'Republic Day'.

APPENDIX VI

SUMMARY OF WORK DONE UNDER THE PRINCIPAL,
GRAMSEVAK TRAINING CENTRE, KOLHAPUR,
DURING THE YEAR 1959-60

The Extension Training Centre at Kolhapur was established in the month of April, 1956, with a view to provide trained personnel for extension works in the National Extension Service Blocks. With the starting of the two year course, the Centre is named as *Gramsevak* Training Centre, from 1st October 1959.

A. Location

The Centre is located at Kasaba Bavada, a suburb three miles away from Kolhapur city.

B. Staff

Shri N. K. Nerikar, was in charge of the Centre till 10th November, 1959. Shri L. H. Mirajkar, Superintendent of the Shahu Agricultural School held the charge of the Principal from 11th to 27th November, 1959, and Shri B. A. Deshpande took over and continued as Principal from 28th November 1959.

C. Brief information of each course, its Syllabus
and Duration

(a) *Extension training course*.—This course is of six months duration. Candidates who have successfully completed the twelve months basic agricultural course were admitted to this course. The syllabus covers the study of the following subjects.

- (1) Social Education, (2) Public Health, (3) Co-operation and Village *Panchayat*, (4) Extension, (5) Small Scale Village Industries and (6) Village Roads and Housing.

(b) *Two year integrated course*.—The course which includes training in various subjects was started at this Centre from 1st October 1959 with the strength of 63 trainees in the first year class. The capacity of the first and second year class of the integrated course is 140 students. The syllabus covers the studies of the subjects of (1) Agriculture I and Agricultural Engineering, (2) Agriculture II, (3) Horticulture and Plant Protection, (4) Animal Husbandry, Dairying and Veterinary Science, (5) Co-operation, (6) *Panchayats*, (7) Public Health, (8) Social Education, (9) Extension Programme planning, (10) Minor Engineering works, and (11) Rural Industries.

During the year under report, one batch completed its six months extension training course by the end for September, 1959. Also, a batch of 70 trainees was admitted for the six months course from 16th April 1960, which will complete its training by 30th September, 1960.

A batch of 63 trainees was also admitted to the two year course from 1st October 1959.

The details of the duration of the courses, candidates admitted, candidates passed etc. are given below:

Batch	Date of commencement	Date of completion	Number		
			Admitted	Passed	
First	...	1-4-1959	30-9-1959	134	134
Second	...	16-4-1960	Under training	70	...
Third	...	1-10-1959	Do.	63	...

D. Facilities

(i) *Demonstration farm.*—The Shahu Agricultural School Farm has an area of about 45 acres. This farm is being utilised for the training of the candidates of the Centre. A proposal to extend the area by acquisition was under correspondence. The present area of the farm is inadequate for training.

(ii) *Demonstration equipment.*—The Centre as started functioning as reported earlier from the 1st April, 1956. The equipment and aid for training have been provided for various subjects. During the year under report, the equipment worth Rs. 17,000 has been added. In the limited space available, a small museum has also been maintained at the Centre. It includes various models of improved agricultural implements, charts, maps, posters etc. on various subjects. Due to inadequate building accommodation, the museum could not be properly strengthened.

(iii) *Class-rooms.*—Separate class-rooms have been provided for conducting separate classes for the courses concerned.

(iv) *Hostel.*—All the trainees of the centre and school were provided with hostel accommodation, taking into consideration the available buildings on hand at *Chalasthan* and S. T. premises. The construction of the hostel and the main building of the Centre

was completed and the buildings have been taken over. The students of the two year course were accommodated in the new hostel building whereas the students of the six months course were provided in the previous buildings. The proposals for the additional buildings for hostel of 70 trainees, museum, library etc. were submitted to the State Government. After completion of these buildings, there will not be any difficulty in the hostel accommodation.

(v) *Reference material.*—A good library is maintained by the Centre. During the year under report, books and periodicals worth about Rs. 2,500 were purchased for the library. In the absence of suitable accommodation a well-equipped library giving full time facilities to the trainees and the staff could not be organised. The trainees were given leaflets, booklets etc. for their reading, besides the regular books.

(vi) *Recreation facilities.*—In-door and out-door games material was provided for the trainees by the Centre. Besides, games, recreation facilities such as radio, record-player, musical instruments were also provided at the Centre.

(vii) *Transport.*—One jeep, one personnel carrier and two small buses were provided for the transport of trainees to the villages and study tour in the Blocks in Satara and Kolhapur districts. The expenditure on account of petrol and minor repairs was Rs. 8,500 during the year.

(viii) *Visual aids.*—For the audio-visual aids, a 16 m.m. projector was with the Centre. Films received in circulation from the U. S. I. S., Publicity Department and I. C. A. R. Film Library were shown in the villages as well as to the trainees. Other visual aids like flannelographs, flash cards etc. were also provided. From 1st October 1959, the post of the Audio-Visual Operator was discontinued and there was nobody to exhibit films to the students and villagers.

E. Training Programme

(i) *Objective.*—Prior to the introduction of the two year integrated course from 1st October 1959, at the centre the training was imparted to the trainees of the six months course. Accordingly, during the year under report, 134 trainees were trained in the extension training course and 70 trainees were under-going training in six months training course from 16th April 1960. Also, a batch of 63 trainees was undergoing training for the first year of the two year integrated course.

(ii) *Work plan.*—The *Gramsevak* trainees were trained in the extension courses as per prescribed syllabus of the six months course

and the two year course. During the training, practical aspect was given primary consideration. Particular attention was given to field practicals. During the extension training, the trainees live in camps for about 8 to 10 days in the villages and try to extend the knowledge gained for the benefit of the villages; while during the two year course, the trainees go for village practicals in villages. The Block staff and the Instructors of the Centre guide the trainees during the village stay and help them to implement the recommendations in various subjects. The difficulties experienced in executing the extension methods were solved on the spot.

Lectures by prominent personalities and authorities on the subjects were arranged to widen the knowledge and out-look of the trainees.

(iii) *Teaching method.*—In practicals, the trainees were taught with the method of 'learning by doing'. Problems were put to the students and line of action to solve them was suggested and put into practice.

In the class-room, the Instructors elaborate the subjects. The lessons in the class-rooms were made instructive through teaching aids like flannelographs, charts, maps, pictures and suitable models. The class-room lectures, wherever necessary, were explained in practicals and were summarised in notes.

As indicated previously, the knowledge gained at the Centre by the students was put in practical use in villages and they were given a job to execute. During the village stays, they also learn village intelligence.

(iv) *Admission.*—The candidates are selected by the District Selection Committee, consisting of the Collector of the District, Assistant Registrar, Civil Surgeon, District Agricultural Officer and two non-official members. The Committee recommends the suitable candidates to the Divisional Commissioner who finally selects the candidates after aptitude tests. Personnel already in service are also considered for the selection for the training.

(v) *Stipends.*—Trainees already in service deputed for training get Rs. 25 p. m. as stipend, in addition to their pay and allowances. Direct recruits were paid at Rs. 50 p. m. with the starting of two year integrated course, the stipend of the direct recruits was reduced Rs. 40 p. m.

(v) *Examinations.*—The examination of the six months course was conducted in theory as well as in practicals, for all the subjects taught. The progress of the candidates during the course of training was also taken into consideration, at the final result. There

was a board of the examiners, nominated by the State Director of Agriculture, for the Extension Training Course. During the year under report, the date of examinations held and the number of candidates appeared and passed are given below.

Extension Training Course

Date of examination	...	September, 1959
Number examined	...	134
Number declared successful	...	134

The examination of the present batch of six months course is scheduled in the month of September, 1960. In connection with the examinations in the two year integrated course, periodical written and practical tests in each of the subjects were taken throughout the period of the course. The marks of these tests were considered in the final examination of the course.

(vi) *Selection of villages for field work.*—No National Extension Block is attached to the Centre. For the village stays, villages were selected in consultation with the Block Development Officers of Karveer, Panhala, Gargoti, Shahuwadi and Shirol. While selecting the villages, preference was given for response to development activities from the inhabitants. During the year under report, trainees of the Centre had their village stay in 24 different villages. The students of the first year of the two year integrated course were taken for village practicals to different villages in different Blocks.

F. Practical work done in the project area by the trainees

The following activities were carried out by the trainees in villages, selected for village stay.

(a) *Agriculture.*—The trainees did propaganla for Japanese method of paddy cultivation and Poona method of *jowar* cultivation and they laid out trial plots in most of the villages. Trainees also demonstrated proper handling of iron ploughs, methods of application of fertilisers to the paddy crop and the use of insecticides and fungicides against the pests and diseases, etc. The trainees dug 48 compost pits and filled 25 pits. Active part in *Vanamahotsav* was taken by the trainees and 625 seedlings were planted by them at Bambavade, Vadakshivale, Shahuwadi and Ghotwade.

(b) *Co-operation.*—The trainees studied on the spot the working of co-operative societies and village *panchayats*. A Housing Society

as organised for the backward class people at Pimpalgaon and necessary share capital was collected. Similarly, a Multipurpose Society was also organised at Nile. Steps to organise youth clubs at Andur, Koparde, Gargoti and Nandani were taken.

(c) *Social Education*.—Under the guidance of the Lecturer in Social Education, the trainees took the literacy activity and each trainee gave lessons to illiterate adults during their stay. Thus about 375 adults were taught reading and writing alphabets and their names. Dramatization work was organised in Udgaon and Kanegaon. *Bhajan Mandalis* were organised in Varul. Ninety cultural programmes were organised for the villagers.

(d) *Public Health*.—The trainees during their village stay contact the villagers and impressed on them the importance of clean living, personal hygiene, balanced diet and of prevention of diseases. Actual work done was as under :

- (i) 10 wells were disinfected with potassium permanganate.
- (ii) 30 odourless urinals were prepared.
- (iii) 25 soak pits were prepared.
- (iv) 17 smokeless *chullas* were prepared.
- (v) 30 persons were operated for birth control, out of 86 persons who were prepared to get operated.
- (vi) The trainees helped the anti-malaria squad in spraying D. D. T.

General

The Centre had taken an active part in the District Agricultural, Industrial and Cattle Exhibition, held at Kolhapur in the month of March, 1960, by opening a stall in it. The trainees of the Centre worked as volunteers in the 'Eye-Camp' held in the premises of the new buildings of the Centre in the month of February, 1960.

APPENDIX VII

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, GRAMSEVAK
TRAINING CENTRE, MANJRI, DURING THE YEAR 1959-60

A. Location

The *Gramsevak* Training Centre with Home Science Wing and Workshop Wing is situated on Poona-Sholapur Road and is 8 miles from Poona city.

B. Staff

Shri D. H. Joshi, held the charge of the post of the Principal throughout the year under report.

Brief Information on each Course, its Syllabus and duration

Course	Object
Extension Wing	To train village level workers required for the Development Blocks.
Home Science Wing.	To train women workers as <i>Gramsevaks</i> for home improvement programme planned under the Development Blocks.
Agricultural Workshop Wing.	To train sons of village artisans in farm mechanics and other aspects of agricultural engineering so as to enable them in establishing rural workshops with the aid of the State Government loans for manufacturing and repairing agricultural implements and machinery.

(a) *Extension Wing*.—

Duration : Two years integrated course in agriculture and extension.

Capacity : 70 trainees per year.

Subjects : (i) Soil Management and Agricultural Engineering (ii) Crop Husbandry (iii) Horticulture and Plant Protection, (iv) Animal Husbandry, (v) Agricultural Extension, (vi) Social Education, (vii) Public Health and Sanitation, (viii) Co-operation, (ix) *Panchayats*, (x) Minor Engineering Works, (xi) Rural Industries.

(b) Home Science Wing.—

Duration : 12 months.

Capacity : 25 trainees.

Subjects : (i) Home Science Extension, (ii) Food and Nutrition, (iii) Mother and Child Care, (iv) Kitchen Gardening, Dairy and Poultry, (v) Clothing and Laundry, (vi) Housing and Home Management, (vii) Handicrafts, (viii) Public Health and Sanitation.

(c) Agricultural Workshop Wing.—

Duration : 12 months.

Capacity : 20 trainees.

Subjects : (i) Farm Mechanics, carpentry, black-smithy, tin-smithy, and welding, (ii) Simple Engineering Mathematics, (iii) Simple Engineering Drawing, (iv) Simple Workshop Technology : materials, tools and equipments and fitter's jobs, (v) Agricultural Implements and Tools, (vi) Farm Power maintenance and simple repairs to diesel engine etc., (vii) Rural Engineering : Simple rural housing designs, cattle sheds and implements sheds, (viii) Miscellaneous : dairy and poultry, equipment roads and fences etc.

D. Facilities

(i) *Demonstration farm.*—The Gramsevak Training Centre is equipped with three Agricultural Farms and one Dairy and Poultry Farm. The area of the three farms together is 207 acres.

(ii) *Demonstration equipment.*—Equipment for practical demonstration in all the subjects taught at the different wings is fully provided and all the Lecturers conduct their classes and practicals with equipment.

(iii) *Class-rooms* — One class room large enough to accommodate 75 students is available. One more class room is to be constructed for the second year class to accommodate 70 students. For conducting practical training in agricultural and rural engineering no class room is available. One such practical class room is being proposed.

(iv) *Hostel*.—Six blocks with eight rooms in each are provided for the Extension Training Centre and School students. One block with 5 rooms for Workshop Wing students is also constructed. The work of construction of hostel for Home Science Wing is complete. Two more hostel blocks are to be constructed to accommodate 70 more students.

(v) *Reference material*.—A well developed library with 1,500 books on different subjects is provided. The library contains books in regional and English languages. A reading room is provided where 20 magazines, 10 newspapers and other periodicals are kept. A permanent museum with all kinds of charts and models is maintained.

(vi) *Recreation facilities*.—Sufficient material for in-door and out-door games has been provided. In addition, programmes like *Bhajan* songs, films, etc. are always organised by the trainees. Equipment for *Bhajan* is provided.

(vii) *Transport*.—At present the centre is provided with one bus, jeeps, one truck and 2 personnel carriers.

(viii) *Visual aids*.—A 16 m. m. projector is working on a special generator and documentary films are shown twice a week.

E. Training Programme

(i) *Objective*.—All the three wings *viz.*, Extension Wing, Home Science Wing and Workshop Wing train the trainees with the objective as stated in item 'C' above.

(ii) *Work plan*.—The Extension trainees are given instructions in 11 different subjects which form an integral part of the rural extension work. More stress is given on the practical side and village work, the distribution being 46 per cent theory, 29 per cent practical and 25 per cent village work. Home Science trainees are given instructions in 8 different subjects and the stress is given on practical side, the distribution being 33 per cent theory and 67 per cent practical. The Workshop trainees are given instructions in 8 subjects. The stress is given on practical side, the distribution being 25 per cent theory and 75 per cent practical.

(iii) *Training methods*.—The methods of instruction followed at all the three wings of the Centre are the same. Instructions in the class-room and fields are given with charts, models and visual aids. In the case of field practicals, however, trainees learn the lessons by doing themselves and observing the results. In addition the method of seminars is always followed to prompt self thinking.

In the Agricultural Workshop Wings, trainees are given problem in developing farm devices and implements. Necessary equipment is also provided. This project work and the related discussion help in developing initiative, confidence and resourcefulness amongst the trainees.

During village work, the *Gramsevak*s and *Gramsevika*s are taught to find the solutions and ways through people. The principle 'community uplift through community life' is practically applied during the village work. The result demonstrations and method demonstrations of improved agricultural practices, rural sanitation and such other practices are arranged by the trainees under the guidance of Instructors during village work. This helps to give practical training to *Gramsevak* trainees in creating a desired change in human behaviour of the rural areas.

(iv) *Admission*.—The methods of selection of trainees for the three different wings are as below.

The District Selection Committee headed by various Department at district level and some members of the District Development Board select the candidates for their district and the selected candidates are sent to one of the Extension Training Centres for aptitude test. The candidates for *Gramsevak* Training Course are finally selected after taking the selection test of the candidates at one of the *Gramsevak* Training Centres. In regard to admissions to the Home Science Wing, applications are called for by the Commissioners of the respective Divisions and trainees are selected by a District Selection Committee consisting of the Chairman and Collector of the District Development Board of the District; Chief Instructor Home Science Wing; District Heads of various Departments; Member of the Community Project Administration and Member of the Social Welfare Board. The village artisans are recommended by the District Collector and final selection is done by the Principal and Chief Instructor, Workshop Wing, Manjari. Candidates in the trade and/or coming from the families practising the trade (carpentry, blacksmithy) are only selected.

(v) *Stipends*.—

Course	Amount of stipend
Extension Wing	... Rs. 25.00 for trainees already service. Rs. 40.00 for the present batch Two years integrated course.
Home Science Wing	... Rs. 50.00 per <i>Gramsevika</i> .
Workshop Wing	... Rs. 50.00 for village artisans.

(iv) *Examinations.*—The results of the examinations of different wings are given below —

Wing	Examination held in	Number		Percentage of passing
		Appeared	Passed	
Extension Wing (8 months).	September 1959 ...	104	101	100.0
Home Science Wing.		19	19	100.0
Workshop Wing	July 1959 ...	15	15	100.0

(vii) *Selection of villages for field work.*—Ten villages in Haveli and Purandhar Blocks were selected for the last batch. Seven villages in Purandhar and Haveli Blocks were selected in consultation with the Block Development Officers for the present batch of two years integrated course. Trainees are sent for a week in each month for their practical village work. The trainees for the last batch were sent in villages for work. These villages were selected in consultation with the Block Development Officers. Two villages were selected for last batch and two villages for the present batch of *Grams vikas* for village work where the trainees of the Home Science Wing worked with extension methods.

F. Practical work done in the Project area by the trainees

(a) *Home Science Wing.*—The following work was done by trainees of the Home Science Wing —

(i) Smokeless <i>chulah</i>	...	74
(ii) Soak pits	...	20
(iii) Trench latrines	...	1
(iv) Compost pits	...	10
(v) Cold storage	...	15
(vi) Kitchen gardening	...	58
(vii) Urinals	...	1
(viii) Bath-rooms	...	7
(ix) Shelves for utensils	...	18

<i>(x) Food and nutrition—</i>	
Mango pickle, raw mango squash, tomato soup, <i>kurdai</i> and <i>papdi</i> of sago.	19
<i>(xi) Clothing—</i>	
9 piece <i>choli</i> , blouses, nickers and baby frocks, hot pads, baby kit of old cloth- ing.	19
<i>(xii) Handicrafts—</i>	
Door mats, hand embroidery, coir matting, embroidery on gunny cloth, agave fabric handicrafts.	
<i>(xiii) Home Science Extension—</i>	
Flash cards and flannelographs on health, charts and posters one set by each	
<i>(xiv) Home Management—</i>	
Kitchen arrangements, arrangement of household articles.	19 Demonstrations.
<i>(b) Extension Wing—</i>	
<i>(i) Agronomy—</i>	
Compost pits	... 135
Improved seed	... 200 acres.
Insecticides	... 120 acres.
Dry farming	... 350 acres.
Soil conservation	... 30 acres.
Tree planting	... 400
Demonstration plots	... 111

(ii) *Animal Husbandry and Veterinary—*

Supply of cocks	...	12
Supply of eggs	...	100
Poultry runs	...	1
Castrating	...	25
Vaccination	...	200
Medical aid to sick animals	...	...

(iii) *Public Health—*

Smokeless <i>chullas</i>	...	42
Soak pits	...	150
Kitchen gardens	...	50
Latrines	...	70
Disinfection of drinking water in all villages.		37

(iv) *Social Education—*

Compulsory attendance	...	70
Admittance of non-school going children to the school.		115
Adult classes	...	10
Library	...	2
Youth clubs	...	20

(v) *Co-operation—*

Increase in membership	...	100
Amalgamation of societies	...	Propaganda.
Help to obtain loan	...	All villages.

APPENDIX VIII

SUMMARY OF WORK DONE UNDER THE PRINCIPAL,
GRAMSEVAK TRAINING CENTRE, PARBHANI,
DURING THE YEAR 1959-60

A. Location

Parbhani, district Parbhani.

B. Staff

Shri T. N. Puranik, held the charge of the post of the Principal throughout the year under report.

C. Brief information on each course, its
Syllabus and Duration

The extension training course is of six months duration. During this period, trainees were given instructions in the subjects of (a) Extension Philosophy and Village Planning, (b) Extension methods, (c) Social Education, (d) Public Health, (e) Co-operation, (f) Village Housing and Roads and (g) Rural Industries in the class-room and fields; the trainees are also taken for village stay for a month or so for job training.

The two year integrated course for training of *Gramsevak*s (Village Level Workers) was started from 1st December 1959. During this period, the trainees were given instructions in the subjects of (a) Agriculture, (b) Horticulture and Plant Protection, (c) Animal Husbandry, (d) Co-operation, (e) *Panchayat*, (f) Public Health, (g) Social Education, (h) Extension Principles and Programme Planning, (i) Minor Engineering Works and (j) Rural Industries, in the class-room at the campus and in the field. Finally they were also taken for job training in villages for three months.

During the period of this report, the following batches of trainees have completed the extension training courses as shown below:

Duration of the course	Number admitted	Number passed	Remarks
16-4-59 to 30-9-59	... 75	72	...
16-10-59 to 31-3-60	... 72	70	...
16-4-60	... 48	...	The course will be completed on 30th September 1960.

The sanctioned strength of the first year class of the two year integrated course is 70 trainees. This course was started from 1st December 1959 at the Centre and 68 trainees were in the first year class.

D. Facilities

(i) *Demonstration farm.*—The students were taken to the Agricultural School Farm for practicals.

(ii) *Demonstration equipment.*—The equipment of the Agricultural School was also used by the Centre for giving demonstrations.

(iii) *Class-rooms.*—There are two class-rooms. One auditorium is also used as class-room.

(iv) *Hostel.*—There were five dormitories used as hostel for the trainees.

(v) *Reference materials.*—There was a library consisting of books in English, Marathi and Hindi on different subjects.

(vi) *Recreation facilities.*—The games such as volley-ball, carom, ping-pong and badminton were played by the trainees.

(vii) *Transport.*—Two cargo-personnel carriers have been provided.

E. Training Programme

(i) *Objective.*—To train the *Gramseaks* to be appointed in the Development Blocks.

(ii) *Work plan.*—Two year course was started and the first batch was under training since 1st December 1959.

(iii) *Teaching methods.*—Class-room lectures, field practicals and village practicals.

(iv) *Admission.*—The Divisional Commissioner gives admission for training.

(v) *Stipends.*—Rs. 40.00 p. m. are paid for direct recruit and Rs. 25.00 p. m. to the Government servant in addition to his pay and allowances.

(vi) *Examinations.*—The periodical tests and the final examination at the end of the course were conducted.

(vii) *Selection of villages for field work.*—The villages were selected from the nearest National Extension Service Blocks.

F. Practical work done in the project area by the trainees

The trainees were given lessons in job training in the project area as per syllabus.

APPENDIX IX

SUMMARY OF WORK DONE UNDER THE PRINCIPAL,
GRAMSEVAK TRAINING CENTRE, SINDEWAHI,
DURING THE YEAR 1959-60

Before the introduction of the two years integrated course for the *Gramsevaks*, this institution functioned as a Basic Agricultural School with a course for extension training. The last batch completed its training in October, 1959 and they were trained in extension upto the end of March 1960.

A batch of *Gramsevaks*, for two year integrated course has been admitted in April 1959 and at present the strength of the trainees in the second year is 48. A second batch of 68 trainees has been admitted in April, 1960.

Besides imparting instructions to the *Gramsevaks* the Centre is running two other wings *viz.*, the Home Science Wing, and the Workshop Wings the former for the training of *Gramsevikas* and the latter for training personnel in smithy and carpentry. In all, 41 *Gramsevika* trainees were admitted in August 1959 and they have completed their course in March 1960. Fourteen craft students are undergoing training since December, 1959.

A. Location

The Centre is situated at the village Sindewahi in Brahmपुरi *tahsil* of Chanda district. The place is approachable by road and railway. The Centre has been opened here as the Government Agricultural Farm and few buildings were available initially for the use of the Centre.

B. Staff

Shri V. B. Mandalekar held the charge of the post of Principal upto the 10th of November, 1959 and thereafter by Shri N. K. Nerikar.

C. Brief Information on each course, its
Syllabus and Duration

(a) *Gramsevak Training Course*.—This is a two year course recently introduced for the training of *Gramsevaks*. The main feature of the training is institutional and job training. The institutional training consists of training at campus and training in field under the directions of the teaching staff provided. In the job training, the trainees are required to work independently as *Gramsevaks* for 3 months at the end of the course in a Development

Block. The main subjects included in the course are : (i) Agriculture I and Agricultural Engineering, (ii) Agriculture II, (iii) Horticulture and Plant Protection, (iv) Animal Husbandry, (v) Co-operation, (vi) *Panchayat*, (vii) Public Health, (viii) Social Education, (ix) Minor Engineering Works, (x) Extension and (xi) Rural Industries.

(b) *Home Science Wing*.—This is a one year course and the subjects included in the course are : (i) Food and Nutrition, (ii) Mother and Child care, (iii) Housings and Home Management, (iv) Clothing for the family, (v) Health and sanitation, (vi) Handicrafts and Cottage Industries, (vii) Agriculture, Dairy and Poultry, (viii) Co-operation and (ix) Home Science Extension.

(c) *Workshop Wing*.—This is a one year course and the subjects taught are : (i) Workshop—Theory, (ii) Workshop—Practicals, (iii) Agricultural Implements and Tools and (iv) Improved Housing and Miscellaneous work.

D. Facilities

(i) *Demonstration farm*.—The Experimental Farm, Sindewahi has an area of 118 acres of mainly paddy lands. The trainees are given practical instructions in agriculture at the Farm.

To give the trainees an intensive training, an area of about 5 acres is exclusively managed by the trainees where they are given instructions in intensive crop growing.

(ii) *Demonstration equipment*.—All the wings at the Centre have full equipment necessary for imparting the training. During the year under report, the amount spent for the purchase of equipment and training aid for different wings is given below.

	Rs.
<i>Gramsevak</i> Training Centre ...	19,000-00
Home Science Wing ...	8,403-00
Workshop Wing ...	26,696-00

(iii) *Class rooms*.—At present, there is the first year and the second year batch of *Gramsevaks* and one batch each of *Gramsevikas* and Workshop trainees receiving instructions. Adequate facilities of class-rooms and sheds for teaching practicals have been arranged. The position has improved considerably during the current year on account of the building programme that is in progress.

(iv) *Hostel*.—Hostel accommodation for the trainees of the different wings has been provided by making some modifications in

the building of the Experiment Farm and the buildings constructed for the purpose by the Centre. The hostel accommodation, however, will have to be increased and proposals for the same are under consideration.

(v) *Reference material.*—The *Gramsevak* Training Centre and the Home Science Wing are maintaining their libraries. Books, periodicals, newspapers, magazines on technical subjects either subscribed or purchased are available in the library. During the year under report, an amount of Rs. 1,239.00 has been spent on equipping the library. The proposal to follow the open library system is being tried and the results are being carefully watched.

(vi) *Recreation facilities.*—Arrangements are being made by the Centre for providing facilities to the trainees for out-door and in-door games like volley ball, *hu-thu-thu*, carom and tenikoit. During the year under report, efforts are made to provide a gymnasium. Double bar, single bar, *mal-khamb* and roman rings have been purchased. The Centre badly needs a gymnasium shed for proper use of facilities provided.

Musical instruments are also available at this Centre. These are very essential in the training programme as the *Gramsevaks* are given instructions to organise cultural activities through this medium.

(vii) *Transport.*—One truck, two personnel-cargo jeeps and one Willys jeep are provided at the Centre for taking the trainees for village work whenever necessary. The transport facilities, however, are inadequate considering the number of trainees to be taken for village work. A proposal to provide two buses has been submitted to the State Government for consideration.

(viii) *Visual aids.*—The Centre has its own generator and has also two film strip projectors. The trainees are also given instructions in the preparation of posters, flannelographs, flash cards through which they expected to convey their ideas to the villagers while on field duty.

During the year under report, this section has been strengthened by purchasing a tape recorder, epidiroscope, amplifier, microphone, and record-changer. An amount of Rs. 5,836.00 has been spent for providing these and other equipment during the current year.

E. Training Programme

(i) *Objective.*—The *Gramsevaks* and *Gramsevikas* are the primary link for successful implementation of the community development

programme and with this end in view, effective training programme has been arranged to inculcate in the trainees a spirit of service to the rural population.

(ii) *Work plan*.—The syllabus of the *Gramsevak* training course has been revised recently by the Committee at the Government of India level and the work plan recommended by the Committee is being followed.

The classes start at 7.00 a. m. with 2½ hours' practical. After the practical class, there are one or two theory classes in the morning upto 11-15 a. m. The afternoons are utilized for theory classes. The training programme is not complete with this class work, extra-curricular activities in different spheres *viz.*, debates, cultural programme, seminars etc. are organised for the benefit of the trainees.

(iii) *Teaching methods*.—Seminars, group discussions, audio-visual aid facilities and the educational tours are the methods followed for training in addition to those which are normally used in teaching line.

(iv) *Admission*.—The selection of trainees for the *Gramsevak* and *Gramsevika* courses is done by the Commissioners of the Divisions as per the State Government orders. The workshop trainees are, however, selected at this Centre by a Committee.

(v) *Stipend*.—All the trainees in different wings are paid stipends as mentioned below.—

		Rs.
<i>Gramsevaks</i>	...	40.00 p. m.
<i>Gramsevikas</i>	...	50.00 p. m.
Workshop Wing	...	50.00 p. m.

The *Gramsevaks* already in service are paid Rs. 25.00 p. m. as stipend in addition to their usual pay and allowances.

(vi) *Examinations*.—During the year under report, the following examinations were held. The results declared are as under.—

Course		Number	
		Appear d	Pass
Basic training course	...	51	51
Extension training course	...	51	50
Home Science Wing Course	...	41	41

(vii) *Selection of villages for field work.*—As previously stated, during the institutional training, work in villages is necessary. The trainees are expected to stay in villages and practice the methods taught at the Centre on the cultivators' fields. Villages are selected considering convenient approach and facilities available. The tract being backward, much difficulty is experienced in making lodging arrangements for the trainees in the villages. A proposal to provide tents for accommodation is under consideration.

The *Gramsevikas* also have village stays during their training period.

APPENDIX X

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, GRAMSEVAK
TRAINING CENTRE, THARSA, DURING THE YEAR 1959-60

A. Location

Tharsa is in Bamtek *tahsil* of Nagpur district.

B. Staff

Shri S. T. Patil held the charge of the post of the Principal throughout the year under report.

C. Brief information on each Course, its
Syllabus and Duration

During this year, a batch of 53 trainees was admitted at this Centre on 15th March 1959, out of which 11 trainees having Diploma in Agriculture were sent for six months extension course at Parbhani Centre on 17th October 1959. Besides, a batch of 25 trainees for six months extension course was also admitted on 25th May, 1959 and they have completed their course successfully and left the Centre on 30th October, 1959. The second batch of 64 trainees joined this Centre on 16th April 1960 for two years integrated course.

The subjects taught at this centre for two years integrated course are given below—

- (a) Agriculture including Horticulture and Plant Protection.
- (b) Extension, (c) Co-operation, (d) *Panchayat*, (e) Public Health
- (f) Minor Engineering, (g) Social Education, (h) Animal Husbandry, (i) Organisation of Village Youth Activities, and
- (j) Rural Industries.

During this year, a batch of 25 trainees of six months extension course was taken on study tour to Nagpur and Kalmeshwar Blocks to study the actual implementation of various activities through extension methods. The trainees also visited various institutions in Nagpur some of which are Central Co-operative Bank, Vidarbha Co-operative Bank, Dairy and Poultry Units and Artificial Insemination Centre.

D. Facilities

(i) *Demonstration farm*.—There is a Government Experiment Farm adjoining the Centre where various crops are grown. The trainees are taken to the farm for demonstration and practical

work. With a view to provide adequate training facilities for practical work in agriculture, Government suggested that the farm should be placed under the administrative control of the Training Centre.

(ii) *Demonstration equipment.*—This Centre has got all the required improved agricultural implements and machinery. The trainees take full advantage of these implements at the time of their village stay as well as practical work. A set of improved agricultural implements such as plough and winnowing fan developed at *Gopuri Sangh*, Pipri has been purchased. There are some models, charts as well as looms which are used for demonstration purposes.

(iii) *Class-rooms.*—At present there are two lecture halls where two batches of the trainees receive their lectures both in theory and practicals. The accommodation falls short as the library section is also accommodated in one of the lecture halls. The class rooms are provided with black-boards and chairs with a board on arm.

(iv) *Hostel.*—There are four dormitories, out of which one is with two sick rooms. At present, the space is inadequate due to increase in the number of trainees. The trainees are provided with wooden cots, cup-boards and chairs. A separate building with kitchen block having a smokeless *chulla*, store room, dining hall, etc. has also been provided. A well with engine, pump, overhead tanks and pipe line is provided for supply of water.

The water supply from the present well falls short during April, May and June every year and some water has to be carted from outside. A provision for another well is very necessary. Stage I plans and estimates duly approved by the Superintending Engineer, (Roads and Buildings), Nagpur have been sent to the Executive Engineer, Agricultural Engineering Division, Poona, and are under scrutiny.

(v) *Reference material.*—There is a library with text books on various subjects. The library has got about 690 technical books and booklets which are very useful for teaching purposes. Besides, there are 411 books for neo-literatures that are taken by the trainees in the villages during their village stay.

(vi) *Recreation facilities.*—The trainees are encouraged to play local games popular in villages like *kabaddi*, volley-ball, *kho-kho* and ring-tennis. They also play in-door games like carom, table tennis and chess. A radio set also has been purchased for recreation.

(vii) *Transport.*—This Centre received one Willys jeep and one personnel carrier under T.C.M. programme, one bullock-cart with pneumatic tyres and another with ordinary wheels have also been

urchased for transporting purposes. Due to increase in number trainees, the present transport arrangement falls short during the periods of village stays. One additional personnel carrier is very essential.

(iii) *Visual-aids*.—One museum with charts, models and specimens etc. has been organised at the Centre. Apart from this, a set of flash cards and flannelographs on various subjects have been purchased. The trainees are expected to practise the skills during their village stay. They are also encouraged to prepare their own charts and posters based on local problems. The Centre has got one overhead projector, one magic lantern machine along with 220 slides, one 16 m.m. sound projector and camera.

E. Training Programme

(i) *Objective*.—The main object of this Training Centre is to train *Gramsevak*s every year for the Community Project Blocks.

(ii) *Work plan*.—The training period of integrated course is of two years' duration and as such one batch of 70 trainees is admitted every year. The candidates selected by the District Selection Committee are deputed for training. Some departmental candidates drawn from other Government Departments are also deputed for *Gramsevak*s' training.

(iii) *Teaching methods*.—The trainees are required to stay in villages for practical demonstration. Every year the trainees are deputed in the paddy pilot blocks for practising Japanese method of paddy cultivation. They practise the skill in various subjects of their training for which facilities are provided at the Centre. As a part of training in social education, the trainees conduct the cultural programme at the Centre. When they go for village stay, they practise extension techniques in addition to acquiring technical skill.

(iv) *Admission*.—The recruitment of the candidates is done through interviews and selection tests. The candidates are interviewed by the District Selection Committee. The selected candidates per quota allotted are sent to the District Agricultural Officers for aptitude tests. The final selection is done by the Divisional Commissioners and successful candidates are admitted for training.

(v) *Stipend*.—The direct trainees get a stipend of Rs. 40.00 per month per head and the departmental candidates and those drawn from other Government Departments receive a stipend of Rs. 25.00 per month in addition to their usual pay and allowances. The trainees admitted at this Centre for six months extension course receive a stipend of Rs. 50.00 per month per head.

(vi) *Examinations.*—The trainees admitted for two years integrated course are required to appear for the final examination at the end of the course, both in theory and practical. The village work to be evaluated by a team of local Lecturers or Instructors as well as those deputed from other Centres.

(vii) *Selection of villages for field work.*—The Centre is situated in Mouda Community Development Block. A group of 30 villages around the Centre has been selected for village stay in consultation with the Block Development Officer, Mouda. There are practically no roads in this area and as such this number has to be reduced in the rainy season.

F. Practical work done in the Project area by the trainees

The fact that the stay in villages is meant more for studying village conditions as well as for effecting a change of attitude among villagers is always emphasised. This educational process is carried on through posters, flash cards, flannelographs, cultural programmes and demonstration talks. During their village stay, the trainees also organise villagers for fulfilling certain community needs like roads, wells, schools, library and *Gram-safai* campaign. The demonstrations given in villages include items like Japanese method of paddy cultivation, fertilizer demonstrations, construction of septic pits, compost pits and treating human and veterinary cases under the guidance of the respective Lecturers.

APPENDIX XI

SUMMARY OF WORK DONE UNDER THE AGRICULTURAL CHEMIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA
DURING THE YEAR 1959-60

A. Staff and Administration

Shri D. K. Ballal, officiated as Agricultural Chemist from 25th May 1959 till 29th October, 1959. Dr. H. G. Pandya on return from U. S. A. officiated as Agricultural Chemist, from 29th October 1959, to 26th April, 1960. For further period Dr. V. K. Leley, Assistant Soil Chemist, Scheme for Expanded Soil Testing Service held the charge of the post of Agricultural Chemist, in addition to his own duties.

B. Research

The schemes in progress during the year and the work done under each scheme is summarised below :

(a) *Scheme for investigation into the micronutrient status of the soils of Bombay State.*

(i) *Soil Survey.*—Fifty-nine soil samples from Ratnagiri and North Satara districts were analysed for different micronutrients as well as mechanical composition, pH and exchangeable bases. Soil samples from Ratnagiri district which are acidic in nature are adequate in all the micronutrients except zinc at a few places. Soil samples from North Satara show a deficiency of zinc. Representative soil samples have been collected from Akola and Yeotmal districts and their analysis is in progress.

(ii) *Field Experiments.*—Twenty-one field experiments with different crops were conducted at the Government Research Stations in the *kharif* and *rabi* season mainly in Nagpur division. This is the first year of the experiments in Marathwada and Vidarbha. The crops tried were *bajri*, groundnut, *kharif jowar*, wheat and *rabi jowar*; the number of research stations for each crop being 3, 3, 3, 9 and 2 respectively. The yield data received are under scrutiny for statistical analysis.

The data of the previous year were analysed statistically during the year under report and following are the main findings.

Bajri crop at Sholapur responded to only one treatment namely plus Mo. The soil analysis indicated a molybdenum deficiency. Groundnut at the same station responded to Zn, B and Mo singly

and in combination, while *tur* at the same station did not show a beneficial effect of the above treatments.

(b) *Scheme for investigation into the band disease of an palm.*—Seventy manurial trials laid out in 1957-58 at Shriwardhan Murud and Diveagar have been continued this year also. The analysis of plant samples collected from these trials is in progress. The analysis of soil samples from 8 soil profiles—3 from band affected gardens and 5 from healthy gardens in Kolaba and Ratnagiri districts indicated that there was no appreciable difference in the macro as well as micro nutrients in the two types of gardens. The analysis of well waters used to irrigate these gardens shows that the waters are suitable for irrigation.

A new plantation of about 300 arecanut seedlings has been completed this year in the Government garden at Shriwardhan. A sand culture experiment has been taken up this year by planting 10 healthy areca seedling in pure sand and regularly applying deficient and toxic doses of micronutrients. The object is to induce the disease artificially and thus locate the possible cause of the disease.

(c) *Scheme for expanded soil testing service.*—

(i) *Poona Centre.*—The scheme was functioning under the control of Central Government till April 1960 when it was taken over by the State Government. During the year, 2,990 soil samples were collected from the cultivators' fields in Poona, North Satara, South Satara, Ahmednagar, Sholapur, Nasik, Kolhapur and Ratnagiri districts. About 900 samples were received from the departmental staff stationed in the districts. About 3,000 soil samples were analysed for different nutrients, pH and soluble salts. More than 95 per cent of the samples show a medium and high level of potash. Only 10 per cent of the samples come under the category of high P. Only about 3 per cent of the samples collected were of acidic nature. Fertilizer recommendations for about 2,800 samples were sent to the cultivators.

(ii) *Nagpur Centre.*—During the year under report, 3,900 soil samples were received in the laboratory of which 3,100 samples were analysed for different nutrients, pH and soluble salt. Recommendations for fertilizers and manures based on soil test were sent out in the case of 3,120 soil samples. Advice was also given to the cultivators regarding the suitability of water samples for irrigation purposes in the case of 68 samples. About 20 soil profiles were examined and soil samples analysed.

(d) *Scheme for utilization of leather waste for manurial purposes.* Studies in the nitrification of vegetable tanned and chrome tanned leather wastes showed that ammonification and nitrification were

fairly high in the case of 2.5 per cent sulphuric acid treated leather waste as compared to untreated ones. A survey of the availability of leather waste in the State is being carried out. From the reports so far received from different firms and societies, it seems that the availability of leather waste may be about 6,000 tons per year. Trials for composting vegetable and chrome tanned leather waste, both treated and untreated, have been recently undertaken.

(e) *Scheme for the study of nitrogen fixation by important leguminous crops.*—The effects of phosphate and molybdenum on nodulation and nitrogen fixation in the soil were studied in pot culture experiments in medium black soil in *kharif* and *rabi* seasons. Two *kharif* legumes, *mug* and *udid* and two *rabi* legumes, gram and peas were selected for the purpose. It was observed that application of phosphate and molybdenum had a beneficial effect on the number of nodules and their nitrogen content.

(f) *Pilot scheme for estimating the cost of production of blood-meal.*—The scheme started functioning from November 1959. Varying quantities of blood were treated with different chemicals and the observations regarding the quality, quantity and the time required for the preparation of blood-meal were recorded. It was observed that the addition of lime, CaCO_3 , CaSO_4 , citric acid or FeSO_4 in the presence of H_2SO_4 and HNO_3 had a favourable effect in increasing the quantity of blood-meal or its nitrogen content.

(g) *Fertilizer Control Order, 1957.*—The object of the order is to see that cultivators get fertilizers and manure mixtures of approved quality at a reasonable price and that there is no malpractice in the manufacture and the sale of manure mixture. To achieve this, the manure mixtures prepared by various authorised firms are collected by the District Agricultural Officers and Fertilizer Inspectors and these samples are sent to the Agricultural Chemist for analysis. Samples are also received from the Agricultural Iron and Steel Supply Officer, Bombay.

The staff for analysis was actually appointed in July, 1959. Since then, 927 samples have been analysed. Out of these, 652 samples were of single superphosphate and 138 were of manure mixtures, the rest being of oil cakes, ammonium sulphate, bone-meal and others.

(h) *Model agronomic experiments.*—This scheme is wholly financed by the Indian Council of Agricultural Research and the work is carried out under the technical control of the Agricultural Chemist. The experiments on paddy, irrigated wheat, *jowar* and *cotton* are being carried out at different centres with a view to study the various aspects of manuring, cultural and irrigation practices and crop rotations, suitable for different regions. With this object in view,

five experiments on paddy at Karjat in Kolaba district, six experiments on irrigated wheat at Lakhmapur and three experiments on cotton and *jowar* at Akola are in progress for the last 3 to 4 years. The yield data are under statistical analysis undertaken by the Indian Council of Agricultural Research.

(i) *Scheme for standardisation of methods of soil analysis.*—The methods for the following determinations were recommended for adoption by the State Laboratories.—

- (i) Lime requirement of acid soils.
- (ii) Gypsum requirement of alkali soils.
- (iii) Available potassium in soils.

Technical Bulletins for the above methods are prepared and sent to the press for printing.

C. Post-Graduate Research

One student obtained Ph.D. degree and four students passed the M.Sc. (Agri.) Examination. Two students secured first class and the other two passed in the second class. Research problems completed during the year are given below.—

- (a) Behaviour of important phosphatic carriers in the three submerged soils of Bombay State.
- (b) Behaviour of nitrogenous fertilizers in submerged rice soils.
- (c) Study of coastal arecanut soils.
- (d) Reclamation of saline soils from Baramati and Manjri.
- (e) Storage of food grains in the presence of DDT and BHC.
- (f) Studies in lipids.

The above studies have revealed that the nitrogenous fertilizers increased the rate of ammonification and availability of other nutrients and the application of phosphatic fertilizers increased the availability not only of P but also of K and Ca and helped in the nitrogen fixation in the submerged rice soils; gypsum is the most effective amendment for saline soils; the contamination of the insecticides have no effect on the chemical constituents of the grains.

D. Advisory and Development Work

Total number of samples received for analysis during the year was 867. Out of these, 155 were from private parties and 712 from Government agencies. In all, 837 samples were analysed during the year under report. Besides, about 2,200 samples were analysed in

the laboratory under different research schemes excluding the samples analysed in the Soil Testing Laboratory and the samples under the Fertilizer Control Order. Facilities were provided for the analysis of about a thousand samples of soils, plants etc. to the post-graduate students and staff members from other sections. In addition to the above analytical work, a number of technical queries from cultivators and others were attended to and the necessary advice given.

E. Publications

(a) "Mowhra Cake as a nitrogenous fertilizer for Sugarcane" Leley, V. K. and Agashe, S. D.,

Indian Journal of Sugarcane Research and Development, Vol. IV, October-December 1959.

(b) "Foliar application of urea on wheat" Patil, N. D. and Pandya, H. G.

Poona Agricultural College Magazine, Vol. 50, No. 3, November 1959.

(c) Oxalate contents of leafy vegetables" Anantha Swamy, T. S., Kamat, V. N. and Pandya, H. G., Current Sci. Vol. 41, April 1960.

F. Miscellaneous Activities

Cattle dung gas plants were supplied to ten Agricultural Schools in the State and the work of installation of the same is in progress. In addition, blue prints for gas plants were supplied to 17 Development Blocks in the State.

Three students have undergone the short course of analytical methods for agricultural products during the year.

District Agricultural and Cattle Show was held at Alibag from 1st April 1960 to 3rd April 1960 in which the staff of the *band* disease scheme exhibited different charts giving information on improved methods of arecanut cultivation and the work on *band* disease.

APPENDIX XII

SUMMARY OF WORK DONE UNDER THE AGRICULTURAL ECONOMIST,
DEPARTMENT OF AGRICULTURE BOMBAY STATE,
POONA DURING THE YEAR 1959-60.

A. Staff and Administration

Shri P. N. Driver held the charge of the post of Agricultural Economist, Agriculture Department, throughout the period under report. During this period he also worked as Principal, College of Agriculture, Poona.

B. Research

(a) *Planning Commission's scheme for working out economics of farm management.*—During the year under report, the final year report for the data collected during the year 1956-57 was prepared and submitted to the Research Programmes Committee of the Planning Commission. This completes the preparation and submission of four reports in all, one each, for the year 1954-55, 1955-56, 1956-57 and a combined report containing a full analysis of all the years' data put together. All these reports are expected to be published by the Government of India and will constitute the first and the most comprehensive series of costing reports ever published in this State. The first report of the scheme i.e. for the year 1954-55 was published by the Government of India during the year 1958-59. The report for the year 1955-56 is in the Central Press and will be out very soon.

This scheme involved a study of farm income and expenditure and cost of production of crops among nearly 480 cultivators selected by random sampling and spread over the two entire districts of Ahmednagar and Nasik. The investigation was by both cost accounting as well as survey method. Data collected in the scheme give a continuous idea of farm conditions for three years and provide an invaluable basis of the study of actual farm conditions.

(b) *Scheme for award of prizes to cultivators for maintaining farm accounts.*—The scheme was continued by the State Government for the year 1959-60.

During the year under report, data of the competition for *rabi* 1958-59, were received from the farmers through the District Agricultural Officers concerned. It was compiled and scrutinised and prizes amounting to Rs. 2,000-00 were distributed among nine successful competitors. For the competition for *rabi* 1959-60, 322

applications have been received from farmers of 15 districts. The proforma for maintaining farm accounts have been sent to these new competitors through the District Agricultural Officers concerned. The data from these competitors are expected to reach this office by the end of July 1960. The scheme is being operated as a Second Five Year Plan Scheme.

(c) *Scheme for studying Economics of bunding in Bombay State—*

This new scheme for studying Economics of bunding came into operation in 1959, after the appointment of the Officer-in-charge.

The scheme involves collection of data from 500 cultivators from 50 villages from bunded areas of the State. The selection of these cultivators is done by the Statistician of the Department. This year three questionnaire forms specially prepared for the scheme, have been sent to the soil conservation staff, for collecting the information. Crop cutting tests, water levels in wells have also been taken. After recording the water levels in the month of May, proforma will come to this office in the month of June, 1960 for analysis.

(d) *Scheme for surveying the advantages of the Looma Milk Supply Scheme to producers and consumers.—*This is a new scheme started during the year under report. The scheme was of a short duration which started in September 1959 and continued upto April 1960. Data in the scheme were collected by survey method. Data from randomly selected cultivators of the Maval and Mulshi area, and randomly selected customers from the Poona City were collected in the scheme. Report of the scheme will be submitted shortly.

C. Post-Graduate Research

This work was continued throughout the year. The following problems may be referred to here.—

- (a) Economics of banana cultivation in Khandesh.
- (b) Land use in a Deccan district.
- (c) Rural unemployment.

D. Advisory and Development Work

Several technical advisory queries were received from the Government of India, departmental officers and other individuals and these were attended to.

E. Publications

- (1) On Agricultural Price Problems, A review by Shri R. S. Savale (Agricultural College Magazine, August 1959, Vol. 50, No. 3.)
- (2) "Farming as a business" by Shri M. P. Dhongade (*Shetkari*, May 1960, Vol. 12 No. 9.)

F. Miscellaneous Activities

1. Shri P. N. Driver, Agricultural Economist, continued throughout as a member of bodies like Royal Economic Society, London, the State Co-operative Institute, the Indian Society of Agricultural Economics.
2. Honorary work at the Co-operative Training College, Poona, continued throughout the year.

APPENDIX XIII

SUMMARY OF WORK DONE UNDER THE AGRICULTURAL ENTOMOLOGIST, DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA, DURING THE YEAR 1959-60

A. Staff and Administration

Shri S. R. Bagal continued to hold the post of the Agricultural Entomologist up to 31st December 1959. Dr. S. K. Dorge took over the charge of the post from 9th December 1959.

B. Research

(a) *Research work at headquarters.*—Investigations carried out both in laboratory as well as in the fields to study the cause of sugary disease of *jowar* revealed that the sugary secretion was associated with presence of both jassids and aphids. Plants kept free from these pests did not show the presence of sugary disease. Field trial was laid out at the Agricultural Research Station, Mohol, to study the efficacy of different insecticides in controlling jassids and aphids on *jowar*. The results showed that except nicotine sulphate all the insecticidal treatments were significantly superior to untreated and water treatment.

Scheme to investigate the use of recorded distress calls of birds in protecting the crops for harmful birds.—Survey of birds invading food and fruit crops was undertaken in Aurangabad, Nanded, Ahmednagar and Sholapur districts. From examination of the stomach contents of the birds recorded in the survey, it was found that no new species of harmful birds exist in these areas other than those recorded previously in other districts of the State.

Field trials to study the efficacy of the recorded distress calls of parrots and weaver birds were carried out in Poona district. A reduction of 55.6 per cent in the visits of parrots in guava gardens and 80.7 per cent in the visits of weaver birds on *jowar* crop was observed, but it had no continued effect.

A field trial with automatic sound producing machine was conducted in Poona district to study its efficacy in protecting *jowar* crop from the attack of birds. There was a reduction of 98.9 per cent in the visits of migratory birds, however, no continued effect was observed.

(b) *Parasite breeding stations for the control of *Nephantis serinopa* on coconut.*—Survey work to demarcate the endemic areas of *Nephantis serinopa* in coconut growing areas was in progress. Breeding

of alternate hosts of larval and pupal parasites of *Naphantis serinopa* was taken up in the laboratories.

(c) *Sugarcane insect pest scheme, Padegaon.*—In general the borer incidence was low during the year under report.

(i) *Stem borer.*—Attack of the pest started in August on three varieties under study. Maximum infestation of 10.28 per cent was recorded on CO-573 in the month of October.

(ii) *Top borer.*—Although the infestation started in September the maximum incidence was recorded in December. The maximum incidence of 5.54 per cent was recorded on the variety CO-419.

(iii) *Root borer.*—Maximum infestation was recorded in December. Percentage of incidence recorded was 4.95 per cent on CO-678, 2.83 per cent on CO-419 and 1.33 per cent on CO-421 respectively.

(iv) *Internode borer.*—Pink borer appeared in November and the maximum incidence was recorded in April.

Laboratory trials with pupal parasites of *Tetrastichus* sp. on top borer were in progress. Naked larvae were found to be parasitised very easily, while the parasites did not parasitise the larvae remaining inside the shoot.

Survey work carried out at fixed Centres at Changdeonagar, Ravalgaon, Kolhapur and Baramati and round about Walchandnagar showed that in general borer infestation was quite low. There was serious outbreak of pyrilla pest round about Ravalgaon in the month of May.

(d) *Citrus pests scheme, Aurangabad.*—

(i) *Fruit sucking moth.*—An experiment laid out to estimate the percentage of loss by fruit sucking moths revealed that the losses ranged from 1.67 to 3.01 per cent. A field experiment to study the efficacy of various insecticides in reducing the losses due to fruit sucking moths was conducted. The results showed that excepting 0.5 per cent DDT suspension, all the insecticides were significantly superior to untreated. Higher concentrations of the insecticides proved better than the lower ones.

(ii) *Nursery pests.*—Field trials were conducted to study relative efficacy of different insecticides in controlling nursery pests i. e. leaf eating caterpillar and leaf miner. Parathion, lindane (0.25 per cent) and endrin were found to be significantly superior to the other insecticides in the control of leaf eating caterpillar, while in case of leaf miners, endrin, parathion and DDT (0.25 per cent) spray were found to be significantly superior to the rest of the treatments.

(iii) *Shoots and bark eating caterpillar.*—From the observations recorded, it was found that the attack of the pest started from the third year of the plantation reaching its peak in 15-20 years. Feeler trials with petrol fumigation gave promising results with the dose of 2 cc. per burrow.

(e) *Entomological research at Agricultural Research Station, Karjat (Kolaba).*—A field trial for the control of land crabs was conducted. The treatments were: (i) 5 per cent DDT bait, (ii) 2 per cent aldrin bait, (iii) 1 per cent dieldrin bait, (iv) 0.8 per cent endrin bait, (v) 3 per cent chlordane bait and (vi) 0.2 per cent parathion emulsion.

The results showed that all the insecticides tried were significantly superior to the untreated. Amongst the insecticides one per cent dieldrin bait was found to be the most effective, however, there was no significant difference between the various insecticidal treatments.

C. Advisory and Development Work

(a) Large number of queries from the cultivators regarding the control measures of various crop pests and the use of various plant protection appliances were attended.

(b) All the divisions of the State have been provided with plant protection units. The technical control of these units rests with this office.

(c) Inspection of the various insecticides purchased by the Department was also carried out by the section. Similarly, the examination of plant protection appliances purchased by the Department and the new ones manufactured by various firms was carried out by the expert committee to study case in operation and their suitability and efficacy in pest control work.

D. Miscellaneous Activities

Various consignments of agricultural commodities to be exported from this country were examined and phytosanitary certificates were issued.

E. Special items of work

Elementary Zoology was taught to F. Y. Sc. (Agri.) class and the subjects of Agricultural Entomology was taught to the Sr. B. Sc. (Agri.) class. Shri L. J. Bhatia working for Ph. D. degree of Poona University on the problem of 'Fate of chlorinated hydrocarbons sprayed on different leaf surfaces' has completed his work and submitted the thesis to the University.

APPENDIX XIV

SUMMARY OF WORK DONE UNDER THE AGRONOMIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA 5
DURING THE YEAR 1959-60

A. Staff and Administration

Shri L. Sreenivas continued as the Agronomist throughout the year under report.

This section has five research schemes under its full control and one crop weather scheme over which only administrative control is exercised.

B. Research

During this year, 35 agronomic experiments were conducted as part of the sectional activities, at the Agricultural College Farm, Poona. Some of the salient features obtained in these experiments are given below cropwise —

(a) *Kharif Crops.*—

(i) *Bajri.*—The long range *bajri*-legume rotation experiment has completed its 30th year. This year the results are non-significant for the effects of the preceding legume crops of *mug*, soyabean and *bajri-tur* mixture.

(ii) *Cotton.*—The long range village-manure experiment on unirrigated cotton (variety 17-3) has completed its 29th year. Due to heavy rains in July, the sowing of cotton was unusually delayed. The experiment is considered vitiated, even though the treatment of 5 cart loads of farm yard manure per acre has given significantly more yield over unmanured (whether ploughed or harrowed).

(iii) *Chilli.*—The results for the first year of the experiment to find out the suitable time of application of sulphate of ammonia at different levels to the rainfed chilli crop, have proved that the nitrogen effect is significant. Of the N levels, 60 lbs. N per acre has shown significant increase in yield over 20 lbs. N per acre but both these levels did not significantly differ from 40 lbs. N per acre. The split application of fertilizer is not beneficial.

(iv) *Suran.*—For the third consecutive year, the spacing of 4' x 2' and the corm size of 2.50 lbs. for planting were found optimum for the fourth year crop. The results of another

experiment on the dose and method of application of farm yard manure were non-significant for the second year in succession.

(v) *Turmeric*.—Ridge and furrow method of planting turmeric was found advantageous in comparison to broad ridge method. It was further noticed that interval of irrigations dose not have any effect on yield. The interaction was also not significant. These results are contrary to those obtained last year.

(vi) *Groundnut*.—In the experiment to study the effect of manuring in the presence and absence of competing weeds, it was found that weeding alone and interculturing followed by weeding are significantly superior to no weeding and no interculturing. However, there was no difference between weeding alone and weeding and interculturing. This indicates that interculturing is not necessary for any purpose other than weed control primarily. Regarding the levels of nitrogen, 20 lbs. per acre showed the best performance over no manure.

(vii) *Maize*.—In the experiment to study the number of plants per hill, 2, 3 and 4 plants per hill gave better performance in yield over one plant per hill. There was no difference between 2 and 3 plants per hill and 3 and 4 plants per hill. But four plants per hill gave more yield over 2 plants per hill. However, the cob size as a quality factor deteriorated with the increase in plant number beyond 2 plants per hill.

(B) *Rabi Crops*.—

(i) *Jowar*.—In the long range tillage manurial experiment on *rabi-jowar* which has completed 29 years so far, the application of 4 cts. of farm yard manure per acre significantly increased the yield of grains by 548 lbs. per acre, but ploughing as deep preliminary tillage has not shown significant effect over shallow tillage (i. e. harrowing) in increasing the yields.

In the experiment to find out suitable method of sowing, the results are non-significant. In another experiment hand stirring at flag leaf stage had no beneficial effect over stirring. The experiment to find out a suitable time and method of application ammonium sulphate to irrigated crop of M-35-1 variety did not show any response to different times and methods of N fertilizer application indicating that any convenient method, broad casting or drilling, and any suitable time i. e. at sowing, 15 days before sowing or one month after sowing may be followed.

(ii) *Wheat*.—Experiment conducted on irrigated wheat to find out suitable method of sowing showed that 60 lbs. seed rate per acre and drilling at either 9" or 12" gives higher yields over

dibbling. In another experiment, 80 lbs. along with 40 lbs P_2O_5 per acre in one dose at sowing has given the best response. The previous two years' results were non-significant. In an experiment to find out suitable stage of growth for burying the *sann* and its effect on succeeding crop of wheat, the results are non-significant indicating no adverse or beneficial effects.

(iii) *Onion*.—Factorial experiment of 2⁴ on N.P.K. (having 0 and 40 lbs. level of each) cum-varieties (N-491 and N-404) was laid out and conducted. It is concluded that strain N-491 has yielded significantly more yield over N-404. A dose of 40 lbs N per acre has given 4,792 lbs. increase in yield over 0 lbs N per acre, which is significant. Application of P_2O_5 shows adverse effect on the crop and it has reduced the yield to an extent of 1,524 lbs. per acre which is significant. There is no effect of potash on the crop.

(c) *Green manuring research*.—In the case of wheat crop there was no adverse or beneficial effect of green manuring, but the soil analysis shown increase in the organic matter content.

As in past 2 years, there is neither an adverse nor a beneficial effect of green manuring crops and a forage legume lucerne inter sown, on the ultimate yield of irrigated cotton. The yield of forage lucerne crop brings an additional income.

C. Post-Graduate Research

The students continued their post-graduate studies in the first year and passed the University examination held in October, 1954. Seven students joined the post-graduate course leading to the degree of M. Sc. (Agr.) of the Poona University.

Experiment conducted on wheat to compare the efficiency of ammonium sulphate and ammonium chloride, it was found that both the fertilizers are equally efficient.

An experiment to study the efficiency of foliar spray as against the soil application showed that both are equally efficient. But application of ammonium sulphate through foliar spray in higher doses (80 lbs. N per acre) has a scorching effect on the crop.

In the experiment to find out suitable method of dibbling and suitable time of thinning *rabi jowar* it was observed that broadcasting in circular fashion gives more yield over dibbling. One spot application of ammonium sulphate through foliar spray in higher yields than late thinning or thinning in one stage.

D. Advisory and Development Work

As usual this section continued to supply information on agronomic topics to all those who approached for the same and organised demonstrations of the *kharif* and *rabi* crops campaigns for all the Gazetted Staff in the Poona division. The staff members were also sent to National Extension Service Blocks for attending and delivering lectures in agronomic improvements. This year the sectional staff delivered four lectures on the subjects allotted for imparting training in regard to minor irrigation works for engineering and agricultural personnel working in the National Extension Service and Community Development Blocks.

A number of visitors from School, Colleges, National Extension Service Blocks and other institutions were taken round the farm and the sectional activities about the cultivation and agronomic improvements explained. The museum maintained by this section was useful for the teaching purposes and also to show the improvements to the visitors in brief. During the refresher's courses arranged for the subordinate staff of the department, this section arranged lectures and imparted practical knowledge regarding the subject. As in the previous years, the farm receipts have progressively increased and the receipts of about Rs. 67,000-00 were obtained which was the maximum as compared to those in the past. The staff members continued to deliver radio talks on various agronomic topics.

E. Publications

During the year the following were the contributions of the section for publication:

S.No.	Authors	Title	Where published
1	Kakde J. R.	... Proper utilization of irrigation water.	The Farmer, March, 1960.
	Kakde J. R.	... Use of manures and fertilizers in irrigation conditions.	The Farmer, April, 1960.

F. Miscellaneous Activities

The section maintains a central vegetable store and a seed store, and also run *Raswanti* for about 4 months during the sugarcane

season. The tour of the B. Sc. (Agri.) final year class was arranged for the first time out side the State and was conducted very successfully visiting different Research and Educational Institutions of the North and East India. The section library added 30 new books and started subscribing for one more quarterly journal-Indian Journal of Sugarcane Research and Development.

G. Special items of work

This year a beginning was made to establish the laboratory for the section. Some equipment was purchased and the work of fitting up laboratory is in progress.

APPENDIX

SUMMARY OF WORK DONE UNDER THE COTTON SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE,
SURAT, DURING THE YEAR 1959-60

A. Staff and Administration

During the period under report, Shri P. S. Pandya was the Cotton Specialist, Department of Agriculture, Bombay State Surat.

B. Research

Research work on cotton was in progress in the various regions of the State. A concise account of the research work carried out in 1959-60 is given in the main report under Chapter IV.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

Nil.

E. Publications

The following papers which were submitted to the Eighth Conference on cotton growing problems in India were published in the Indian Cotton Growing Review during the year 1959-60.

(a) "Breeding long Stapled Hyderabad *Gaorani* Cotton" by V. K. Bedekar.

(b) "Individual Plant Selection as a method of breeding for Cotton Improvement" by V. K. Bedekar.

(c) "Heterosis and its exploitation in Cotton Improvement" by P. S. Pandya and C. T. Patel.

APPENDIX XVI

SUMMARY OF WORK DONE UNDER THE ECONOMIC BOTANIST,
DEPARTMENT OF AGRICULTURE STATE, BOMBAY STATE,
POONA 5, DURING THE YEAR 1959-60

A Staff and Administration

Dr. M. C. Desai, was Economic Botanist throughout the year under report.

B Research

(a) *Research work on forage grasses and legumes.*—The application of nitrogen to *moshi* (*Iseilema wightii*) *marol*, Thin Napier (*Pennisetum polystachyon*), Blue Panic and Madras *anjari* gave increased yield of dry matter. Though the percentage difference of protein in the plant was not significant, the recovery of nitrogen due to increased yield of dry matter was significant. The grassland work at Bebad Ohal Milk Centre showed that simple protection during monsoon gave perennial grasses a chance to re-establish themselves with the result that the villagers obtained 3,746 bundle of hay (6,365 lbs.) in an area of less than 100 acres.

During the year under report, 422 lbs. of grass and legume seeds and 2,41,000 sets of grasses were supplied to the Government institutions and private parties.

(b) *Plant physiology and weed control.*—It was found that *Calotropis gigantea* (Rui) can be controlled by spraying weedicide when the plant is in full bloom and is in flowering condition. The weed could not be controlled by cutting the plant and then spraying the weedicides on the new shoots. The weedicides used were 2,4-D and 2,4,5-T in the proportion of 2:1 and in concentration of 0.1 per cent.

Experiments were carried out to study possibilities of cultivating *Rauwolfia serpentina*. It was found that the seeds are empty to the extent of 30 per cent and that the seeds do not germinate easily. It appears that the species can be vegetatively propagated by root cutting as the stem cuttings and stumps do not sprout easily.

(c) *Fibre research.*—During the second year of the trial, ramie exhibited a good response to nitrogen and irrigation treatments. There was little increase in plant growth after the fourth cut. In the NPK experiments, the NP and NPK treatments gave significantly higher yields of the fibre crop and it was found that F increases the percentage of fibre in the plant.

During the year under report, seed samples of *ambadi* Roselle and *Crotalaria* species were collected from different sources in India.

In the preliminary experiments, strain N. A.-14 of Roselle yielded highest percentage of fibre. Similarly, strain I. A.-2 of *ambadi* was found to be the tallest. During the year under report, two million agave suckers and bulbils were supplied as planting material to various Government Departments and private institutions.

(d) *Cytological work*.—Good quantities of seeds of the new allohexaploid derived from the cross *Arachia hypogaea* X *A-villosa* have been obtained.

Ten families in F₆ generation of the cross *Cajanus cajan* X *Atylosia lineate* were raised with a view to select fertile types having other economic characters. Back cross progeny F₇ generation with *C. cajan* was also grown with the same idea.

Material received from different departmental specialists was cytologically examined and the results communicated to them.

(e) *Legume work*.—The scheme for introduction of foreign legumes and their associated nodule organisms is financed by Sir Cusrow Wadia Trust Fund. This is the third year of the scheme.

Two varieties of peas, one American and one local were tried with 17 strains of *Rhizobium leguminosarum*. In the case of local variety, one Russian and two local strains were superior in action while in case of American variety all the Russian strains, two Delhi and two local strains were effective. Out of ten different strains of *Rhizobium meliloti* tested on two species of *Medicago* one of *Melilotus* and one of *Trigonella*, two bacterial strains from Australia, and one from America were found to be superior on all the species tried in that experiment. Fifteen strains of *R. leguminosarum* were tried on *masur* and *lang*. One Russian, one Delhi and two local strains were superior in the case of *masur* and *lang*. Another Russian strain isolated from *Lens* and a local strain from peas was found to be superior.

Seven varieties of soyabeans were tried in a field experiment with two strains of *R. japonicum*. It was found that the local variety reacted well to the inoculation and Russian strain was found to be superior. In another layout at Deesa Farm on the groundnut variety. *Kopergaon* No. 1, the treatment having Rhizobial culture (Russian strain) gave 25 per cent more yield.

C. Agricultural Education

The teaching of undergraduate courses in General Botany and Agricultural Botany was carried out in a satisfactory manner. Nine students were studying for M. Sc. (Agri.) in Agricultural Botany. Four of them received M. Sc. (Agri.) degree this year. One student obtained Ph. D. degree in Agricultural Botany.

D. Advisory and Development Work

A large number of queries on seed testing, identification of plants, hedge plants, weed control etc. were received from different parties and the required information was supplied.

E. Publications

1. Thombre, M. V. (1959) ... Interspecific hybridisation between *Mucunes pruriens* D. C. and *M. chichinchinensis* A. Chev. *Curr Sci.* 72 : 498-99.
2. Thombre, M. V. (1959)... Chromosome numbers of some common flowering plants. *sci. and Cult.* 25 : 208.
3. Desai, M. C. Majumdar, V. F. and Thombre, M. V., (1959) A naked flower mutant in pearl millet (*Pennisetum typhoides*), *Pa Agri. College Mag.* 50 : 37-38.
4. Do. A narrow leaf mutant in Bajr (*Pennisetum typhoides* Burn S and H).
5. Gupta, S. C. Thombre, M. V. and Desai, M. C., (1960). A case of triploidy in Raminie. *Curr Sci.* 29 : 191-192.
6. R. D'Cruz, (1959) ... Calculation of linkage values by Product ratio Method-I. Complementary and duplicate ratios. *Pa. Agri. Coll. Mag.* 50 146-147.
7. Kadam, B. S. and R. D'Cruz, (1960). Inheritance of zebra chlorophyll deficiency in rice. *Sci. and Cult* 25 : 532-533.
8. R. D'Cruz, (1960). A linkage between two basic genes for anthocyanin colour in rice. *Sci. and Cult.* 25 : 534-536.

F. Special items of work

Dr. M. C. Desai, the Economic Botanist, was in charge of the Agricultural Pavilion of the Bombay State, at the World Agricultural Fair, held at new Delhi during 1959-60.

Lectures on seed testing, grasses and grasslands and weed control were given to the agricultural assistants attending the refreshers' course.

APPENDIX XVII

SUMMARY OF WORK DONE UNDER THE HORTICULTURIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE,
POONA, DURING THE YEAR 1959-60

A. Staff and Administration

Shri N. Gopalkrishna continued to hold the charge of the post of the Horticulturist during the year under report.

B. Research

(a) *Ganeshkhind Fruit Experiment Station, Poona 7.*—Fourteen new grape varieties, one of mango, 21 of *papaya* and four wild types were obtained for trial from other parts of India and foreign countries as well as two types of litchi and coconut. Hybridisation in grapes to evolve a suitable variety combining all desirable characters is in progress. Manurial trial in *Gulabi* grape variety shows that there is no significant difference in treatments either with the blood meal or sulphate of ammonia. Spacing and training trials on *Bhokri* grape show that vines spaced 8' x 2' yield more per acre till seventh year after which the yield decreases.

In citrus, comparative study of nucellar versus budded plants of *mosambi* is in progress and the plants have not come into bearing yet.

The hormone scheme financed by Sir Cusrow Wadia Trust Fund was put into operation to explore the possibility of use of hormones with different concentrations of NAA and 2, 4-D in preventing pre-harvest fruit drop in *Alphanso* and *Pairi* varieties of mango.

In the *papaya* scheme with the object of evolving a strain resistant to leaf mosaic virus, sibmating and hybridisation in *papaya* is initiated.

(b) *Modibag Gardens, Poona.*—The manurial trial on *Basrai* banana was continued and this year's yield results show no significant difference between the treatments *viz.*, N alone or NPK.

(c) *Fruit Research Station, Aurangabad.*—The varietal collection of grapes now stands at 118. Morphological description of 74 varieties has been completed so far. In the varietal trial of 12 leading grape varieties for yield, it is seen that *Black Muscat*, *Black Hamburg*, *Hur*, and *Bhokari* are heavy yielders whereas in training trials, *Fakhari* has given higher yields on cordon system. Pruning

trials to assess the optimum time for pruning of grape varieties *Bhokri* and *Fakhari* show that early pruning in September makes the vines more susceptible to attack of powdery mildew and downy mildew and that the second week of October is suitable for pruning grape vines under Aurangabad conditions. In citrus, hybridisation work continues between *Jambiri* as female parent and grapefruit, *Sathgudi* and *Santra* (*Mandarin*) as male parents. *Mosambi* is crossed with grapefruit.

(d) *Banana Research Scheme, Poona 7*.—The expensive varietal collection has been grouped into eight groups according to the similarity in morphological characters. Taxonomical description of these varieties is in progress. Some 50 banana varieties were tested for virus resistance with the help of the Virus Specialist so as to utilise resistant varieties in future breeding programmes.

Field trials show that 2 lbs. bits are better as planting material than 3 or 4 lbs. bits or whole rhizomes. Whole rhizome used as planting material has shown slight superiority over bits by bringing about early flowering. Pit method of planting is slightly superior to furrow method in respect of yield. Two months old suckers are not suitable as planting material and there is very little difference between four and six month old suckers. Six month old suckers are early in fruiting. February is the best month for planting *Basrai* banana under Poona conditions to obtain early fruiting and more yield whereas April planting is better than that in June. Progeny row trials of high yielding clones of *Basrai* and *Harichal* varieties are laid out.

(e) *Mango Research Station Vengurla, district Ratnagiri*.—The site was finally selected adjoining the Regional Cashewnut Research Station at Vengurla and the planting material is being collected and prepared at the Ganeshkhind Fruit Experiment Station, Poona-7, so that the varietal and manurial trials may be laid out in the following season.

(f) *Regional Cashewnut Research Station, Vengurla, (district Ratnagiri)*.—In all, 62 types of cashewnut are collected and planted for study and selection in hybridisation work to be taken up later on. The propagation trial as well as the manurial and cultural-cum-spacing trial are also laid out and observations are being taken.

(g) *Regional Coconut Research Station, Ratnagiri*.—Observations on the growth of plants under the manurial and cultural experiments are being taken and collection of varieties including TXD palms is in progress. A progeny row trial of high yielding palms selected from growers' orchards in the district is also laid out and growth observations of these palms are being recorded.

C. Post-Graduate Research

The post-graduate classes in Horticulture for M. Sc. (Agri.) degree were conducted during the year under report. Ten students were undergoing post-graduate studies and three of them have passed their M. Sc. (Agri.) examination.

D. Advisory and Development Work

This item of work continued and necessary advice on gardening, especially fruit growing was given by correspondence as well as by personal visits wherever necessary. This work is also now being attended to by the staff of the scheme for Development of Fruit Production in Maharashtra State. Help was given for arranging the Mango Show held at Poona on 4th June, 1959 and the grape show at Nagpur on 5th to 7th March, 1960 to the Horticultural Development Officer, Bombay State, Poona, and his staff. Both these Shows were largely attended, the exhibits tendered at these two Shows showed a keen interest among the gardeners for cultivating better varieties of mango and grape. Besides this, special classes were conducted in 'Home Gardening' and fruit preservation for ladies at Agriculture College, Poona-5, during 1st September 1959 to 16th October 1959 and in all 137 ladies were trained in Home Gardening and 47 ladies in fruit preservation from 1st April 1960 to 30th April 1960. A nominal fee of Rs. 5.00 was charged per head for each of the above classes in April 1960.

Supply of Plants.—The following grafts, layers and budded plants were prepared and sold to individual gardeners and other institutions for planting—

Name of plants sold	G. E. E. station	Modiba garden	Government orchards Ajra	F. R. S. Aurangabad	Total
Mango Grafts <i>Alphonso</i> and <i>Pairi</i> ...	2,815	227	617	...	3,659
Guava L-49, grafts ...	2,428	433	...	...	2,856
Grape cuttings ...	1,104	292	...	12,267	13,663
<i>Chiku</i> grafts ...	388	1	...	...	384
Banana suckers (<i>Basrai</i> , <i>Velchi</i> , <i>Lal-kei</i> , <i>Harichai</i> , etc.)	1,480	1,478	...	...	2,958
K. Lime seedlings ...	9,148	8,085	28	122	17,393
Avocado ...	201	...	...	...	201
Fig (Poona Local) ...	...	153	...	18	171
Miscellaneous fruit plants, shade trees, etc.	41,979	2,925	25	7,092	51,021

E. Publications

The following scientific articles were published during the year 1959-60 :

(1) "Pigmentation of Lamina as an aid in classification of Banana", by N. Gopalkrishna and N. A. Phadnis (Poona Agri. College Mag., Vol. 49, No. 4, February 1959).

(2) "Lucknow-49—A promising variety of guava for Western India", by N. Gopalkrishna and S. D. Khanduja (Poona Agri. College Mag., Vol. 49, No. 4, February 1959).

(3) "A case of bud variation in *Plumeria rubra* Linn" by N. Gopalkrishna and N. A. Phadnis (Poona Agri. College Mag., Vol. 49, No. 4, February 1959).

(4) "A note on the decline of *Mandarin* Orange (*Citrus reticulata*) in Nagpur region", by N. A. Phadnis (Poona Agri. College Mag., Vol. 50, No. 3, November 1959).

(5) "Mango", by N. Gopalkrishna. *The Farmer*, January 1960.

(6) "Grape", by N. Gopalkrishna. *The Farmer*, January 1960.

(7) "Nagpur Orange", by N. Gopalkrishna. *The Farmer*, January 1960.

APPENDIX XVIII

SUMMARY OF WORK DONE UNDER THE HORTICULTURIST,
CITRUS DIEBACK DISEASE SCHEME, SRIRAMPUR,
DURING THE YEAR 1959-60

A. Staff and Administration

Shri M. M. Farooqui joined as Horticulturist incharge of the scheme on 8th July 1959. Shri N. Gopalkrishna took over the charge of the post on 28th December 1959 in addition to his own duties. The post of the Virus Pathologist was sanctioned under Government Resolution, Agriculture and Forests Department, No. ICAR-5359, dated 16th July 1959. The post was vacant.

B. Research

Results of previous investigations have revealed that the so-called 'dieback' disease of *Mosambi* plants was in greater measure due to virus diseases like tristeza and psoriasis. Attempts are therefore, made to find out a root-stock scion combination which will prove resistant to the virus complex.

A root-stock experiment is laid out at the Research Farm at Anatpur using 16 different root-stocks viz., (1) *Mosambi*, (2) *Karna Khatta*, (3) *Jamburi* (Bombay), (4) *Rangpur Lime*, (5) *Grape Fruit Marsh seedless*, (6) *Gajanimma*, (7) *Sour Orange*, (8) *Sohmyndong*, (9) *Adajamir*, (10) *Pavi-Jamir*, (11) *Billikichilli*, (12) *Jamburi* (Kodur), (13) *Bengal Citron*, (14) *Herale*, (15) *Wood-apple* and (16) *Atlantia*. The sub-treatments in the experiment are the bud-grafts raised from budwoods obtained from three different sources (1) *Deesa*, (2) *Ganeshkhind* and (3) *Nucellar*. The experiment is laid out with splitplot design and the budlings were planted in January 1959. The normal growth observations were recorded every month. The results of the experiment are given in the following table.

*Total height of the plants under root-stock experiment at
Shrirampur, March 1960*

S. No.	Name of the treatment	Sub-treatments			Treatment average
		Deesa 'A'	G. F. E. 'B'	Nucellar 'C'	
1	<i>Mosambi</i> ...	118.12	144.62	155.37	139.37
2	<i>Karna Khatta</i> ...	179.12	161.37	186.25	175.58
3	<i>Jamburi (Bombay)</i> ...	174.62	169.00	179.37	174.33
4	<i>Rangpur Lime</i> ...	175.75	180.62	183.37	179.91
5	Grapefruit Marsh ...	95.37	106.25	122.50	108.04
6	<i>Gajaninna</i> ...	178.62	133.37	139.25	150.41
7	Sour Orange ...	121.00	97.37	167.50	128.62
8	<i>Sohmyndong</i> —	184.25	179.12	207.37	190.24
9	<i>Adajamir</i> ...	150.87	125.00	173.62	149.88
10	<i>Panijamir</i> ...	153.37 *	145.87	174.87	158.03
11	<i>Billikichilli</i> ...	152.12	121.25	140.72	138.03
12	<i>Jamburi (Kodur)</i> —	182.12	171.00	189.00	180.70
13	<i>Bengal Citron</i> ...	142.00	98.12	169.00	136.37
14	<i>Herale</i> ...	179.37	69.12	136.25	138.24
15	Wood-apple ...	127.50	110.75	147.75	128.66
16	<i>Atlantia</i> ...	128.62	107.62	133.75	124.99
	Sub-treatment averages.	152.67	131.52	166.05	—
	S. E. for treatments ...	6.3	Critical Difference	18.04	
	S. E. for sub-treatments.	2.46	Critical Difference	6.08	
	S. E. for sub-treatments within main treatments.	13.90	Critical Difference	27.02	
	S. E. for Main within sub-treatments and others.	12.01	Critical Difference	23.5	

From the above table, it will be seen that among the root-stock combinations employed, the root-stock *Sohmyndong* combination has put out the vigorous growth closely followed by *Jamburi* (Kodur), *Rangpur* lime, *Karna Khatta* and *Jamburi* (Bombay). The root-stocks *Mosambi*, Grape fruit Marsh, *Gajanimma*, Sour orange, *Adajamir*, *Billikichibi*, *Bengal Citron*, *Heralc*, wood-apple and *Atlantia* show poor growth.

The nucellar scion growth on root-stocks *Sohmyndong* and *Jamburi* (Kodur) are better, followed by *Karna Khatta*, *Jamburi* (Bombay) and *Rangpur* lime. The same order holds good in case of budwood from Deesa. However, in case of scion wood from Ganeskhind Fruit Experiment Station, Poona *Rangpur* lime, and *Sohmyndong* root-stock combinations show better performance as compared to the rest of the root-stock combinations.

Compared to the growth of budwood from Ganeskhind on *Jamburi* (Bombay), the performance of nucellar scion is the best followed by the Deesa scion.

The growth observations will be continued next year.

In the absence of adequate laboratory facilities by way of water, etc., the chemical work has received a serious set back. The analytical work will be undertaken as soon as the facilities are available.

APPENDIX XIX

SUMMARY OF WORK DONE UNDER THE HORTICULTURIST, CITRUS
FRUIT RESEARCH SCHEME, NAGPUR, DURING
THE YEAR 1959-60

A. Staff and Administration

Shri N. A. Phadnis continued to work as the Horticulturist during the period under report.

B. Research

The programme of research envisages the improvement of *Nagpur Santra* by field experiments. Trials to determine a suitable root-stock, manurial and irrigational requirements and proper method of controlling flowering were contemplated to be undertaken. Of these, the root-stock and manurial trials are in progress.

(a) *Rootstock trial*.—The trial aims at finding out the most suitable root-stock, for the *Nagpur santra* and is in progress since 1948. Seven different root-stocks are under study.

The observations recorded, so far, indicate that the *santra* trees on *Jamberi*, *Jatti Khatti* and sweet lemon root-stocks are the most vigorous. The trees on the *Rangpur* lime root-stock are of medium vigour while those on sweet lime, *Jullandari khatti* and sour orange are comparatively less vigorous.

As regards volume of the *santra* tree (determined by Height x E. W. spread x N. S. spread) the observations recorded so far indicate that the trees on sweet lemon and *Jamberi* rootstocks have developed the largest crown followed by those on *Jatti khatti* root-stocks. The trees on sweet lime root-stocks have medium crown while those on sour orange and *Jullandari khatti* have the smallest crown.

During the year under report, the *santra* crop was lost due to hailstorm during the month of March. However, from the cumulative yield data the trees on *Rangpur* lime root-stock were found to be superior to the trees on all the other root-stocks. The yield of *Jamberi*, sweet lemon and sweet lime gave practically similar yields, while the trees on sour orange rootstock yielded the least.

The quality, as determined by physico-chemical analysis showed that the fruits of the trees on *Rangpur* lime root-stocks were large in size, low in rind and seed content and at the same time having optimum sugar and acid ratio. Thus, they were of superior quality. The quality of the fruits of the trees on *Jamberi*, *Jatti khatti* and

sweet lime rootstock was quite good but next to that of *santra* fruits on *Rangpur* lime, while the fruits of the *santra* trees on sour orange rootstock were of inferior quality. It may be concluded that amongst the rootstocks tried *Rangpur* lime appears to be a promising rootstocks.

(b) *Manurial trial*.—Though the trees in this experiment were planted in 1948, the manurial doses under the different manurial treatments, however, were given for the first time in January 1955, and this is, therefore, the fifth year of the experiment.

The observations show that both in respect of growth of trees and fruiting, oilcake gave better performance as a basal dressing than either the farm yard manure or the green manure. Amongst the sub-plot treatments it is observed that N has a striking effect on the trees in respect of growth as well as yield, when applied alone or in combination with P and K. Application of P or K in the absence of N did not produce a healthy appearance on the trees and on the other hand, when K was applied without N it produced a depressing effect.

Thus, in conclusion it can be said that the *santra* trees in the black soils of Vidarbha respond well to judicious supply of nitrogenous manures and that 'P' or 'K' may not be necessary.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

Under pedigree nursery scheme, 2,025 *santra* plants, 413 lime plants were distributed to the growers in the region.

The *santra* cultivation of this region is in a state of decline. With a view to rejuvenate declining orchards by scientific methods, this section carried out rejuvenation work in the old orange orchard of the Government Seed Farm, Tharsa.

With a view to acquaint a large number of growers about the rejuvenation programme, a few demonstration centres have been arranged in private orchards to serve as a guide to the surrounding growers.

There is a great scope for banana cultivation in Vidarbha region. With a view to acquaint the cultivators with the scientific cultivation of Banana, three demonstration centres were arranged during the year and for this purpose 5,700 banana suckers were supplied through this section.

E. Publications

The following article written by Shri N. A. Phadnis, Horticulturist, Nagpur, was published in the Poona Agriculture College magazine of November 1959 issue. "A note on the decline of the *Nagpur Mandarin* orange in Nagpur region".

A leaflet on "How will you rejuvenate your declining orchards" in Marathi was prepared by Shri N. A. Phadnis, Horticulturist for guidance to the orange growers of the region.

F. Special items of work

The section took active part in the exhibition conducted under the District Agricultural and Cattle Show at Mohpa in Nagpur district from 29th December to 31st December 1959, *Kisan* seminar at Talegaon in Amravati district from 15th to 16th January 1960 and the Fruit, Flower and Vegetable Show at Bombay on 27th, 28th and 29th February 1960 organised by the Friends of the Tree Association. The *santra* fruits exhibited by this section in the Bombay Show were adjudged the best and a certificate of merit was awarded by the Show Committee.

APPENDIX XX

**SUMMARY OF WORK DONE UNDER THE HORTICULTURAL
DEVELOPMENT OFFICER, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60**

A. Staff and Administration

Shri I. A. Sayed held the charge of the post of Horticultural Development Officer, Bombay State, Poona.

B. Research

Nil.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

Advice on various aspects of fruit and vegetable growing was given to fruit growers and amateur growers through correspondence and on the spot. Specific service such as pruning, manuring, spraying and dusting was also rendered to the growers by the technical staff. Lectures and practical demonstrations were given on improved horticultural practices during the village leaders' camps and agricultural shows.

During the year under report, 4,019 acres of new area was brought under the cultivation of different commercial fruit crops and 4,714 acres of existing orchards were rejuvenated by adopting cultural, manurial and plant protection measures to increase the yield of fruit trees. In all 3,942 *Raiwal* mango trees were renovated to superior varieties by side-grafting. A campaign for dusting mango trees with DDT and sulphur for controlling jassids, hoppers and mildew was undertaken and 5,032 mango trees were treated.

In order to build up a stock of mango mother trees of superior varieties for future propagation, mango plantations *in situ* were established at 17 Taluka Seed Farms where irrigation facilities are available. Five commercial grape varieties *viz.*, *Bhokri* selection No. 94, *Gulabi*, *Bangalore Purple* and *Anab-e-Shahi* were planted in an area of 5 gunthas at 12 Taluka Seed Farms in different parts of the State to determine their suitability to particular region.

Fruit nursery at the Modibag, Agricultural College, Poona and arecanut nursery at the Regional Coconut Research Station, Ratnagiri, were established. At these two centres 8,000 rooted

cuttings of commercial grape varieties, 3,000 *kagdi* lime seedlings and 600 fig cuttings and 2,700 arecanut seedlings were produced.

Long term loans on easy terms of payment were advanced to fruit growers for bringing new area under fruit cultivation at the rate of Rs. 300-00 per acre upto a maximum of Rs. 3,000-00. During the year under report, loans amounting to Rs. 3,68,544-00 were disbursed to the cultivators.

E. Publications

An article entitled "Improving *Baival* Mango" by I. A. Sayed Horticultural Development Officer, Maharashtra State, Poona, was published in the October, 1959 issue of the 'Farmer'.

The illustrated leaflets on the following fruit crops were brought out and distributed to the cultivators.

- (1) Cashewnut cultivation and raising cashew seedlings.
- (2) Side-grafting of country mango trees.
- (3) Grape cultivation.

F. Miscellaneous Activities

A campaign for eradicating *Loranthus* (*Bandgul*), a parasite on mango trees, was undertaken at Phulambri village, taluka Aurangabad and *Loranthus* from 5,810 trees was removed.

G. Special items of work

The first State Level Mango and Grape Shows were organised at Poona in June 1959, and at Nagpur in March 1960, respectively. At the Mango Show, there were 48 entries and 425 exhibits covering 159 varieties, while at the Grape Show, there were 81 entries and 307 exhibits covering 107 varieties. These shows were very largely attended and appreciated by the growers and people alike.

APPENDIX XXI

SUMMARY OF WORK DONE UNDER THE MILLET SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, PARBHANI,
DURING THE YEAR 1959-60

A. Staff and Administration

During the year under report, the following officers held the charge of the post of the Millet Specialist, Department of Agriculture, Bombay State, Parbhani.

Officer	Period
Shri B. G. Jogalekar ...	1-7-1959 to 18-8-1959
Shri V. K. Joshi ...	19-8-1959 to 18-10-1959
Shri R. G. Joglekar ...	19-10-1959 to 22-12-1959
Shri V. K. Joshi ...	From 23-12-1959 onwards.

B. Research

Research work is summarised under Chapter IV.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

The Millets Section has taken part in the *khariif* and *rabi* crops campaigns launched by the Department in conducting practical demonstrations of sowing, thinning, and top dressing of fertilizers in case of irrigated *jowar*. In order to know the difficulties of the farmers of the tract a questionnaire was prepared and in all 150 farmers were interviewed by the representatives of the Millets Section, the College of Agriculture, and the District Agricultural Officer, Parbhani, and their replies are under consideration.

E. Publications

Nil.

F. Miscellaneous Activities

A certificate of merit was awarded to the Millets section for the pageant on Republic Day celebrations at Parbhani on 26th January 1960.

G. Special Items of work

The section took part in the District Agricultural Shows arranged at Bhir and Aurangabad districts by installing demonstration stalls and explained to the cultivators the improved methods of cultivation of cereals and pulses.

APPENDIX XXII

SUMMARY OF WORK DONE UNDER THE OILSEEDS SPECIALIST
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60.

A. Staff and Administration

Dr. Y. S. Kulkarni continued as Oilseeds Specialist for the period under report.

B. Research

(a) *Groundnut*.—At Dhulia, *Faizpur*—1-5 was significantly superior to *Spanish* local. At Jalgaon, strains SBXI and *Faizpur*-1-5 gave 52 and 47 per cent higher yield respectively than *Spanish* local. At Parbhani, *Kopargaon*-1 (semi-spreading) and T. M. V. 2 were significantly superior to the local. At Nanded, *Karad*—4-11 gave significantly higher yield than the local. At Latur *Karad*—4-11 gave significantly higher yield than the local spreading. At Buldana, strains N. G. 268, N. G. 51 and N. G. 386 were found significantly superior to the local. At Karad, three new improved Junagadh strains *viz.*, *Gondal*—221-31, A. H. 334 and A. H. 29-207 were found significantly superior to *Karad*—4-11 in a small scale trial. At Digraj *Kopargaon*-1 (semi-spreading), three local selections and T. M. V. 3 from Madras were significantly superior to the local spreading.

(b) *Sesamum*.—At Niphad, two strains *viz.* N. 58-2 and N. 72-17 were significantly superior in yield to the local. These two strains were found drought resistant also. At Jalgaon, three strains, N. 72-17, N. 58-2 and N. 106-5 gave significantly higher yield than the local. In a small scale trial, strain S-23 from Nagpur gave 30 per cent higher yield than the local.

(c) *Niger*.—In a small scale trial at Niphad two strains *viz.*, No. 63-1 and No. 64-12 were found significantly superior to N-12-3 and local. At Parbhani, two selections *viz.*, No. 235 and No. 261 gave 22 and 9 per cent higher yield respectively than the local.

(d) *Linseed*.—

Nagpur.—One culture of the cross (n3 x R. R. 202) F9-34 was found promising since it contains 46.2 per cent oil.

Parbhani.—Scheynne and K₂ gave significantly higher yield than the local.

(c) *Safflower*.—

Parbhani.—Three Kopargaon selections *viz.*, 51-13-10, 51-24-12 and 51-16-12 from Kopargaon were significantly superior to the local. In a small scale trial, three selections *viz.*, 535, 246 and 537 were found significantly superior to the local.

C. Post-Graduate Research

Nil

D. Advisory and Development Work

The estimated additional production due to the scheme for increased production of oilseeds in Bombay State was 27,282 tons. Three hundred and two maunds of seed of *Karad-4-11* groundnut were distributed to registered seed growers in Satara. Demonstration plots to show the beneficial effects of fertilizer application, seed treatment and plant protection measures were arranged in 22 districts. Groundnut crop competitions were held in seventeen districts. About 186 maunds of seed of castor 8-20 were distributed free to the cultivators for planting them on contour bunds. It was reported that castor was planted on the bunds of about 35,000 acres.

E. Publications

The following article was published during the year :

(1) "Groundnut Improvement in the Bombay Deccan" by R. A. Sangve, Y. M. Chavan, G. V. Gadre and A. K. Gupta, Indian Central Oilseeds Committee, Vol. IV, No. 1, 1960.

(2) Popular booklets in Marathi and Gujarathi on Intensive Cultivation of Groundnut were printed for distribution.

F. Miscellaneous Activities

The following Radio talks were broadcast by the Oilseeds Specialist from All India Radio, Poona.

Date	Subject
10-7-1959	... Note on " <i>Erandi</i> " and " <i>Itar Galatanchi Fike</i> " in Farm Forum Programme.
11-12-1959	... " <i>Sarkichya Biya, Pendh ani Tel Yancha Upayog</i> ".

The Oilseeds Specialist visited Groundnut Research Station Tindivanam (Madras State) in November 1959, and collected seed of promising strains of groundnut and castor.

G. Special items of work

The Oilseeds Specialist, Bombay State, Poona, who is a member of the Agricultural Research Sub-committee acted as the Chairman of the Agricultural Research Sub-Committee for groundnut at the annual meetings of the Indian Central Oilseeds Committee held in February 1960.

APPENDIX XXIII

SUMMARY OF WORK DONE UNDER THE PLANT PATHOLOGIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60

A. Staff and Administration

Dr. V. P. Bhide was Plant Pathologist, Agriculture Department, Bombay State, Poona 5, from 13th August 1959 to 30th April 1960.

B. Research

(a) *Cotton wilt breeding scheme, Poona.*—A large number of cotton selections, crosses and strains received from the Assistant Cotton Research Botanist, Nanded and Cotton Breeders, Jalgaon and Parbhani were tested for their resistance to wilt in pot culture tests under controlled conditions in the glass house. The results are summarised as under.

Jalgaon Section.—All the 30 cultures from the old material consisting of progenies of crosses involving Madras *arborium*, *Virnar* and *Dhulia-2* selections, selections and bulks of Y-1, *Virnar* (N. B.) and C. J. 73 showed better performance than the last year. All the new cultures showed high degree of susceptibility.

Parbhani Section.—Progenies of the cultures 4971, 2204, 4166, 4826, 4822, 5875, 5280, 5907, P. 47-3591 from Parbhani and Badnapur showed high resistance. All the new cultures, 6 from Parbhani and 3 from Badnapur showed high degree of susceptibility.

Nanded Section.—Progenies of the cultures 1716, 1952, 2146, M-980, 6634, 2164, 1494, 723, 688, 1422, 1946 showed high resistance. Progenies of cultures 2466, 2526, 1951, 3883, 3741, 3742, 3693 and 1946-BK showed varying degree of susceptibility, the mortality ranging from 11.9 to 58.5 per cent. All the 5 new cultures showed high degree of susceptibility.

(b) *Wheat rust research scheme, Mahabaleshwar.*—

(i) *Seedling and mature plant resistance tests of fixed varieties.*—All the five Russian Macaroni and soft wheat varieties viz., *Molanonus-26*, *Molanonus-69*, *Atridum-43*, *Sarajoseraja-21*, *Mritrospermum-841*, proved highly susceptible to stem rust in the seedling and mature plant tests.

Three out of six American *T. Vulgare* wheat varieties viz., *New Thatch*, *Bowie* and *Kenya Farmer* were highly or moderately resistant in the seedling stage to eleven races of stem rust including rare but virulent races 15C and 122. In the mature plant tests, the first two varieties remained free from infection of stem and leaf rusts while wheat variety *Kenya Farmer* exhibited moderate resistance to stem rust and high resistance to leaf rust at this stage. The remaining three varieties viz., *Lee* and *Helvia* developed 'SR' and 'S' type of infection in the mature plant tests in the field.

Of the 72 *T. durum* and *T. vulgare* exotic wheat varieties received from the Head of the Division of Botany, Indian Agricultural Research Institute, New Delhi, 23 varieties, were mostly susceptible in the mature plant tests. Seedling and mature plant resistance tests of the remaining varieties are in progress. Wheat variety NP-200 has been found to be resistant to 2 races but proved to be susceptible to race 42-B in the seedling stage. In the mature plant tests in the field, it developed 20 per cent susceptible type of infection. This wheat, therefore, will not be useful for cultivation in Bombay State, where race 42-B is most commonly occurring race.

Of the two *T. durum* wheat varieties F-2158 is resistant in the seedling stage to 8 races including race 15C but proved to be susceptible to race 122, while E-2025 (*Arbian durum*) proved resistant at this stage to 11 races including races 15C and 122.

Plants grown from the well developed seeds of *Saga* and *Paraguay-1423* developed 'MS' and 'S' types of infection in the mature plant tests in the field. These varieties, therefore, may not be useful for hybridisation as a source of resistance to stem rust.

(ii) *Seedling and/or mature plant resistance tests of hybrids.*—*Agricultural Research Station, Niphad.*—Progeny of 163 cultures of 20 crosses in F₃, 186 in F₄, 192 in F₅, one in F₆ and 339 in F₈ to F₁₃ and F₁₅ generations was tested in the field. Only 61 cultures in F₃, 95 in F₄, 97 in F₅, one in F₆ and 329 in F₈ to F₁₃ and F₁₅ did not have any susceptible plants. On the whole crosses C 588 X *Vijay*, R. F. P. M. 80 X. N. P. 710, C-135 X C. 588 and C-59 X *Vijay* in F₃, A. 206 X *Gaza*, crosses of R. F. P. M. 83 with MHD-177, KCN 179 and 180, and *Khapli* X *Motia* in F₄, F₁ (*Motia* X *Gaza*) X *Gaza* and F₁ (*Immillo* R. L. 7 X *Gaza*) X *Vijay* in F₅ and those of *Gaza* with *Jay*, *Gulab*, B. 23 and *Motia* in advanced generations have yielded more uniformly rust resistant selections than others.

It is interesting to note that selections from cross *Khapli* X *Gaza* F₅ were not only more resistant than *Khapli* but also appeared to be superior in agronomic qualities to *Khapli*. High yielding and rust resistant selections of this cross may replace *Khapli* wheat at present under cultivation in certain districts of the State.

Two hundred and thirty-eight out of 246 cultures (F₅ to F₁₃) under large and small scale yield trials at the Agricultural Research Station, Niphad, during the year under review were uniformly resistant.

Crop Research Station, Badnapur.—Progeny of crosses of PW-1, 3 and 7 with *Gaza* and those of PW-5 and 12 with NP 790 and *charter* respectively, all in F₅, was tested in the mature plant stage in the field at Mahabaleshwar. Two hundred and sixty-eight out of 425 cultures were uniformly resistant. All the 28 cultures of cross PW-12 X *Charter*, F₅ were uniformly resistant. The rust resistance of this cross was however inferior to that exhibited by the cross PW-5 X N. P. 790. As the selections of cross PW-7 X *Gaza*, F₅ were very late, they might have escaped heavy infection of stem rust.

Agricultural Research Station, Kopergaon.—Eighty-four out of 90 cultures from crosses of N. S-12-13 with *Gaza* and reciprocal in F₈ and F₉ were uniformly resistant. The resistance of cross N-8-12-13 X *Gaza* was consistently superior to other crosses for the last 4 years. Four *Khapli* wheats viz., *Popatia Khapli*, *Felted Khapli*, *Local Khapli* and *Dink Khapli* and 31 *Khapli* selections were uniformly susceptible to rust. The range of infection was from 25 per cent to 65 per cent 'S' type.

(iii) *Occurrence of rust in the State during 1959-60.*—Of the three hundred and forty-six reports about rust on wheat received from various districts of the State, 103 reports were of stem rust alone, 156 of leaf rust alone, 74 samples showed infection of stem and leaf rusts and 13 samples showed no infection of any rusts.

Sixty-two out of 63 reports regarding appearance of rust on such rust resistant varieties as MHD-345, KON-179, *Kenphad*, Hy 65, N. 59, . 62 and N. 125 showed infection of leaf rust only, while one sample of *Kenphad* wheat from the Taluka Seed Farm, Tasgaon (district S. Satara) showed infection of susceptible type of stem rust. The analysis of district rust samples indicated presence of races 21, 34, 40, 42-B and 42B-1. So far, the last mentioned race was present in traces only in one sample received from Yeola (district Nasik) of the above mentioned races, R-42B appeared to be common.

(iv) *Exposure of slides in Acroscopes and sowing of wheat varieties for detecting new physiologic races of stem rust.*—Slides were exposed in Acroscopes on seed farms in 19 districts of the State for studying the dissemination of stem rust, similarly 23 wheat varieties combining present and future sources of resistance to stem rust were also grown at some seed farms for detecting new physiologic races of stem rust. The study of exposed slides is not yet complete. No infection of stem rust was reported on any of the above-mentioned 23 varieties.

(v) *Training of staff in rust work.*—Six Agricultural Supervisors and six Agricultural Assistants from six Research Stations engaged in wheat breeding work were trained at Mahabaleshwar for one week in the technique of creating artificial infection of stem rust.

(c) *Scheme for control of nematodes on betelvine at Vaznerbhairao.*—Eight varieties of betelvine obtained from different parts of Bombay State and from other States were tested in a naturally nematodes infected plot. None of them was found resistant to nematodes. In addition three species of piper, viz., *P. Longum*, *P. nigrum* and *P. Orkeri* were also tested and found susceptible.

Nematocidal trials using diazinon, nemagon, formaldehyde and Karanj cake have been conducted during the year to test their efficacy in controlling nematodes. The results of these trials are awaited.

The identity of the nematodes attacking betelvine has been determined. They belong to the genus *Meloidogyne* and species *M. arenaria* and *M. inonita* var. *actite* respectively.

(d) *Scheme for investigation into Tikka and sclerotium wilt of groundnut.*—Fungicidal trials for control of *Tikka* of groundnut were laid out at Agricultural Research Stations, Jalgaon and Akola. The results of these trials are yet to be analysed, but observations of the trials at Akola showed that Bordeaux mixture 5:5:50 and copper compound 50 per cent controlled the disease to a large extent and the yield of pods obtained showed about 20 per cent increase over the control. The treatment F i.e. copper dust 4 per cent plus sulphur (1:1) was next to B.M. 5:5:50 and copper compound 50 per cent (5 lbs. in 100 gals.).

Isolations were made of the causal organism from sclerotium wilt affected groundnut plants collected from Poona, Karad, Kopargaoon, Latur and Akola. Pathogenicity of the isolates from Poona, Karad, Kopargaoon and Latur was proved.

Groundnut varieties obtained from Akola, Jalgaon and Karad were tested for their resistance to sclerotium wilt and varieties viz., Kolawad, T-47, and T-17-2 showed promise of yielding resistant material.

Observations on resistance to 'Tikka' in varieties of groundnut grown at Agricultural Research Stations, Jalgaon and Latur were taken. The observations indicated that most of the varieties were highly susceptible.

(e) *Scheme for investigation into bacterial blight of paddy.*—On surveying the paddy area in the State, bacterial blight was found to be present in Kolaba, Ratnagiri, Poona, Thana, Nagpur, Chanda and Bhandara districts. The organism was isolated successfully from the few samples collected from different parts and pathogenicity of the few isolates was proved.

(f) *Scheme for blast of rice and foot-rot of wheat.*—Seventeen isolates of the 'blast' fungus were tested on 24 fixed varieties of rice to determine the existence of physiologic races. The results of the last three years' tests are inconsistent. Strains which were virulent in one year proved weak parasites in the next year and vice versa. It can now be definitely stated that no physiologic forms exist amongst the 17 isolates of the fungus under test. At the most, it could be stated that some isolates are more virulent than the others.

In the experiments on foot-rot of wheat the isolate No. 26 and Jalgaon 11 failed to infect wheat seedlings in pot culture experiments in the glasshouse.

(g) *Departmental research work.*—(i) The experiment on control of 'Dahiya' disease of cotton in Vidarbha was continued in Yeotmal, Wardha, Nagpur, Amravati and Akola districts on cultivators' fields and on some seed farms. The results show that sulphur alone and sulphur plus DDT 5 per cent (3:1) gives good control of *Dahiya*. The yield figures have not yet been received.

(ii) *Control of 'fig rust' in Poona district.*—This experiment was repeated at Velu near Poona. The fungicides used were copper dust 4 per cent, copper dust 8 per cent and Bordenux mixture 2:2:50. The fungicides were applied four times at monthly intervals beginning in September. All the fungicides gave good control of the disease.

(iii) *'Club root' of crucifers at Mahabaleshwar.*—Four varieties of cabbage obtained from Wisconsin have been planted in club root infested fields at Mahabaleshwar and in infested soil in pots at Poona to evaluate their resistance under Indian conditions. The results are not yet available.

(iv) *'Anthracnose' of cotton in Khandesh.*—Four demonstration blocks at Akulkheda, Nimdale, Zodge and Singvetukai in East Khandesh, West Khandesh, Nasik and Ahmednagar districts respectively were continued during the year

Observations on the incidence of 'anthracnose' were recorded as usual. The results show that seed treatment was effective in controlling seedling infection as also the boll infection.

(v) *Testing for resistance to blast of rice.*—Testing for resistance to blast under conditions of an artificial epiphytotic were carried out at Mahableshwar and at Lonavala in the newly constructed glass-house. The following strains and hybrid selections showed resistance.

Naragam material.—29-9, 29-17, 1-10, 24-21, 32-20, 31-10, 50-21, 35-17, 41-2, 48-16, 4-9, 56-6, 58-15, 81-4, 53-1, and 84-4 from the cross (Est. 39X H. 566) F₃.

Karjat material.—(T3XZ. 149) F₃-59 (6498/1 X E.K. 70) F₆-17-12-1, 17-12-3, 17-13-1, and 17-10-1, (Norin-43 X K. 42) F₆-22-1-1, (Z. 14 X Bas. 370) F₆-19-3-3, (Kada-68-1X Londer) (F₆-16-1-1 and 16-1-2, (K. 540 X Co. 25) F₆-4-4-3 and 4-4-1, (Co. 25 X I-B-12-11) F₇-5-3-5, 5-1-4, 5-1-3, 5-3-3 and 5-3-2, (Co. 25 X E. K. 70) F₇-15-10-4, 15-11-3, 15-11-2 and 15-11-4.

Igatpuri material.—Pelopar-2799 and Krishnasal-10.

Vadgaon material.—Krishnasal Sel. 17. •

(h) *Sugarcane disease investigation scheme.*—

(i) *Studies on sclerotial red sheath disease of sugarcane.*—The causal agent of the disease was brought into pure culture and has been proved to be pathogenic on sugarcane varieties. This fungus was tested on different sugarcane varieties for noting their reaction. Of the 82 varieties infected, varieties *viz.*, Co. 290, Co. 453, Co. 457, Co. 1010, Co. 1021, Co. 1025, Co. 1108 and Co. 1132 failed to develop infection even 20 days after inoculation. The fungus is being studied for noting its morphological, cultural and physiological characters.

(ii) *Survey of sugarcane diseases.*—Periodical observations have been recorded for noting incidence of different sugarcane diseases on different sugarcane varieties grown at Padegaon.

(iii) *The all India-co-ordinated scheme for investigation and control of rust disease on sugarcane.*—Field observations on different varieties of sugarcane tried in preliminary, prefinal and final stages grown at Padegaon Farm were recorded for noting the incidence of rust disease. Thirty-four varieties continued to be susceptible while 229 varieties showed no infection under field conditions at Padegaon.

C. Post-graduate Research

Nil.

D. Advisory and Development Work

A large number of enquiries on diseases, their control, fungicides and appliances etc. were dealt with and large number of phytopathological certificates were issued during the year. Targets for carrying out campaigns on the plant diseases for their control has been suggested to the Plant Protection Officers. Refreshers classes for Agricultural Assistants were conducted.

E. Publications

The following research and other articles were sent for publication and some of them were published during the year under report.—

- | | | | |
|-----------------------------|-----|--------|---|
| Gadgil, P. D. and
V. P. | and | Bhide, | Nitrogen fixation by <i>Azotobacter</i> in association with some associated soil micro-organisms. |
| Bhagwat, V. Y. and
V. P. | and | Bhide, | <i>Phyllosticta</i> leafspot of cotton in B. S. (sent for publication to Indian phytopathology). |
| Bhagwat, V. Y. and
V. P. | and | Bhide, | Vascular infection of some Indian cotton by <i>Xanthomonas malvacearum</i> (sent for publication to Indian phytopathology). |
| Bhide, V. P. | ... | | Ergot on <i>Bajri</i> (Published in Farmer). |
| Bhagwat, V. Y. | ... | | Disinfection of cotton seed and its effect on seed viability (published, Poona Agriculture College Magazine). |
| Bhagwat, V. Y. | ... | | Control of soft-root of Ginger in B. S. (sent for publication to Poona Agricultural College Magazine). |

F. Miscellaneous activities

Identification of diseased specimens received from different places was attended.

APPENDIX XXIV

SUMMARY OF WORK DONE UNDER THE PROFESSOR OF AGRICULTURAL
ENGINEERING, COLLEGE OF AGRICULTURE, POONA-5, DURING
THE YEAR 1959-60.

A. Staff and Administration

Shri A. A. Memon and Shri V. V. Gokhale held charge of the post of Professor of Agricultural Engineering for different periods during the year under report.

B. Research

Nil.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

Nil.

E. Publications

Nil.

F. Miscellaneous Activities

This has been purely a teaching section doing teaching work to the under-graduates only all along in the past. There is no post graduate teaching and no other activities in the section.

APPENDIX XXV

SUMMARY OF WORK DONE UNDER THE PROFESSOR OF ANIMAL
HUSBANDRY AND DAIRYING, POONA, DURING THE YEAR 1959-60

A. Staff and Administration

Shri P. S. Duduskar has taken over the charge of the post of the Professor of Animal Husbandry and Dairying from 12th September 1959 from Shri Y. R. Karnik.

B. Season

Season was favourable for milk production. The cost of production of milk was Re. 0.54 per lb.

C. Agricultural Education

Teaching in Animal Husbandry and dairying of four classes leading to B. Sc. (Agri.) Degree course was, as usual, conducted both in theory and practicals. Selective breeding for high milk yield, early maturity and shorter dry period is still in progress. Due to better management and better type of housing for calves there was a considerable reduction in calf mortality compared to that in previous years.

D. Advisory and Development work

Numerous visitors, both local and from abroad and also students of the various schools and colleges had been shown round the dairy and they were explained the principles and practices of animal breeds, breeding, feeding and management, as well as clean milk production, milk handling and manufacture of milk products. A number of queries with regard to animal husbandry and dairying made by the public were given due attention.

E. Publications

Nil.

F. Miscellaneous Activities

The hybrid variety of sorghum received from the U. S. A. was introduced on the farm and comparative study was done along with the local variety *Nilwa*. It was seen that *Nilwa* as a green fodder crop yields better than the hybrid. Besides the above trial, some of the varietal trials were taken up on the Agricultural College Dairy Farm. New variety of perennial grass viz., Hybrid No. 4 is tried along with some of the perennial and seasonal grasses. The analytical work of the above grasses is in progress.

APPENDIX XXVI

SUMMARY OF WORK DONE UNDER THE RESEARCH ENGINEER,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60

A. Staff and Administration

Shri N. S. Soman was holding the charge of the post of the Research Engineer throughout the year under report.

B. Research

Under the scheme for carrying out research in agricultural implements, the work of designing and manufacturing of various improved agricultural implements and taking their trials was undertaken.

(i) Trials of the modified type of the four point dibbler for *jowar* were taken. During its operation, lumps of wet clay stick to the dibbler at times and obstruct its smooth working. It was also noticed that the time required for dibbling an area of 2 gunthas by one man was 2 hours while the sowing operation by a seed-drill on 2 gunthas of land can be done by one man with a pair of bullocks in 8 minutes. When the seed germinated, the growth was found to be uniform and seedlings had equal spacings both ways.

Modified designs of one point dibblers for wheat, gram and groundnut were also tried. Though the growth was found to be uniform and seedlings had equal spacings both ways, the time required for carrying out the dibbling operation was much more than that required by the seed-drill.

(ii) A trial of the seed-cum-fertilizer drill was taken both in *kharif* and *rabi* seasons. The draft required for this drill was about 33 per cent more than that for the country drill. Similarly big lumps of wet soil were brought out by each group of 3 coulters (one for fertilizer and 2 for seed) and they obstruct the smooth working of the implement.

(iii) Attachment to a country drill for automatic sowing of *jowar*, wheat and paddy has been prepared and tried. The draft required for working this drill was the same as that required for the normal drill. The sowing of the seed at a desired rate (of 10 lbs. per acre for *jowar* seed and 40 lbs. per acre for wheat seed) was achieved. The services of an expert in dropping the seed evenly in the seed-bowl were dispensed with, by using this attachment. The results by using this attachment were encouraging; hence twelve such attachments are being constructed for trials in different parts of the State.

(iv) A groundnut digger with a steel frame and two blades was tried and found to be working well. But to have still better performance, the two blades would be joined at the back end and counter sunk headed bolts would be used in a new design and it would be tried next year.

(v) The piston type dynamometer could not be constructed fully this year. Its construction would be completed next year and its trials would also be taken.

(vi) The bullock cart having a used axle of a 3 ton truck and used tyres and tubes was under trials at the Agricultural College Farm, Poona.

(vii) The modified winnowing fan was prepared. Its preliminary trial was taken and it was found to be working satisfactorily. A long duration trial of it would be taken next year.

(viii) Long duration trial of the double acting *mhot* arrangement constructed last year was taken. It was found that the bullocks have to exert an average pull of 5 cwt. for working this *mhot* in comparison to the pull of about 3 cwt. in normal *mhot* practice. Similarly, it was found that repeated dropping of the iron *mhot* from the well top to the water surface in well, damages it much and it starts leaking through joints in a week or so.

(ix) A bullock cart was prepared with its body 4'-6" above the ground level, and a power sprayer and 18 ft. long boom with 12 nozzels were fitted on it. The cart and the equipment was used for spraying purposes on 50 acres of land, and was found to be giving a good performance. Six such booms to be fitted on common carts for spraying on 20 ft. wide strips have been manufactured.

(x) Plans and estimates of a portable prefabricated black iron pipe and C. G. I. Sheet shed 20' x 20' x 10' high in size were submitted by the Research Engineer were approved. Construction of the shed has been commenced. When its construction would be completed, a large number of prototypes of such sheds could be constructed and erected as implement sheds, fodder sheds and store sheds at different farms.

(xi) As the wooden template normally used for checking bund size was cumbersome in handling and was losing its shape in a short while, a template was prepared from 3/4 inch conduit pipe. It was found to be light in weight and durable. It also does not lose its shape by rough usage. Fifty such templates were manufactured and are now in use.

(xi) The usual *kani* is 3' long x 1'-3" broad. With a view to find out the optimum size of a *kani* to move maximum quantity of earth with a minimum draft, four designs of *kanis* of different dimensions, such as (1) 3' long x 1'-6" broad, (2) 3' long x 1'-6" broad and fitted with a 2" pipe roller, (3) 3'-6" long x 1'-6" broad, and (4) 4' long x 1'-6" broad were prepared. They would be tried next year.

C. Post-Graduate Research

[Nil.]

D. Advisory and Development work

The Research Engineer continued to be a member of the Special Committee appointed by the State Director of Agriculture for testing plant protection equipment to be purchased on a large scale by Government. The Research Engineer along with other members of the Committee inspected and tested the seed dressing drums, bucket sprayers, foot sprayers, power sprayers, hand operated dusts and power operated dusters, offered by different firms.

Various queries received from the members of the public and the departmental institutions were replied.

E. Publications

A list of improved agricultural implements suitable for use in each district of the State was prepared and circulated to the different officers in each district.

A note on 'BULLOCK CARTS' prepared by the Research Engineer giving details of the turned axle, cast iron, bush bearings and efficient lubrication and dust-proofing arrangement evolved by the Department was circulated to the different officers in the Department.

F. Miscellaneous Activities

(i) The Research Engineer participated in the World Agricultural Fair held in New Delhi and demonstrated the implements evolved by the State Agricultural Department.

(ii) A pamphlet giving information about all the improved agricultural implements suitable for use in each district of Bombay State has been prepared both in Marathi and English languages. It gives information about the advantages which accrue from the use of each improved implement, how it is to be used, where it can be obtained and at what price.

(ii) The engineering portion of the scheme to ascertain the superiority of the sprinkler irrigation system over the surface flow system is under consideration.

G. Special items of work

(i) Under the scheme for granting financial aid to cultivators for improving implements, Shri H. N. Patil of Borgaon, district S. Satara, was given an aid of Rs. 250.00 for evolving a water lifting device for working a 2" x 2" centrifugal pump by a pair of bullocks. His implement was inspected and tested. It was found that for working his device the bullocks had to exert a pull of about 4 cwt which was beyond the capacity of a normal pair of bullocks.

During this year, Shri M. G. Patil of Ardal, from Ajra mahal in Kolhapur district was given a financial aid of Rs. 100.00 for fabricating and manufacturing a bullock drawn dibbler for jowar. He would be submitting his implement next year and it would then be tried.

(ii) Under the scheme for award of prizes for invention of improved agricultural implements financed for Sir Sassoon David Trust fund, 9 implements were received and tried. None of these implements was considered suitable for the award of prize as none was satisfying all the necessary conditions. However, a consolation prize of Rs. 100.00 was granted to Shri M. G. Patil of Ardal, from Ajra Mahal, district Kolhapur for the seed drill for jowar and wheat prepared by him as it incorporates a major improvement over the implement in common use.

(iii) Under the scheme for award of prizes for improvement of implements financed by the Indian Council of Agricultural Research, final testing of the 26 implements which were offered from Bombay State was done by the Committee appointed by the Indian Council of Agricultural Research (of which the Research Engineer was a member) and a report was submitted to the Council.

(iv) For minimising the time and cost of removing debris from a well under construction, a simple debris removing device was prepared and fitted on a well in a Sholapur district. The device has been worked for its proper job during the progress of the well construction.

APPENDIX XXVII

SUMMARY OF WORK DONE UNDER THE RICE SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE,
KARJAT (KOLABA) DURING THE YEAR
1959-60

A. Staff and Administration

The post of the Rice Specialist, was held by Shri P. Y. Shendge, in addition to his duties as Assistant Rice Specialist upto 30th April 1960.

The headquarters of the Bio-Chemist and his staff in the Rice Research Scheme was permanently transferred from Poona to Karjat in August 1959, and he continued to work under the technical control of the Agricultural Chemist and administrative control of the Superintending Agricultural Officer, Bombay Division, Nasik.

B. Research

Agricultural research under the Section was conducted at the main station at Karjat and other Agricultural Research Stations. The work was mainly of types, *viz.*, (i) Plant breeding, and (ii) Agronomic research.

At Karjat, however, besides plant breeding and agronomic research, work on bio-chemical and physiological aspects of rice as well as work on control of crab pest was conducted. Observations on crop growth and weather data were also recorded at Karjat. Research on plant breeding and agronomy has already been reported under appropriate paragraphs in the main report.

C. Post-graduate Research

Nil.

D. Advisory and Development Work

(i) *Nucleus seed supply.*—The following quantities of pure nucleus seed of the various improved strains was multiplied at the research stations and supplied to the Taluka Seed Farms and registered seed growers for further multiplication and distribution through the District Agricultural Officers.

Seed multiplication during 1959-60

Sr. No.	Name of the strain	Quantity in B. Mds.
<i>I Paddy</i>		
1	<i>Kolamba-42</i>	302
2	<i>Kolamba-540</i>	67
3	<i>Early Kolpi-70</i>	297
4	<i>Kada-68-1</i>	4
5	<i>Mohadi-4-4</i>	8
6	<i>Zinya-31</i>	45
7	<i>Garvel-1-8</i>	4
8	<i>Bhadas-1303</i>	126
9	<i>Zinya-149</i>	14
10	<i>Zinya-14</i>	61
11	<i>Late Kolpi-248</i>	45
12	<i>Kala Rata-1-24</i>	22
13	<i>Bhura Rata-4-10</i>	12
14	<i>Patni-6</i>	78
15	<i>Panvel-61</i>	81
16	<i>Waksal-207</i>	190
17	<i>Bhadas-79</i>	15
18	<i>Varangal-487</i>	42
19	<i>Ambemohar-157</i>	92

Sr. No.	Name of the strain	Quantity in B. Mds.
<i>I Paddy—contd.</i>		
20	<i>Ambemohar-159</i>	42
21	Early <i>Ambemohar-102</i>	2
22	<i>Chimansal-39</i>	8
23	<i>Dodgya-622</i>	7
24	<i>Antersal-57</i>	6
25	<i>Mugad-161</i>	6
26	<i>Yelikerisal-4</i>	9
27	<i>Krishnasal</i>	52
<i>II Nagli</i>		
1	B-11	17
2	E-31	4
3	A-16	4
<i>III Wal</i>		
1	2-K-2	15
2	125-36	10
<i>IV Green Manuring Crops</i>		
1	<i>Sann</i>	2
2	<i>Sesbania Speciosa</i>	5
3	<i>Dahincha</i>	2

(ii) *Supply of processed seed.*—At the suggestion of Dr. B. S. Kadam, Joint Director of Agriculture (Extension), processing of paddy seed was taken up at the Agricultural Research Station.

Karjat. The object was to supply the best quality seed of which purity and germination are guaranteed. The pure seed was first subjected to dipping in 3 per cent salt solution dried for 24 hours, treated with Agrosan G. N, packed in the ten seer cloth bags each sufficient to raise seedlings for an acre, labled with printed card labels bearing information about the seed treatment, the improved strain and a code number to facilitate a back reference, and sealed with the station seal. Two hundred such bags were supplied to cultivators in *Raja Nala* area for growing in the hot weather under irrigation. Seed of six important strains was thus processed and 1512 bags were supplied from Agricultural Research Station, Karjat, for growing in *kharif* season of 1960-61.

There was good response from the cultivators and a heavy demand for the processed seed despite its high price. From the Agricultural Research Station, Khopoli, 100 bags of processed E. K.-70 seed was supplied.

(iii) Farmers' week was celebrated at Karjat, Ratnagiri, Vadgaon and Khopoli and the activities of the research stations were explained to the visiting farmers. Exhibitions were arranged at the District Agricultural Shows and other *Shibirs* by the respective research stations.

E. Publications

The following papers were published :—

Sr. No.	Author	Subject	Publication
1	Shri Shendge, P. Y. ... Shri Chavan, V. M. ... Shri Deshpande, J. D.	Breeding saline resistant rice varieties in Bombay State.	Rice News Teller, July 1959.
2	Shri Shendge, P. Y. ...	Better rice yields by Japanese method.	Farmer, January, February 1960.
3	Shri Shendge, P. Y. ...	Progress of Agricultural Research at the Agricultural Research Station, Karjat.	Farmer, 1960.
4	Shri Shendge, P. Y. ... Shri Kulkarni, N. B. ...	Co-ordinated trials of blast resistant rice varieties in Bombay State.	Rice News Teller (in Press)

Sr. No.	Author	Subject	Publication
5	Shri Shendge, P. Y. ...	Variety-cum-fertilizer interaction on paddy.	Paper submitted for F.A.O. working party on rice production held in Ceylon November 1959.
6	Shri Shendge, P. Y. ...	Progress of breeding for blast resistance in Bombay State.	Do.
7	Shri Shendge, P. Y. ...	Extension and Development of cowdung Gas Plant.	Paper submitted for the World Agricultural Fair Seminar, February 1960.

F. Miscellaneous Activities

There were a number of distinguished visitors who were shown round the research stations. Dr. G. Julien, Plant Breeding Specialist, with the F. A. O., Rome, visited Karjat in November 1959. Dr. K. Ramiah, Rice Expert with the Indian Council of Agricultural Research visited some of the Rice Research Stations in the State and submitted a report to the Council expressing satisfaction at the progress achieved.

Besides attending the meetings of the Departmental Technical Committees, meetings of the Botany Sub-Committee of the Rice Committee of the Indian Council of Agricultural Research, New Delhi, were also attended.

Short course in Plant breeding and Genetics for the Officers of the Rice Research Stations and in roguing, account keeping and paddy seed processing for Agricultural Assistants on seed farms were arranged at the Agricultural Research Station, Karjat.

G. Special items of work

(a) *Biochemical and Physiological research.*—The experimental work was conducted in pots in the glass house at the Agricultural Research Station, Karjat. The work is briefly summarised below.

(i) To induce running to leaf condition in paddy and to devise means to control the same, an experiment was conducted in pots since 1957-58 with as high a dose of N as 600 lbs. in the form of ammonium sulphate, cowdung and night soil combined with a spray of Indol Acetic Acid. In none of the years 'running to leaf' condition was obtained, nor was there any appreciable effect of the spraying of I. A. A.

(ii) To investigate critical straw to paddy ratio beyond which luxuriant vegetative growth starts.

The experiment was started in 1958-59 in pots to find out the relation between doses of N applied and the straw to paddy ratio. The doses of N applied were 0, 20, 40, 60, 80, 100 and 120 and those of P_2O_5 were 10 and 20 lbs. per acre. It was observed from the results that the initial ratio was wide. It was lowest between 20 lbs. N and 40 lbs. N but beyond 40 lbs. N it increased. The grain yield was the highest between 80 and 100 lbs. N and the ratio became wider after this dose. Similar results were obtained during both the years.

(iii) To investigate the effect of foliar spraying of micronutrients on the yield of paddy.

An experiment was conducted in pots for two years, 1958-59 and 1959-60, to find out the effect of foliar spray of micro-nutrients viz, Zn, B, Cu, Mn, and Mo. The concentrations used were 0.3 per cent $ZnSO_4$, 0.2 per cent borax, 0.8 per cent $CuSO_4$, 0.3 per cent $MnSO_4$, and 0.13 per cent sodium molybdate, all in a dose of 20 c.c. Six treatments received one spray and another six treatments received two sprays. The results showed that there was no appreciable difference either in growth or in yield of paddy due to the various treatments.

(b) *Crab control work.*—An experiment was conducted to control crabs in paddy fields with different insecticides. The treatment one per cent dieldrin bait gave the most effective control.

(c) *Work under the crop weather observation scheme.*—Data on climatological factors such as rainfall, soil and air temperatures humidity, wind velocity, evaporation and hours of sunshine are being recorded at the Agricultural Research Station, Karjat. Periodical growth observations on height, number of tillers, panicle bearing tillers, occurrence on pest and disease are also recorded on two varieties viz, K-42 and K-540. These observations are periodically submitted to the Director of Agricultural Meteorology for compilation and correlation of weather factors with the crop growth.

APPENDIX XXVIII

SUMMARY OF WORK DONE UNDER THE SOILS SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, SHOLAPUR,
DURING THE YEAR 1959-60

A. Staff and Administration

During the period under report, the post of the Soils Specialist was held by the following officers for the periods mentioned against their names.

Officer	Period
Dr. M. M. Kibe ...	1-7-1959 to 14-9-1959
Shri V. D. Tagare ...	15-9-1959 to 6-11-1959 (held additional charge)
Shri D. K. Ballal ...	7-11-1959 to 30-4-1960

B. Research

The section of the Soils Specialist deals with various problems of soils, soil moisture conservation and soil reclamation in the different soil climatic complexes of the State. The object of these studies is to evolve suitable land use patterns and soil and crop management practices in the different regions. The main findings of the work carried out, during the period under report, are briefly summarised in paragraphs under Chapter III.

(a) *Extensive research in dry farming and soil conservation.*—This scheme supplements the regular work of the section by providing additional staff to carry out soil surveys, soil erosion studies and statistical compilation of the work done in the section.

(b) *Scheme for experimental bunding in deep black soil at Honmurgi (Sholapur).*—The object of the scheme was to evolve a suitable technique for the construction of bunds in deep black soils which are vulnerable to erosion. The past efforts made to solve this problem have failed and a new approach to this problem is being worked out at Thair Farm in Osmanabad district.

(c) *Scheme for investigations into the khar lands.*—The object of the scheme is to evolve suitable economic methods for reclaiming the extensive areas of the *khar* lands occurring in the coastal districts of the State.

(d) *Soil conservation and demonstration scheme in Vidarbha.*—The scheme is to evolve suitable soil conservation measures and water disposal systems.

(e) *Soil Conservation Research Station, Awashi.*—A scheme for the establishment of Soil Conservation Research Station in high rainfall region at Awashi in Ratnagiri district is in progress.

(f) *Trial-cum-Demonstration Farms.*—Scheme for establishment of trial-cum-demonstration farms at Khasapur (Osmanabad), Golegaon (Parbhani) and Kashti (Ahmednagar).

The object of these trial-cum-demonstration farms is to conduct experiments and demonstrate to the cultivators how irrigation facilities could be utilised in the most economic manner and what crops can be cultivated more profitably under wet conditions.

C. Post-graduate Research

Nil.

D. Advisory and Development Work

This section undertakes examination of soils for advisory purposes of specific projects. During the period under report, the following major items of specific surveys and examination of lands were undertaken and recommendations made.

(a) *Specific surveys.*—

(i) Examination of lands of Dr. H. G. Nabaria at Sholapur for improvement of salty patch.

(ii) Examination of small salty patch of lands in Hattur village, Sholapur district, belonging to Shri Abdul Majid Hazi Hazarat Khan with a view to advise on sugarcane cultivation.

(iii) Water-logged area at Itkare village in Walva taluka, district South Satara.

(iv) Examination of salt lands in Walva taluka, district South Satara.

(b) The following soil surveys were undertaken during the year covering a total area of 450 acres—

(i) Area of the Agricultural College Farm, Akola.

(ii) Area of the Trial-cum-Demonstration Centre at Bhir under Bendsura Project.

(iii) Area of the Trial-cum-Demonstration Centre at Golegaon (Parbhani) under Purna Project.

(c) Soil samples collected from the following farms were analysed and reports given.

(i) Taluka Seed Farm, Thair, district Osmanabad.

(ii) Taluka Seed Farm, Pimpri, district Nasik.

(d) Besides, water samples from Purna river in Buldana district were analysed and reported.

(e) Moisture studies in bunded and unbunded areas in Ahmednagar district, with a view to assess the effect of bunding, were undertaken periodically which showed that soils in bunded areas conserved more moisture than those in unbunded areas.

(f) From the point of view of soil conservation and bunding, the soil samples from the Soil Conservation Research Station, Awashi, district Ratnagiri; Changdeo village, district East Khandesh and Taluka Seed Farm, Thajr, district Osmanabad, were analysed.

(g) Farmers' week was celebrated on 14th January 1960. There was good response from the cultivators.

E. Publications

Nil.

F. Miscellaneous Activities

A large number of officers, farmers and students of High Schools, Agricultural Colleges and Soil Conservation Institutes, visited the Research Station during the year under report. In addition, the following eminent personalities visited the section.

Date of visit	Name of visitors
6th December 1959	... Shri Shriman Narayan, Member of Planning Commission, Government of India.
29th March 1960	... Dr. W. S. Speer, Soil Conservation Advisor, Government of India.

Agricultural Supervisors and Officers attended to the work allotted to them in the *kharij* and *rabi* crops campaigns.

G. Special items of work

The Soil Specialist's section has been recognized for the post-graduate studies by the University of Poona and one student has registered for M. Sc. (Agri.) course.

The Soils Specialist attended the seminar on 'Bacterial Fertilizers' held at Delhi on 4th, 5th and 6th February 1960.

APPENDIX XXIX

SUMMARY OF WORK DONE UNDER THE STATISTICIAN,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE,
POONA, DURING THE YEAR 1959-60

A. Staff and Administration

Shri D. S. Ranga Rao held the post of Statistician, Department of Agriculture, Bombay State, Poona, during the year under report.

B. Research

(a) *Crop estimation surveys.*—During 1959-60, crop estimation surveys on a Statewide scale, were conducted on the crops mentioned in Chapter I of the main report. In all, 334 plots or 3.6 per cent of the total harvested plots were supervised by the technical staff of the section.

As usual, the yield forecasts for the crops under survey were mostly based on the results of the surveys.

Ad-hoc surveys.—Compilation and analysis of the data in respect of three schemes, viz., (i) crop estimation surveys on banana, onion and grapes, (ii) pilot scheme for investigation into cultivation practices and yield of oranges in Vidarbha region (*Mrig bahar* 1958-59) and (iii) pilot survey on sugarcane was completed. The results of the surveys are briefly described in Chapter I of the main report.

Pilot survey.—The field work of the surveys, scrutiny and compilation of the data in respect of the schemes viz., (i) combined scheme for correct estimation of area and production of coconut and arecanut, (ii) scheme for rationalised supervision of the crop acreages recorded by the *Patwaris* were in progress.

Compilation of the data in respect of the schemes viz., (i) scheme for collection, by sampling, of the data on cultural and manorial practices in Bombay State and (ii) scheme to ascertain the extent and causes of fallow areas in Bombay State, was completed. The results of these surveys are summarised in Chapter I of the main report.

(b) *Design of experiments.*—During the year under review, 103 new layouts were given and 169 plans of experiments undertaken at the Agricultural Research Stations, were scrutinised. The data of 73 experiments were analysed and collation of the data of experiments conducted at different Agricultural Research Stations for three or more years was carried out and 12 statistical reports

embodying results of these experiments were prepared and submitted to the 'Agresco'. The important conclusions from the above statistical reports are summarised in Chapter I of the main report.

(c) *Collection, compilation and publication of agricultural statistics.*—Details will be found in Chapter I of the main report. The various items of agricultural statistics were collected, compiled and published on usual lines.

C. Post-Graduate Research

[Nil.]

D. Advisory and Development Work

[Nil.]

E. Publications

The following two papers were read at the 13th Annual Conference of the Indian Society of Agricultural Statistics, held in January, 1960 at Poona.

(1) Paper entitled "Statistical analysis of the data of simple manurial trials on paddy in cultivators' fields of Thana district, B. S." by Shri D. S. Ranga Rao, Shri O. G. Kundalkar, and Shri P. N. Satbhai.

(2) Paper entitled "Assessment of extent and causes of fallow areas by sample survey", by Shri D. S. Ranga Rao, Shri V. N. Panditrao and Shri N. P. Joshi.

F. Miscellaneous Activities

The following miscellaneous activities were carried out :

(a) Refreshers' Course in Statistics for the Departmental Officers.

(b) The work of construction of index numbers of production of crops and farm harvest prices.

(c) Cost of cultivation of cotton and its rotational crops.

G. Special items of work

During the year, the Statistician attended several important meetings.

APPENDIX XXX

SUMMARY OF WORK DONE UNDER THE SUGARCANE SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, PADEGAON,
DURING THE YEAR 1959-60

A. Staff and Administration

Shri G. T. Babriwala held the charge of the post of Sugarcane Specialist upto 25th April 1960 after which Shri K. V. Joshi, Soil Survey Officer, took over.

B. Research

A short *resume* of salient features and outstanding results carried out under different sections have already been reported under Chapter II.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

(a) Soil Survey.—

(i) General soil survey of Kolhapur areas was done in two villages covering an area of 1,800 acres.

(ii) *Advisory works*.—In all, 30 extract map files were supplied along with recommendations to the cultivators. About 20 soil samples and 7 water samples, received from the cultivators, were analysed and necessary recommendations were given to them.

(b) *Gulva training class*.—In order to train persons in efficient and quality manufacture of *gul*, a *gulva* training class was conducted during the crushing season.

Propaganda was made for increasing sugarcane yield and sugar yield per acre by recommending improved methods of cultivation, viz, (1) use of improved seed, (2) selection of varieties according to soil types, (3) application of manures and irrigation, so as to maintain the balanced nutrition, (4) use of improved implements, (5) harvesting of cane at proper maturity, (6) use of improved furnace and proper method of *gul* manufacture.

E. Publications

During the year under report, the following seven notes and papers were presented to the Deccan Sugar Technologists Association's Convention held in 1959.

S (Q) 1238—14

(1) "A short note on the utility of Tensiometers for irrigation control", by Chinchorkar, S. V., Deccan Sugar Technologists Association, 16th Convention 1959.

(2) "Sugarcane varieties as a means of increasing Sugar Recoveries" by Babriwala, G. T., and Watve, J. K., Deccan Sugar Technologists' Association, 16th Convention 1959.

(3) "Control of borers by mechanical methods in comparison with other methods" by Mahajan, V. O., Deccan Sugar Technologists' Association, 16th Convention, 1959.

(4) "A note on certain studies of morphological characters and uptake behaviour in a few sugarcane varieties by Kale, R. A. and Babriwala, G. T., Deccan Sugar Technologists' Association 16th Convention, 1959.

(5) "On the utility of dicalcium phosphate in cane manuring in calcareous soils of Bombay Deccan" by Babriwala, G. T., Kadrekar, S. B. and Kale, R. A., Deccan Sugar Technologists Association, 16th Convention, 1959.

(6) "Procedure for conducting soil surveys for cane area," by Joshi, K. V., Deccan Sugar Technologists' Association, 16th Convention, 1959.

(7) "Importance of soil survey in planning and development under irrigation projects" by Joshi, K. V., Agricultural College Journal, Parbhani, 1959.

F. Miscellaneous Activities

Farmers' week was celebrated at the Agricultural Research Station, Padegaon, as usual, which was attended by a very large number of cultivators. Many distinguished visitors visited the Central Research Station, Padegaon, and the activities carried out by the Station were explained to them.

G. Special Items of work

(i) Agricultural Sub-committee meeting of the Indian Central Sugarcane Committee was held at the Agricultural Research Station, Padegaon, during October 1959 and various aspects of sugarcane research were discussed.

(ii) Factory chemists and trainees from different institutions were trained in sugarcane cultivation and analytical methods.

(iii) Active part was taken in Cattle and Agricultural Shows at Basim and Dhoki, and exhibits were sent at the World Agricultural Fair, New Delhi.

APPENDIX XXXI

SUMMARY OF WORK DONE UNDER THE WHEAT SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, BADNAPUR
DURING THE YEAR 1959-60

A. Staff and Administration

Shri E. D. Fimpalikar held the charge of the Wheat Specialist, Bombay State, Badnapur, during the year under report.

B. Research

(a) *Wheat*.—From the trials of *durum* and *vulgare* selections from Niphad, only 20 selections proved superior in yield both at Badnapur and Parbhani. In the trial of NP varieties conducted at Badnapur and Parbhani, none of the NP varieties gave higher yield than the check under dry conditions at both the places. None of the rust resistant selections from Niphad gave higher yield than the PW selections. The various crosses which were effected to evolve high yielding, rust resistant and good quality wheat for the region were grown in F₄ and F₅ generations at Mahaleshwar, Badnapur and Padegaon and selections of desirable plants and bulks were effected.

In Bombay division, a large number of trials of rust resistant selections from Niphad were arranged at the Agricultural Research Station, Niphad, Jalgaon and Dhulia. A number of high yielding selections of desirable characters were finally selected for trials during the next year. A synthetic material created for the evolution of rust resistant, high yielding and good quality strains was grown under artificial epidemic of rust at Mahaleshwar, Kopergaon and Niphad and a number of selections of desirable characters effected. The R. R. varieties viz N-59, N-125, N-1200, N-917, N-973, N-974, N-146 and N-345 from Niphad were tried in district trials in the division. The varieties N-1200, and N-917 proved superior in yield to the checks. Number of fresh crosses to evolve varieties resistant to all forms of stem brown rusts have been effected at Niphad.

In Poona division, trials of short duration wheat varieties were arranged at Mohol and Vadgaon. A few varieties proved successful for growing as a second crop. At Mohol, R. R. selections from Niphad were tried with NP 710 as check. N-345 and N-973 gave more than 50 per cent higher yield than the check. At Kopergaon trials of R. R. *vulgare* types together with NP. 710 and NP. 718 were conducted. The selections C-271, C-974, N. 345 and N. 179 from Niphad and NP. 710 and NP. 718 yielded more than the check.

In Nagpur division, the newly selected early *durum* hybrid varieties viz. Hy. 3-4-2-2, and Hy-3-4-2-4 from Powarkhere were compared with other early *durum* selections from Niphad. All the selections under trial proved superior in yield at Washim while PW5 gave higher yield at the College of Agriculture, Nagpur. In another trial of wheat varieties, from Niphad, Powarkhada, Indian Agricultural Research Institute and Badnapur, Hy. 11 and N. 179 gave higher yield under Irrigation at Washim while PW5 proved superior yield under both the conditions at College Farm Nagpur. At Sindewahi, two NP wheats and four selections from Niphad gave higher yield than the check.

In the manurial experiment at Badnapur, the treatment 30 lbs. N as farm yard manure plus 30 lbs. N as ammonium sulphate plus 30 lbs. P₂O₅ gave highest yield.

In Bombay division, the seed rate of 60 pounds per acre proved better at Dhulia.

At Washim in Nagpur division, 5th November, proved to be the proper sowing time of wheat.

(b) *Gram*.—At Badnapur, in Aurangabad division, number of improved strains from different stations in the State were compared with local. Promising ones from the same were retained for further trial. In Bombay division, promising selections from Niphad and Dhulia were compared at various Research Stations and Seed Multiplication Farms. *Chafa* and D-69 proved better in grain yield in many of these trials. In Poona division, C-31-1, N-74, N-59 and N-59-2 proved better in yield. Some of the bold seeded type also gave encouraging results. In Nagpur division, N. 31, N. 59, N. 10, N. 61, N. 29 and *chafa* gave higher yield than the check.

In Bombay division, spacing-cum-seed rate experiment on gram was conducted at Jalgaon. Seed rate of 30 lbs. per acre with 12 inches spacing gave higher yield. In Poona division, in a mixed cropping experiment at Mohol, the entire crop of gram and the treatment in which gram and *jowar* crop sown in 3:1 proportion proved better than the rest of the treatments. In a rotational experiment, the yield of gram crop was more when grown either after gram or safflower. In Nagpur division, manurial-cum-topping experiment was in progress at Washim. Topping after 20 days of sowing and manuring it with 10 lbs. P₂O₅ and 5 lbs. N gave higher yield than other treatments.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

Prominent cultivators of National Extension Service Blocks, Udgir and Osmanabad, visited this farm in December 1959. All queries raised by the cultivators were replied to their satisfaction. Improved seeds of wheat and gram were given to the District Agricultural Officers for further multiplication. Note on wheat and its improvement in Bombay State was prepared in Marathi.

E. Publications

Nil.

F. Miscellaneous Activities

Samples of improved varieties together with charts etc. of wheat, gram and *lakh* were exhibited in the fair at Chakur, Udgir, Aurangabad, Parli-Vaijanath, Nanded and World Agricultural Fair at New Delhi. In the *rabi* food campaign, improved methods of cultivation of wheat and *jowar* were actually shown to the Block Development Officers at Parbhani and other workers of the Department at Badnapur.

G. Special items of work

Nil.

APPENDIX XXXII

SUMMARY OF WORK DONE UNDER THE SUPERINTENDING
AGRICULTURAL OFFICER, AURANGABAD DIVISION,
AURANGABAD, DURING THE YEAR 1959-60

A. Staff and Administration

Shri V. K. Bederkar held the charge of the post of Superintending Agricultural Officer upto 13th March 1960, on whose retirement, the charge of the post was held in addition to his own duties by Shri V. P. Gokhale, Deputy Director of Agriculture, (Research and Education) upto 30th April 1960.

B. Season

Commencement of monsoon was late by a fortnight all over the Division during the year except in Osmanabad district where it was started in the second week of June. Consequently sowing of *kharif* crops was delayed and completed by the end of July. Sowing of cotton crop in Osmanabad district, however, was completed before the end of June and cotton crop of this district was, therefore, satisfactory. During the months of August and September more or less heavy and continuous rains were received particularly in Nanded and East Khandesh districts, as a result of which intercultural operations i.e. weeding and hoeing could not be carried out in time, and cotton and *jowar* crop received a set back. On the other hand, *kharif* crops in some parts of Aurangabad district suffered for want of sufficient rains in early stages. Distribution of rains during the months of September and October was fairly well spread, which helped timely sowings of *rabi* crops and their satisfactory germination. Sowings of *rabi* crops were carried out from the second fortnight of September to the end of October. *Kharif* crops revived to some extent in later stages.

C. Propaganda and publicity including shows

Various agricultural extension activities were given widest possible publicity taking advantages of gathering of *Kisans* on various occasions such as Seminars, *Jatras* etc. Available audio-visual aids were fully used for giving effective publicity to popularise the use of fertilizers, improved seeds, insecticides, fungicides, agricultural implements and other improved techniques and practices.

(i) *Demonstrations*.—*Kharif* and *rabi* crops campaign demonstrations were conducted at division, district, taluka and village levels throughout the Division through which cultivators were explained

about use of improved seed, broad sowing, use of fertilizers, treatment of seeds against seed borne diseases, plant protection, inter-cultural operations etc.

(ii) *Exhibition and shows.*—A number of shows on various occasions were arranged during the year under report. District Agricultural Show was arranged on a large scale at the Fruit Farm, Aurangabad, in the month of February 1960, which was inaugurated by the Honourable Chief Minister. This Show was attended by about one lakh people. Prizes were also awarded to various live crop samples which were exhibited at district shows.

(iii) *Leaflets and pamphlets.*—Leaflets and pamphlets on various agricultural practices recommended by the Department were distributed.

(iv) *Crop competition.*—For increasing healthy and keen competition among cultivators for raising yields, crop competitions play a vital role. Crop competitions during the *kharif* season were on the same pattern as that of last year. During *kharif* season, crop competitions were held for *kharif jowar, bajri, paddy, groundnut* and cotton crops.

From *rabi* season the crop competitions have been reorganised on all India pattern. One Crop Competition Officer of Class II status has been appointed at divisional level. In the reorganised pattern, competitions at village, block/taluka, district and state level have been held. During the *rabi* season, crop competitions were held for *rabi jowar* and wheat crops.

D. Grow More Food Campaign

(a) *Improved seed.*—The seeds of improved varieties of *kharif jowar, bajri, mug, udid, cotton, groundnut, rabi jowar, wheat* and gram were distributed departmentally with a view to cover maximum areas under improved seeds. These seeds were distributed both on cash and *tagai* from the departmental godowns. The total quantity of seed of different crops distributed was 1,42,000 B. Mds. covering an area of about 7,60,000 acres.

From the year 1957-58, taluka Seed Farms have been established to ensure adequate supplies of pure seeds of improved varieties. During this year, 52 seed farms were to be established in the division including East Khandesh district. Upto the end of June 1960, possession of 46 Taluka Seed Farms was taken and put under cultivation. The existing Aurangabad division of 5 districts had 16 Taluka Seed Farms with an area of 2,521 acres 20 *gunthas* after the transfer of East Khandesh district with 10 Taluka Seed Farms to Bombay Division.

On these seed farms the multiplication of improved varieties of *kharif jowar*, groundnut, cotton, *mug, udid, tur, bajri*, paddy, *rabi jowar*, wheat, gram and safflower was undertaken. The total production of improved seeds was 10,300 B. Mds.

(b) *Food Crops Act*.—This Act was not extended to this division during the period under report.

(c) *Distribution of manures and fertilizers*.—The department maintained godowns at several places in Marathwada from where the farmers get their fertilizer requirement either on cash or on *tagai*. The demand for fertilizers has been on increase since farmers have been convinced of benefits derived from use of the fertilizers. Free fertilizer demonstration plots were of considerable value in convincing the farmers of the benefits of chemical fertilizers.

Distribution of fertilizers was hitherto being done by the Departmental staff. From 1st April 1960, the distribution work of nitrogenous fertilizers has been entrusted to the District Co-operative Societies as wholesalers in Aurangabad, Parbhani, Nanded and Osmanabad districts. In Dhir district, the distribution work is still done departmentally.

The quantity of fertilizers distributed during the year was 17,250 tons.

(d) *Compost scheme and its utility*.—The compost scheme has been in operation in Aurangabad division since 1944. There was a post of Assistant Bio-Chemist at the divisional level which has been abolished during the year. Now there are compost *kamgaris* (one for each district) working in the division.

The compost scheme comprises of two parts viz., (i) Rural compost and (ii) Town compost. The former was worked by the regular extension staff working at field level under the District Agricultural Officers whereas the latter which was previously organised by the Assistant Bio-Chemist and his staff also implemented by the District Agricultural Officers. Municipalities and *Grampanchayats* were given technical guidance regarding preparation of compost. In addition to above, there was a subsidy scheme from the year under report. Subsidy was given for additional compost prepared at Rs. 2.00 per ton to such Municipalities and *Grampanchayats* (population above 5,000) which produced additional compost over an average of preceding two years output. Under the above subsidy scheme, an amount of Rs. 9,113.00 has been given as subsidy Municipalities in the division. The object of this scheme was to encourage the production of town compost. The achievements during the year under report, for both rural as well as urban composts were 82,160 tons and 25,880 tons respectively.

E. Insect Pests and Plant Diseases

(i) Sulphur was supplied all over the division for seed treatment of *jowar* against smut for prophylactic dusting of cotton and wheat against *Dahiya* and rust respectively.

(ii) Incidence of aphids and jassids on American cotton was controlled by spraying endrin which was supplied to farmers for this purpose.

(iii) To control pests like aphids, thrips, bugs and various plant diseases, Gammexene, copper sulphate and Aldrin were supplied during the year under report. Zinc phosphate was used for control of rats.

(iv) Rust on wheat was noticed in Aurangabad and Parbhani districts at late stage which was controlled by sulphur dusting and damage was reported to be negligible.

(v) Cotton crop (*Deshi*) was affected by *Dahiya* disease all over the district of East Khandesh, in parts of Nanded and Parbhani districts due to heavy rains and continuous humid weather. Damage was severe in East Khandesh district though crop was dusted with sulphur. Damage in Parbhani and Nanded districts was negligible.

F. Agricultural Demonstration Centre

The scheme of establishing demonstration Centres has recently been made applicable to Marathwada area vide Government letter No. ADC-1256/1960-I-C, dated 23rd March 1960. Hence progress during the year under report is 'Nil'.

G. Irrigation

(i) *Wells*.—Financial assistance was given to cultivators for constructing new wells and repairs to old wells. The amount was kept at the disposal of Collectors which was disbursed through the Revenue Department and Land Mortgage Banks. Subsidy was also granted.

(ii) *Oil Engines*.—During the year 1959-60, oil engines and pumping sets were supplied on *tagai* from the departmental funds. On account of this additional area was brought under irrigation.

H. Other Items

(a) *Farmers' Unions*.—In all, 3,980 Farmers' Unions have been organised with a total membership of 47,929 cultivators of 3,983 villages in the five districts of Marathwada.

Farmers' Unions have assisted the Department in executing following activities.—

- (i) Distribution of improved seed,
- (ii) Distribution of fertilizers,
- (iii) *Kharif* and *rabi* crops campaign,

- (iv) Use of insecticides and fungicides against pests and diseases,
 (v) Compost making,
 (vi) Adoption of improved cultivation practices.

(b) *Vanamahotsava*—*Vanamahotsava* week was celebrated during July and August 1959 in the Division. About 35,318 fruit trees and 71,534 other trees were planted during the year.

(c) *Free Fertilizer Demonstration Plots*.—In all, 2,412 free fertilizers demonstration plots were arranged for various crops, *kharif jowar*, cotton, tur, mug, groundnut, *bajri*, *rabi jowar* and wheat during the year under report.

(d) *Paddy pilot block*.—Paddy pilot block of 8,000 acres was started during the year under report in Nanded district. This block covers villages of Bhokar, Billoli, Kinwat and Degloor talukas with headquarters at Billoli. During the period under report, the selection of villages was completed by the end of April 1960. Adequate quantities of fertilizers were stocked at various places in the area, indents collected and distribution done.

(e) *Kharif and rabi crops campaign*.—Grow More Food Campaign, which started from the *rabi* season 1958-59 was continued during *kharif* and *rabi* season 1959-60. Work started from dummy demonstrations at division, district, taluka/block and village level, through which use of fertilizers, improved seeds, treatment of seed with fungicides dibbling, broad sowing and thinning was explained to cultivators. *Kharif jowar*, cotton, *bajri*, groundnut *rabi jowar*, and wheat were brought under intensive as well as extensive phases of cultivation. Farmers are enthusiastically adopting the improved recommended practices. The targets and achievement under intensive and extensive phases are given in the following table.

Crop	Targets in acres		Achievement in acres	
	Intensive	Extensive	Intensive	Extensive
Paddy	...	40,000	5,234	23,190
<i>Kharif jowar</i>	50,000	2,00,000	23,583	1,28,161
<i>Bajri</i>	30,000	75,000	13,857	42,191
Groundnut	20,000	1,00,000	12,560	65,469
Cotton	3,000	2,45,000	18,825	1,31,546
<i>Rabi jowar</i>	41,000	16,60,000	26,350	10,37,423
Wheat	17,000	1,12,000	12,492	81,814

In addition to above, technical advice was given to the farmers in various agricultural aspects from time to time.

APPENDIX XXXIII

SUMMARY OF WORK DONE UNDER THE SUPERINTENDING
AGRICULTURAL OFFICER, BOMBAY DIVISION, NASIK,
DURING THE YEAR 1959-60

A. Staff and Administration

Dr. S. Solomon worked as the Superintending Agricultural Officer, Bombay Division, Nasik, throughout the year.

The Headquarter of the Bombay Division is at Nasik. This Division consisted of seven districts upto end of December 1959. From January 1960, Surat district was detached from Bombay Division and attached to the Ahmedabad Division in view of the impending bifurcation of the New Bombay State.

B. Season

The monsoon started in Konkan districts of Ratnagiri, Kolaba and Thana at proper time. In West Khandesh and Nasik, the monsoon started in the last week of June 1959. The rains were received timely throughout the season. The rains received in the months of October and November 1959 in West Khandesh district affected *kharif* crops to some extent but were favourable for *rabi* crops. On the whole the season was normal.

C. Propaganda and publicity including shows

Propaganda meetings were organised by the staff. Leaflets and pamphlets describing improved methods of cultivation of food and vegetable crops were distributed. District Agricultural Shows were held in the districts of Nasik, Ratnagiri and West Khandesh.

Shibirs were arranged in each of the paddy pilot blocks and dummy demonstrations were held at the divisional and district level to explain the improved agricultural practices to be adopted in *kharif* and *rabi* seasons.

D. Grow More Food Campaign

(a) *Improved seeds*.—During the year under report, five new Taluka Seed Farms were established in Nasik and Ratnagiri districts in addition to existing 28 farms. The quantity of seeds of improved strains of different crops produced at these farms was of the order of 7,060 B. Mds. About 10,430 B. Mds. of seeds of various

crops were purchased from the registered seed growers and supplied to the cultivators of this Division.

(b) *Growth of Food Crops Act and its application.*—This act was not in force in any of the districts of this division during the period under report.

(c) *Distribution of manures and fertilizers.*—The fertilizers were distributed for manuring food crops such as paddy, *bajri*, wheat and *jowar*. The total area manured was about 1,61,175 acres under paddy and 2,17,475 acres under wheat, *bajri* and *jowar*. The additional production due to the application of these fertilizers was estimated to be 16,117 tons of paddy and 2,174 tons of wheat *bajri* and *jowar*. A quantity of 20,340 tons of fertilizers and manures was distributed during the year under report.

(d) *Utilization of local manurial resources.*—

(i) *Rural compost and farm yard manure.*—Approximately 23,400 pits were dug and filled in and about 38,500 tons of compost and farm yard manure were prepared. This might have been used on an area of about 11,700 acres resulting in an additional production of 585 tons.

(ii) *Town compost.*—In all, 32 Municipalities and *Gram Panchayats* produced about 54,040 tons of compost from the town refuse and sweepings, out of which 47,049 tons were used and must have covered an area of about 23,000 acres. The additional yield expected was 940 tons.

It is observed that this scheme was not making satisfactory progress in the Konkan districts of Thana, Kolaba and Ratnagiri.

(iii) *Compost from forest leaves.*—This scheme was in operation in the districts of Thana, Kolaba and Nasik. Under it, a subsidy of Rs. 6-00 per pit was given to landless persons who sell the compost made from forest leaves. In these districts 600 pits were filled in for which a subsidy of Rs. 3,600-00 was granted.

(iv) *Green manure.*—A scheme for distribution of sann seed at subsidised rates was continued during the year under report and a quantity of 870 B. Mds. of seed was distributed.

(e) *Paddy pilot scheme.*—During the *Kharif* season 8 paddy pilot blocks were in operation in this division. An area of 37,130 acres was covered by these blocks as against 1,00,000 acres of target allotted to this division.

It is estimated that additional production of 6 B. Mds. was obtained per acre.

(f) Kharif and rabi crops campaign.—The information with regard to the targets fixed for the *kharif* crops viz., paddy, *bajri*, *kharif jowar*, groundnut and cotton and the *rabi* crops viz., wheat and *rabi jowar* under intensive and extensive phases together with the area achieved is given in the following table.

Crop	Target in acres		Achievement in acres	
	Intensive	Extensive	Intensive	Extensive
Paddy	48,500	85,500	51,412	22,348
Bajri	45,000	2,00,000	40,786	1,56,724
Kharif jowar	5,000	15,000	4,969	18,921
Groundnut	5,000	9,000	4,766	12,244
Cotton	2,100	17,000	4,272	18,280
Wheat	80,000	65,000	42,500	78,900
Rabi jowar	11,000	75,000	2,660	87,540

E. Insect Pests and Plant Diseases

There was an attack of Jassid hoppers in Thana and Kolaba districts which was controlled by dusting 5 per cent BHC and spraying with 50 per cent DDT. Pyrilla appeared on sugarcane crop in Nasik district. Bombay Agricultural Pests and Diseases Act, 1947 was made applicable to Malegaon and Satana talukas and aerial spraying was undertaken.

Plant protection appliances such as dusters, sprayers and seed drums have been kept for sale at 50 per cent subsidy to cultivators. Also these appliances are being given on hire to cultivators.

F. Agricultural Demonstration Centres

There are 143 Agricultural Demonstration Centres functioning in the Bombay division. Proposals for opening 59 new Agricultural Demonstration Centres were under consideration.

In all, 4 model Agricultural Projects were in operation to guide the cultivators of Backward Class.

G. Irrigation

(a) *Wells*.—During the year 1959-60, Government continued the scheme for construction of new wells and repairs to old ones. Under this scheme, new wells were dug and old wells were repaired. For this purpose financial assistance was given to the needy cultivators.

(b) *Katcha Bandharas*.—New *Katcha Bandharas* were constructed in Ratnagiri district which brought additional area under irrigation. During the year under review, paddy crop was grown in hot weather on tail waters of *Rajanala*, *Vasrang* and *Muthok* *Bandharas* in Kolaba district.

H. Other items

(i) *Farmers' Unions*.—Farmers' Unions were organised in Bombay division. There were in all 4,302 Farmers' Unions having a total membership of 86,282. The number of villages covered was 4,537.

(ii) *Crop competitions*.—Crop competitions were organised at the taluka and Block levels for cotton, *nagli*, *bajri* and paddy in Nasik district, for *bajri* and paddy in West Khandesh district and for paddy in Thana, Kolaba and Ratnagiri districts. Separate competitions were organised for Scheduled Tribes cultivators wherever possible.

(iii) *Free fertilizer demonstration and district trials*.—In all, 967 free fertilizer trials and 621 district trials for improved strains were arranged on cultivators' fields during the year under report.

(iv) *Vanamahotsava*.—Tree planting was done on large scale in villages. Meetings were held and the cultivators were convinced of the importance of tree planting. About 8,00,000 trees were planted.

(v) About 530 cultivators from Bombay division went to Delhi to see the World Agricultural Fair held in January-February 1960.

(vi) The District Agricultural Officers attended the meetings of the District Development Board, Agricultural Sub-Committee and Co-ordinated Committee.

The Superintending Agricultural Officer, Bombay Division, Nasik, attended meetings of the Divisional Development Council and the Co-ordinated Meetings of Regional Officers and Collectors called by the Commissioner, Bombay Division, at Bombay.

Superintending Agricultural Officer, Bombay Division, Nasik, has also arranged and attended several meetings.

APPENDIX XXXIV

SUMMARY OF WORK DONE UNDER THE SUPERINTENDING
AGRICULTURAL OFFICER, NAGPUR DIVISION, NAGPUR,
DURING THE YEAR 1959-60

A. Staff and Administration

Dr. K. G. Joshi continued to hold the charge of the post of Superintending Agricultural Officer, Nagpur Division, Nagpur, till 30th April 1960.

B. Season

In the first fortnight of June 1959 light showers were received with intermittent breaks. The monsoons actually broke out in the last week of June. Sowing of cotton was, therefore, taken up a bit late. Its germination was reported to be satisfactory. Transplantation of paddy started from 20th July 1959 onwards. There were continuous rains in the month of July except a few short breaks. The sowing of *jowar* was completed by the end of July. Fairly widespread showers at frequent intervals were received during the month of August 1959 and the weather remained cloudy. Almost in all the districts of the division the soil was not workable and crops were stunted in growth. During the month of September, conditions continued to be the same. Incessant rains were received. Heavy rainfall was recorded in all the districts during the period from 11th September 1959 to 16th October 1959 and crops were damaged by floods. Fields were water logged almost throughout the *kharif* season so that agricultural operations were almost impossible during the season.

Reports received from the District Agricultural Officers revealed that the areas ranging from 7,000 acres in Chandas district to 95,000 acres in Yeotmal district were either washed off or heavily damaged due to heavy rains and floods in September 1959.

The continuous rains did not permit the intercultural operations of the *kharif* crops, till the third week of September, 1959, after which the operations were attended to.

Due to heavy and continuous rains in *kharif* season and heavy floods, much of the *kharif* crop was lost and a fairly large portion of this area was put under *rabi* crops. The sowing of *rabi* crops started in the second fortnight of October and continued till the second week of November 1959. The condition of *rabi* crops, in general, was satisfactory, except at places where hail-storm was

received in the districts of Nagpur, Wardha and Yeotmal affecting an area of about 2 per cent. The year, on the whole, was of heavy rainfall and unfavourable for the *kharif* crops.

No insect pest attack on crops was reported from any of the districts during June and July 1951, except mild attack of *Mava* or Aphids on groundnut crop in Amravati district, and mild attack of *Gad* or paddy Gall-fly on paddy in Bhandara district. Paddy crop in Chanda district was attacked by the case-worms, but the attack was mild and was easily controlled by adoption of suitable control measures. *Deshi* cotton was widely attacked by *Dahiya* and the attack was severe. Prophylactic dusting of sulphur was undertaken, American cotton was attacked by Jassids, but the attack was not of severe nature and control measures were undertaken and attack brought under control.

Aerial spraying with Endrin was done in Amravati district on cotton crop on an area of 1,200 acres by 'Burmah Shell Co.' The *rabi* season remained normal.

C. Propaganda and publicity including shows

Propaganda and publicity of the existing schemes were made through the Agricultural and Development staff. District Agricultural Shows were arranged in each district at important places of fairs etc. Departmental leaflets on growing different crops with departmental recommendations were distributed, throughout the Division. Training and demonstrations were also arranged at different levels under *kharif* and *rabi* campaigns.

Crop competitions.—The reorganised crop competition scheme was introduced from the *rabi* season 1959-60. The entries obtained at various levels in this division were as under—

Crop	No. of entries obtained at level				Total
	State	District	Block or Taluka	Village	
<i>Rabi jowar</i>	2	...	1	160	163
<i>Wheat</i>	4	9	88	114	215

The highest yield of wheat obtained at the State level in this Division was 50 Mus. 30 seers 1 Chh.

D. Grow More Food Campaign

(a) *Improved seeds.*—The quantity of improved seed of different crops, distributed in the Division, was 95,190 B. Mds. covering an area of 4,54,490 acres.

During the year under report, the target figure of Taluka Seed Multiplication Farms of Nagpur division was raised from 65 to 71 and additional area was acquired in cases of some of the Taluka Seed Farms. The total number of Taluka Seed Farms so far taken into possession was 68 with an area of 3,842 acres. An area of 210 acres was under irrigated crops and 3,632 acres under unirrigated crops.

The object of opening of the Taluka Seed Farms was to multiply and distribute improved seeds to the 'A' and 'B' class seed farmers. Most of the Taluka Seed Farms have been provided with wells, oil engines and electric motors to increase the production of improved seeds. The total seed production of various crops during the year was of the order of 14,235 B. Mds.

Japanese method of paddy cultivation.—During the year, six new paddy pilot blocks were opened in addition to existing 2 blocks in the districts of Bhandara and Chanda. The total target was 1,05,000 acres against which the actual achievement was 85,955 acres. During 1960-61, *khariif* season one new block in Nagpur district was also opened and there were in all 9 blocks with a target of 1,30,000 acres to achieve under the scheme.

The following quantities of fertilizers were distributed under paddy pilot scheme and an area of 55,198 acres was manured with these fertilizers.

Fertilizer	Tons
Ammonium Sulphate	... 2,861
Single Superphosphate	... 614
Triple Superphosphate	... 743

(b) *Growth of Food Crops Act and its application.*—This Act was not in operating in this Division, during the period under report.

(c) *Distribution of fertilizers and manures.*—The Vidarbha Co-operative Marketing Society continued to carry out the distribution

of fertilizers during the year. The following stocks were distributed :

Sr. No.	Fertilizer	Quantity distributed in tons	Area covered in acres
1	Ammonium sulphate	11,542	2,30,840
2	Ammonium sulphate nitrate	269	5,380
3	Urea	352	1,428
4	Superphosphate	3,451	69,020

In addition to this, 6,567 B. Mds. of sann seed for green manuring were distributed covering an area of 6,310 acres.

(d) *Rural compost and town compost :*

(i) *Rural compost.*—Due to wide propaganda by the field staff the cultivators have taken up preparation of compost by improved method. Pits were prepared by them accordingly to the departmental specifications. The progress of rural compost is given below.

No. of villages	No. of pits dug	No. of pits filled	Compost prepared in tons	Area covered in acres
10,569	48,424	70,691	2,52,798	1,51,071

(ii) *Town compost.*—The municipal committees have taken up the preparation of compost manure from town refuse. It has become a regular source of income to them. The cultivators have also realised the importance and utility of this manure.

There was a great demand for the same. The progress under this scheme is given below :

No. of centres producing town refuse	Target in tons	Qty. of town compost prepared in tons	Qty. of town compost distributed in tons	Area covered in acres
[70]	80,000	50,939	42,316	22,325

E. Insect Pests and Plant Diseases

(i) During the period under report, different insecticides and fungicides, were distributed under the *Kharif* and *rabi* crops campaigns to control pests and diseases.

(ii) The details of insect pests and plant diseases, damage and control measures adopted are given below :

Crop	Disease	Percentage of damage	Measures adopted
1 Paddy	... Gallfly	1	Endrex 20 per cent E. C. spraying.
	Stem borer	1	DDT 50 per cent spraying.
2 Dashi cotton	... Dahiya	15	Prophylactic dusting of sulphur.
3 Buri cotton	... Spotted boll-worms, aphids, jassids and thrips.	10	Endrine spraying.
4 Jowar	... Stem borer	2	Dusting with BHC 5 per cent.
5 Oranges	... Citrus psyllae.	50	Endrin 1 per cent spray.
6 Chilli	... Churda-murda.	15	Spraying by Endrin, Copper fungicide, Ultra-sulphur.

F. Agricultural Demonstration Centres

The Agricultural Demonstration Centres were established to popularise the improved methods of agriculture on cultivators' fields. During last year, 724 centres were established. This year, 171 new centres were established making a progressive total of 895 centres.

Khariif and rabi crops campaign.—The scheme of *khariif* and *rabi* campaigns was in operation during the period under report and the progress thereof was as under in this division.

Crop	Target in acres		Achievement in acres	
	Intensive	Extensive	Intensive	Extensive
Paddy	1,05,000	1,00,000	69,510	76,975
<i>Khariif jowar</i>	1,85,100	2,40,000	92,948	2,37,233
Groundnut	5,000	20,500	7,086	32,725
Cotton	1,01,000	3,00,000	64,005	3,34,956
Wheat	16,000	3,98,000	15,016	2,99,390
<i>Rabi jowar</i>	16,000	3,10,000	6,969	1,44,565

The distribution of fertilizers, only for the *khariif* and *rabi* crop campaign was as under :

	Tons
Ammonium sulphate	7,607
Superphospate	2,523
Urea	114
Ammonium Sulphate nitrate	104

Farmer's Unions.—During the year under report, wide propaganda was made to establish Farmers' Unions for co-operative working. The details of the Farmers' Unions are given below :

No. of Farmers' Unions organised	No. of villages covered	No. of members enrolled
3,840	3,840	39,185

G. Irrigation

Sinking of new wells and repairs to old wells and distribution of

oil engines and pumps or electric motors were the two main schemes in force under this head in addition to construction of and repairs to tanks. Financial assistance in the form of *tagai* loans and subsidy was given to the needy cultivators for (i) sinking of new wells and repairs to old ones, (ii) purchase of oil engines pumps and electric motors, (iii) construction of and repairs to tanks and (iv) field embankments.

H. Other items

(a) *Vanamahotsava*.—Twelfth *Vanamahotsava* was observed during July 1959. The total number of plants of various trees planted was 4,14,611.

(b) *Help and technical advice*.—Technical advice regarding implementation of agricultural development programme in the development blocks was given to the Block Development Officers and they were persuaded for the successful implementation of the schemes. Village leader's camps which were organised in blocks were attended and training in improved agricultural practices, use of fertilizers and insecticides, control of crop pests and plant diseases was imparted to cultivators.

(c) *District Development Boards*.—District Development Boards were constituted in all the districts during 1957-58, and continued functioning this year also. The District Agricultural Officers concerned functioned as Secretaries of the District Agricultural and Forest Sub-Committees of these Boards. The meetings of the Sub-Committees were attended by the District Agricultural Officers and items were made to push up all the agricultural schemes, through the Sub-Committees of the Boards.

(d) *Divisional Development Council*.—The Superintending Agricultural Officer, functioned as a member of Divisional Development Council and Secretary of the Agriculture and Forest Sub-Committee of the Council during the year under report. The work entrusted to the Superintending Agricultural Officer in these capacities during the Period was properly attended to.

APPENDIX XXXV

**SUMMARY OF WORK DONE UNDER THE SUPERINTENDING
AGRICULTURAL OFFICER, POONA DIVISION, POONA,
DURING THE YEAR 1959-60**

A. Staff and Administration

During the year under report, the following officers held the charge of the post of the Superintending Agricultural Officer, Poona Division, Poona.

Officer	Period
Dr. B. A. Chaugule, B. Sc., M. S., Ph. D.	... 1-7-1959 to 25-4-1960
Shri E. L. Zope, B. Ag.	... 25-4-1960 to 30-4-1960

B. Season

The monsoon started rather late in Poona, North Satara and South Satara districts. The rains were inadequate and not well distributed in Sholapur and Ahmednagar districts as a result of which considerable area of *kharif* crop remained unsown in these districts. A large acreage of *kharif* crops also dried off for want of adequate soil moisture. Intensity of rains increased during the month of July in Poona, North Satara, South Satara and Kolhapur districts. Incessant rains delayed sowing of *kharif* crops and also hampered the initial growth of the crops.

From August onwards the rains were intermittent and the *kharif* crops showed improvement in this and subsequent months, and intercultural operations could be undertaken during the breaks in the rains. Heavy rains, however, continued in these months in the western paddy tract which resulted in yellowing of the paddy crop. Breaches in paddy bunds were also reported in Bhor and Velh *Mahal* of Poona district. The conditions in Sholapur and Ahmednagar districts considerably improved during months of August and September. Sowing of *rabi* crops could be done in time and rain received in the month of October were very helpful for the *rabi* crops.

During the period under report, there were no serious pests and diseases reported except a few sporadic infestations as detailed below :

(a) Infestation of Deccan wingless grass hoppers on *kharif jowar* in South Satara district.

(b) Infestation of hairy caterpillar on paddy crop in Shirala Mahal of South Satara and part of Kolhapur district.

(c) Ergot disease of *bajri* in South Satara district.

The Departmental recommendations of dusting the crop with 10 per cent BHC against hairy caterpillar has been used by some cultivators. Aerial spraying with 'Aldrex' over an area of 15,000 acres was done in South Satara district with a view to effecting control on the Deccan wingless grasshopper. Aerial spraying was also done last year.

In general, conditions of both the *kharif* and *rabi* crops were satisfactory.

C. Propaganda and Publicity including shows

Several meetings, demonstrations, agricultural shows and *shibirs* were held during the period under report.

Crop competitions.—The work done under the scheme is summarised below :

Sr. No.	Name of the crop for which competition was held.	No. of competitions held			No. of applications received		
		Village level	Taluka level	Dist. level	Village level	Taluka level	Dist. level
1	Paddy	...	7	...	...	120	...
2	<i>Kharif jowar</i>	...	19	...	...	278	...
3	<i>Rabi jowar</i>	101	11	...	1,036	379	19
4	Wheat <i>rabi</i>	22	2	...	231	58	...
5	<i>Bajri</i>	...	14	...	...	177	...
6	Cotton	...	...	1	...	...	60
7	Potato	14	1	...	150	25	...

D. Grow More Food Campaign

(a) *Establishment of Taluka Seed Multiplication Farms.*—During the period under report, possession of three seed farms was taken bringing the total number of Seed Multiplication Farms in this division to 47.

During the year under report, an area of about 1734-38 acres was under cultivation at the Seed Multiplication Farm which produced about 10,250 B. Mds. of improved seeds of various crops.

(b) *Growth of Food Crops Act and its application.*—This Act was not applicable to any of the districts in this division.

(c) *Distribution of improved seeds.*—A quantity of 14,390 B. Mds. of improved seed of different food-crops was distributed covering an area of 92,460 acres.

(d) *Distribution of manures and fertilizers.*—The distribution of manures and fertilizers effected in the division for the period under report was 34,725 tons covering an area of 5,53,475 acres.

(e) *Town compost and rural compost.*—The position in respect of production and distribution of town compost and rural compost during the year was as shown below :

(i) Town compost

No. of Municipalities working under the scheme	Quantity of compost prepared	Quantity of compost distributed	Area covered.
53	1,27,523	1,23,026	24,837

(ii) Rural compost and Farm Yard Manures

No. of villages to be covered	No. of pits dug	No. of pits filled		Quantity of compost prepared in tons	Area covered.
		Old	New		
3,151	33,974	9,603	29,588	97,977	19,595

(f) *Kharif and rabi crops campaign.*—The progress achieved as against the target assigned is shown below :

Serial No.	Crop	Phase	Target fixed	Achievement
			(acres)	(acres)
<i>Kharif crops campaign 1959-60</i>				
1	Paddy	... Intensive ...	1,05,000	1,06,542
		... Extensive ...	1,00,000	70,256
2	Jowar	... Intensive ...	25,000	21,325
		... Extensive ...	60,000	66,618
3	Bajri	... Intensive ...	53,000	22,539
		... Extensive ...	2,50,000	92,714
4	Groundnut	... Intensive ...	21,000	19,350
		... Extensive ...	50,000	56,075
5	Cotton	... Intensive ...	20,000	44,500
<i>Rabi crops campaign 1959-60</i>				
1	Jowar	... Intensive ...	50,000	80,103
		... Extensive ...	2,00,000	10,50,207
2	Wheat	... Intensive ...	15,000	14,273

(g) *Paddy pilot scheme.*—Four paddy pilot blocks viz., (A) Akola-Ghoti (Ahmednagar), (B) Mulshi-Maval (Poona), (C) Jaoli-Patan North Satara), (D) Karvir-Panhala (Kolhapur) were continued during the year.

Besides, 3 new blocks viz., (a) Shirala (S. Satara), (b) Ajra Chhandgad-Gadhinglaj (c) Radhanagari-Bhudargad and Kagal Kolhapur) were opened during the year 1959-60 and the progress under the scheme is detailed below :

District	Name of the block	Target fixed	Achievement
		(acres)	(acres)
Poona	... Maval, Mulshi, Bhor ...	20,000	21,836
Kolhapur	... Karvir-Panhala, Radhanagari-Bhudargad Ajra-Chhandgad.	55,000	56,324
S. Satara	... Satara, Jaoli, Wai ...	15,000	16,814
S. Satara	... Shirala ...	10,000	8,032
Ahmednagar	... Akola-Ghoti ...	5,000	3,566
		1,05,000	1,06,542

Three more blocks viz., (a) Khed-Ambegaon-Junnar (Poona), (b) Shahuwadi (Kolhapur), (c) Patan, Mahabaleshwar, Karad (North Satara), have been opened during the year 1959-60.

(h) *Pilot scheme for jowar cultivation.*—A pilot scheme for intensive cultivation of jowar by Poona method was operated in compact blocks in Kolhapur, North Satara, and South Satara districts. Achievements as against the target fixed are summarised below :

District	Name of block	Crop	Target fixed	Achievement.
				(acres)
N. Satara	... Karad	... Kharif jowar	7,500	7,788
		... Rabi jowar	2,500	4,050
S. Satara	... Tasgaon	... Kharif jowar	5,000	4,230
Kolhapur	... Hakhanagale, Shirol, Karvir.	... Kharif jowar	10,000	8,858
		Total	25,000	24,986

(i) *Taluka seed-cum-fertilizer godowns.*—during the year under report, four seed-cum-fertilizer godowns were constructed bringing the total number of seed-cum-fertilizer godowns in the division to 11.

E. Insect Pest and Plant Diseases

(a) Plant protection appliances such as rotary dust guns, compression sprayers, rockers sprayers, foot sprayers, seed dressing drums and bucket sprayers were sold to the cultivators at 50 per cent subsidised rate.

(b) Under the scheme for augmenting of plant protection appliances, a large number of the following appliances were stocked with the extension staff in the division for giving on hire to the needy cultivators.

Type of appliances

- | | | |
|--------------------------|-----|---------------------------|
| (1) Orient dusters | ... | (4) Compression sprayers. |
| (2) Rocking sprayers | ... | (5) Power sprayers. |
| (3) Maruti food sprayers | ... | (6) Seed dressing drums. |

(c) Different quantities of insecticides and fungicides were also distributed to the cultivators at subsidised rate.

F. Agricultural Demonstration Centres

There were 85 Agricultural Demonstration Centres already established in the division. No new Agricultural Demonstration Centre was opened during the year under report.

G. Irrigation

Well Schemes.—Under this scheme, Government sanctioned *lagavi* loans for the construction of new wells to the extent of Rs. 2,500·00 per well and repairs to old wells upto Rs. 1,000·00 per well, to poor and needy cultivators. Subsidy to the extent of 25 per cent of the total cost of construction limited to Rs. 500·00 per well or 25 per cent of the cost of construction whichever is less was also granted for new wells.

H. Other Items

(i) *Organisation of Farmers' Unions.*—In Poona division during the period under report, there were in all, 5,649 Farmers' Unions with a membership of 1,97,927. The number of villages covered was 5,792.

(ii) *Miscellaneous activities.*—In addition to the departmental activities, extension staff had also participated in the observance of (1) *Gram Sudhar Saptah*, (2) *Harijan Day*, (3) *Vannahotsava*, (4) *Shramadan* fortnight.

P A R T II
GUJARAT REGION

**ANNUAL ADMINISTRATION REPORT OF THE
DEPARTMENT OF AGRICULTURE FOR
THE YEAR 1959-60**

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CHAPTER I

THE SEASON, STATISTICS AND LEGISLATION

1. THE AGRICULTURAL SEASON

The Season of 1959-60 was unfavourable to both the *kharij* and *rabi* crops over most of the State. The monsoon set in somewhat late but adequate rains were generally received in Gujrat region by the end of June and the sowings of *kharij* crops were in full swing. In July, heavy rains were recorded over many parts causing damage, to some extent, to the young standing crops and to the seedlings, particularly in the low lying areas in the region. In the second fortnight of September and in the first fortnight of October, there were unprecedented heavy floods in parts of all the divisions of the region where damage to varying extent was caused to crops. The situation, however, improved to some extent subsequently due to fair weather. There were heavy showers accompanied by hailstorms, in parts of all the divisions of the region, during the months of January and March. Consequently, damage to varying extent was caused to the *rabi* crops and to the orchards in parts of the divisions.

The climatic conditions experienced during the year were conducive to the development of insect, pests and plant diseases, which caused damage to the crops. The control as well as preventive measures resorted to, in time in the affected areas, however, saved the situation to a large extent.

(a) *Rajkot Division*.—The monsoon set in late, but substantial rains were received during the later half of the month of June and sowing of *kharij* crops was generally in full swing. There were incessant and abnormally heavy rains during the second fortnight of July all over the division. Consequently, damage to varying extent was caused to *kharij jowar* and *bajri* crops. Agricultural operations were impeded and bunds were damaged causing heavy erosion of soil particularly in the low lying areas. The rains received in August, September and October also proved to be excessive. As a result, *bajri* pollen was ashed away, and *kharij jowar* and groundnut crops suffered to a varying extent due to excessive moisture in soil. The crops in the low lying areas almost failed due to over saturation of moisture in the soil. In November, there were heavy showers accompanied by cyclonic storm in the first week in parts of Bhavnagar district, where slight damage was caused to the standing crops.

(b) *Ahmedabad Division* —The monsoon started rather late. The rains received in the months of July and August were heavy and proved harmful to the healthy development of crops. In the latter

half of September, there were heavy and torrential rains in the division. Crops like *bajri*, cotton, groundnut, maize etc. were submerged in water particularly in the low lying areas and were damaged to a considerable extent. The situation, however, improved to some extent due to fair weather conditions, which prevailed subsequently. In January, there were hailstorms in parts of Kaira and Panchmahals districts. Consequently, tobacco, gram and fenna crops were damaged to some extent in parts of Kaira district, and gram, *tur* and *jowar* crops in parts of Panchmahals district.

(c) *Bombay Division*—The monsoon commenced towards the end of June and sowing of *kharif* crops was generally in progress. Substantial rains were received during the months of July and August in the division. In Surat district, continuous rains proved detrimental to the healthy development of standing *kharif* crops. In the second fortnight of September, there were heavy and unprecedented floods in this districts as the river *Tapi* was in spate. Consequently, extensive and heavy damage to cotton, groundnut, sugarcane, banana and other crops and to the cattle wealth was caused in several villages in Chorasi, Olpad, Kamrej and Mandvi talukas of the district. Several villages situated on the banks of river *Tapi* in this district were inundated causing considerable damage to life and property.

2. AGRICULTURAL STATISTICS

The work done in the branch is briefly described in the following paragraphs under four heads *viz.*, (A) Crop estimation and other ad-hoc surveys, (B) Design of experiments, (C) Collection, compilation and publication of agricultural statistics and (D) Other miscellaneous activities.

A. Crop Estimation Surveys

The State-wide crop estimation surveys on six food crops, *viz.* paddy, *bajri*, *kharif jowar*, maize, *rabi jowar*, wheat and gram, and on three non-food crops, *viz.* cotton, groundnut and tobacco were continued. The survey was also continued on *ragi* in the Dang district. Pilot surveys on sesamum in Bhavnagar district and on castor in Jamnagar and Mehsana districts were undertaken.

The survey estimates of the average yield per acre were as under

Crop		Average yield in lbs/per acre.
Rice	...	717.3
<i>Bajri</i>	...	183.7
<i>Kharif jowar</i>	...	107.5
Maize	...	401.7
Groundnut	...	453.1

Cotton (lint)	...	72.9
Tobacco	...	615.3
<i>Rabi jowar</i>	...	487.1
Wheat	...	581.3
Gram	...	332.2

The average yield of *ragi* was estimated at 761.0 lbs. for Dangs district.

In all, 216 plots, were supervised by the technical staff of the Statistics Section at the time of harvest, while an additional 812 plots were supervised by other agencies.

Ad-hoc sample surveys

I. Crop estimation surveys on banana.—The survey on banana was undertaken in Surat district.

II. Scheme for collection by sampling of data on cultural and manurial practices adopted by the cultivators in Bombay State.—The compilation and statistical analysis of the data collected during 1958-59 in the following two districts viz., Surat and Mehsana were carried out in respect of size and mode of operational holdings, extent of area irrigated and percentage of area covered by manures. The results of the analysis are summarised below.

The size of the holdings was determined on the following basis.

Acres.		Size.
Upto 5.0	...	Small
Upto 10.0	...	Medium
Above 10.0	...	Large

(a) The distribution of holdings in different size groups reveals that the percentage of small sized holdings is high in the district of Surat and Mehsana being 69.1.

(b) The area covered by large sized holdings varied from 27 per cent to 41 per cent in Surat and Mehsana districts.

(c) The cropped area brought under irrigation was 11 per cent in Mehsana district.

(d) A study of the percentage of manured area to the total cropped area, that of irrigated manured area to the total irrigated area and of unirrigated manured area to the total unirrigated area,

shows that the extent of the total area manured was 45 per cent in Surat district. The entire irrigated area was manured in the district.

III. Assessment of additional production of paddy due to Intensive Method of Cultivation.—The sample survey for assessing the additional production of paddy due to intensive method of cultivation was continued during the year in 24 blocks covering 14 districts. Of these, six blocks were in the Gujarat region of the State. The preliminary analysis of the data in respect of 6 blocks of the region indicated that the additional yield of paddy was 7.63 B. Mds. per acre.

B. Design of Experiments

During the year under review, 25 new layouts were given and 20 plans of experiments undertaken on Agricultural Research Stations were scrutinised. The data of 32 experiments were analysed and collection of the data of experiments conducted for three or more years was carried out and one statistical report was presented to the Technical Committees of the Department. The important conclusion embodied in the above report is summarised below.

Experiment to study the effect of spacings, seed-rates and manure on the yield of gram.—The experiment was conducted at Agricultural Research Station, Waghai with the variety *Chafa* gram. The five factors *viz.*, nitrogen, P_2O_5 , K_2O , seed-rate and spacing between rows, each at 2 levels were tried. A dose of 10 lbs. N per acre had significantly increased the yield over 'No manure' by 53 lbs. per acre or 26 per cent. In the case of the factors P_2O_5 and K_2O , the response due to application of 50 lbs. per acre of each fertilizer over 'No application' was about the same. Forty lbs. of seed-rate per acre gave 39 lbs. per acre higher yield or 13.2 per cent than 30 lbs. of seed-rate per acre. Out of the two spacings tried 10" and 15", the yield due to the former exceeded that due to the latter by 51 lbs. per acre (or 17.6 per cent) and this increase was significant.

C. Collection, compilation and publication of agricultural statistics

During the year under report, eighty-six forecast reports were issued on 29 crops. As in the previous year, the data of crop estimation surveys were utilised for framing the yield forecasts and for preparing the outturn table of the season and crop report. The Season and Crop Report for 1956-57 was finalised and sent to Press. The report for 1957-58 was under preparation and the data received

for the report for 1958-59 were under scrutiny. The usual work of compilation and publication of periodical returns such as rainfall, prices, Cotton ginned and pressed, annual census of cotton stock held by the trade on 31st August, was continued. Queries from Government and the public were attended to.

(a) *Crop acreages.*—The table below gives the final forecast estimates of area under principal crops during the season 1959-60 along with the corresponding revised estimates of area during the preceding year.

Crop 1	Area during the year		Percentage by which area in col. 2 exceeds (i. e. +) or falls short (i. e. -) of that in col. 3	
	1959-60 (final forecast) 2	1958-59 (revised estimates) 3	4	
Rice	11,73,046	11,57,785	+	1.3
Wheat	11,97,492	10,03,492	+	19.3
Jowar	83,17,411	84,83,218	-	4.8
Bajri	37,91,808	40,95,204	-	7.4
Maize	4,62,556	4,38,843	+	6.6
Ragi	1,58,177	1,43,207	+	10.4
Gram	2,79,512	2,67,562	+	4.5
Tur	1,82,235	2,00,160	-	8.9
Cotton	42,25,343	45,64,754	-	7.4
Groundnut	35,19,183	32,60,378	+	11.10
Sesamum	2,94,981	3,91,951	-	25.3
Castor	2,49,106	2,61,734	-	4.8
Sugarcane	36,268	37,935	-	4.4
Tobacco	1,64,908	1,50,693	+	9.5

It is seen that area under rice, wheat, gram, maize and ragi has increased while that under the jowar, bajri and tur crops has decreased when compared with corresponding figures of the preceding year.

In the case of cash crops, the area under groundnut and tobacco has increased over while the area under sesamum, castor, cotton and sugarcane has increased as compared to that of the preceding year.

(b) The table below gives the final forecast estimates of production of principal crops for the season 1959-60 along with the corresponding revised estimates of production during the preceding year. The regions and the crops in respect of which the estimates of production were based on the results of the crop estimation survey are mentioned below—

Crop	Region
Rice	Gujrat
Wheat	Do.
Jowar	Do.
Bajri	Do.
Cotton	Do.
Groundnut	Do.
Maize	Do.
Ragi	Dangs district
Tobacco	Gujrat

Crop	Production of crops during the year		Percentage by which production in col. 2 exceeds (i. e. +) or falls short (i. e. -) of that in col. 3
	1959-60 (final forecast)	1958-59 (revised estimates)	
1	2	3	4
Rice	3,76,307	4,26,865	- 13.8
Wheat	3,00,533	3,12,878	- 4.2
Jowar	2,01,296	3,95,066	- 49.4
Bajri	3,09,029	6,77,304	- 54.4
Maize	81,641	2,25,014	- 65.3
Ragi	55,617	55,468	- 4.9
Gram	43,019	42,572	+ 1.0
Tur	88,645	47,526	- 18.7
Cotton (Bales)	8,04,487	12,96,730	- 38.0
Groundnut	7,33,715	11,25,067	- 34.8
Sesamum	19,560	25,668	- 23.8
Castor	26,253	37,912	- 6.0
<i>Miscellaneous</i>			
Sugarcane (Gul)	79,269	83,512	- 5.1
Tobacco	46,275	43,103	+ 7.3

It will be seen that the production of most of the crops has gone down due to heavy and excessive rains received in September and October i. e. at the maturity stage of *kharif* crops and heavy showers accompanied by hail-storms during the months of January and March in parts of the region. In the case of tobacco crop, the production has increased by 7.3 per cent over that during the preceding year and this is due partly to the increase in the area under the crop and partly due to favourable weather condition for this crop, which prevailed in the major crop growing tract of the region.

(c) *Crop prices*.—The unfavourable character of the season was reflected in the reduced yields of most of the *kharif* as well as the *rabi* crops during the year under report when compared with that during the preceding year. Prices of agricultural commodities continued to rule high. Details regarding fluctuations in the prices of important agricultural commodities will be incorporated in the Season and Crop Report for the year 1959-60.

D. Other Miscellaneous Activities

(a) Refreshers' course in Agricultural Statistics for the seventh batch of nine Agricultural Officers posted at Agricultural Research Stations of the State was held from 8th October 1958 to 7th November 1959, at the Agricultural College, Poona.

(b) *Sample survey to assess the extent of work done under Wells Scheme*—The analysis of the data of the sample survey conducted in 1958, at the instance of the Technical Committee on the Wells Scheme, was completed and a report on the same submitted to Government has been recently published. The main conclusions emerging from the analysis of the data are as follows.

(1) Out of the total of 467 wells, 288 or 62 per cent were found to be functioning during the year under survey.

(2) Inadequacy of water was the major cause for dereliction of wells and accounted for 7 per cent of the wells. Unsatisfactory or inadequate financial status prevented 1 per cent of the cultivators from availing of the irrigation benefits. Non-availability and unsuitability of water resulted in 7 per cent of the wells going out of use.

(3) The analysis of the data revealed that the average area irrigated per new well and the average additional area brought under irrigation per old repaired well was 3.14 and 1.76 acres respectively.

(4) Food crops occupied 2.13 acres or 70 per cent of the total cropped area. Of this, foodgrain crops accounted for 1.77 acres.

Similarly, of 1.43 acres of additional area brought under food crops per old repaired well, food grain crops occupied 1.27 acres.

(5) The total cropped area showed an increase of 13.1 per cent in the triennium subsequent to the construction of wells over that prior to the construction. Of this, 1.6 per cent was the result of cultivation of areas under the category of other fallows. The remaining 11.5 per cent can, therefore, be considered as increase in the double cropped area.

(6) Among the food crops, area under paddy and wheat showed considerable increase. Further, more than 70 per cent area under these crops was brought under irrigation.

(7) Crops like chillies, sugarcane, fruits and vegetables which were either grown in a negligible area or not grown at all prior to the construction of wells, were grown to varying extent subsequent to the well programme.

(c) *Index numbers of Agricultural Production.*—The index numbers of agricultural production of 21 principal crops, covering 85 per cent of the total cropped area, were worked out upto 1958-59 with 1919-50 as the base year. In conformity with the method adopted and recommended by the Directorate of Economics and Statistics, Ministry of Food and Agriculture, Government of India, the index numbers have been constructed by the chain base method. The indices of some of the principal crops for the period under study are given in the report submitted to the State Government and Government of India, Ministry of Food and Agriculture.

The all commodity index numbers showed an increase of 91 per cent during 1958-59 over that of the base period.

(d) *Cost of cultivation of cotton and rotation crops.*—With the object of estimating the cost of cultivation of cotton and the principal food and oilseed crops grown in rotation with it, a scheme jointly financed by the Indian Central Cotton Committee, Indian Central Oilseeds Committee and Indian Council of Agricultural Research, was initiated in seven major cotton growing districts of the region during the year under report. The data will be collected both in terms of physical requirements of cultivation, viz, labour, materials etc. as well as their money value.

CHAPTER II
BOTANICAL RESEARCH

A. COTTON

1. *Herbaceum cotton breeding work at Surat.*—The breeding work under progress at Surat aims at evolving a wilt resistant type possessing fibre length of one inch and above and superior or equal to present improved type *Vijalpa* (2087) in other economic characters.

Out of three promising strains from the cross 2087 × 2334 F_8 tried in large scale varietal trial, two strains *viz.*, 115 and 179 yielded on par with 2087 with superior fibre length. These strains are, however, lower in ginning outturn by about 1 to 1.5 per cent which would be compensated by way of higher prices on account of better fibre length. Additionally, five cultures from the above cross and two from 2087 × 1802 F_8 were tried in another varietal trial with 2087 as control. Four cultures appeared to be promising as they gave as good or slightly higher yield than 2087 with superior fibre length. These cultures are also slightly lower in ginning outturn than 2087.

Thirty-two cultures from crosses involving 2087 on one side and quality cultures *viz.*, 2334, 1802 and 1789 on the other were tried in small scale trials. Out of these, 14 were found superior to 2087 in fibre length and equal in yield. These cultures are further being tested for wilt resistance under optimum condition at Poona.

Eight families from the cross 2087 × 2334 were tried in compact family block with four progenies in each. All the progenies were superior to *Vijalpa* in fibre length, but were found to be low in ginning outturn. All the nineteen cultures from the crosses between highly wilt resistant progenies of 2087 and 2334 in F_8 generation, were found to be superior to *Vijalpa* in respect of fibre length. The cultures from the crosses (1-ALB × 1773) and (*Vijay* × 1773) in F_8 generation were found to be superior in respect of fibre length and were equal in yield to *Vijalpa* but were low in ginning outturn.

The new strains 115 and 198 with 2087 and *Dignijay* as controls were also tried on cultivators' fields. Both the strains gave as good or slightly higher yield than both the controls. They kept up their superior fibre length, but were low in ginning outturn by about 2 per cent than 2087. Some replicated trials of these strains were laid out on Government farms, and the performances were practically the same.

2. *Cotton breeding work at Hansot.*—The work which was financed by the Indian Central Cotton Committee, Bombay, is taken up by the Government of Bombay from 1st April 1956 and is included in the Second Five Year Plan. The object is to evolve a wilt resistant variety of cotton for south Gujarat cotton tract. This station serves as a sub-station for the *herbaceum* cotton breeding work at Surat for testing resistance to wilt under highly wilt infected field conditions.

Fifteen cultures from the cross of 2087 × 2334 in F₂ together with thirteen promising Poona transplants were tried in a highly wilt-sick plot for wild resistance. All the promising cultures showed wilt incidence ranging from 5.6 to 22.2 per cent and 80.6 per cent in case of highly susceptible type 1027 ALF.

Cultures obtained from crosses involving *Vijay*, 1-A, L. B. and long staple Persian derivatives were tried to study their wilt resistance. The total wilt incidence ranged from 0.00 to 50.00 per cent for these cultures as against 62.5 per cent of the susceptible control.

Twelve Poona transplants selected from the cross 2087 × 2334 (W. R.) F₂ together with their original cultures were tested for wilt resistance. The selected transplants showed higher degree of resistance as compared to their original cultures.

3. *Scheme for improvement of Indo-American cotton at Surat.*—The scheme has come into operation from March 1957 with the financial aid of the Indian Central Cotton Committee, Bombay. As a result of work done under the scheme for interspecific hybridization in cottons, two Indo-American types *viz.*, *Deviraj* with a staple length of 1.1/16" to 1.1/8" and *Devitej* with a staple length of 3/16" were obtained and have covered an area of about 6.5 lakh acres during 1959-60 in the Bombay State.

The object of the scheme is to evolve Indo-American types suitable for spinning 50's and over and to develop high degree of resistance to jassids, thrips and also to blackarm disease.

In a plot scale trial of six superior long staple (1.1/16" to 1.1/3") Indo-American derivatives, the strain 68-18-3 gave significantly higher yield than the control, *Deviraj* while the other five strains yielded on par with controls. In ginning outturn two blackarm resistant strains *viz.*, 170-Co2-2-126 and 170-Co2-2-S-3 were as good as *Deviraj*. These strains, however did not show improvement in spinning quality. The Pressley Strength Index value of the Indo-American strains varied from 6.5 to 6.9.

All the ten extra long staple (1.3/16" and above) Indo-American strains tried on the plot scale gave significantly higher seed cotton yield than the control *Deviraj*. As compared to the control, *Vijalpa* only one strain viz., 134-Co2-M-D-19 gave significantly higher yield. In ginning outturn, none of the strains was superior to both the controls. The new blackarm resistant strain I. S. C. 67-4 has been found to give significantly higher yield than *Devitej*, consistently for three seasons. It is equal in staple length to *Devitej* but is superior in fibre strength, feel and spinning quality to *Devitej*.

Two out of eleven progenies of *Deviraj* tried, yielded better than control, *Deviraj*, and were resistant to blackarm. Thirteen progenies of *Devitej* were studied of which seven progenies appeared to be promising as they combined high yield with better staple length ranging from 1.09 to 1.22 as against 1.15 of *Devitej*. They were also higher in ginning outturn than control. Twenty-seven cultures of B. C. 68 were tried with *Devitej* as control of which 19 cultures were superior in respect of yield and staple length. They were also highly resistant to blackarm disease and tolerant to jassids. Four cultures of B. C. 22 and eleven cultures 68 x 22 were studied in duplicate rows with *Deviraj* as control. Only one culture viz., B. C. 22-17-4 was superior to *Deviraj* in yield. Out of thirty-seven progenies of I. S. C. 67, 29 progenies yielded significantly higher than the control, *Devitej*, whereas all the progenies showed high degree of resistance to blackarm and tolerance to jassids.

Out of thirty-five progenies of other inter-crosses tried with *Devitej* as control, 27 progenies gave significantly higher yield than the control. In the synthetic material obtained from *hirsutum*, *barbâense* crosses and back crosses, fifteen cultures appeared to be promising since they gave higher yield with ginning outturn ranging from 31.0 to 38.2 per cent and fibre length ranging from 28.9 mm. to 33.9 mm. These cultures also showed high degree of resistance to blackarm disease.

Out of 35 cultures evolving the wild type *G. anomalum*, twelve cultures showed a good combination of yield, ginning outturn, fibre length and resistance to blackarm and jassids. Nineteen Co tom cultures derived from the crosses involving wild type *G. tomentosum* were tried with *Deviraj* as control, of which only nine cultures were found to be resistant to blackarm. All the Co-tom cultures were still low in yield, but proved highly resistant to jassids and were characterised by thick velvet like hairy leaves. A few cultures showed improvement in boll bearing.

The cultures obtained from annual-perennial crosses recorded improvement in black-arm resistance. Out of nineteen cultures tried, 18 cultures gave higher yield than the control, *Deviraj*.

The results of the five district trials conducted at the Government Farms and at 23 places on cultivators' fields showed that I. S. C. 67 and the blackarm resistant sub-strain 134-Co2-M-21 out yielded *Devitej* at most of the places. As compared to *Deviraj*, the strain I. S. C. 67 yielded lower in the trials at Government Farms except at Kadiadra, while higher at some places on cultivators' fields. In ginning outturn, I. S. C. 67 was at par with *Devitej*, but lower than *Deviraj*, with regard to mean fibre length I. S. C. 67 was as good as *Devitej* while it was distinctly superior to *Deviraj*. In spinning quality, I. S. C. 67 was found to be better than 134-Co2-M-21, a blackarm resistant sub-culture of *Devitej*.

(4) *Cotton breeding work at Broach with sub-station at Kadiadra (district Sabarkantha).*—The cotton breeding work at Broach with a sub-station at Kadiadra which was originally financed by the Indian Central Cotton Committee, has been taken up by the State Department of Agriculture from 1955. The research work in progress at Broach has resulted in evolving a new strain *Digvijay* (98-41) from the cross of *Vijay* x (1027 A L. F. x *Vijay*) and given out for general cultivation in 1955-56 and has practically replaced the whole area under *Vijay* in Middle Gujarat cotton zone. Further work is diverted towards evolving a strain superior to *Digvijay* in fibre length and earliness so as to escape frost which is occurring frequently in northern part of middle Gujrat cotton tract.

In a large scale trial consisting of promising strains *viz.*, strains 92 derived from (E. 22 x 1802), B. C. 11-2 and 198 (from Surat) with *Digvijay*, *Vijay* and 2087 as controls. The variety *Digvijay* stood first in respect of yield but the results were not statistically significant. The types 92 and 11-2 have a fibre length over one inch and the spinning performance is also satisfactory, but they are low yielders. As regards ginning outturn, culture 92 was on par with *Digvijay* whereas B. C. 11-2 recorded 2 per cent lower ginning than *Digvijay*. Three segregates from the cross of E-22 x 1802 and two segregates from (E-22 x 1802) x E-22 were tried in small scale trial with *Digvijay* as control. The yield differences were found to be highly significant. None of the segregates was found to be superior in yield to *Digvijay*. These segregates did not show any significant differences among themselves. However, all the segregates are superior to *Digvijay* in mean halo length.

Crosses involving (E-22 x 1802) on the one hand and 98-41 or 66-60 on the other were studied further in a replicated progeny bulk trial in F₂. In all, 50 individual plants with good combination of G. P. and staple length from these crosses were selected for further trial. Crosses involving *Digvijay*, *Vijay* and 92 on one hand and Madras *herbaceums viz.*, 4252, 4257 and 2711 and Dharwar *herbaceums viz.*, 15-39 and No. 16 on the other hand were studied in F₂, and promising individual plants have been selected for further study.

At the sub-station Kadiadra in Sabarkantha district, work is in progress with the object of evolving an early type suitable for the northern region of the middle Gujarat cotton zone so as to escape frost, which is of common occurrence. Promising synthetic material evolved at Broach, Surat and early *hirsutum* types from outside are tried there. Due to excessive rains at Kadiadra during the year under report, the entire *herbaceum* crop had failed and all the experiments were completely vitiated. The other experiments with Indo-American types were somewhat successful and are reported below.

The yield differences under the large scale varietal trial were found to be highly significant. I. S. C 67 170-Co-2, 134-Co 2-M-21 were on par and this group was significantly superior to *Digvijay* and 134-Co2-M in respect of seed cotton yield. I. S. C. 67 was less affected by blackarm as compared to the rest.

A. 7 an early *hirsutum* type from Gadag and three early American derivatives 68-24, 68-G-3 and 170-Co2-126 were tried with 134-Co2-M (*Devitej*) with two spacings viz., 5.0' x 2.0' and 2.5' x 2.0'. Though the experiment was vitiated it indicated that higher yields are obtained for the close spacing of 2.5' x 2.0'.

Cotton breeding work at Viramgam—Cotton improvement work prior to April 1956 was in progress with financial aid of the Indian Central Cotton Committee. Since 1st April, 1956 the work is fully financed by the State Government. The object of the work is to evolve a strain superior to *Kalyan* in yield and earliness and equal to or superior to *Kalyan* in other economic characters.

Eight early segregates were tried with *Kalyan* as control on plot scale. The yield differences were not significant. However, four segregates viz., 694, 597-B, 742-B and 797 gave higher yield than *Kalyan*. All the segregates were superior to *Kalyan* in fibre qualities.

Eleven promising strains derived from crosses involving *Kalyan Vijay*, Type 13-4 and W-87 were compared in small scale trial with *Kalyan*. The experiment was vitiated due to bad season. Crosses of *Kalyan* and W-87 with Madras and Dharwar *herbaceum* and Wagad types with Persian derivatives were studied in F₇. This experiment was also badly affected and the results were not conclusive.

Kalyan has been crossed with quality type 2087, 2334 from Surat to combine fibre qualities and spinning quality. The segregates in early generation are under study. Similarly, crosses of *Wagad-8* and *Kalyan* with *Ganomalum* to combine fibre strength and fineness were in the early stage of selection.

(6) *Cotton breeding work at sub-station, Bavla.*—The sub-station was started from 1958-59 with the object of studying the segregates evolved at Viramgam under the *Goradu* and sandy soils of the region. The eight promising segregates viz., 786-B, 797, 694, 597-B, 1411, 394-3, 742-B, and 596-B were tried with *Kalyan* as control in two spacings viz., 2' x 2' and 2' x 9". The closer spacing was found to be significantly superior to wider spacing. Strains 786-B, 297, 694, 597-B, and 1411 were significantly superior to *Kalyan* in seed cotton yield. Other promising segregates in early generation from crosses involving Madras and Dharwar *herbaceum* and crosses of Wagad types and Persian derivatives were also studied at Bavla.

(7) *Scheme for evolving extra long staple type cotton at Talod.*—The scheme came into operation from July 1957 with the object of evolving extra long staple (1 1/8" and above) cotton type suitable for cultivation in *Goradu* and sandy loam soils of North Gujarat both under rainfed and irrigated conditions. The scheme is fully financed by the Indian Central Cotton Committee.

Four Indo-American strains viz., I. S. C. 67, 68-G-3, 68-G-4-11 and 134-Co2-M-21 were tried in a replicated trial on plot scale, with *Deviraj* and *Devitej* and two *herbaceum* types *Vijalpa* and *Digvijay* as controls under irrigated and rainfed conditions. The new black-arm resistant strain I. S. C. 67 showed superiority in respect of yield to an extent of 80 to 90 per cent over *Devitej* and in one trial upto 25 per cent over *Deviraj* also. In comparison to *herbaceum* strains, *Digvijay* and *Vijalpa*, it was equal in yield of seed cotton. Under Casa system of spinning it gave H. S. W. C. upto 62's as against 55's of *Devitej*. The other strains, though gave higher yield than *Devitej*, were not superior to I. S. C. 67 in fibre length and/or spinning quality. The results of the district trials on scattered blocks showed that I. S. C. 67 gave on an average 27.8 per cent and 6.4 per cent higher yield than *Devitej* and *Deviraj* respectively. This variety 134-Co2-M-21 was lower in yield than both the controls.

Sixteen secondary selections from *Devitej* were studied I. S. C. 67 and *Devitej* as controls. Four selections viz., *Bhagapure-2*, *Sikka-2*, *Talod-14* and *Vatwa-5* ranging in ginning outturn and mean halo length from 27.2 to 32.3 per cent and from 29.4 to 30.7 mms, respectively have been selected for further study.

Out of 30 progenies from I. S. C. 67, three were found to be superior to control, I. S. C. 67, in ginning outturn and mean halo length combined with black-arm resistance. All were superior to *Devitej* in mean halo length. Fifteen progenies possessing these combinations have been selected for further study. All the nine

black-arm resistant progenies from 134-Co2-M-21 were equal to *Devitej* in yield and mean halo length.

Twenty-four progenies derived from *hirsutum-barbadense* crosses and backcrosses were studied. In ginning outturn, one progeny was superior to control, *Deviraj*, while eleven progenies were equal to *Devitej* with better staple length. A few progenies retained fine and silky fibre characteristics inherited from *barbadense* parent *Sea Island*. Out of 33 progenies from *Co-ano* culture studied, three progenies were at par with *Devitej*. In mean halo length, one progeny was superior to and twenty-two progenies were equal to *Devitej*.

In the trial of thirty progenies from *Co-tom* cultures, 14 progenies were found to be equal to control *Deviraj* in ginning outturn. In mean halo length twelve progenies were equal to the control, I. S. C. 67. In yield of seed cotton, none of the cultures has still come up to the level of *Deviraj* control. However, gradual improvement in bearing capacity was observed in few cultures. On studying thirty progenies from *inter-se*-crosses in F₄, one was found to be superior and three were equal to control, *Devitej*, in ginning outturn while 26 were superior to I. S. C. 67 in this respect. Five cultures were superior to control, I. S. C. 67, in mean halo length. Similarly, out of 19 progenies from *inter-se*-crosses in F₅, two were superior to I. S. C. 67 in ginning outturn and 14 cultures were equal to I. S. C. 67 in mean halo length.

In the minor yield trial of 22 cultures derived from *inter-se*-crosses, *Co-ano* crosses and Indo-American types, two cultures from I. S. C. 67, three from B. C. 68 and one from *Co-ano* yielded significantly higher than *Devitej*, with superior fibre qualities and were equal to it in ginning outturn. Four cultures were found to be superior in microspinning test giving count strength product ranging from 1709 to 1745 for 50's against 1615 of *Devitej*. Out of two hybrid combinations tried in plot scale trial, both the hybrids *viz.*, (68 X S. I.) and (68 X *Moco*) were found to be significantly higher in yield of seed cotton and earlier than the control, *Devitej*. In spinning capacity 68 X S. I. and 68 X *Moco* gave 70's and 77's as against 36's of control. Hybrid (68 X *Moco*) appears to be more promising as it is superior in yield of seed cotton, ginning outturn and spinning capacity to 68 X S. I. with healthy growth and desirable boll opening.

(8) *Arboreum cotton improvement scheme, Amreli*.—As a result of research work carried out at this station under the *Mathio* cotton scheme, a strain C. J. 73 was evolved and was given out for general cultivation in 1958 under the popular name *Sanjay*. By growing

Sanjay, the farmers realise an extra income of about Rs. 45.00 per acre as compared to *Pratap* on account of its superiority in yield, ginning outturn and fibre quality over *Pratap*. Present scheme came into operation from 1st March 1959. The object of the scheme is to evolve a strain superior to C. J. 73 in economic characters specially fibre length and spinning capacity.

Four strains viz., BA-2 derived from the cross of *Sanjay* with *Pratap* and B-1-15-W and B-13-21-L derived from the cross of *Sanjay* with 29-7-6 and were tried on a plot scale with *Pratap* and *Sanjay* as controls. The strain BA-2 was found to be superior to *Sanjay* in ginning, outturn and equal in yield, fibre length and yarn strength. The strains B-1-15-W and B-13-21-W were found to be superior to *Sanjay* in ginning outturn. All the strains even though equal to *Sanjay* in fibre length were superior to it in yarn strength.

Thirteen synthetic cultures in F7 derived from the cross of *Sanjay* with 29-7-6 were compared with *Sanjay* in a small scale trial. Four cultures viz., A-9-2-L, A-9-2-W, B-16-24-W and B-30-32-W gave yield on par with *Sanjay*. All the cultures were found to be superior to *Sanjay* in ginning outturn. The culture B-2-16-W was found to be superior to *Sanjay* in fibre length, while the rest of the cultures were found to be on par with it in fibre length.

Twenty-three cultures in F6, derived from the crosses of *Sanjay* and *Pratap* on the one hand and D. C. cultures from Punjab on the other were tried along with *Sanjay*. Though all the cultures were found to be superior to *Sanjay* in ginning outturn, they were found to be inferior to *Sanjay* in yarn strength.

Thirty-two cultures in F5, derived from the crosses of *Sanjay* with W-31 and W-31 were tried along with *Sanjay* as control. Thirteen cultures yielded on par with *Sanjay* while all the cultures except three were found to be on par with *Sanjay* in ginning outturn. Ten cultures were found to be superior to *Sanjay* in fibre length. Three cultures viz., C. J. W-31-14, W-31-C. J. 145 and W-31 C. J. 54 gave stronger yarn than that of *Sanjay*. The culture W. 31-C. J. 145 appeared to be promising as it was found to be superior to *Sanjay* in ginning outturn and yarn strength.

Eleven cultures in F4, derived from the crosses involving *Sanjay*, 10-2, 12 A, 24-A and 18-B were tried along with *Sanjay*. All the cultures were found to be on par with *Sanjay* in yield and superior to it in ginning outturn. Two cultures viz., 10-2 X 24-A-2-L and 10-2 X 24-A-6. L. appeared to be promising as they were found to be superior to *Sanjay* in ginning outturn and yarn strength and on par with it in yield and fibre length.

Crossing of *Sanjay* and C-520 on the one hand and improved strains from Nagpur, Udaipur, Jalgaon, Akola, Nanded and Madhya Bharat were studied in early generations *viz.*, F₁, F₂ and F₃. Back-crosses and out-crosses of these with *Sanjay* were also under study with the object of combining ginning outturn and fibre length.

(9) *Cotton research work at Junagadh.*—The Indo-American type *Deviraj* (170-Co2) is getting more popular amongst the farmers in Saurashtra and was grown on an area of about 3.93 lakh acres in Saurashtra during 1959-60. With the object of evolving a type superior to *Deviraj* in economic characters and also resistant to black-arm disease, work has been taken up at Sagdividi Farm at Junagadh. Secondary selection in 170-Co2 was carried out. New material received from Surat was found to be superior to 170-Co2 in quality and this material is being further studied.

B. Rice

(a) At Agricultural Research Station, Halwad, (Rajkot division), varietal trials of coarse paddy were conducted. The performance of local was superior to all other varieties. In the varietal trial of fine paddy, the performance of B. S. 38 was superior to local and other varieties.

(b) At the Central Experimental Station, Junagadh (Rajkot division), it was observed in the varietal trials for fine paddy that B. S. 73, B. S. 45, S-40 and B. S. 81 are promising varieties. In the case of trials with the coarse paddy K. S. 594, K. S. 584 and S. 86 gave promising results. The results of the selection trials depict that S-38, S-54, S-31 and S-22 are promising. S-38 has a profuse tillering capacity. In a varietal trial for blast resistance, it seems that CH-55, F-10, B. J. 1 and T-6517 are less susceptible than others, though the grain yielding capacity of CH-55 is poor. B. J.-1 was the highest in yield followed by T-6517 and F-10. The results of Radhanagari trials revealed that D-6-2-2, Antarsal-67 and M-161 are superior to the local.

C. Wheat

(a) *Central Experiment Station Junagadh (Rajkot Division).*—In wheat selection trials, results of the last two years showed that S-79, S-51, S-88, S-47, S-56 and S-50 are promising and they yield higher than NP-710, NP-718, NP-798 and K-28. The results of wheat varietal trial show that NP-824 is significantly superior and yields the highest on the basis of the last two years' results. The

grains are hard, amber coloured and bold. NP-824 in the above trial is followed by S-56, a selection of the station. During this year, 163 strains of wheat were maintained and 440 selections were sown for single plant study.

(b) *Agricultural Research Station, Halwad (Rajkot) Division.*—In the wheat varietal trial, the performance of NP-718, 824, 826 and KCN-179 was the best. At Umrata, the strain NP-524 gave superior performance as compared to all other strains of NP-700 and 500 series. At Amreh, in the varietal trial, variety KCN-133 and MHD-224 were found to be superior to others. At Porbander, the variety KCN-179, NP-822 and NP-825 were found to be superior to local as well as other varieties.

D. Jowar

At Dabhoi, the *jowar* selection strain B-93-2, B-61-1, B-4-1-1 and 4-1-2 have given higher yields. At Junagadh, 12 selections and varietal trials were conducted during the year under report for grains and fodder. In the selection trial A, for grains, the results of the three years depict that S-213, S-21-2, S-19, S-18 and S-234 are best. In the *jowar* selection trial B, the results of three years reveal that S-124-3, S-277-5, S-95-391, S-132-2 and S-232-2 are first five in the trial yielding more than 100 per cent over local. In the trial C, for grains, it has been found that S-100-92, S-93-233, S-100-92, S-100-26, S-101-53 are the first five. In selection trial D, for grains, all the selections have yielded more than 100 per cent over the local.

In Umrata selection trial, none of the selections were superior to S-213 in grain as well as fodder yield.

E. Other Cereals

(a) Bajri—

Ahmedabad Division.—Research work on *Bajri* was carried out at Agricultural Research Station, Talod, Vijapur and Deesa. At Vijapur, in the small scale trials, comprising of 7 selections from Makrampura, tried with *bajri* No. 207 as local, it was indicated that the selection M-87, 8, 9 and 88 have given 13, 10, 5 and 3 per cent higher yield over the local.

At Deesa, 3 strains *viz.*, 2-4-24.2, 17-5.4-8 and 14-3-7-6 were superior to local in yield.

At Talod, large scale varietal trials indicated that the strains 10-5, 28-5; 5-2, 27-2 and others have given higher yields over the local.

Rajkot Division.—At Junagadh, in the varietal trial on *bajri*, it was observed that *Babapuri* and No. 28-15-2 gave the best results. In another trial, 28-15-2 gave higher yield when tried with *Babapuri* and other local varieties. At Jamnagar, the Niphad strains *viz.*, 28-15-1 and 28-15-2 gave better performance than the other varieties. At Halwad, the variety J-G-14 gave the best results. In the selection trial, the variety N-28-15-2 was found superior to others.

At Umrals, 28-15-2 gave the highest yield, and the performance remained constant for four successive years. At Bachau, the variety, local *Mahudo* variety proved to be the best.

At Aureli, in large scale varietal trials of six varieties of *bajri*, the variety 28-15-1 gave the highest yield.

(b) Hill Millets.—*Nagali*

Ahmedabad Division.—At Waghai, 130 selections were put in progeny rows along with *nagli* B-11 and local check. In given lots 24 selections have given higher yield over B-11 and local. Ten selections have given slightly more yield than B-11. Two selections were found equally good as compared to B-11. Selection 5-1, 6-3, 12-4, 38-5, 62-4 and 203 are promising in the 21 selection as compared to *nagli* B-11 and the local. Further, the selection 107-1, 136-2, 130-7, and 301-2 gave significantly higher yield, over *nagli* B-11 and the local, in the eight promising selections.

F. OILSEEDS AND PULSES

Oilseeds

(a) *Groundnut.*—The work on groundnut is in progress at Junagadh, Amreli, Deesa, Talod and Dohad with the object of evolving groundnut strains, both in bunch and spreading types, possessing high yield, better shelling outturn, more oil content and resistance to 'tikka' disease. Four bunch strains of groundnut *viz.* A. H. 32, S. B. XI, A. K. 12-24 and A. H. 814-1 and local were tried on cultivators' fields in Bhavnagar district. A. H. 32 and S. B. XI gave 20.0 and 16.0 per cent higher yield respectively than local. At Amreli, A. H. 814-20 and S. B. XI gave 58.5 and 41.9 per cent higher yield respectively than the local. At Deesa *Kopargaon-1* (semi-spreading) was found superior to bunch and spreading types of groundnut. At Talod, the spreading groundnut strain 31-9 gave 25.0 per cent higher yield than the local. This strain possesses 75.0 per cent shelling outturn and 50.6 per cent oil content. At Dohad, the spreading groundnut strain *Dhulia-D* gave significantly higher

yield than the local. The bunch groundnut strains 5144, *Faizpur* 1-5, A. H. 814-1 and S. B. XI were significantly superior in yield to the local.

(b) *Sesamum*.—Research work on sesamum (*khariif*) is in progress at Umrata (Bhavnagar) and Talod with the object of evolving early maturing strains of sesamum possessing high yield, high oil content, bold seed and resistance to 'Phyllody' disease. At Umrata, three strains *viz.*, Timbi-9, *Kundala-2-6* and *Kundala-2-3* gave 19, 11 and 10 per cent higher yield respectively than the local. In a small scale trial, two selections *viz.*, *Patelka-11* and *Sidhpur-7* gave significantly higher yield than the local. As Deesa, two field selections 5-19 and 7-24 gave 29 and 20 per cent higher yield than the local. At Talod, five selections, 21-2, 28-3, 24-5, 30-5 and 25-3 gave higher yield ranging from 12 to 48 per cent than the local.

Pulses

The research work on pulses was in progress at Vijapur, Talod and Deesa of Ahmedabad division. Small scale trials were conducted *on tur* at Vijapur and *mug* at Deesa. At Junagadh, the results of pest experiments on gram variety *chafa* indicate that *chafa* was superior to the other strains received from Niphad.

G. VEGETABLES

(a) *Bhendi*.—At Junagadh, the varieties of *bhendi* S-392-17, Anand 66, 392-18, *Pusa Makhamali* gave better performance.

(b) Tomato.—The varieties *Pusa Rubi*, S-102-8, hybrid-6 were found to be superior over the local in the varietal trials at Junagadh.

(c) *Chillies*.—At Junagadh, the varieties S-66 and S-36 were found better in yielding capacity.

CHAPTER III

RESEARCH WORK ON PESTS AND DISEASES OF CROPS

A. PLANT DISEASES

An extensive programme of research work on the methods of prevention and control of plant diseases, breeding of disease resistant varieties of crop plants, investigations into new diseases was carried out and advice and guidance to cultivators for control of plant diseases was given. Some of these investigations carried out are partly financed by the Indian Central Cotton Committee, the Indian Council of Agricultural Research and the Indian Central Oilseeds Committee.

Research results

(a) The following cotton selections, crosses and strains received from different centres have shown positive results towards resistance to wilt disease of cotton.

(i) *Broach Section*.—Thirteen out of 16 bulk progenies of 93-41 all the 5 bulk progenies of (E. 22 × 1802) F₁₁ 92, 3 out of 10 progenies of the back cross [(E. 22 × 1802) × E. 22] F₁₀ showed high resistance to wilt. Eleven out of 15 progenies of the crosses involving 66-60 and 98-41 with (E. 22 × 1802) showed high resistance.

(ii) *Surat Section*.—All the 16 cultures of 2087 (*Vijalpa*) maintained at Poona showed high resistance. Twelve out of 13 progenies of (2087 × 2334) F₈ showed high resistance.

(b) The wheat varieties *New thatch*, *Rowie* and *Kenya Farmer* were highly or moderately resistant in the seedling stage to eleven races of stem rust, on top of it, they were even resistant to the virulent races 15C and 122. *New thatch* and *Rowie* have shown mature plant resistance to stem and leaf rust, whereas *Kenya Farmer* has shown moderate resistance to stem rust and high resistance to leaf rust at this stage. The varieties *Lee*, *Fontana* and *Helvia* have shown semi-resistance and susceptible type of infection in the mature plant test in the field.

Wheat variety NP. 200 was found to be resistant to 8 races but showed susceptibility towards the race 42B in the seedling stage. It is, therefore, concluded that the wheat variety NP. 200 though resistant to 8 races is not useful for cultivation in the State where race 42B is a commonly occurring race.

The wheat variety E-2153 has been found to be resistant in the seedling stage to 8 races inclusive of race 15-C but susceptible to race 122. The wheat variety E. 2025 has shown positive resistance at this stage to 11 races including races 15-C and 122.

(c) The following strains and hybrid selections of rice from Newagam material *viz.*, 29-9, 29-17, 1-10, 24-21, 32-20, 31-10, 50-21, 35-17, 41-2, 48-16, 4-9, 56-6, 58-15, 81-4, 53-1 and 81 4 from the cross (Est 39 × H. 566) F₃ have shown resistance to blast of rice.

(d) Bordeaux mixture 2:2:50 has controlled soft-rot of ginger at Gandevi in Surat district.

(e) Two dustings of copper dust 4 per cent, the first one month after sowing and the second two weeks after the first, gave satisfactory control of *alternaria* blight of cumin in Gujrat.

B. CROP PESTS

Insecticidal trials were laid on field scale for the control of bollworms, jassids, thrips and aphids on cotton at Surat. The data are being analysed.

From the experiment laid out to estimate the loss by fruit sucking moths of citrus, it was observed that the losses were ranging from 1.67 per cent to 3.01 per cent. A field experiment laid out to study the efficacy of various insecticides in reducing the losses due to fruit sucking moths showed that all the insecticidal treatments except 0.5 per cent DDT suspension were significantly superior to untreated. Trial conducted to study relative efficacy of different insecticides for controlling citrus nursery pests *viz.*, leaf eating caterpillar and leaf miner showed that parathion, lindane (0.25 per cent) and endrin were significantly superior to other insecticides in controlling leaf eating caterpillar while endrin, parathion and DDT (0.25 per cent) were significantly superior to the rest of the insecticides tried in controlling the leaf miner.

C. CROP PROTECTION AND OTHER ACTIVITIES

During the year, eight plant protection schemes were in operation in various parts of the Bombay State. These schemes were sanctioned on the basis of schemes already in operation in these regions before reorganisation.

The important activities of the plant protection unit were as under—

(a) To demonstrate the insecticidal and other control measures for the important crop pests and diseases of the State.

(b) To provide insecticides and appliances to the cultivators at the subsidised rates.

(c) To issue crop protection circulars to the extension staff.

(d) To deal with all public enquiries pertaining to insect pest control.

In addition, the Agricultural Entomologist and the Plant Pathologist received a number of queries from the cultivators and advised them about the control measures to be adopted. Many demonstrations were held wherever necessary. The Agricultural Entomologist and the Plant Pathologist also issued a large number of phytosanitary certificates for the consignments of plants, bulbs, seeds and other plant products exported from Bombay.

During the year, appliances worth Rs. 8.50 lakhs were purchased for giving to cultivators on hire and appliances to the extent of Rs. 4,478.00 to be sold at 50 per cent subsidised rates. The total number of appliances with the department for giving on hire including those purchased during this year was 3,350 hand operated dusters, 1,075 hand operated sprayers and 4 power sprayers.

In addition, insecticides worth Rs. 9,108.00 were purchased to be sold at 20 per cent subsidised rate, worth Rs. 75,000.00 to be sold at 50 per cent subsidised rates and worth Rs. 7,050.00 on no profit no loss basis.

A few appliances like 2 purivox machines (bird scarer) and 30 bucket pumps were also purchased for trial purposes and distributed to Rajkot and Ahmedabad divisions to find out their efficiency on field scale.

These appliances and insecticides were distributed to different District Agricultural Officers according to their requirements and an additional reserved stock was maintained at the central depots at Ahmedabad and Baroda.

The quantities of appliances purchased under various schemes during the year 1959-60 are as under.

Item	Purchased for hire	Purchased for sale at subsidised rates
1. Dusters	... 3,550	10
2. Sprayers	... 1,075	10
3. Power sprayers	... 4	...
4. Seed dressing drums	... ..	27

CHAPTER IV

MANURES AND FERTILIZERS

(1) *Scheme for the preparation of organic manures from farm and village wastes.*—The Rural Compost Scheme and Farm Yard Manure Scheme are amalgamated as per Government letter No. MNR-1456/210347-G, dated 18th October 1957.

The object of the scheme is to supplement the present out-put of F. Y. M. by preparing compost from the rural wastes and to improve the quantity and quality of F. Y. M. prepared by farmers by conservation of urine of cattle and by using the same along with dung and litter in the preparation of manure. In all, 5,000 villages participated in the scheme. The total number of pits filled was 67,386 against the target of 92,000 pits. The quantity of manure expected from these pits was 1,68,470 tons sufficient to cover an area of 33,694 acres. The additional yield of food grains estimated thereby is 3,369 tons.

(2) *Town compost.*—The object of the scheme is to induce the Municipalities and village *Panchayats* (above 5,000 population) to prepare compost manure from the routine disposal of town wastes collected by them and thereby increase the out-put of organic in the region.

Under this scheme, out of 104 urban centres, 114 reported compost production, during the year under report to the tune of 74,426 tons. The compost manure distributed was 48,482 tons.

(3) *Distribution of sann hemp seed for green manuring of food crops.*—As per recommendations of the State Development Committee, the scheme for distribution of *Sann* hemp seed for green manuring was continued during the year under report. A quantity of 11,856 B. Mds. of seed was distributed in the region against the target of 2,000 B. Mds.

(4) *Distribution of Fertilizers.*—Distribution of nitrogenous fertilizers was made to the consumers, through the co-operative societies throughout the region. The distribution was so arranged that the consumers at any corner of the region would get the material at the controlled rates.

Ammonium sulphate (20 per cent N), calcium ammonium nitrate (20 per cent N.), ammonium sulphate nitrate (26 per cent N.) and urea (45 per cent N.) were distributed during the period under report. The materials were supplied either ex-docks or ex-godowns, Bombay, on cash and carry basis.

During the year, a total quantity of 29,947 tons of fertilizers and manure mixtures were distributed as under:

S. No.	Name of the fertilizer	Quantity
		(Tons)
1	Ammonium sulphate	19,571
2	Ammonium sulphate nitrate	4,193
3	Urea	3,713
4	Superphosphate	11,940
5	Manure mixture	10,522
6	Fishmeal and bonemeal	458
7	Other fertilizers	9,350

CHAPTER V
HORTICULTURE

Investigations on various fruit crops were continued during the year at the regionally situated horticultural research stations. Varietal collection of mango, grapes and citrus was strengthened both at the Ganeshkhind Fruit Experiment Station, Poona 7, and Fruit Research Station, Aurangabad. Hybridisation with the object of evolving better table quality coupled with yield was carried out in grapes at both these centres. The breeding work on *papaya* to evolve disease resistant variety to leaf mosaic was initiated at the Ganeshkhind Fruit Experiment Station, Poona 7. The resistant species i. e. *Carica cauliflora* obtained from Venezuela was grown for use as male parent. Submerging was resorted to for purification of the cultures. Preliminary trials on the use of growth regulators for preventing preharvest fruit drop in mango varieties, *Alphanso* and *pairi* were conducted under the hormone scheme. In banana, the collection of types under table, cooking and wild types stands at 209. Experiments conducted on the planting material and season of planting have given consistent results. The findings which could be passed on to extension workers are (a) 1 lb. or 2 lbs. bits of corm is a good planting material, (b) February is the best season for planting of *Basrai* banana variety for early and high yield in comparison with April or June planting and (c) two month old suckers do not serve as useful planting material.

The Gardeners' Training Classes continued to function at Junagadh in the region.

The scheme for the Development of Fruit Production in Bombay State came into operation in November 1958. The object of the scheme is to increase fruit production by bringing new area under cultivation, rejuvenating existing orchards and renovating inferior mango and *bor* trees, to superior varieties.

During the year under report, 983 acres of new area has been planted with different kinds of fruit trees chiefly mango, citrus, banana, guava, grape and *chiku*. Under the rejuvenation programme, 934 acres were treated and good results were obtained. Similarly, 140 mango trees were side-grafted with commercial mango varieties. A campaign for dusting mango trees with DDT and sulphur was undertaken in the block and non-block areas and in all, 5,960 trees were treated.

One of the important features of the development work was the planting of mango stones *in situ* on Taluka Seed Farms, where irrigation is available for the purpose of building up a stock of mother trees for future propagation.

There is a provision under the scheme for advancement of long term loans to fruit growers for bringing new area under fruit cultivation. During the year under report, loans amounting to Rs. 2,73,065.00 were actually disbursed to the growers.

CHAPTER VI

AGRICULTURAL ENGINEERING

The agricultural engineering activities continued to remain under the control of the Superintending Agricultural Officers of the Gujrat region. Each Superintending Agricultural Officer is assisted by one Deputy Director of Agriculture (Engineering) and one Agricultural Engineer. The activities comprise land development, minor irrigation and research in agricultural implements.

A. LAND DEVELOPMENT

Mechanical cultivation is undertaken in two ways *viz.* by bulldozing operations and by tractor ploughing. The following schemes in various parts of Bombay State are sanctioned. All the schemes stand included in the Second Five Year Plan except the Mechanical Cultivation Scheme in Saurashtra.

B. BULLDOZING OPERATIONS

(a) *Mechanical Cultivation Section in old Bombay State.*—Under the scheme, 40 machines (38 bulldozers and 2 motor graders) were operated through 10 operational units to undertake levelling, grading bunding and terracing. During the year 3,284 hours of bulldozing work was done in Gujarat region. The charges are levied on hourly basis at Rs. 40.00 for 80 H. P., Rs. 30.00 for 60 H. P. and Rs. 25 for 40 H. P. machine.

(b) *Mechanical cultivation in Community Development Project areas in Saurashtra.*—One unit of 4 bulldozers is established under the scheme to undertake levelling and bunding. During the year, work of 5,700 hours was done. The work was undertaken at the following rates:

Caterpillar	...	D-7	136.00 per day of 8 hours.
Caterpillar	...	D-4	88.00 per day of 8 hours.

C. PLOUGHING OPERATIONS

(a) *Mechanical Cultivation in Saurashtra.*—This is a permanent activity. Under the scheme, 13 tractors were worked to undertake ploughing operations in the fields of cultivators. The tractors were very old and during the year 1,052 acres were ploughed. A rate of Rs. 17.50 per acre was charged to the cultivators.

(b) *Mechanical Cultivation in Kutch.*—This is a new scheme started for Kutch district. Under the scheme, 4 tractors and one bulldozer were to be purchased and worked. The machinery was indented with the Central Purchasing Officer, Bombay, but the same could not be procured during 1959-60. Two old tractors were, however, temporarily sent from Saurashtra and work of 100 acres of ploughing was done. The rate charged was Rs. 30.00 per acre.

D. OTHER ACTIVITIES

(a) *Mechanical Work.*—During the year, several enquiries on agricultural engineering problems were received and attended to. Technical help was given to the agriculturists, Government Farms, Agricultural Institutions at the usual rates of Rs. 5.00 per day per technical man.

(b) *Water Finding.*—All the water finding machines which were distributed in various district could not be worked as these were out of order and irreparable. These were, therefore, discarded.

(c) *Training.*—Four oil engine classes each of 3 months' duration were conducted at Baroda. Forty-five students were trained at Baroda during the year.

(d) *Building Construction Work.*—Small constructional work at various Farms, Institutions, Research Stations, costing up to Rs. 5,000.00 each, were undertaken departmentally.

CHAPTER VII

MINOR IRRIGATION

A. Wells

(a) Under the scheme, a loan to the extent of Rs. 2,500-00 (maximum) and subsidy at 25 per cent subject to a maximum of Rs. 500-00 is granted for construction of new well. In respect of repairs to old wells, only loans to the extent of Rs. 1,000-00 are granted. Amount of Rs. 2,94,021-00 as loans was distributed through the Revenue Department. The work of granting loans to the cultivators was continued to be carried out by the branches of the Bombay State Co-operative Land Mortgage Bank in all the districts of the region. It is reported that 702 new wells were constructed and 1,471 old wells were repaired. 3

(b) *Operation wells scheme.*—To reduce the shortfall in the Second Five Year Plan expenditure, an 'Operation Wells Scheme' on the pattern of 'Integrated Wells Scheme' was sanctioned by Government in December 1959. During the year 1959-60, loans to the extent of Rs. 1,60,84,000-00 were granted for construction of 1,027 wells.

B. Pumping Sets

In Saurashtra, Amreli and Kutch districts, loans were granted through the Saurashtra Land Mortgage Bank. Under this scheme, a loan to the extent of the actual cost of the pumping set or electric motor up to 20 H. P. and a subsidy of 25 per cent (subject to a maximum of Rs. 800-00) is granted through the Bombay State Co-operative Land Mortgage Bank. Loans amounting to Rs. 16,87,000-00 for the purchase of 491 pumping sets were granted to the cultivators.

C. Boring

(a) *Old Bombay State area.*—The scheme sanctioned so far pertained to working of 12 percussion type boring machines in the area of the districts of Ahmedabad, Kaira, Baroda. Government have sanctioned the integrated boring scheme under which 16 boring machines are to work in the entire Gujarat region excluding Rajkot Division, which has a permanent activity. During the year under report, only one bore was taken.

(b) *Saurashtra.*—This is a permanent activity. Under the scheme, 26 power boring machines were worked. During the year, 114 bores were taken.

(c) *Kutch*.—This is a permanent activity. Under the scheme, one power boring machine and 7 hand boring machines were worked. During the year, 149 bores have been taken.

D. Blasting

It is proposed to charge the following rates for undertaking air compressor and blasting operations :

For Agricultural Purposes

- (a) Drilling and Blasting ... Rs. 8.00 per shot hole of 2 ft. depth containing 1 detonator and 5 cartridges.
- (b) Dewatering charges ... Rs. 5.00 per hour.

For Non-Agricultural Purposes

- (a) Drilling and blasting ... Rs. 10.50 per shot hole of 2 ft. depth containing 1 detonator and 2 cartridges.
- (b) Dewatering charges ... Rs. 5.00 per hour.

Saurashtra.—This is a permanent activity. Under the scheme, both hand and air compressor blasting works are undertaken. There are 30 truck mounted air compressor units. During the year, 2,729 blasts (20,599 shot holes) were taken by hand blasting and 2,666 blasts (20,412 shot holes) by air compressor and blasting.

E. Co-operative Lift Irrigation Scheme

The work relating to mechanical portion of the Co-operative Lift Irrigation Schemes is looked by the department in respect of the following aspects.

- (a) Investigation of mechanical part.
- (b) Issue of feasibility certificates.
- (c) Preparation of plans and estimates of mechanical part.
- (d) Preparation of the financial aspect of the schemes.

CHAPTER VIII
SOIL CONSERVATION

(a) *General*.—The number of Soil Conservation sub-Divisions in the Gujrat region were 13 which were engaged in executing intensive bunding works.

A number of visitors and Soil Conservation trainees deputed by the Central Soil Conservation Board, were shown the Soil Conservation works and given short training in the methods of Soil Conservation followed in the Bombay State. Notable among these were from Punjab Forest Department, Hajaribagh, Kotah, Ootacmand and Dehra-Dun.

(b) *Bunding*.—The quantum of work carried out during the year under report and the cost incurred is as under.—

	Acres	Expenditure
		Rs.
1. Soil Conservation contour bunding work. (Non-scarcity).	78,499	} 26,34,094-00
2. Rectification and completion of scarcity bunding works.	3,163	

(c) *Experiments on bunding in black soil*.—

(a) Inquiries were made for selecting the sites comprising 400 to 500 acres of Government owned land for carrying out experiments of bunding in deep black soil in Baroda division, as per decision taken in the "Agresco." But no suitable sites were available.

(b) A site at village Pavda, taluka Padra, district Baroda, has been selected for a typical scheme for gully control. Survey work is carried out and rough plan approved. The scheme will start functioning in the next year.

(c) *Survey and classification of the cultivable waste lands*.—The scheme for survey and classification of assessed cultivable Government waste lands was continued during the year under report, under Government Resolution, Agriculture and Forests Department No. WSL-1159(B)-F, dated the 18th July 1959. An area of 1,47,423 acres was surveyed by the two units in 5 districts. In addition to this, detailed survey of protected forest of 11,043 acres

in Dangs district was carried out by the Land Utilisation Survey Officer, Poona.

Bunding work under Kakrapara Project

The execution of the scheme started in the year under report and survey of the whole block is completed. An amount of Rs. 1,632 00 was spent and discharge measuring instruments were fixed and readings taken. An area of 30 acres was bunded and an amount of Rs. 747 00 was spent.

(c) *Record of Rights and Liabilities under the Bombay Land Improvement Schemes Act.*—The progress on the submission of recovery statements to the Revenue Department during the year under report is given below.

Area covered	Total amount to be recovered
39,932	... Rs. 1,62,957-00

CHAPTER IX

AGRICULTURAL EXTENSION

(A) *Scheme for Intensive Cultivation of Paddy by Japanese Method.*—The scheme for intensive cultivation of paddy by Japanese Method started from the year 1953-54 in all the paddy growing districts and continued during the year 1959-60.

The following programme was fixed for the year 1959-60—

- (i) To arrange 300 demonstration plots on guarantee basis.
- (ii) To extend area under Japanese Method to 18,300 acres (excluding the area under the Paddy Pilot Scheme) and
- (iii) To advance *Tagai* loans to the tune of Rs. 10 lakhs, to the rice growers under the scheme.

The achievement under some of the above items was as given below.

Demonstration plots to the extent of 943 each of about 10 to 15 gunthas were arranged in the paddy growing districts. An area of 7,821 acres was covered under improved method of paddy cultivation.

(B) *The Pilot Scheme for Intensive cultivation of paddy in Paddy Areas.*—With a view to step up paddy production by bringing the largest possible acreage under Intensive Cultivation and to enable the average paddy grower to adopt the Japanese method of cultivation by making available technical advice and necessary finance, the Pilot Scheme, for intensive cultivation in paddy areas was launched in 6 blocks with a targetted area of 1,25,000 acres in Gujarat region.

Out of 26 blocks, 6 blocks, with a targetted area of 1,25,000 acres, were transferred to this region, out of which 1,12,658 acres of area was brought under cultivation. Under this scheme, 5,808 tons of ammonium sulphate and 5,811 tons of single superphosphate were distributed to cultivators. The co-operative societies, issued credit of Rs. 31,68,453.00 of which Rs. 13,94,073.00 was in the form of seeds and fertilizers and Rs. 20,74,380.00 was in cash. Demonstration at the various stages of crop growth were arranged on 1,043 plots to educate the cultivators in technical aspects.

The average additional production of paddy, per acre in the region due to adoption of Japanese Method based on the results of random crop cutting survey was 7.63 B. Mds.

The Department of Agriculture attended to the technical guidance, propaganda and demonstrations to convince the cultivators to adopt J. M. P. cultivation while the Co-operative Department looked after the financial side.

(C) *Kharif and rabi crops campaigns.*—*Kharif* and *rabi* crops campaigns were launched by State Government as a part of nation-wide campaign initiated by Government of India for increasing production of principle food crops, during *kharif* and *rabi* seasons. Paddy, *kharif jowar* and *bajri*, the main food crops and groundnut and cotton, the main cash crops generally rotated with these crops were included in the *kharif* campaign, while *rabi jowar* and wheat were included in the *rabi* campaign. These campaigns were launched both for intensive and extensive cultivation in suitable areas in the region.

(a) *Kharif campaign.*—The following were the targets of acreages fixed and achievements under the two phases in the region.

(1) Crop : *Paddy*

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		acres	acres	acres	acres
1	Ahmedabad	1,25,000	1,30,000	1,12,658	1,55,228

(2) Crop : *Kharif jowar*

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		acres	acres	acres	acres
1	Ahmedabad	10,000	75,000	9,909	77,994

(3) Crop : *Bajri*:

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		acres	acres	acres	acres
1	Ahmedabad	50,000	1,85,000	50,285	2,29,447
2	Rajkot	27,000	90,000	18,936	76,920
	Total	77,000	2,75,000	69,221	3,06,367

(4) Crop : *Groundnut*

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		acres	acres	acres	acres
1	Ahmedabad	5,000	21,000	5,000	82,896
2	Rajkot	50,000	2,04,000	37,835	1,96,600
	Total	55,000	2,25,000	42,835	2,79,506

(5) Crop : *Cotton*

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		acres	acres	acres	acres
1	Ahmedabad	9,000	2,80,000	9,000	4,94,855
2	Rajkot	40,000	1,50,000	33,958	2,55,136
	Total	49,000	4,30,000	42,958	7,49,991

Under the campaign, improved seeds and fertilizers were distributed to the cultivators both in cash and in kind as given below.

S. No.	Division	Quantities of improved seed distributed (B. Mds.)				
		Paddy	<i>Khraif jowar</i>	<i>Bajri</i>	Ground- nut	Cotton
1	Ahmedabad	... 10,487	1,778	14,763	43,486	41,495
2	Rajkot	... ..	...	5,217	1,54,836	68,252
	Total	... 10,487	1,778	19,980	1,98,322	1,09,747

Quantities of fertilizers distributed

S. No.	Division	Ammoni- um sulphate	Ammoni- um sulphate nitrate	Urea	Manure mixture	Triple- phosphate	Single superphos- phate
		Tons	Tons	Tons	Tons	Tons	Tons
1	Ahmedabad	... 7,660	599	283	112	35	2,030
2	Rajkot	... 2,040	...	...	1,568	...	3,461
	Total	... 9,700	599	283	1,680	35	5,491

Sufficient quantities of different insecticides and fungicides were stocked at convenient places for distribution to cultivators; to control the pest and diseases under the campaign at 25 per cent subsidised rates. Following quantities were distributed—

S. No.	Division	Sulphur lbs.	Gamm- exeno lbs.	Endrin lbs.	DDT lbs.	BHC lbs.	Agr-san lbs.
1	Ahmedabad	... 33,016	20,158	193	218	40,659	495
2	Rajkot	... 10,976	14,891	1,312	850	29,789	7,361
	Total	... 43,992	35,049	1,505	1,068	70,448	7,856

As a first step towards launching of campaign, 'Dummy demonstrations' training programmes were arranged to impart training in improved methods of cultivation of these crops and technique to the development staff at different levels and to the cultivators, during the month of April and May 1959. Under this programme, 5,718 dummy demonstrations were held at divisional, district, taluka and village levels. The divisionwise information was as given below.

S. No.	Name of Division	Demonstrations	Cultivators attended
1	Ahmedabad	4,297	58,164
2	Rajkot	1,421	23,235
	Total	5,718	81,399

Crop Finance.—The Total crop finance issued by the central financing agencies through the Co-operative Societies was to the tune of Rs. 2,71,36,534.00 including crop finance given under paddy pilot scheme. Divisionwise distribution was as given below—

S. No.	Division	Crop finance distributed
		Rs.
1	Ahmedabad	2,25,96,624.00
2	Rajkot	45,39,910.00
	Total	2,71,36,534.00

(b) *Rabi crops campaign.*—The campaign was first launched in the year 1958-59 and was continued during 1959-60. Two important food crops *rabi jowar* and wheat were selected during this season under the campaign. The following were the targets of acreage fixed and achievements under the two phases in the region.

(1) *Rabi jowar*

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		acres	acres	acres	acres
1	Ahmedabad	61,000	1,55,000	42,148	1,26,150
2	Rajkot	...	...	...	...
	Total	61,000	1,55,000	42,148	1,26,150

(2) *Wheat*

S. No.	Division	Targets		Achievements	
		Intensive	Extensive	Intensive	Extensive
		acres	acres	acres	acres
1	Ahmedabad	66,000	3,30,000	77,799	3,10,735
2	Rajkot	35,000	1,50,000	28,009	1,03,441
	Total	1,01,800	4,80,000	1,05,808	4,14,166

Improved seed distributed

S. No.	Division	Rabi jowar	Wheat
		B. Mds.	B. Mds.
1	Ahmedabad	2,695	38,381
2	Rajkot	...	31,597
	Total	2,695	69,978

Fertilisers distributed

S. No.	Division	Ammono- nium sulphate	Ammono- nium sulphate nitrate	Urea	Manure mixture	Super- phosphate
		tons	tons	tons	tons	tons
1	Ahmedabad	4,004	206	41	200	1,022
2	Rajkot	1,191	...	...	612	1,345
	Total	5,195	206	41	812	2,368

A training programme as executed during *kharif* season was organised from August 1959 to October 1959. The demonstrations executed under the programme divisionwise were as under.

S. No.	Division	No. of demonstrations	No. of cultivators attended
1	Ahmedabad	...	2,695
	Rajkot	...	500
	Total	...	3,195
			62,586

Sufficient quantities of different insecticides and fungicides were stocked at convenient places for distribution to cultivators to control the pests and diseases under the campaign at 25 per cent subsidised rates. Following quantities were distributed.

S. No.	Division	Sulphur	Agrosan	Zinc phosphate	B. H. C.	Endrin
		lbs.	lbs.	lbs.	lbs.	Gallons
1	Ahmedabad	...	12,882	1,008	67	11,200
2	Rajkot	...	224	2,576	860	6,160
	Total	...	12,556	3,584	427	17,360

Crop finance.—The total crop finance issued by the Central Financing Agencies through the Co-operative Societies was to the tune of Rs. 7,29,73,236.00. Divisionwise distribution was as below :

S. No.	Division	Rs.
1	Ahmedabad	...
		6,98,41,916-00
2	Rajkot	...
		31,31,290-00
	Total	...
		7,29,73,236-00

The estimates of additional production during the rabi season under the campaign were 50,638 tons of food grains as detailed below.

S.No.	Division	Rabi jowar tons	Wheat tons
1	Ahmedabad	9,258	23,321
2	Rajkot	...	18,059
	Total	9,258	41,380

(D) *Grant-in-aid to Taluka Development Boards/Associations for Agricultural Propaganda.*—The grant-in-aid is given to the Taluk Development Boards/Associations where qualified fieldmen are appointed by the Taluka Development Boards/Associations. The Taluka Development Boards/Associations have to do the following items of work.

(a) Advise the cultivators for adopting various improved agricultural methods.

(b) Co-ordinate the activities of the Department with the members of the Taluka Development Boards/Associations.

(c) Organise demonstrations of improved practices in crops in the taluka for which Taluka Development Association has been formed.

(d) Organise trial-cum-demonstration centre at his headquarters.

(e) Organise various Weeks observed in the State from time to time.

(f) Supply of seeds, fertilisers etc. if the work is not discontinued by the Development Boards/Associations.

An amount of Rs. 915.00 was given to 4 Taluka Development Boards/Associations during this year duly recommended by the Collectors and verified by the Co-operative Department.

(E) *Agricultural Demonstration Centres.*—The total number of Agricultural Demonstration Centres during the year under report was 327, as given below.

Division	No. of Agricultural Demonstration Centres
1. Ahmedabad	37
2. Baroda	290
Total	327

As usual these centres proved a great asset in promoting the cause of improved methods among the cultivators in general.

(F) *Information Unit*.—Agriculture and Forests Department of Bombay State sanctioned a scheme for establishing Agricultural Information Unit in September 1958. The scheme actually started in the month of December 1958 by the appointment of the Agricultural Information Officer. The object of the Information Unit is to give publicity to various activities of the Agricultural Department and to form a connecting link between the research institutes, the extension staff and the cultivators by setting up of an organisation for dissemination of technical information, to represent the activities of the Department in the exhibitions held in various parts of the State. It is contemplated in the scheme to revise the leaflets and pamphlets, folders and posters useful for publicity in various campaigns and as guides to the extension workers.

The progress of work done.—The work of printing suitable literature on the *kharif* and *rabi* crops campaign was undertaken and the copies were supplied to all the extension workers and other officers of Agricultural, revenue and Development Departments. Pamphlets, leaflets and circulars were printed on Offset Press, attached to the unit. Seventeen pamphlets on all crops, included in the campaign, were printed from Government Press and distributed. Besides, 36 leaflets were issued which were printed on the Offset Press.

Radio talks on various subjects were also arranged in the Rural Farm Forum Programme of All India Radio Station, Poona, on *kharif* and *rabi* food crop campaigns, seasonal crops and allied subjects. Such talks were also arranged at All India Radio, Rajkot.

The Agricultural Information Officer, attended exhibitions and extended help to the local officers. The important exhibitions are World Agricultural Fair, Grape Shows and Mango Shows.

An attempt has been made to prepare four movie films on Poona method of *jowar* cultivation, Intensive Method of wheat cultivation, World Agricultural Fair at New Delhi, and Grape Show. Besides, the Photographer in the Information Unit moved in the State and collected photographs for publicity.

The Unit is also dealing with a number of queries received from the cultivators and extension workers. The demand of old and new pamphlets by the cultivators and extension workers is also met with by the Unit.

CHAPTER X

AGRICULTURAL EDUCATION

Agricultural Education forms one of the important activities of the Agricultural Department. The object of imparting agricultural education is to train young men to become efficient farmers, and good research and extension workers at all levels.

During the period under report, there has been considerable expansion in every aspect of the agricultural education.

A. AGRICULTURAL COLLEGES

There is one grant-in-aid Agricultural College at Anand (District Kaira) in the Gujarat region to provide educational facilities. The duration of the course at the Agricultural College, Anand, is four years after S. S. C. In order to meet the requirements in respect of agricultural graduates for manning the various departmental posts, the admission capacity of the College has been enhanced from 150 to 257 during 1959-60.

During the period under report, every effort was made to provide better educational facilities to meet the growing needs of the region.

The number of students admitted in the 1st year was 244 and the actual strength of the students was 569 in the College during the year. During the year under report, 71 students graduated from this College. This College continued to provide facilities for the post-graduate training leading to the degree of M. Sc. (Agri.) in almost all the subjects in Agriculture. In all, 13 students were declared successful in that examination at Anand.

Free studentships were granted to the students whose parents' incomes do not exceed Rs. 900-00 per annum.

B. AGRICULTURAL SCHOOLS

The number of agricultural schools in the region is 10 out of which 4 are grant-in-aid institutions and 6 were run by Government.

The total strength of students in all the 10 schools was 294 in the first year, and 287 in the second year as against the sanctioned strength of 350 in each year. The details are given in the statement No. 1.

C. BASIC AGRICULTURAL SCHOOLS

There is no Basic Agricultural School in the region.

The trainees could not be admitted at Morvi, since the Centre has been converted to integrated training centre during this year.

D. EXTENSION TRAINING CENTRES

During the year under report, two extension training centres continued to impart training to *Gramsevak*s in the region. These Centres are located at Baroda and Anand. The centre at Anand is run as grant-in-aid while the other at Baroda is run by Government.

A course of six months was conducted at all the extension training centres and the candidates were selected by the Department of Agriculture. The total sanctioned capacity of these two centres was 193. Actually 109 candidates undertook training, out of which 149 candidates successfully passed the course, and 50 candidates were still under training. The details are given in statement No. 2 appended.

E. GRAMSEVAK TRAINING CENTRES

A two year integrated course has been started this year at 5 centres in the region, viz., Junagadh, Baroda, Anand, Morvi and Surat. The institution at Anand is run on grant-in-aid basis while the rest are run by Government.

This course has been started to train persons for posts of village level workers in the Development Blocks. The minimum qualifications for admission to this course is vernacular final examination passed plus diploma from an agricultural school or matriculation or secondary school certificate examination passed. The candidates are trained in basic knowledge of certain important subjects related to the rural development work.

A total number of 302 candidates were on the roll as against the sanctioned strength of 350 as per details enclosed in statement No. 3.

F. HOME SCIENCE WING

One year's training in Home Science is imparted to *Gramsevika* trainees in two home science wings at Junagadh and Baroda. The centre at Baroda is grant-in-aid institution while the centre at Junagadh is run by Government.

G. WORK-SHOP TRAINING CENTRES

In these institutions, the selected artisans are trained for a period of one year in smithy, carpentry and masonry work to enable them to establish modern workshops in villages with Government aid. Workshop wing is attached to *Gramsevak* Training Centre, Junagadh.

H. GARDENERS' TRAINING CLASSES

The class started in the year 1957 and was continued at Junagadh with the object to train the sons of cultivators in the technique of gardening. The duration of the course is 6 months and each trainee domiciled in this region is paid stipend of Rs. 30.00 p. m. during training. The number of students trained successfully was 19 during the year.

*I. SOIL CONSERVATION TRAINING INSTITUTE

In order to ensure sufficient availability of technical manpower to fulfil the targets fixed for soil conservation works and to have adequate personnel trained in soil and water conservation problems, the training programme of VII, VIII and IX batches of trainees was started. The details are as under.

Institute	Batch No. with period	Trainees	Trainees absorbed in Department
Soil Conservation Training Institute, Morvi.	VII 1-2-59 to 31-7-59.	89	86
	VIII 1-8-59 to 31-1-60.	76	76
	IX 1-2-60 onwards.	56	Training in progress.

*Grant-in-aid.

STATEMENT NO. 1

Statement showing the number of students on roll in each of the classes of the Agricultural Schools during 1959-60:

S. No.	Name	Sanctioned strength of the school	Students on roll	
			1st year	2nd year
1	Agricultural School, Dohad (Dist. Panchmahals).	50	25	24
2	Agricultural School, Baroda (Dist. Baroda) ...	60	30	30
3	Agricultural School, Jagudau (Dist. Mehsana)	40	20	20
4	Agricultural School, Dhari (Dist. Amreli) ...	80	40	35
*5	Agricultural School, Anand (Dist. Kaira) ...	100	50	30
6	Agricultural School, Charodi (Dist. Ahmedabad)	50	26	24
7	Agricultural School, Sansora ...	80†	...	29
8	Agricultural School, Aliabad (Dist. Halar) ...	100	37	33
9	Agricultural School, Vandhya (Dist. Kutch) ...	40	20	18
10	Agricultural School, Manvdar (Dist. Junagadh)	100	46	33
	Total ...	700	294	276

*Grant-in-aid school.

†Lok Bharati Sansora decided to close Agricultural School Section. No fresh admission given.

STATEMENT No. 2

Extension Training Centre

Statement showing the candidates on roll and candidates passed out—

Name of the centre	Sanctioned strength	Candidates on roll	Candidates passed out	Remarks	
1 Baroda	...	50	50	...	Will reappear in September 1960.
		110	111	111	Passed in September 1959.
2 Anand	...	88	88	88	Passed in September 1959.
Total	...	198	199	149	

STATEMENT No. 3

Gramsevak Training Centre

Name of the Centre	Sanctioned strength	Candidates on roll	Remarks
1 Junagadh	—	...	Information not received.
2 Baroda	—	70	64 Admitted from April 1959
		70	61 Admitted from October 1959
3 Anand	—	70	58 Admitted from March 1959
4 Mevri	—	70	51 Admitted from October 1959.
5 Surat	—	70	68 Admitted from October 1959.
Total	—	350	302

CHAPTER XI

GENERAL AGRICULTURAL RESEARCH AND
AGRICULTURAL ECONOMICS

1. AGRICULTURAL RESEARCH

Paddy

Experiment on Chinese method of paddy cultivation.—The experiment was conducted at the instance of the Indian Council of Agricultural Research, New Delhi, to determine the merits of Chinese method of paddy cultivation as against Japanese and Departmental methods.

At Dabhoi, Chinese method gave 910 lbs. yield per acre as compared to 872 lbs. by Departmental method.

2. AGRICULTURAL ECONOMICS

The Planning Commission's Scheme for Studies into the Economics of Farm Management was conducted by this Section from 1954 to August 1958. During the year under report, a comprehensive report for the data pertaining to the year 1956-57 i. e. last year of the scheme, was prepared and submitted to the Research Programmes Committee of the Planning Commission. A very useful information pertaining to the Economics of Farm Management has been collected in the scheme.

The scheme for Studying Economics of Bunding was started during the year under report. The scheme aims at substantiating with facts and figures the important advantages claimed on account of Bunding. Data from 20 cultivators from 2 villages in the region was collected in the three questionnaire forms specially prepared for the scheme. Crop cutting tests, actual water levels in the wells of the bunded areas were also undertaken from the sub-sample selected for the purpose. This would give the idea of increase in yield, increase in water levels etc. The scheme is partly financed by the Indian Council of Agricultural Research, and partly by the Department.

This section was also managing the Scheme for Award of Prizes to Cultivators for maintaining farm accounts. Besides, these research schemes, useful research on different problems in Agricultural Economics was also conducted through post-graduate students.

CHAPTER XII

ACTIVITIES OF THE DEPARTMENT OF AGRICULTURE FOR
THE WELFARE OF BACKWARD CLASSES

(A) *Model Agricultural Projects.*—The Scheme for organisation of model Agricultural Project of Nawapur and Amoda in West Khandesh district was first sanctioned for a period of three years from 1st April, 1949 and has been continued further from year to year. The provision during the year 1959-60 was to the extent of Rs. 12,520-00 against which the actual expenditure incurred was Rs. 938-00.

The scheme for organisation of the Model Agricultural Projects at Gotib in Panchmahals and Kapura in Surat, was first sanctioned for a period of one year from 1st March, 1955 and has been continued from year to year. An amount of Rs. 24,700-00 was sanctioned during the year 1959-60 out of which Rs. 17,439-00 were utilised.

(B) *Maintenance of Agricultural Projects at Juvli in Akkalkuwa taluka and Bhil-Jamboli in Nandurbar taluka in West Khandesh.*—The scheme for organisation of Model Agricultural Projects in Javli (taluka Akkalkuwa) and Bhil-Jamboli (Nandurbar taluka) in West Khandesh was sanctioned for a period of one year from 1st March 1949 and has been continued from year to year. The amount of Rs. 4,050-00 was sanctioned during 1959-60 out of which Rs. 1,834-00 were utilised.

The object of the Model Agricultural Project is to hold demonstrations of improved methods and practices on cultivators fields and to assess the economic advantages which result from the introduction of all the agricultural improvements followed on the holdings of cultivators in selected villages.

(C) *Agricultural Demonstration Centres.*—The scheme for maintenance of eight Agricultural Demonstration Centres in Backward Class area of West Khandesh was continued during this year also. An amount of Rs. 6,489-00 was spent during the year under report.

The object of these centres is to demonstrate the improved agricultural Practices to the 'Bhil' cultivators by introducing agricultural improvements on the fields of selected cultivators.

(D) *Supply of vegetable seeds and sweet potato vines to the scheduled tribes cultivators at half cost.*—The scheme was sanctioned at an estimated cost of Rs. 4,000-00. Under the scheme, vegetable seeds and sweet potato vines were raised at the three agricultural

schools in Gujarat in the vicinity of the Scheduled areas and supplied at half cost to the Scheduled Tribes cultivators. The actual expenditure incurred was Rs. 2,485-00.

(E) *Scheme for reclamation of waste lands belonging to Backward Classes.*—Reclamation work of waste lands belonging to or granted to Scheduled Caste, Scheduled Tribes and Backward Class cultivators was undertaken at Government cost. The information regarding area covered and the expenditure incurred under this scheme is shown below:—

Gujarat:—area covered	...	acres 153
Expenditure	...	Rs. 92,253-00

(F) *Special measures for scheduled areas and under-developed areas.*—

(a) *Construction of irrigation wells in the Scheduled areas.*—Under the scheme a subsidy of Rs. 1,500-00 is granted to cultivator belonging to Scheduled Tribes in three equal instalments of Rs. 500-00 each for construction of a new well. An amount of Rs. 67,601-00 was actually paid for construction of 63 wells.

(b) *Centrally sponsored programme for the development of under developed rural areas.*—Under the scheme for development of agricultural lands for welfare of undeveloped rural areas, an area of 706 acres was developed at an expenditure of Rs. 353-00.

(c) *Centrally sponsored programme—Construction of irrigation wells.*—During the year 1955-60, Government have sanctioned a scheme for construction of irrigation wells in under developed areas. The scheme envisages construction of 1-7 new wells in 5 districts of the region. Under this scheme, a loan of Rs. 5 0-00 and subsidy of Rs. 1,500-00 for each well were granted to a cultivator of Backward Class. During the year 1955-60, amounts of Rs. 73,275-00 and Rs. 59,812-00 were provided for loans and subsidy respectively for 187 wells.

(G) *Educational facilities to Backward Classes*

(a) *Agricultural Colleges.*—Free studentships were granted to the students whose parents incomes do not exceed Rs. 90-00 per annum in all the Agricultural Colleges.

(b) *Agricultural Schools.*—Ten per cent seats have been reserved for admission to Backward Class candidates in all the five Agricultural Schools of this region and the condition that a

candidate must be a farmer's son has been relaxed in case of Backward Class students. As regards age limit, admission is open to all the candidates between 16 and 30 years of age and no special age relaxation is made for the Backward Class candidates.

In case of *Gramsevak*s Training Centres and Home Science Wings the following reservations of seats are made for *Gramsevak* and *Gramsevikas*:

- | | | |
|-------------------------|-----|-------------|
| 1. Scheduled Caste | ... | 6 per cent. |
| 2. Scheduled Tribes | ... | 7 per cent. |
| 3. Other Backward Class | ... | 9 per cent. |

The age limit of 30 years in ordinary cases is relaxable upto 35 years in case of Scheduled Caste, Scheduled Tribes and Other Backward Class candidates both for *Gramsevak*s and *Gramsevikas*.

Recruitment to the post of *Gramsevak*s and *Gramsevikas* is made by the Commissioners of Revenue Divisions.

(H) *Scheme for award of prizes to Scheduled Tribes cultivators or taking part in crop competitions.*—The standard of cultivation of Scheduled Tribes cultivators is generally much lower than that of the cultivators belonging to other classes. The Scheduled Tribes cultivators cannot, on account of their lower standard of cultivation, expect to secure the prizes offered for obtaining the highest yields of the staple crops under the crops competitions organised by the District Development Boards under the crop competition schemes. Unless there is some hope of getting a prize there can be no incentive to the Scheduled Tribes cultivators to take part in crop competitions and obtain high yields. In order therefore, to induce Scheduled Tribes cultivators to take part in crop competitions, it is necessary to have a separate prize for a Scheduled Tribes cultivator who obtains the highest yield of the staple crop of the taluka from among the competitors belonging to the Scheduled Tribes. Government have sanctioned an amount of Rs. 1,800-00 for organising crop competitions among Scheduled Tribes cultivators.

APPENDIX I

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, GRAMSEVAK
TRAINING CENTRE, BARODA, DURING THE YEAR 1959-60

A. Location

It is located at the Agricultural School Farm, Baroda, which is one mile away from the railway station.

B. Staff

Shri H. J. Vadodaria held the charge of the post of the Principal throughout the year under report.

C. Brief Information on each course, its Syllabus
and Duration

The Centre started working from the 1st May, 1956. The subjects taught to the trainees of the six months extension course are Agricultural Extension, Co-operation, Education, Public Health, Village *Panchayat*, Roads and Building and First Aid. Out of 112 trainees admitted in April 1959, 111 trainees were successful in the examination held in September 1959.

The session of two year integrated course commenced at the Centre from the 16th October 1959. Due to late selection of the trainees by the District Selection Committee of each district the actual admission started in December 1959. Seventy trainees were admitted at this Centre but at present there are 61 trainees.

The subjects included in the two year integrated course are (i) Soil Management and Agricultural Engineering, (ii) Crop Husbandry, (iii) Horticulture and Plant Protection, (iv) Animal Husbandry, (v) Co-operation, (vi) *Panchayat*, (vii) Public Health, (viii) Social Education, (ix) Extension, Principles and Program Planning, (x) Minor Engineering Works and (xi) Rural Industries.

To meet the shortage of *Gramsevak*s, a short course of six months extension training, commenced from the 16th April 1960 for the candidates holding a diploma in Agriculture. Out of the sanctioned strength of 60 trainees, 50 were admitted and all are continuing at present.

D. Facilities

(a) *Demonstration Farms*.—The Agricultural School Farm comprising of 88 acres is used for the practical training in the subjects of agriculture, animal husbandry and horticulture.

(b) *Demonstration equipment.*—The tools, implements and machinery of the school are used for teaching the subjects. In addition some dairy equipment, farm tools and implements and horticultural equipment were purchased for teaching purposes from the funds of the Centre. One projector, generator and transformer were received at the Centre at teaching aids.

(c) *Class-rooms.*—Two new rooms are constructed. Office building and dairy building are under construction.

(d) *Hostel.*—There is accommodation for 80 trainees in the newly constructed hostel and 30 in the old hostel of the Agricultural School. Thus, there is a provision of 110 trainees in the hostel. Hostel accommodation for the remaining 30 students is to be provided.

(e) *Reference material.*—The library of the Agricultural School having about 3,400 books is utilised by the trainees. Books on agricultural and allied subjects were received from the T. C. M. In addition, about 500 books and charts on different subjects were purchased. About 35 periodicals and magazines are subscribed.

(f) *Recreation facilities.*—Sports material and musical instruments were purchased by the Centre which are used by the trainees. A play-ground is provided for the out-door games.

(g) *Transport facilities.*—One jeep and one personnel carrier are supplied to the Centre.

(h) *Visual aids.*—A projector is utilised at the Centre and in the village work for showing different films on various subjects.

E. Training Programme

(a) *Objective.*—The object of the Centre is to impart training in various subjects of village developments and their extension methods to the trainees and thus turn out *Gramsevak*s to meet the personnel required for the Development Blocks during the Second and Third Five Year Plans.

(b) *Work plan.*—To impart theory and practical training to the trainees in the subjects included in the courses.

(c) *Teaching methods.*—Trainees are given training through theoretical lectures and practical lessons in each subject. More stress is given to the practical training. For this purpose, in addition to giving practical lessons at the Centre, the trainees are taken to the nearest National Extension Service Block for one week every month for village work. The lecturers also stay with them for the whole week to guide them in their work.

(d) *Admission.*—The direct and departmental trainees are selected by the District Selection Committee formed by the officials and non-officials appointed by Government. The trainees have to undergo an 'aptitude test' comprising of walking test, agricultural practices, tests, entertainment programme and playing games before personal interview. The candidates so selected are sent to the centre for training.

(e) *Stipends.*—The departmental trainees are paid a stipend of Rs. 25.00 per month in addition to their usual pay and allowances during the training period. The direct recruit trainees of two year course as well as six month course are paid a stipend of Rs. 40.00 per month.

(f) *Examinations.*—There is a Board of Examiners consisting of a representative of the Central Government, Assistant Commissioner (Development) Ahmedabad, Extension Training Officer Extension Training Centre, Anand and the Principal, of this Centre for setting up papers for the six month extension course. Last examination for this Centre was held in September 1959. For two year integrated course there is no examination for the first year but at the end of 21 months final examination is to be conducted. During this period, only periodical tests are to be conducted for each subject according to syllabus of the course.

(g) *Selection of the villages for field work.*—The trainees are taken to stage I Block, Padra, district Baroda, for village work. The villages are selected in consultation with the Block Development Officer. In each selected village, 12 trainees are sent for practical field work. For want of bus type of vehicle, much time of the trainees is consumed in going to and returning from the villages.

F. Practical work done in the Project Area by the Trainees

During the year under report, the trainees were taken to the villages of Padra Block at a distance of about 40 miles from the centre. During the stay in these villages, they carried out practical work in various subjects in addition to the public contact and many other duties. The details are given below:

(1) Demonstration of compost pits and method of filling improved seeds, fertilizers, insecticides and fungicides, (2) Preparation of farm yard manure pits and repairing of old ones, (3) Propaganda and distribution of agricultural implements, grafts, seedling improved seeds, fertilizers and green manure seeds, (4) Construction of soak pits, smokeless *chulas* and odourless urinals, *Gramsaf*

programme and disinfection of wells, (5) Absent school children successfully persuaded to go to school, (6) Organised group discussions, *bhajan* programmes, meetings with the help of local leaders, (7) Taught the students of the primary schools to play games without any cost and equipment, (8) Organised youth clubs and literary classes, (9) Repaired old cattle byres and treated the animals with local medicines as a preventive measure, (10) Propaganda of the *khari* and *rabi* crops campaigns in all villages, (11) Organised one drama successfully, (12) Helped the vaccinator in vaccination, (13) Propaganda and formation of new co-operatives and to increase the membership of the existing ones and (14) Arranged projector film shows.

APPENDIX II

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, GRAMSEVAK
TRAINING CENTRE, JUNAGADH, DURING THE YEAR 1959-60

A. Location

The centre is at a distance of $1\frac{1}{2}$ miles from the Junagadh railway station.

B. Staff

Shri N. M. Patel held the charge of the post of the Principal upto 20th July, 1959 and thereafter by Shri P. C. Mehta on his transfer.

C. Brief information on each course, its Syllabus
and Duration

There are three courses at this centre: (a) Two year Integrated Course for *Gramsevak*s, (b) Home Science Wing for *Gramsevik*as, (c) Workshops Wing for village artisans.

The Basic Agriculture Course and the Extension Course were discontinued from the 30th September 1959 and 31st March 1960 respectively.

(a) *Two year integrated course*.—The course is of two years duration during which the following subjects are taught—

(1) Agriculture-I, (2) Agriculture-II, (3) Horticulture and Plant Protection, (4) Animal Husbandry, Dairy and Poultry, (5) Extension-Principles and Methods, (6) Social Education, (7) Co-operation and *Panchayat*, (8) Public Health and Sanitation, (9) Rural Industries and (10) Rural Housing, Roads and Engineering.

(b) *Home science wing*—

(1) Agriculture and allied subjects including Animal Husbandry, Poultry and Bee Keeping, (2) Extension Philosophy and Technique, (3) Mother and Child-care, (4) Food and Nutrition, (5) Home Management, (6) Clothing, (7) Craft, (8) Co-operation, (9) Health and Sanitation, (10) Office procedure and records.

(c) *Workshop wing*—

(1) Establishment of workshop, (2) Providing equipment for workshop, (3) Material for construction, (4) Elementary study of machine parts and hardware materials, (5) Safety precaution

and first aid, (6) Workshop tools used in villages, (7) *Deshi* or indigenous implements, (8) Improved and modern implements, (9) Miscellaneous implements, (10) Methods of improving agricultural implements, (11) Manufacture of agricultural implements, (12) Extension approach in agricultural engineering.

The basic agricultural course comprised of training in (1) Agriculture-I, (2) Agriculture-II, (3) Agriculture-III, (4) Agricultural Engineering, (5) Animal Husbandry, (6) Veterinary, (7) Forestry and Soil Conservation.

The extension course comprised of training in (1) Social Science, (2) Social Education, (3) Agricultural Extension, (4) Public Health, (5) Co-operation, (6) *Panchayat*, (7) Village Housing and Roads, (8) Soil Conservation.

D. Facilities

(a) *Demonstration farm*.—The Centre has got 50 acres of land for field practicals and demonstrations.

(b) *Demonstration equipment*.—The Centre is fully equipped with equipment for practical training in the camps and fields. Both local and improved implement, other tools, laboratory facilities for canning and preservation, dairy and veterinary equipment and material for first aid are provided at the Centre. The Centre possesses audio-visual aids like projector, filmstrip-projector, magic lantern and camera.

(c) *Class-room*.—In the present buildings, class room facilities for integrated course are available but with the increased strength of the trainees the proposal for two additional class-rooms has been submitted for sanction. As regards Home Science Wing a proposal has been submitted for construction of a central training hall which is expected to be constructed during the current year. The present facilities cannot be considered adequate with increased strength. For the Workshop Wing, adequate facilities for class room are available.

The Centre has a well equipped museum and laboratory.

(d) *Hostel*.—The present hostel accommodation for *Gramsevikas* is inadequate. The two blocks can accommodate only 80 trainees. A proposal has been submitted for the third hostel block and Government sanction is awaited. The hostel accommodation for *Gramsevikas* is also not adequate. At present, the trainees stay in *Manahar Kutir*. Hostel blocks have been constructed for 20 trainees and a proposal for additional block for 20 trainees has been submitted. The work is likely to start during the current year.

The hostel accommodation for the trainees of workshop wing is adequate.

(e) *Reference material.*—The Centre has got a very good library. All the publications are being received for the trainees as well as instructors.

(f) *Recreation facilities.*—The Centre has got good recreational facilities. Two radio sets (one for *Gramsevak*s and the other for *Gramsevik*as) have been kept in the hostel. Musical instruments like harmonium, *tabla*, *manjira*, *sitar* and gramophone are with the Centre. Volley-ball, table tennis, carom and Athletic games are played by the trainees. The recreational programmes are also organised by them.

(g) *Transport.*—Under T. C. M. programme, 4 vehicles have been provided which are sufficient.

(h) *Visual aids.*—The Centre has been equipped with necessary visual aids. They are being utilised as and when necessary. With the change in pattern of the Centre, the post of the Audio Visual Operator (Projectionist) was abolished. On account of this the use of the aids has been limited. A trained person is badly required.

E. Training Programme

(a) *Objective.*—To work among the people to raise their standard of living. To develop suitable aptitude and skill among the village workers to help villagers to recognise their problems and to work out solutions thereof. To inspire village people to work for better living and to create in them the desire to live better.

(b) *Work plan.*—

Integrated Course ...	1150	periods for theory
	690	periods for practicals
	6	weeks for village work.
Home Science Wing...	558	hours for theory
	134	hours for practicals
	1	week tour in C. D. Block
	4	weeks village work
	1	week examination.

Basic Agriculture Course.		Training at the School
		Training on individual plot
		Training in farmer's field
	627	hours for theory
	918	hours for practicals.
		The course has been discontinued from 31st September, 1959.
Extension Course ...	281	hours for theory
	531	hours for practicals
	1	week camp
	1	week tour in Vanthali, Manavadar and Keshod Block.
		The course has been discontinued from 31st March, 1960.

(c) *Teaching methods.*—The theory is taught by talks and discussions of problems while practicals are taught with practical operations on the field on various subjects. More emphasis is placed on discussions while teaching theory equally so in learning by doing in practicals.

(d) *Admission.*—For all the courses the primary selection is done by the District Selection Committee consisting of Collector (Chairman), District Agricultural Officer, Assistant Registrar, Co-operative Societies, District Project Officer (wherever appointed). In the absence of District Project Officer, a Deputy Collector to be nominated by the Collector, Vice-Chairman of the District Development Board and two non-official members nominated by the Collector. Then candidates are sent for selection test at the nearest centre. Taking into consideration the marks obtained by the candidates the Divisional Commissioners finally select the candidates for training.

(e) *Stipends.*—The trainees receive stipend as under—

Extension Course ...	Rs. 25.00	p.m. Government servant
	Rs. 50.00	p.m. Direct recruit.

Basic Agriculture Course,	Rs. 25.00	p.m. Government servant.
	Rs. 30.00	p.m. Direct recruit.
Home Science Wing...	Rs. 50.00	p.m.
Workshop Wing ..	Rs. 50.00	p.m.
Integrated Course ...	Rs. 25.00	p.m. Government servant
	Rs. 40.00	p.m. Direct recruit.

(f) *Examinations.*—The examinations are held in theory and practicals. The assessment of work and aptitude tests are periodically held. More stress is given to practicals. The procedure for appointing examiners and allocation of marks are made on the model lines prescribed by the Director of Extension and Training, Government of India.

(g) *Selection of villages for field work.*—As the first stage block is near the Centre surrounding villages are selected for the field work. Generally one village is selected for three or four trainees who stay there for village work for one week in each month after taking primary training.

F. Practical Work done in the project area by the trainees

The trainees of extension course and integrated course visited villages for practical training. The survey of the allotted village was carried out by party of three trainees to study the facilities before and after the Development Block was started. The trainees organised recreation programme, *Bhajan* and the village people actively participated. The trainees demonstrated method demonstration for the use of groundnut decorticator, winnowing fan, winnowing machine, spraying insecticides, *Magan Chula* and use of flash cards. For health and sanitation programme, as per block scheme, the trainees prepared people of eleven villages to go for water seal latrines and application for the same was forwarded to the Block Development Officer, Junagadh Bhesan Block. During their village stay, the trainees visited all the fields of progressive farmers and discussed the efficacy of improved methods of agriculture. Demonstration plots were laid out on the cultivators' fields and were given demonstration of improved methods. The trainees of home science wing also visited a few villages in groups and tried to rejuvenate the *Mahila Mandals*. They have organised the meetings and discussed the problems regarding *Mahila* activities that can be taken up.

APPENDIX III

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, GRAMSEVAK
TRAINING CENTRE, SURAT DURING THE YEAR 1959-60.

A. Location

The *Gramsevak* Training Centre is near the Government Farm, Athwa lines, Surat.

B. Staff and Administration

Shri R. Y. Pawar held the charge of the post of the Principal, throughout the year under report.

C. Brief Information on each course, its Syllabus
and duration

Two year integrated course has been started from 1st October 1959 and will be completed by 30th September, 1961. The syllabus prescribed by the Department includes the following subjects:—

(1) Extension, (2) Agriculture, (3) Animal Husbandry, (4) Public Health, (5) *Panchayat*, (6) Minor Irrigation, (7) Social Education, (8) Rural Industries and (9) Co-operation.

The trainees are taken for practical work for a week in each month in various villages in selected blocks.

D. Facilities

(a) *Demonstration*.—No farm is attached to the centre. Trainees are taken to a nearby Government farm for practicals.

(b) *Demonstration equipment*.—Charts, some farm equipment, etc.

(c) *Class-rooms*.—One big hall on the first floor of hired building is used as class room.

(d) *Hostel*.—Four bungalows are hired for hostel. New hostel buildings are under construction at the Government Farm, Surat.

(e) *Reference material*.—A library has been maintained with all necessary books.

(f) *Recreation facilities*.—Volley ball, ring tennis and Indian games are played.

(g) *Transport*.—Only a cargo vehicle has been provided.

(h) *Visual aids*.—No T. C. M. equipment is still received.

E. Training Programme

(a) *Objective.*—Candidates are trained to be qualified as *Gramsevaks* in Development Blocks.

(b) *Work plan.*—The trainees have to attend this for a period of two years.

(c) *Teaching methods.*—Teaching by lectures and using models, whenever necessary in class-room. More stress is given on practical work while teaching.

(d) *Admission.*—In all, 70 candidates were selected out of which 69 joined. Two have been repatriated to their parent Department and one had been transferred to Baroda Centre. Thus, the present strength is 66 trainees.

(e) *Stipends.*—Direct trainees are given Rs. 40.00 per month as stipend and trainees deputed from the Government Departments are given Rs. 25.00 per month as per Government orders. Upto the end of June 1960, Rs. 13,179.00 are given as stipend.

(f) *Examinations.*—Test examinations in all the subjects are undertaken as prescribed in the syllabus by each lecturer at least once in two months. The final examination will be taken at the end of two years' training.

(g) *Selection of villages for field work.*—In Navsari Block, 16 villages are selected and the trainees are sent to these villages in groups. The lecturers also give practical training on the spot explaining what is taught in class-rooms. Besides, experienced villagers also accompany the trainees on the field and explain various agricultural practicals.

F. Miscellaneous Activities

In all, five youth clubs were organised last year and it is proposed to organise five more this year. In all, Rs. 1,101.00 were spent for this purpose last year because the clubs were started at the end of the year.

APPENDIX IV

SUMMARY OF WORK DONE UNDER THE PRINCIPAL, SOIL
CONSERVATION TRAINING INSTITUTE, MORVI,
DURING THE YEAR 1959-60

A. Location

The Institute is situated at a distance of 2 miles from Morvi city and about half a mile from Nazarbāg railway station. The facility to train 100 personnel is available at the Institute. Hostel accommodation for 100 trainees is also available. Stipend at the rate of Rs. 50.00 per month is given to each trainee, during the training period of six months.

The Institute was started in the year 1954 under the control of the Principal, L. E. College, Morvi. The Institute started functioning independently from the L. E. College, Morvi from August 1956. Till the beginning of the year under report, 441 trainees in six batches were trained in soil conservation.

B. Staff and Administration

Shri C. J. Magdum held the charge of the post of Principal, from 1st July 1959 to 16th November 1959 and Shri H. G. Mehta, for the remaining period of the year.

C. Object

The object of starting the Institute is to meet the requirement of trained technical personnel for various soil conservation schemes viz., contour bunding, grass land improvement and demonstration, included in the Five Year Plan.

D. Refreshers' Course

During the year under report, 8 Agricultural Supervisors (fresh graduates) from the Soil Conservation Section were given training for three weeks so as to train them in soil conservation technique followed by the Department and working of the Soil Conservation Section. This course helped them to work satisfactorily and independently in the Soil Conservation Section. Similarly, 18 Agricultural Assistants from sections other than Soil Conservation Section of the Department were imparted training in soil conservation. In addition to this, 19 more Agricultural Assistants are under training and

will be completing it on 31st July 1960. The details of the personnel trained during the period under report are as under :—

Batch No.	Period	Number	Absorbed as Agricultural Assistants in the department	Remarks
VII	1-2-1959 to 31-7-1959	... 89	86	
VIII	1-8-1959 to 31-1-1960	... 75	76	One ex-trainee of VII batch passed in the examination. Training in progress.
IX	1-2-1960 to 31-7-1960	... 56	...	

APPENDIX V

SUMMARY OF WORK DONE UNDER THE AGRICULTURAL CHEMIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60

A. Staff and Administration

Prof. D. K. Ballal officiated as Agricultural Chemist from 25th May, 1959 till 29th October 1959. Dr. H. G. Pandya on return from United States of America, officiated as Agricultural Chemist, from 29th October 1959 to 26th April 1960. Dr. V. K. Leley, Assistant Soil Chemist, Scheme for Expanded Soil Testing Service, held the charge of the post of Agricultural Chemist, in addition to his own duties till Prof. D. K. Ballal took over from him on 16th May 1960.

B. Research

The schemes in progress during the year and the work done under each scheme is summarised below :

(1) *Scheme for investigation into the micronutrient status of the soils of Bombay State Soil Survey.*—Thirty-eight soil samples from Jamnagar and Bhavnagar districts were analysed for different micronutrients as well as mechanical composition, pH and exchangeable bases. Soil samples from Jamnagar are deficient in cobalt and zinc, while soils from Bhavnagar district are low in zinc only.

The data from the previous year was analysed statistically during the year under report and following are the main findings.

Gram did not show any significant response at the Agricultural Research Station, Vijapur.

(2) *Scheme for expanded soil testing service (Poona Centre).*—The scheme was functioning under the control of Central Government till April 1960, when it was taken over by the State Government. During the year, 310 soil samples were collected from the cultivators' fields in Gujarat region. More than 95 per cent of the samples showed a medium to high level of potash. Only 10 per cent of the samples come under the category of high P. Only about 3 per cent of the samples collected were of acidic nature.

(3) *Scheme for the study of nitrogen fixation by important leguminous crops.*—The effects of phosphate and molybdenum on nodulation and nitrogen fixation in the soil were studied in pot-culture experiments in medium black soil in *kharif* and *rabi* seasons. Two *kharif* legumes, *mug* and *udid* and two *rabi* legumes, gram and pea were selected for the purpose. It was observed that application of phosphate and molybdenum had a beneficial effect on the number of nodules and their nitrogen content.

(4) *Pilot scheme for estimating the cost of production of blood-meal.*—The scheme started functioning from November 1959. Varying amounts of blood were treated with different chemicals and the observations regarding the quality, quantity and the time required for the preparation of blood meal were recorded. It was observed that the addition of lime, CaCO_3 , CaSO_4 , citric acid, or FeSO_4 (in presence of H_2SO_4 and HNO_3) had a favourable effect in increasing the quantity of blood-meal or its nitrogen content.

(5) *Fertilizer Control Order, 1957.*—The object of the order is to see that cultivators get fertilizers and manure mixtures of approved quality at a reasonable price and that there is no malpractice in the manufacture and the sale of manure mixture. To achieve this, the manure mixtures prepared by various authorised firms are collected by District Agricultural Officers and Fertilizer Inspectors and these samples are sent to the Agricultural Chemists for analysis. Samples are also received from the Agricultural Iron and Steel Supply Officer, Bombay.

The staff for analysis was actually appointed in July 1959. Since then, 3·5 samples of Gujarat region have been analysed. Out of these, 257 samples were of single superphosphate and 55 were of manure mixtures.

(6) *Model agronomic experiments.*—This scheme is wholly financed by the Indian Council of Agricultural Research and the work is carried out under the technical control of the Agricultural Chemist. The experiments on paddy, irrigated wheat, *jowar* and cotton are being carried out at different centres with a view to study the various aspects of manuring, cultural and irrigation practices and crop rotations, suitable for different regions.

(7) *Scheme for standardisation of methods of soil analysis.*—The methods for the following determinations were recommended for adoption by the State Laboratories.

- (i) Lime requirement of acid soils.
- (ii) Gypsum requirement of alkali soils.
- (iii) Available potassium in soils.

Technical bulletins for the above methods are prepared and sent to the press for printing.

C. Post-graduate Research

Research problems completed during the year were:

- (a) Behaviour of important phosphatic carriers in the three submerged soils of Bombay State.

- (b) Behaviour of nitrogenous fertilizers in submerged rice soils.
- (c) Study of coastal arecanut soils.
- (d) Reclamation of saline soils from Baramati and Manjri.
- (e) Storage of food grains in the presence of DDT and BHC.
- (f) Studies on lipids.

The above studies have revealed that the nitrogenous fertilizers increased the rate of ammonification and availability of other nutrients and the application of phosphatic fertilizers increased the availability of not only P but also of K and Ca and helped in the nitrogen fixation in the submerged rice soils; gypsum is the most effective amendment for saline soils; the contamination of the insecticides have no effect on the chemical constituents of the grains.

: **D. Advisory and Development Work**

Total number of samples received for analysis from Gujarat region during the year were 88. Out of these 30 were from private parties and 58 from Government agencies. In all, 88 samples were analysed during the year under report. Besides, about 300 samples were analysed in the laboratory under different research schemes excluding the samples analysed in the soil testing laboratory and the samples under the Fertilizer control order. Facilities were provided for the analysis of about a thousand samples of soils, plants, etc. to the post-graduate students and staff members from other sections. In addition to the above analytical work, a number of technical queries from cultivators and others were attended to and the necessary advice given.

E. Publications

- (1) "Mowhra Cake as a nitrogenous fertilizer for Sugarcane" Leley, V. K. and Agashe, S. D. Indian Journal of Sugarcane Research and Development, Vol. IV, October-December 1959.
- (2) "Foliar application of urea on wheat" Patil, N. D. and Pandya, H. G. Poona Agricultural College Magazine, Vol. 50, No. 3, November 1959.
- (3) "Oxalate contents of leafy vegetables" Anantha Swamy, T. S., Kamat, V. N. and Pandya H. G. Current Sci., Vol. 41, April 1960.

APPENDIX VI

SUMMARY OF WORK DONE UNDER THE AGRICULTURAL ECONOMIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60

A. Staff and Administration

Principal P. N. Driver held the charge of the post of Agricultural Economist, till 9th May 1960. During the period from 9th May 1960 to 15th May 1960, Shri N. K. Ghumare, Officer-in-charge, Scheme for Studying Economics of Bunding held the charge in addition to his own duties.

B. Research

(1) *Scheme for award of prizes to cultivators for maintaining farm accounts.*—The scheme was continued by the Government of Bombay for the year 1959-60. The areas for working the scheme have been modified and the Gujarat region has been divided into two divisions *viz.*, (a) Gujarat, (b) Kutch and Saurashtra.

During the year under report, data for the competition for *rabi* 1958-59, was received from the farmers through the District Agricultural Officers concerned. It was compiled and scrutinised and prizes amounting to Rs. 1,300.00 were distributed among seven successful competitors. For the competition for *rabi* 1959-60, 263 applications were received from farmers of 14 districts spread over Gujarat region. The proforma for maintaining farm accounts were sent to these new competitors through the District Agricultural Officers concerned. The data from these competitors was expected to reach by the end of July 1960. The scheme is being operated as a Second Five Year Plan Scheme.

(2) *Scheme for studying economics of bunding in Bombay State.*—This new scheme for studying Economics of Bunding came into operation in 1959, after the appointment of the Officer-in-charge. The scheme involves collection of data from 20 cultivators from 2 villages from bunded areas of Gujarat region of the Bombay State. The selection of these cultivators is done by the Statistician of the Department. This year three questionnaire forms specially prepared for the scheme, have been sent to the Soil Conservation staff for collecting the information. Crop cutting tests, water levels in wells have also been taken.

C. Post-Graduate Research

The work of post-graduate teaching continued throughout the year. The following problems were taken up.—

- (a) Economics of Banana cultivation in Khandesh.
- (b) Land use in a Deccan District.
- (c) Rural Unemployment.

D. Advisory and Development Work

Several technical advisory queries were received from the Government of India, the Departmental Officers and other individual and these were attended to.

E. Publications

- (1) "On Agricultural Price Problems," A review by Shri R. S. Savale. (Agricultural College Magazine, August 1959, Vol. 50, No. 3).
- (2) "Farming as a business," by Shri M. P. Dhongade ('Shetkari', May 1960, Vol. 12, No. 9).

F. Miscellaneous Activities

Principal P. N. Driver, Agricultural Economist, remained throughout as a member of different bodies like Royal Economic Society, London, the State Co-operative Institute and the Indian Society of Agricultural Economics.

APPENDIX VII

SUMMARY OF WORK DONE UNDER THE AGRICULTURAL ENTOMOLOGIST, DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA, DURING THE YEAR 1959-60

A. Staff and Administration

Shri S. R. Bagal held the post of the Agricultural Entomologist upto 8th December 1959. Dr. S. K. Dorge took over the charge of the post from 9th December 1959.

B Research

(a) *Scheme to investigate the use of endrin and other insecticides for the control of cotton pests in Bombay State.*—Insecticidal trials were laid on field scale at Agricultural Research Station, Surat. For these trials *Deviraj* and *Vijalpa* varieties of cotton were selected. Similar insecticidal trials were laid out for the control of other cotton pests like jassids, thrips and mites. The results of these trials are being analysed.

(b) *Parasite breeding stations for the control of *Nephantis serinopa* on coconut.*—Survey work to demarcate the endemic areas of *Nephantis serinopa* in coconut growing areas was in progress. Breeding of alternate hosts of larval and pupal parasites of *Nephantis serinopa* was taken up in the laboratories.

(c) *Sugarcane insect pests scheme, Padegaon Nursery pests.*—Field trials were conducted to study relative efficacy of different insecticides in controlling nursery pests such as leaf eating caterpillar and leaf miner. Parathion, lindane (0.25 per cent) and endrin were found to be significantly superior to the other insecticides in the control of leaf eating caterpillar; while in case of leaf miners, endrin, parathion and DDT (0.25 per cent spray) were found to be significantly superior to the rest of the treatments.

C Advisory and Development Work

(a) A large number of queries from the cultivators regarding the control measures of various crop pests and the use of various plant protection appliances were attended.

(b) Both the divisions of the region have been provided with plant protection units, the technical control of which rests with the Agricultural Entomologist.

(c) Inspection of the various insecticides purchased by the Department was also carried out. Similarly, the examination of plant protection appliances purchased by the Department and the new ones manufactured by the various firms was carried out by an Expert Committee appointed by the Department to study the case in their operation and their suitability and efficacy in pest control work.

APPENDIX VIII

SUMMARY OF WORK DONE UNDER THE COTTON SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, SURAT,
DURING THE YEAR 1959-60**A. Staff and Administration**

Shri P. S. Pandya continued as Cotton Specialist, Department of Agriculture, Bombay State, Surat, throughout the period under report.

B. Research*(a) COTTON RESEARCH*

The details of work done on cotton research are given under Chapter IV on Botanical Research.

*(b) AGRONOMIC RESEARCH**RAJKOT DIVISION***Agricultural Research Station, Amreli**

(1) A manurial trial of different forms of nitrogenous fertilisers was continued in its fourth year during 1959-60. The average results of four years indicated that the use of ammonium sulphate gave the highest yield of 288 lbs. per acre.

(2) To study the effect of phosphatic fertilizers on the yield of cotton C. J. 73, an experiment was continued for the fourth season during 1959-60. During the year under report, the treatment of triple superphosphate gave significantly higher yield than the rest and also the average of four years' results revealed that triple superphosphate was the best amongst phosphatic fertilizers.

(3) An experiment to find out optimum spacing between and within rows in combination with fixed dose of nitrogen and phosphorus was continued for the second season during 1959-60. The treatments included in the trial were spacings 18, 27 and 36 inches between the rows and 6 and 9 inches within the rows. Two fixed doses of fertilisers *viz.*, 20 lbs. N+10 lbs. P₂O₅ and 40 lbs. N+20 lbs. P₂O₅ were also included in the trial along with no manured plot as control. The results indicated that the spacings between the rows gave significantly higher yield, and the wider spacing of 36 inches gave the highest yield over the rest. Manured

plots also gave significantly higher yield over control plots. A combination of spacings between the rows either with spacings within the rows or with manures or with both, have given significantly higher yields.

Agricultural Research Station, Umralla

Following experiments are in progress during the year under report—

(1) Rotational experiment to study the direct residual and complementary effect of three levels of N, P_2O_5 and K_2O and two levels of bulky manure on fixed crop rotation under irrigated condition on C. J. 73 cotton and wheat.

(2) Time of application of nitrogen to cotton C. J. 73. Two levels of nitrogen are included in the experiment.

Agricultural Research Station, Junagadh

Seven agronomic experiments on cotton were conducted during the year under report. Out of seven, five were vitiated due to uneven plant population on account of water stagnation as a result of continuous heavy rains.

In case of irrigation-cum-sowing date-cum-spacing-cum-fertiliser experiment, the results indicated that sowing on 27th May having spacing of $3' \times 18'$ with 20 lbs. N gave a higher yield of seed cotton.

In the spacing-cum-manurial experiment it was found that the spacing of $3' \times 2'$ gave more yield than the spacing of $4' \times 2'$. There was no significant difference between the treatments viz., farm yard manure, fertilising with urea and no manure. However, numerically farm yard manure gave slightly better results.

AHMEDABAD DIVISION

Agricultural Research Station, Viramgam

Following experiments were in progress during the year under report—

(1) Manurial-cum-spacing experiment on cotton at Viramgam. The experiment was vitiated due to abnormally wet season.

(2) Effect of burning *jowar* stubbles in cotton fields. The results do not show any advantage of burning *jowar* stubbles on the cotton fields and hence the experiment is discontinued.

Agricultural Research Station, Broach

The rotational experiment with *lang*, *jowar* and mixed crop of *lang* and *jowar* continued this year. This was the 6th year of the experiment and would be continued for two years more. The results indicated that cotton after *lang* gave higher yields followed by cotton after *lang* and *jowar* mixed and *jowar* alone.

A feeler trial was conducted to find out a suitable crop to replace *lang*. The results indicated that *lang* stood first in the yield of grain and second in the yield of fodder, while *wal* stood first in the yield of fodder, and second in grain yield.

At Kadiadra, cultures 92 and *Digvijay* were tried with two spacings viz., 5' x 2' and 2.5' x 2'. Even though the results were not significant, higher yields were obtained in favour of close spacings of 2.5' x 2'.

Agricultural Research Station, Surat

(1) *Rotational experiment*.—The experiment has completed one cycle of rotation. The results indicated that manuring of cotton once in two years either in the year of its cultivation or in the previous year, had given lower yield than manured cotton following *jowar* (unmanured). Cotton following legume (*tur*) gave even better yield than cotton manured after *jowar* (unmanured). Manuring of *jowar* once in two years gave lower yield than *jowar* unmanured following cotton manured.

(2) *Experiment of NPK cum-spacing-cum-farm yard manure-cum-number of plants per dibble on cotton*.—The experiment was started in the year 1957-58. The results indicated that with an increase in the dose of nitrogen there was a progressive increase in the yield of seed cotton. This progressive increase was evident in combination of nitrogen levels with all other treatments viz., P_2O_5 , K_2O , farm yard manure, spacing and number of plants per dibble. Application of P_2O_5 either alone or in combination with other factors did not show any increase in yield. Potash alone did not show increase in yield of seed cotton. Similarly, wider spacing or number of plants per dibble alone was not instrumental in increasing the cotton yield.

(3) *Experiment of spraying phytohormones on cotton*.—This is the third year of the trial. Two phytohormones viz., N. A. A. and P. A. A. were tried in two doses of 10 P. P. M. and 20 P. P. M. The results were not significant indicating that the phytohormonal spray was not useful in enhancing cotton yields.

(4) *Experiment to study the roll of organic manures and fertilisers in crop production and maintenance of soil fertility on cotton.*—This is the second year of the experiment with the following treatments:—

- A—Control.
- B—Bulky manure (5 C. L. per acre) i. e. normal dose.
- C—Bulky manure (2.5 C. L. per acre) i. e. half the normal dose.
- D—No bulky manure + N. P. K. fertilisers equivalent.
- E—No bulky manure + half the dose of above.
- F—Bulky manure + N. P. K. fertiliser equivalent.
- G—Bulky manure + half the above dose.
- H—N. P. + N. P. K. fertilisers equivalent.
- I—Half the dose of above.

The results of the experiment were significant. It was found that N. P. K. given in form of fertilisers either alone or in combination with the bulky manure (D, E, F, H and I) gave better results and was significantly superior to control and bulky manure alone (treatments A, B and C). However, the treatment of bulky manure plus half N. P. K. dose (G) gave significantly less yield than the treatment of no bulky manure plus a full dose of N. P. K. indicating an immediate response of cotton crop to fertilisers alone.

(5) *Experiment of burning jowar stubbles on growth and yield of cotton.*—This is the second year of the trial. The treatment of burning jowar stubbles gave slightly higher yield than the control but the difference was not significant during both the years.

(6) *The experiment of mixed cropping of legume (tur) and cereal.*—The experiment was started in the year 1954-55. The results were significant. Jowar alone or legume (tur) mixed with cereal (jowar) in proportion of 1:1 and 2:1 either sown, mixed or in rows gave significantly higher returns than tur alone or legume and cereal mixed in the ratio of 3:1.

Agricultural Research and Demonstration Station, Kholwad—

The following experiments were undertaken during the year under report.—

- (i) N. P. K.—*cum-spacing-cum-farm yard manure* experiment on 2057 under irrigation.
- (ii) N. P. K.—*cum-spacing-cum-farm yard manure* experiment on *Deviraj* under irrigation.

Agricultural Research and Demonstration Station, Bardoli.—

N. P. K.—*cum-spacing-cum-farm yard manure* experiment on 2087 under irrigation was also conducted at this station.

C. Advisory and Development Work

The Cotton Specialist attended the meeting of Standing Expert Committee for extra long staple cotton work at Abohar in October 1959 and the Seminar on fertilisers and manures held at the World Agricultural Fair, New Delhi, in February 1960.

D. Special item of work

Nil.

E. Publications

The following articles and notes were published by the section of the Cotton Specialist, Agricultural Department, Bombay State, Surat, during the year 1959-60 for the period from 1st July 1959 to 30th June 1960.

1. Pandya, P. S. ... 'Cotton', The Farmer (World Agricultural Fair, special number) January 1960.
2. Pandya, P. S. and Patel, C. T. An interesting case of segregation in a *Hirsutum-Barbadense* cross. Indian Cotton Growing Review, Vol. XIII, No. 4, July 1959.
3. Pandya, P. S. and Patel, C. T. Heterosis and its exploitation in cotton improvement. Indian Cotton Growing Review, Vol. XIII, No. 6, November 1959.
4. Patel, C. T. and Pandya, P. S. Study of manuring-cum-spacing requirement of the Indo-American strains 170-Co2 (*Deviraj*). Indian Cotton Growing Review, Vol. 4, July 1959.
5. Parmar, M. U. and Patel, C. T. A note on the Anomalous spinning performance of some Indo-American types. Indian Cotton Growing Review, Vol. XIII, No. 4, July 1959.

F. Miscellaneous Activities

Farmers' Day was observed at the Agricultural Research Station, Surat, Broach, Viramgam and Amreli. Cultivators from the various National Extension Service Blocks and Community Projects visited the above research Stations.

APPENDIX IX

SUMMARY OF WORK DONE UNDER THE HORTICULTURAL
DEVELOPMENT OFFICER, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60

A. Staff and Administration

Shri I. A. Sayed held charge of the post of Horticultural Development Officer, B. S., Poona.

B. Advisory and Development Work

Advice on various aspects of fruit and vegetable growing was given to fruit growers and amateur growers through correspondence and on the spot. Specific service such as pruning, manuring, spraying, dusting was also rendered to the growers by the technical staff. Lectures and practical demonstrations were given on improved horticultural practices during the village leaders' camps and Agricultural Shows.

During the year under report, 993 acres of new area was brought under the cultivation of different commercial fruit crops and 2,032 acres of existing orchards were rejuvenated by adopting cultural, manurial and plant protection measures to increase the yield of fruit trees in Gujarat region. A campaign for dusting mango trees with DDT and sulphur for controlling jassids, hoppers and mildew was undertaken and 6,000 mango trees were treated.

Long term loans on easy terms of payment were advanced to fruit growers for bringing new area under fruit cultivation at the rate of Rs. 300.00 per acre upto a maximum of Rs. 3,000.00. During the year under report, loans amounting to Rs. 2,73,066.00 were disbursed to the cultivators.

C. Publications

An article entitled 'Improving *Raiwal* Mango' by I. A. Sayed, Horticultural Development Officer, B. S., Poona, was published in the October 1959 issue of the 'Farmer'. The illustrated leaflets on the following fruit crops were brought out and distributed to the cultivators—

- (1) Cashewnut cultivation and raising cashew seedlings.
- (2) Side-grafting of country mango trees.
- (3) Grape cultivation.

APPENDIX X

SUMMARY OF WORK DONE UNDER THE OILSEEDS SPECIALIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA,
DURING THE YEAR 1960

A. Staff and Administration

Dr. Y. S. Kulkarni continued as Oilseeds Specialist for the period under report.

B. Research

The following research work was carried out :

Groundnut

(a) *Amreli Agricultural Research Station*.—The varieties 814-20 and SBXI gave 5.5 and 41.9 per cent higher yield of pods respectively than the local.

(b) *Deesa Agricultural Research Station, Kopergaon-1*.—(semi-spreading) was found superior to bunch and spreading types of groundnut.

(c) *Talod Agricultural Research Station*.—The strain 31-9 (Spreading) gave 25 per cent higher yield than the local.

(d) *Dohad Agricultural Research Station*.—The spreading groundnut strain *Dhudhia* gave significantly higher yield than the local. The bunch groundnut strains 5144, *Faizpur-1-5*, A. H. 814-1 and SBXI were significantly superior to the local.

Sesamum

(a) *Umrata Agricultural Research Station*.—Two selections viz., *Patelka-11* and *Sidhpur-7* gave significantly higher yield than the local.

(b) *Deesa Agricultural Research Station*.—Two field selections viz., 5-19 and 7-24 gave 29 and 20 per cent higher yield respectively than the local.

(c) *Talod Agricultural Research Station*.—Five selections gave higher ranging from 12 to 48 per cent than the local.

C. Advisory and Development Work

The estimated additional production due to the scheme for increased production of oilseeds in Gujarat region was 14,577 tons.

Demonstration plots to show the beneficial effects of fertilizer application, seed treatment and plant protection measures were arranged. Groundnut crop competitions were held. About 51 B. M ls. seed of castor S-20 were distributed free to the cultivators for planting them on contour bunds.

D. Publications

The following articles were published during the year :

(1) "Groundnut Improvement in the Bombay Deccan" by R. A. Sangave, V. M. Chavan, G. V. Gadre and A. K. Gupte, Indian Central Oilseeds Committee, Vol. IV, No. 1, 1960.

(2) Popular booklets in Marathi and Gujarathi on intensive cultivation of groundnut were printed for distribution.

APPENDIX XI

SUMMARY OF WORK DONE UNDER THE PLANT PATHOLOGIST,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE, POONA,
DURING THE YEAR 1959-60

A. Staff and Administration

Dr. V. P. Bhide held charge of the post of Plant Pathologist,
Department of Agriculture, B. S., Poona.

B. Research

(a) *Cotton wilt breeding scheme, Poona.*—A large number of cotton selections, crosses and strains received from the Cotton Specialist, Surat, the Assistant Cotton Research Botanist, Nanded and Cotton Breeder, Broach were tested for their resistance to wilt in pot culture tests under controlled conditions in the glass house. The results are summarised below.

Broach Section.—Thirteen out of 16 bulk progenies of 98-41, all the 5 bulk progenies of (E. 22 x 1802) F₁, 11-92, 3 out of 10 progenies of the back cross (E. 22 x 1802 x E. 22) F₁₀ showed high resistance to wilt. Eleven out of 15 progenies of the crosses involving 66-60 and 98-41 with (E. 22 x 1802) showed high resistance. Ten new progenies of the crosses involving 66-60 and 98-41 with (E. 22 x 1802) showed a varying degree of susceptibility, the mortality ranging from 13.2 to 64.5 per cent.

Surat Section.—All the 16 cultures of 2087 (*Vijalpa*) maintained at Poona showed high resistance along with the 7 new cultures except that 2087-D-1-1 BK-Poona showed slight variation from the last year's performance. 12 out of 13 progenies of (2087 x 2334) F₈ showed high resistance. All the 12 progenies of (2087 x 2554) F₆ showed a varying degree of susceptibility, the mortality ranging from 9.9 to 47.6 per cent.

(1) *Seedling and/or mature plant resistance tests of hybrids*

Agricultural Research Station, Niphad

Progeny of 163 cultures of 20 crosses in F₃, 186 in F₄, 192 in F₅, one in F₆ and 339 in F₈ to F₁₃ and F₁₅ generations was tested in the field. Only 61 cultures in F₃, 95 in F₄, 97 in F₅, one in F₆ and 329 in F₈ to F₁₃ and F₁₅ did not have any susceptible plants. On the whole crosses C. 588 x *Vijay*, R. F. P. M. 80 x N. P. 710, C-135 X C. 588 and C-59 x *Vijay* in F₃, A. 206 x *Gasa*, crosses of

R. F. P. M. 83 with MHD-177, KCN. 179 and 180, and *Khapli* x *Motia* in F_4 , F_1 (*Motia* x *Gaza*) x *Gaza* and F_1 (*Immilo* R. L. 7 x *Gaza*) x *Vijay* in F_5 and those of *Gaza* with *Jay*, *Gulab*, B. 23 and *Motia* in advanced generations have yielded more uniformly rust resistant selections than others.

It is interesting to note that selections from cross *Khapli* x *Gaza* F_3 were not only more resistant than *Khapli* but also appeared to be superior in agronomic qualities to *Khapli*. High yielding and rust resistant selections of this cross may replace *Khapli* wheat at present under cultivation in certain districts of the State.

Agricultural Research Station, Arnej

Ninety-six out of 100 cultures from crosses of A.206 and 624 with *Gaza* in F_6 and F_7 were uniformly resistant in the mature plant tests in field. All the cultures from crosses *Gaza* x A. 624 and reciprocal in F_6 *Gaza* x A. 206 in F_6 and F_7 were uniformly rust resistant.

(2) Scheme for investigation into tikka and sclerotium wilt of groundnut

Isolations were made of the causal organism from *Sclerotium* wilt affected groundnut plants collected from Junagadh. Groundnut varieties obtained from Junagadh were tested for their resistance to *sclerotium* wilt and varieties viz., *Kolawad*, T-47, and T-17-2 showed promise of yielding resistant material.

(3) Scheme for investigation into bacterial blight of paddy

On surveying the paddy area in the State, bacterial blight was found to be present in Surat and Ahmedabad districts. The organism was isolated successfully from the few samples collected from different parts and pathogenicity of the few isolates was proved.

(4) Scheme for evolving root-rot resistant types of cotton in Bombay State

This is an Indian Central Cotton Committee Scheme and has started functioning from January 1960.

Cotton plants affected by root-rot disease were collected from different districts of Gujarat region. Isolations from these samples were made and these isolates are being tested for their pathogenicity.

(5) Soft rot of ginger

Bordeaux Mixture 2 : 2 : 50 applied to the soil 4 times once one week before planting and then at 15 days interval gave good control of the disease at Gaudevi in Surat district. Cheshnut compound was the next best.

(6) *Control of Alternaria blight of cumin in Gujarat*

Experiments to control *Alternaria* blight of cumin in Mehsana district were continued during the year. The fungicides used were sulphur, wettable sulphur (both as control), copper dust 4 per cent, copper dust 8 per cent, sulphur (1 : 1) copper compound 50 per cent and copper compound 50 per cent wettable sulphur. The results show that 2 dustings of copper dust 4 per cent, the first one month after sowing and the second, 2 weeks after the first, gave satisfactory control of the disease.

C. Post-Graduate Research

Nil.

D. Advisory and Development Work

A large number of queries on diseases, their control, fungicides and appliances were dealt with. Phytopathological certificates were also issued in a large number.

E. Publications

The following research and other articles were sent for publication and some of them were published during the year under report.

1. Bhagwat, V. Y. and *Phyllosticta* leafspot of cotton in B. S.
Bhide, V. P. (sent for publication to Indian *Phytopathology*)
2. Bhagwat, V. Y. and Vascular infection of some Indian
Bhide, V. P. cotton by *Xanthomonas malvacearum*
(sent for publication to Indian *Phytopathology*)
3. Bhide, V. P. ... Ergot on *Bajri* (Published in Farmer)
4. Bhagwat, V. Y. ... Disinfection of cotton seed and its
effect on seed viability (published, in
Poona Agricultural College Magazine).
5. Bhagwat, V. Y. ... Control of soft-root of Ginger in B. S.
(sent for publication to Poona Agricultural College Magazine).
6. Gadgil, P. D. and Nitrogen fixation by *Azotobacter* in
Bhide, V. P. association with some associated
soil micro-organisms.

APPENDIX XII

SUMMARY OF WORK DONE UNDER THE STATISTICIAN,
DEPARTMENT OF AGRICULTURE, BOMBAY STATE,
POONA, DURING THE YEAR 1959-60

A. Staff and Administration

Shri D. S. Ranga Rao held the post of Statistician, Department of Agriculture, B. S., Poona, during the year under report.

B. Research

(a) *Crop estimation surveys.*—During 1959-60, crop estimation surveys on a State wide scale, were conducted on the crops mentioned in the Chapter I of the main report. In all, 216 harvested plots were supervised by the technical staff of the section.

As usual, the yield forecasts for the crops under survey were mostly based on the results of the surveys.

Compilation of the data in respect of the schemes *viz.*, (1) scheme for collection, by sampling, of the data on cultural and manurial practices in Bombay State and (2) scheme to ascertain the extent and causes of fallow area in Bombay State, were completed. The results of these surveys are summarised in Chapter I of the main report.

(b) *Design of experiments.*—During the year under review, for the Gujarat region, 25 new layouts were given and 12 plants of experiments undertaken on agricultural research stations, were scrutinised. The data of 32 experiments were analysed and collation of the data of experiments conducted at different agricultural research stations for three or more years was carried out. One statistical report embodying results of these experiments was prepared and submitted to the 'Agresco'. The important conclusions from the above statistical report are summarised in Chapter I of the main report.

(c) *Collection, compilation and publication of agricultural statistics.*—Details will be found in chapter I of the main report. The various items of agricultural statistics were collected compiled and published on usual lines.

C. Special Items of Work

The results of the following surveys are given in the report :

- (1) Survey for assessment of additional production of paddy due to intensive method of cultivation.

(2) Survey for assessment of additional production due to various Grow More Food measures.

(3) A sample survey to assess the extent of work done under the wells scheme from 1947-48 to 1957-58.

D. Publications

(1) An article entitled 'A sampling technique to estimate the incidence of pests and diseases' was published by Shri D. S. Ranga Rao, Statistician and Shri V. N. Panditrao, Assistant Statistician in the journal "Artha Vignayan" of the Gokhale Institute of Politics and Economics, Poona, Vol. 2, June 1960.

(2) An article entitled 'Paddy cultivation practices in the former Bombay State,' by Shri D. S. Ranga Rao, Statistician and Shri V. N. Panditrao, Assistant Statistician, was published in the journal of Agricultural situation in India, May 1960.

The following two papers were read at the 13th Annual Conference of the Indian Society of Agricultural Statistics, held in January, 1960 at Poona.

(1) Paper entitled "Statistical analysis of the data of Simple Manurial Trials on Paddy in cultivators' fields of Thana district, B. S." by Shri D. S. Ranga Rao, Shri O. G. Kundalkar and Shri P. N. Satbbai.

(2) Paper entitled "Assessment of extent and causes of fallow areas by sample survey" by Shri D. S. Ranga Rao, Shri V. N. Panditrao and Shri N. P. Joshi.

E. Miscellaneous Activities

The following miscellaneous activities were carried out :

- (1) Refreshers' Course in Statistics for Departmental Officers.
- (2) The work of construction of index numbers of production of crops and farm harvest prices.
- (3) Cost of cultivation of cotton and its rotation crops.

During the year the Statistician attended several important meetings.

APPENDIX XIII

SUMMARY OF WORK DONE UNDER THE SUPERINTENDING
AGRICULTURAL OFFICER, AHMEDABAD DIVISION,
AHMEDABAD, DURING THE YEAR 1959-60

A. Staff and Administration

During the year under report, the post of Superintending Agricultural Officer, Ahmedabad Division, Ahmedabad was held by different Officers as shown below.

Officer	Period
Dr. R. L. Nagpal ...	1-7-1959 to 12-3-1960
Dr. C. C. Shah ...	13-3-1960 to 30-4-1960

During the year under report, Surat district was placed under the control of Ahmedabad division from 1st January 1960.

B. Season

The monsoon commenced from the third week of June but at some places it rained in the second week of June. After first rain, sowing was mostly carried out at all places but on account of continuous excessive rain, resowing had to be carried out twice, thrice and even four times, at places. Interculturing and weeding operations could not be done in time on account of continuous heavy rain. This had brought a serious set back in normal growth of *kharif* crops and it had also adversely affected yield per acre to about 50 per cent except in paddy.

In short, the *kharif* season was peculiar in respect of more number of rainy days. It rained in the months of September and October. There was unprecedented flood in Tapi river during September. Due to this most of the *kharif* crops like cotton, *jowar*, groundnut were heavily damaged in the talukas of Choriashi, Olpad, Kamrej, Mandavi and part of Bardoli situated on the bank of Tapi river. Estimated damage to crops due to flood was Rs. 1,38,07,120-00 and estimated damage to live stock was 1,37,890.

Wheat and other *rabi* crops had to be sown without adequate preparatory tillage due to heavy and continuous late rains. In January, a severe hailstorm passed over certain villages of Anand, Nadiad talukas which damaged the standing crops of tobacco, tur, wheat, fennel etc.

During the year under report, no severe attack of pests or diseases was noticed.

The total rainfall of each place was double and at places it had rained even three times the average rainfall. The number of rainy days were 60 to 90 during the season.

*C. Propaganda and Publicity including Shows

During the year under report, 11,160 meetings and demonstrations and 39 shows were arranged by the staff of the Department, as well as the block in which 2,38,786 cultivators had participated. Besides this, knowledge of improved method of agricultural practices etc. was also disseminated through press notes, films, *Akashvani* and by distributing leaflets on various subjects.

Crop competitions.—Crop competitions were organised for *khariif*, *jowar*, *bajri* and paddy in the *khariif* season whereas for wheat, potato and *rabi jowar* in the *rabi* season. During the year, 1472 cultivators participated at the village level competitions, 410 at the block/taluka level, 23 at district level and 4 participated at State level. In addition to prize distribution, merit certificates were also issued by the District Development Boards to the prize winners. Tobacco crop competition was held in Anand taluka of Kaira district. In all, 105 applications were received, out of which 3 were awarded the following prizes.

1st prize of Rs. 1,000·00

2nd prize of Rs. 500·00

3rd prize of Rs. 250·00

Similarly, cotton and groundnut crop competitions were also organised and 56 and 64 applications were received respectively. For cotton, the 1st prize of Rs. 100·00, 2nd prize of Rs. 50·00 and 3rd prize of Rs. 25·00 were awarded to the winners at the district level and for groundnut competition a prize of Rs. 50·00 was awarded at taluka level. Entrance fee for both competitions was Re. one.

*D. Grow More Food Campaign

(a) *Improved seeds.*—During the period under report, following quantity of improved seeds were multiplied at the seed farms and distributed to cultivators.

Crop		Quantity in B. Mds.
Paddy	...	3,450
Bajri	..	491
Groundnut	...	200
Jowar	...	855
Wheat	...	2,100
Gram	...	100
Castor	...	500
		<u>7,696</u>

In addition to this, following quantities of improved seeds were also distributed.

Crop		Quantity in B. Mds.	Area covered in acres
Paddy	...	9,613	53,861
Jowar	...	9,552	93,035
Bajri	...	15,029	1,44,802
Wheat	...	52,063	54,832
Others	...	10,648	28,555

(b) *Seed farms.*—To make the entire area covered with improved seeds, efforts were made to acquire the lands for the remaining seed farms. At the end of the year, 71 seed farms having an area of 3,159 acres were in the possession of the Department. Thirteen more seed farms with an additional area of about 1,220 acres have been proposed to be acquired so that improved seeds of trial can be spread over all the talukas within a period of at least three years.

(c) *Taluka-cum-fertilizer godowns.*—In all, 45 seed-cum-fertilizer godowns have been completed and 58 godowns are still to be constructed.

(d) *Growth of Food Crops Act and its application.*—The act was not in operation in any part of the division.

(e) *Distribution of manures and fertilizers.*—

(i) *Rural compost.*—During the year under report, a quantity of 1,63,302 tons of ripend rural compost and farm yard manure was specially prepared and distributed. It covered an area of 32,657 acres which would have produced 3,265 tons of more food during the year.

(ii) *Town compost.*—In preparation of town compost on scientific lines, 50 Municipalities and *Gram Panchayats* participated. The quantity prepared and sold was 23,950 tons which would have covered an area of 5,787 acres. The additional production of food crops was estimated at 575 tons.

(iii) *Fertilizers.*—During the year under report, following quantity of different fertilizers were used:

Fertilizer	Quantity in tons
Ammonium sulphate ...	17,535
Ammonium sulphato nitrate ...	4,193
Urea ...	3,713
Superphosphate ...	3,342
Oil cakes ...	8,670
Manure mixtures ...	1,394
Bonemeal ...	39

These fertilizers, covered an estimated area of 5,06,352 acres.

***E. Insects Pests and Plant Diseases**

During the year under report, no serious pests or diseases were reported. However, *ergot* in *bajri* was reported at some places. A special press note was immediately issued by the Department. Blast in paddy and blight in cumin were also noticed but the damage was negligible. Pests like aphids, jassids, hairy caterpillar were also reported but on account of heavy rain and timely action they were washed away. No damage was reported. To control different pests and diseases the following insecticides and fungicides were distributed:

Sulphur dust	...	1,60,059 lbs.
BHC dust	...	17,15,752 lbs.
Zinc phosphide	...	1,105 lbs.
DDT	...	484 lbs.
Perenox	...	43 lbs.
Endrine	...	4,282 lbs.
Nicotine sulphate	...	199 lbs.
Agrosene	...	1,355 lbs.
Others	...	19,903 lbs.

To facilitate spraying and dusting of the pesticides sprayers and dusters were also distributed to cultivators.

F. Agricultural Demonstration Centres

During the year under report, 290 Agricultural Demonstration Centres were functioning.

***G. Irrigation**

During the period under report, 3,627 new wells were constructed and 982 wells were repaired. It was estimated that an additional area of 16,472 acres was brought under irrigation. As a result 3,294 tons of additional food production was estimated.

***H. Other items**

(a) *Vanamahotsava*.—*Vanamahotsava* was celebrated throughout the division with a great enthusiasm and 6,54,304 trees have been reported to have been planted.

(b) *Farmers' Unions.*—During the year under report, 3,071 Farmers' Unions were organised, and 67,904 cultivators have been enrolled as members.

(c) *Green manuring.*—Under the scheme of subsidised distribution of *sann* seed, 3,968 B. Mds. of *sann* seed is reported to have been distributed and the area covered under green manuring was 39,047 acres.

(d) *Pilot schemes.*—During the year under report, three different pilot schemes *viz.* paddy, wheat and hybrid cotton were in operation.

During the year under report, paddy pilot scheme was in operation in Billimora, Ransda, Bulsar Bardoli, Ahmedabad and Nawagam talukas.

The wheat pilot scheme was operated in Vijapur taluka. The details of the same are given below:

Target in acres	...	5,000
Achievement in acres	...	8,029
No. of villages covered	...	34
No. of cultivators benefited	...	2,728
Fertilizers distributed in tons	...	541
Improved seeds distributed in B. Mds.	...	9,291
Finance Distributed in Rs.	...	56,000

The average increased yield per acre was 8 B. Mds. during 1959-60.

New pilot scheme for cultivation of hybrid cotton in four districts of north Gujarat *viz.* Kaira, Mehsana, Sabarkantha and Ahmedabad.

During the year under report, multiplication work was done at Research Station, Surat and Vijapur where 108 lbs. of hybrid seed was produced by crossing 1,00,000 and 9,87,000 flowers respectively. On account of bad climatic conditions the produce was very small. It was distributed in four different districts.

*Figures under items (C), (D), (E), (G) and (H) are based on the reports as on 30th June 1960.

APPENDIX XIV

SUMMARY OF WORK DONE UNDER THE SUPERINTENDING
AGRICULTURAL OFFICER, BOMBAY DIVISION, NASIK
DURING THE YEAR 1959-60

A. Staff and Administration

The Bombay Division consists of 7 districts. The two districts *viz.*, Surat and Dangs which were formerly included in Bombay division were transferred to Gujarat region from January 1960. The report given below, pertains to Surat and Dangs districts only.

Dr. S. Solomon held charge of the post of the Superintending Agricultural Officer, Bombay Division, Nasik throughout the year.

B. Season

The rains started in the districts at proper time. The *kharif* crops were somewhat affected by the heavy rains. The season was normal.

C. Propaganda and Publicity

Propaganda meetings were organised by the staff. Leaflets and pamphlets describing improved methods of cultivation of food and vegetable crops were distributed. *Shibirs* were arranged in each of the Paddy Pilot Block and dummy demonstrations were held at the divisional and district level to explain the improved agricultural practices to be adopted in *kharif* and *rabi* seasons.

*D. Grow More Food Campaign

The following statement shows the production of improved seeds by the various seed farms, pertaining to the districts of Gujarat region.

District	Improved seeds produced in B.M.s.							
	Paddy	Wheat	Bajri	Jowar	Nagli	Pulses	Cotton	Total
Surat	... 1,433	99	...	134	...	25	114	1,805
Dangs	... 104	...	...	—	12	—	...	116
Total	... 1,537	99	...	134	12	25	114	1,921

Similarly, the following statement shows the distribution of seeds purchased from the Registered Seed Growers and distributed to cultivators.

Name of district	Seed distributed in B.Mds.					Total
	Paddy	Bajri	Wheat	Cotton	Jowar	
Surat	... 1,947	...	425	...	320	3,692
Dangs	— 26	...	...	...	...	26
	<i>Nagli</i>					
Total	... 1,947	...	425	...	320	3,718
	<i>26 Nagli</i>					

(b) *Growth of Food Crops Act and its application.*—This Act was not in force in any of the districts of this division during the period under report.

(c) *Distribution of manures and fertilizers.*—The fertilizers given below were distributed for manuring food crops such as paddy, bajri wheat and jowar.

The following statement shows the districtwise distribution of various fertilizers.

Name of district	Fertilizers and manures distributed in tons					
	Ammonium sulphate	Superphosphate	Other nitro-fertilizers	Oil cake	Manure mixture	Total
Surat	... 4,861	1,805	507	2,602	748	10,523
Dangs	...	—	...	...	...	...
Total	... 4,861	1,805	507	2,602	748	10,523

(d) *Utilisation of local manurial resources.*—

(i) *Rural compost and farm yard manure.*—Details of pits dug and filled and the quantity of compost prepared for Surat and Dangs districts were not available.

(ii) *Town compost.*—At Surat district compost prepared at 8 centres was to the tune of 15,023 tons.

(iii) *Green manure.*—A scheme for distribution of *sann* seed at subsidised rates was continued during the year under report. In Surat district 200 B.Mds. of *sann* seed was distributed.

(e) *Padāy pilot scheme.*—During the *Kharif* season, 4 Paddy Pilot Blocks were in operation in the area of Gujarat region.

District	Paddy Pilot Block	Target	Achievement
		Acres.	Acres.
Surat	... Bansda	20,000	7,813
	Bulsar	20,000	12,281
	Billimora	30,000	19,655
	Bardoli	25,000	10,438
Total ...		95,000	50,187

An additional production of 6 B.Mds. per acre was estimated.

(f) *Kharif and rabi crops campaign.*—A statement showing the targets fixed for the *kharif* crops viz., paddy, bajri, *kharif jowar*, groundnut and cotton and the *rabi* crops viz., wheat and *rabi jowar* for Surat district, under intensive and extensive phase together with the area achieved is given in the following table:

(a) *Kharif crops campaign, district Surat*

Crop		Target		Achievement	
		Intensive	Extensive	Intensive	Extensive
Paddy	...	95,000	50,000	57,164	38,500
Bajri	...	10,000	45,000	9,900	38,200
<i>Kharif jowar</i>	...	10,000	...	4,790	...
Groundnut	...	...	1,000	—	1,000
Cotton	...	..	80,000	—	33,400
Total ...		1,15,000	1,26,000	71,863	1,11,160

(b) *Rabi crops campaign, district Surat*

Crop		Target		Achievement	
		Intensive	Extensive	Intensive	Extensive
Wheat	...	1,000	2,000	950	2,110
<i>Rabi jowar</i>	...	...	5,000	—	4,930
Total ...		1,000	7,000	950	7,030

E. Insect Pests and Plant Diseases

Plant protection appliances such as dusters, sprayers, seed drums etc. were kept for sale at 50 per cent subsidy to cultivators. Also these appliances were given on hire to cultivators.

F. Agricultura' Demonstration Centres

† Nil.

G. Irrigation

† Nil.

* H. Other Items

(a) *Farmers Unions.*—Farmers Unions were organised as given below:

District	Farmers' unions formed	Membership
Surat	418	8,289
Dangs	12	2,692
Total	430	11,981

(b) *Crop competitions.*—Crop competitions were organised at the taluka and Block levels for paddy in Surat district. Separate competitions were organised for scheduled tribes cultivators wherever possible.

(c) *Free fertilizer demonstration and district trials.*—Free fertilizer trials and district trials for improved strains were arranged on cultivators' fields during the year under report.

(d) *Vanamahotsava.*—Tree planting was done on large scale in villages. Meetings were held and the cultivators were convinced of the importance of tree planting.

† Information not available.

* Figures under items (D) and (H) are based on the reports as on 30-6-1960.

APPENDIX XV

SUMMARY OF WORK DONE UNDER THE SUPERINTENDING
AGRICULTURAL OFFICER, RAJKOT DIVISION, RAJKOT,
DURING THE YEAR 1959-60

A. Staff and Administration

During the period under report, the post of Superintending Agricultural Officer, Rajkot Division, Rajkot was held by Dr. G. A. Patel.

B. Season

The rainy season of the year 1959-60 was unusual with heavy incessant rains. The rains received in certain parts were two or three times that of average rainfall. The rainy season started in the second fortnight of June in all the districts except Amreli district where rains were received in the first week of June. The sowing operations were started and continued from the last week of June to first week of July. The continuous and incessant rains in the early period retarded the crop growth, as the agricultural operation like weeding, interculturing could not be carried out timely. Also, the late rains received during September and October adversely affected the crop yield because of washing away of pollens of *bajri* and sprouting of erect type of groundnut in fields before harvest. Thus, these two major crops of this division were damaged to considerable extent at certain places. The heavy rains and cloudy weather also resulted in attack of pests and diseases on cotton crop. The beneficial effects of heavy and late rains were seen in *rabi* season, as due to high moisture content in soil and accumulation of more water in wells and water reservoirs. The sowing of wheat, gram and other crops were carried out to a greater extent and *rabi* crops gave good returns.

*C. Propaganda and Publicity including Shows

The exhibitions and shows were arranged at several places especially on religious occasions, like *Melas* and *Yatras*. Large number of cultivators have taken the advantage of the same. The number of dummy demonstrations were arranged under *kharif* and *rabi* crops campaign. The demonstrations were held at regional, district, block and village level, which were attended by Government staff, social workers and large number of cultivators.

The literature of *kharif* and *rabi* campaign in form of leaflets and posters were distributed free of cost for wide propaganda.

The activity of the Department and the spectacular achievements were also published periodically in local newspapers.

The talks on the important activities were broadcast from All India Radio, Rajkot.

Crop competition.—Crop competitions were held for *bajri* and wheat crops in almost all the districts. The competition for groundnut crop was also held in Bhavnagar, Rajkot and Junagadh districts. In all, 793 competitors have participated in the crop competition and 94 prizes were distributed.

*D. Grow More Food Campaign

(a) *Improved seeds—Seed farms.*—The total Seed Multiplication Farms at the end of period under report were 53. During the period under report, in all 13 new Seed Multiplication Farms were started. Thus, the total area of these 53 farms at end of the period under report was 1,998 acres. The seeds of various improved varieties of crops were multiplied and distributed to the progressive cultivators. The details of the same are given below:

Crop	Production	Distribution
	(B. Mds.)	(B. Mds.)
<i>Bajri</i>	612	516
Groundnut	2,726	2,299
Cotton	15	31
<i>Jowar</i>	175	124
Wheat	1,035	387
Gram	133	32

Distribution of improved seeds.—The distribution of improved seeds of cotton, and groundnut is being done by the special staff provided under different multiplication and distribution schemes. The distribution of improved seeds of wheat, *jowar*, *bajri* and other crops is being done by the District Agricultural Officers.

(i) Cotton

For regular seed multiplication and distribution of cotton crop three separate schemes are in operation in this division, which are partly financed by the Indian Central Cotton Committee. The schemes are for *Kalyan*, C. J. 73 and 170-CO2 varieties of cotton. Under these schemes, the multiplication of seed is done stagewise and distribution of seed is done through the merchants and co-operative societies who work as authorised licencees of the Department under the supervision of departmental staff appointed in these schemes.

The produce of the improved seed of recommended varieties is processed under the supervision of scheme staff and a certificate of purity is given to only such processed bales. The number of bales certified during the period under report, of each of the varieties were as under:

Variety		No. of bales certified
170-CO2	...	1,16,892
<i>Kalyan</i>	...	14,579
<i>Sanjay</i>	...	784

(ii) Groundnut

The scheme for multiplication and distribution of improved groundnut seed is in operation since first Five Year Plan period. The scheme is partly financed by the Indian Central Oilseeds Committee. Under the present scheme, the improved varieties viz., AK-12-24, AH-32, *Punjab-1*, AH-334 are to be pushed. The stagewise distribution is handled through the authorised licencees under the supervision of departmental staff of the scheme. The licencees are paid commission at Re. 0.50 per B. Md. for stocking and distributing the improved seed under this scheme. The nucleus seed farm of 40 acres maintained at Junagadh where initially the pure seed is multiplied. The total area covered under improved seed including natural spread, is to the extent of 2,79,816 acres.

The following activities are also undertaken under the oilseed development programme by the scheme staff as well as by district staff (1) bringing more area under summer cultivation of groundnut, (2) bringing fallow land under groundnut crop and (3) organising crop competitions in groundnut crop.

(iii) Wheat

There is a separate scheme for distribution of rust resistant wheat seed in Rajkot division. Under this scheme, the work is organised through the existing staff of the District Agricultural Officers as no separate staff is provided. The seed stocking and distribution is done through licencees who are paid commission at Re. 1-00 per B. Md. The improved varieties distributed were NP-710, NP-718, 790 NP and *Kenphad*.

(iv) Other seeds

The distribution of improved seeds of other crops like *bajri*, *jowar*, paddy, gram and sugarcane is being done as a regular activity of the Department. The improved strains of *bajri* viz., *Babapuri*, N-28-15-2, N. 207, S. 14 and local-11 were distributed. For *jowar* varieties viz., S. 213-210, C-10-2, and S-56, for gram *Chafa* and for sugarcane CO. 419 were distributed under this item of work. The quantity of seeds distributed for these crops is given below :

Crop	Quantity distributed (B. Mds.)
Paddy	138
<i>Bajri</i>	3,751
Groundnut	7,29,633
Cotton	44,753
<i>Jowar</i>	761
Wheat	96,595
Gram	610
Total ...	<u>8,76,241</u>

(b) *Growth of Food Crops Act and its application.*—The act was not in force in this division during the year under report.

(c) *Distribution of manures and fertilizer.*—In Rajkot division, amongst fertilizers, ammonium sulphate and superphosphate are more popular. The use of pure fertiliser is day by day increasing. The most common manure mixture is of 8:1:1 proportion of groundnut cake, ammonium sulphate and superphosphate. The use of fertilizers has increased in the recent years due to special schemes like *Kharif* and *rabi* crops campaign and pilot schemes.

In Rajkot division, except in Kutch district, the stocking and distribution of fertilisers is being done by the authorised dealers

who are mostly co-operative societies and a few private parties. The fertilisers are not stocked by the Government unlike former Saurashtra Government. In Kutch district as co-operative societies are not coming forward for taking up this work, it is being done by the departmental staff.

The scheme for subsidised distribution of manure mixture was continued during the year under report for the area of formed Saurashtra State where there was a provision of payment of subsiys of Re. one for distribution of one B. Md. of manure mixture to the cultivator. Superphosphate was sold at the subsidised rate fixed by the Government. Ammonium sulphate, urea and ammonium sulphate nitrate were distributed as per Government terms. The total quantity of various fertilisers distributed during the year under report is given below :

Name of the fertilizer		Quantity in tons
Ammonium sulphate	...	2,036
Superphosphate	...	8,598
Manure mixture	...	9,128
Fishmeal and bonemeal	...	419
Other fertilisers	...	680
Total	...	<u>20,861</u>

(d) *Rural and town compost scheme.*—In the present days of paucity of chemical fertilizers, intensification of local manurial resources like compost production both rural and urban is quite imperative and of vital immediate importance to accelerate the pace of progress of good production. Moreover, it is the findings of field laboratory that chemical fertilisers in combination with bulky manure like compost improves the physical condition of the soil making suitable for increased agricultural production. With this end in view, the Department has already launched a scheme to encourage the municipalities and bigger rural centres for producing maximum quantity of compost by granting them subsidy and all the requisite technical guidance. At present, some of the municipalities have taken up systematic compost production and in rural areas large number of cultivators are preparing rural compost in systematic manner.

(i) *Rural Compost*.—There is no separate scheme and special staff for this item of work, but looking to its permanent importance this is taken up as a regular activity of Department and is being executed by the district staff. The production of the compost from 2,943 villages is estimated at 79,187 tons.

(ii) *Town compost scheme*.—Out of 76 municipalities, at present 37 municipalities are working under this scheme. The town compost production for the period under report was 49,579 tons. When compared with the total potentiality of 1·5 lakh tons, it seems that much remains to be done for this item of work.

(e) *Improvement of farm yard manure*.—This activity is taken up with rural compost work and the production is included in the rural compost.

*E Insects, Pests and Plant Diseases

To popularise the use of insecticides and fungicides for controlling plant pests and diseases, the insecticides and fungicides were sold to the cultivators at 50 and 25 per cent cost respectively under different schemes.

In *Bhal* area there was heavy infestation in wheat crop by surface grass hoppers. The control operations were carried out by the Department and several experiments were made with different insecticides at different steps. During the year under report, the ergot disease on *bajri* was observed for the first time on very large scale. This can be attributed to the heavy rains during the year. The propaganda was carried out through leaflets and radio broadcast for prevention of this disease. The other major pests were aphids and jassids on cotton, 170-Co2, mango hoppers on mango and aphids on groundnut. Also, damage due to rat trouble was considerable. *Tikka* on groundnut was very high because of heavy rains. The sulphur dusting was carried out for control of this disease.

With a view that all the cultivators even in the remotest villages can obtain, the plant protection appliances, the grant of subsidy at 50 per cent rate was continued this year also. During the year under report, 1,25,828 lbs. of insecticides and fungicides were distributed covering an area of 3,71,495 acres. In all, 516 appliances were distributed during the year under report.

F. Agricultural Demonstration Centres

Only 37 centres were working during the period under report in Amreli and Kutch districts. The proposals for about 100 centres, have been submitted for which sanction is not received.

*G. Irrigation

Well irrigation has been accepted as most economic and effective method for increasing the output of agricultural production. During the period under report, 4,956 new wells were constructed and 1,983 old wells were repaired. The additional area brought under irrigation by the new and old wells is of the order of 19,824 and 3,966 acres respectively. This scheme has become very popular amongst the farmers as it has played no small part in stepping up the production.

So far as irrigation by tanks and *Bandharas* is concerned, at present, 4,539 acres of land is being irrigated in Amreli district.

*H. Other Items

(a) *Farmers' Union*.—The farmers' Union has to play an important role in effecting agricultural improvement. During the year under report, 1,760 new Farmers' Unions were organised bringing the total to 2,035 in the division. In all, 25,099 new members were enrolled during the period under report bringing the total membership to 32,364.

(b) *Kharif and rabi crops campaign*.—Encouraged by the spectacular achievements gained during 1958 *rabi* campaign, the scheme was also continued during period under report for both *kharif* and *rabi* seasons. During the *kharif* season, *bajri*, groundnut, cotton and in *rabi* season wheat were taken up. The targets and achievements are given in the following table:

Sr. No.	Crop	Targets		Achievement	
		Intensive	Extensive	Intensive	Extensive
		Acres	Acres	Acres	Acres
1	<i>Bajri</i>	27,000	90,120	22,258	76,920
2	Groundnut	50,000	2,04,000	47,245	1,96,600
3	Cotton	40,000	1,50,000	34,943	2,55,186
4	Wheat	35,000	1,50,000	30,119	1,15,545
Total ...		1,62,000	5,94,120	1,34,566	6,44,301

In the *kharif* campaign, the achievement for the intensive phase and extensive phase for all the three crops was 80.72 and 119.34 per

cent respectively. In *rabi* campaign, the corresponding percentages were 86.05 and 77.03 respectively. During the year under report, under this scheme, 2,681 demonstrations were held which were attended by 40,413 cultivators. Also 85,687 leaflets and pamphlets were distributed free of cost.

(c) *Miscellaneous activities.*—

(i) *Vanmahotsava.*—*Vanmahotsava* week was celebrated in all the districts and about 2,00,000 new trees were planted.

(ii) *Subsidised agricultural farms.*—During the period under report, 13 'A' type and 9 'B' types subsidised Agricultural Farms were functioning in this region.

(iii) *Training classes and meetings.*—About 1,451 meetings and training classes were held during the period under report which were attended by approximately 29,000 cultivators.

The training camps at village level were attended by the District Agricultural Officers and technical training was imparted. The technical advice and guidance were extended to the cultivators by the technical staff of the district while on tours, and better methods of farming were recommended as advocated in different departmental schemes.

The meetings of the District Development Boards and that of Divisional Development Council were attended by the District Agricultural Officers and Superintending Agricultural Officer, respectively.

*Figures under items (C), (D), (E), (G) and (H) are based on the reports as on 30th June 1960.

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