



Report on the working of the  
Department of Agriculture of the  
Central Provinces for the year  
ending the 31st March 1929

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**INDIA.**

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No. 1445-417-XIV.

GOVERNMENT OF THE CENTRAL PROVINCES.  
AGRICULTURE DEPARTMENT.

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*Nagpur, the 25th November 1930.*

READ—

Report on the working of the Department of Agriculture for the year ending 31st March 1930.

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RESOLUTION.

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There was steady progress during the year along the lines of policy already laid down, *viz.*, research directed to the evolution of more paying varieties of the main crops grown in the province combined with demonstration to and extension among the cultivating classes of the types of improved crops already tested and proved. Though the visible return in departmental cash receipts is not striking, the indirect returns are enormous and there is no department of Government so capable of affecting to so large a degree a large proportion of the population. It is the more unfortunate that straitened financial resources render it impossible to provide the increased demonstration staff which is essential for wide publicity of the improvements that are available. It is satisfactory to note that in the year under report 600,000 maunds of improved seed, or an increase of 140,000 maunds over the previous year, were distributed by or under the control of the department, covering an area of nearly  $1\frac{1}{2}$  million acres and bringing in an estimated increased value to the cultivator of 1.20 crores. But the total cropped area of the province is 25 million acres, and for every cultivator reached at present there are hundreds, and possibly thousands, who are not even aware of the existence of the department. Though the past decade has seen the area sown with departmental seed rise from under 400,000 acres to over  $1\frac{1}{2}$  million acres, the fact serves only to emphasize still more the enormous task which remains to be taken up. It is clear that without the fullest co-operation on the part of the public no Government agency can hope to tackle such a task, and the Local Government believes that the most

hopeful lines of advance lie in the multiplication of those activities in which the largest share must be taken by the cultivator himself, such as the various types of seed unions described in the report, combined with the spread of demonstration plots. The progress made in western Berar, where such co-operation is most active, is evidence of what can be achieved on these lines.

2. There has been a larger number of changes among the officers holding charge of the different circles during the year than is entirely satisfactory. These changes were unavoidable, but the cadre of the class I services has now been settled finally and Government trusts that as soon as it has been possible to fill the total sanctioned posts it will be possible so to arrange the posting of officers as to interfere as little as possible with that continuity of supervision which is essential for success. On the research side the staff has suffered a loss in the retirement of Dr. Youngman, who has taken up the post of Director of Agriculture in Ceylon, and the delay in the constitution of the new class I service has also resulted in other posts remaining unfilled. In this connection nothing emerges so clearly from almost every page of the report than the conclusion that, if the department is to fulfill its proper function, and if research is to keep sufficiently ahead of current practice, there should be no break in continuity, and no reduction in strength in the scientific side of the staff and no recruitment save of officers of the highest calibre. Nothing but the best can be good enough. Success in the past has been striking, but there are many signs that if further staff had been available progress would have been faster still. In particular Government notices that rice which covers the largest area of any single crop in the province has not been able to receive that attention which its importance deserves. It is to be hoped that it will now be possible to fill up the sanctioned posts at an early date and to attack the many problems to which the report draws attention.

3. Government has read with particular interest the further accounts of the experiments in connection with Verum 262 cotton, which affords a typical example of the value of the contribution which even a single line of research can bring to the cultivator when full facilities for investigation are forthcoming. Three years ago 7,500 lbs. of seed of this variety were distributed to cultivators.

In the year under report this figure had increased to 460,000 lbs., which were sown over an area of 40,000 acres with a resulting average extra profit of Rs. 12-8-0 per acre. The variety is highly resistant to wilt, and was most successful in areas where the monsoon ends early in September, but defects in the crop when grown in areas where the rains generally persist into late September or early October were observed and a separate variety is being evolved for use in areas where such conditions normally prevail. The problem in connection with this variety has rapidly changed from one of multiplication of seed to one of marketing. The outturn for the year under report was 6,500 bales, for the marketing of which Government advanced a loan of Rs. 2,00,000. If the outturn next year grows to the amount of 40,000 bales, as expected, it is obvious that other arrangements must be made and that Government cannot continue indefinitely to finance operations on so large a scale. The problem is one in which should engage the immediate attention both of the Co-operative Department and the newly appointed Marketing Officer.

4. The work of the Agricultural Engineer was again handicapped by lack of equipment, which the financial stringency prevents being remedied, but valuable results were achieved. Government attaches special importance to the short course instituted for training mechanics for oil engines and tractors. It is not satisfactory that 40 per cent of the privately owned tractors in the province are at present, either for lack of spare parts or inability on the part of owners to effect minor repairs, laid up out of use. Government also agrees with the Director that further investigation is necessary into the economics of mechanical cultivation and would have liked a more detailed appreciation of the results at the credit of the old tractors which the report now condemns.

5. Though the Director reports that there was little difference in the course of studies or the calibre of the examinees, the results of the second University examination were almost as gratifying as the results of the first examination were unsatisfactory. Eighteen out of 19 candidates passed in the final and 24 out of 36 in the Intermediate. The number of candidates seeking admission to the College was 137, of whom 47 were selected. While appreciating the difficulties that beset the Principal in the selection of candidates for admission,

Government considers that preference must be given to those whose standard in the School Leaving Certificate holds out promise that they will be able satisfactorily to complete the course with the main benefit to themselves and the province. It is unfortunate that this must mean the exclusion of a number genuinely bound to the soil by natural associations, but it must be remembered that it is not everyone who is able to derive the full benefits of a university education, and if choice is to be limited, it must be the best brain; which should have preference. If this selection excludes the genuine agriculturist or if the degree course is above the head of the average candidate, the reopening of the two years' certificate course will be necessary. Government, however, would like to emphasize the point raised by the Director of Agriculture that whether the course be the full degree course of B. Ag., or merely the practical certificate course, it is essential that there should be proper co-ordination between the teaching of the college and actual practice on the land. If this essential correlation is not maintained the college teaching can never hope to be a living force.

6. The Department was under the directorship of Mr. Plymen for nine months and of Mr. Allan, who has submitted the report under review, for the remainder of the year. Government desires to thank both these officers as well as the many non-official gentlemen without whose help such success as has been attained would not have been possible, for their efforts in the advancement of the premier industry of the province.

ORDER.—Ordered that a copy of this Resolution, together with the enclosure, be submitted to the Government of India in the Department of Education, Health and Lands (Agriculture), that copies be forwarded to the Director of Agriculture and to all Commissioners of Divisions and Deputy Commissioners for information and guidance; and that it be published in the Supplement to the *Central Provinces Gazette*.

By order of the Government

(Ministry of Agriculture),

A. McDONALD,

Secretary to Government,

*Central Provinces.*

No 3618

FROM

R. G. ALLAN, ESQ., M.A., I.A.S.,

OFFG. DIRECTOR OF AGRICULTURE,

*Central Provinces,*

TO

THE REVENUE SECRETARY TO  
GOVERNMENT,*Central Provinces.**Nagpur, the 14th July 1930.*

SIR,

I have the honour to submit herewith the report on the working of the Department of Agriculture, Central Provinces, for the year ending 31st March 1930.

I have the honour to be,

SIR,

Your most obedient servant,

R. G. ALLAN,

*Offg. Director of Agriculture,**Central Provinces.*

Report on the working of the Department of Agriculture,  
Central Provinces, for the year ending 31st March 1930.

PART I.—ADMINISTRATION.

Mr. F. J. Plymen, the permanent Director of Agriculture, proceeded on leave in January last and I assumed charge of the appointment with effect from the 25th January 1930. Other appointments usually held by the members of the Indian Agricultural Service were filled as follows :—

Deputy Director of Agriculture, Northern  
Circle, Jubbulpore—

From 1st April to 15th December 1929	...	Mr. Churchill.
From 16th December 1929 to 31st March 1930	...	Rai Sahib Bhaiyalal Dubey, Extra-Assistant Director of Agriculture, officiated as Deputy Director of Agriculture.

Deputy Director of Agriculture, Southern  
Circle, Nagpur—

1st April 1929	...	Mr. Hill.
From 2nd April to 22nd October 1929	...	Rao Saheb G. K. Kelkar, Extra-Assistant Director of Agriculture, held charge.
From 23rd October to 16th November 1929	...	Mr. McDougall.
From 17th November to 17th December 1929	...	Rao Saheb G. K. Kelkar, Extra-Assistant Director of Agriculture, held charge.
From 18th December 1929 to 1st February 1930	...	Mr. D. V. Bal, Extra-Assistant Director of Agriculture, officiated as Deputy Director of Agriculture.
From 2nd February to 31st March 1930	...	Mr. Hill.



Deputy Director of Agriculture, Western  
Circle, Amraoti—

From 1st April to 11th September 1929	...	Rai Sahib Bhaiyalal Dubey, Extra-Assistant Director of Agriculture, held charge.
From 12th September 1929 to 4th February 1930	...	Mr. Mutkekar.
From 5th February to 31st March 1930	...	Rao Sahib G. K. Kelkar, Extra-Assistant Director of Agriculture, officiated as Deputy Director of Agriculture.

Deputy Director of Agriculture, Eastern  
Circle, Raipur

... Rai Bahadur Tundilal Powar, Extra-Assistant Director of Agriculture, held charge from 1st April to 23rd November 1929 and was confirmed subsequently as Deputy Director of Agriculture and filled the post for the rest of the period.

Deputy Director of Animal Husbandry,  
Central Provinces, Nagpur

... Mr. Wallace.

Principal, Agriculture College, Nagpur—

From 1st April to 22nd October 1929	...	Mr. McDougall.
From 23rd October 1929 to 24th January 1930	...	Mr. Allan.
From 25th January to 31st March 1930	...	Mr. Churchill.

Agricultural Chemist, Central Provinces,  
Nagpur

... Mr. A. R. P. Iyer, Extra-Assistant Director of Agriculture, held charge.

Economic Botanist for Cotton, Central Provinces, Nagpur—	
From 1st April to 18th May 1929 ...	Dr. W. Youngman
From 19th May 1929 to 31st March 1930 ...	Mr. D. N. Mahta, Second Economic Botanist, held charge in addition to his own duties.
Second Economic Botanist, Central Provinces, Nagpur ...	
	Mr. D. N. Mahta.
Mycologist to Government, Central Provinces, Nagpur—	
From 1st April to 20th June 1929 ...	Mr. J. F. Dastur.
From 21st June to 16th October 1929 ...	Mr. Jiwan Singh, Assistant to Mycologist to Government, Central Provinces, held charge.
From 17th October 1929 to 31st March 1930 ...	Mr. J. F. Dastur.
Agricultural Engineer, Central Provinces, Nagpur—	
From 1st April to 2nd June 1929 ...	Mr. F. J. Plymen, Director of Agriculture, looked after the work in addition to his own duties.
From 3rd June 1929 to 31st March 1930 ...	Mr. M. S. Paranjpe.

Messrs. L. N. Dubey, G. D. Mehta and N. G. Sule acted in the Provincial Agricultural Service for broken periods and Mr. J. S. Gurjar continued to officiate in the Provincial Agricultural Service throughout the year.

2. During the year under report the department suffered a very serious loss in the departure of Dr. Youngman to take over the post of Director of Agriculture, Ceylon. Dr. Youngman joined this department in the year 1922 and was posted as Economic Botanist in charge of cotton. Dr. Youngman's work on this crop

is so well known as to need no remark. The variety *Verum* 262 which is now spreading rapidly, together with a large amount of the early investigation and breeding by which further advances on the improvement of this crop are possible, are the outcome of his short period of service in the Central Provinces. If we realize that the 7,000 bales of *Verum* which sold this year at a premium of Rs. 50 per bale over local cotton means an increase of wealth to the cotton grower of nearly 3.5 lakhs, it becomes easier to appreciate the importance of a plant breeder of Dr. Youngman's calibre in agricultural improvements and the loss suffered, by his going. The Central Provinces has been far from fortunate in failing to retain the service of two plant breeders of the ability of Dr. Graham and Dr. Youngman. The department suffered a further loss in the death of Mr. J. L. Khare who was in charge of the Entomological work of the department for a number of years and had but comparatively recently been promoted to the Provincial Service as a reward of his services.

3. After a somewhat protracted delay the cadre and pay of the Central Provinces Agricultural Service (Class I) was notified in September 1929. Rai Bahadur Tundilal Powar, who has for long been acting as a Deputy Director, was the first officer confirmed in the new service. The creation of this service will now make the getting of the department on to a basis of greater efficiency possible. It permits of an officer to be engaged in Agricultural Economics and Marketing, the division of the too unwieldy Northern Circle into two circles by the appointment of another Deputy Director and the appointment of an additional Deputy Director as an Assistant to the Director. Steps will be taken during this year to fill these and other posts for some years past held on a temporary basis.

4. The expenditure during the financial year 1929-30 was Rs. 11,78,853 which included Rs. 85,843 on account of expenditure on botanical and other gardens and Rs. 28,546 on account of expenditure on cotton works. The receipts amounted to Rs. 3,71,245.

The net expenditure on Agriculture including expenditure on cotton work thus amounted to Rs. 8,07,608,

The statement below gives the corresponding figures for the past ten years and indicates how the activities of the Agriculture Department expanded during the period.

Year.	Receipts.	Expenditure.	Net expenditure.
	Rs.	Rs.	Rs.
1919-20	2,19,034	7,83,843	5,64,809
1920-21	2,01,631	8,83,167	6,81,536
1921-22	2,45,908	9,64,049	7,18,141
1922-23	2,73,882	9,15,207	6,41,325
1923-24	2,79,992	9,63,097	6,83,105
1924-25	3,19,986	8,87,503	5,67,517
1925-26	2,73,357	9,70,752	6,97,395
1926-27	2,81,333	10,78,644	7,97,311
1927-28	3,04,933	12,93,879	9,88,946
1928-29	3,82,130	11,95,679	8,13,549

## PART II.—AGRICULTURAL EDUCATION.

5. The results secured in the University examinations of this year indicate that conclusions based on a single examination year are apt to be as misleading as those founded on one year of field experimental trials.

In the year under report, of the 19 men who appeared in the B. Ag. examination, 18 passed, the vast majority in the second division. In this number were included all the candidates taking the examination for the first time. In the Intermediate, of the 36 who appeared 24 passed and 4 got compartments. Of the 36 who took the examination, but for circumstances which this year prevented the application of the college rules, debarring men from appearing for the examination on account of ineffective work in term, 7 would normally have not been permitted to take the examination. Taking

this into consideration 24 of the 29 who were qualified to appear passed. In 1928-29 only 5 out of 13 qualified in the final and in the Intermediate but 7 out of 21. Apart from certain modification this year in the examination in English, a subject which has been the primary cause of failure in the Intermediate in previous years, there was no marked change in the character of the course, the standard of the papers or of even the examiners engaged. The calibre of the students taking the examinations was not strikingly different, and though there were certain alterations in the time-table and in the details of teaching, these were not in themselves sufficient to account for the change.

Apart from the undoubted effect of the alteration in the English requirement on the Intermediate position, a factor which does not operate in the final, the only conclusion to be made is that it is not possible to judge by examination results only the efficiency of a new course or the character of the teaching imparted in it, till it has been in operation for some years.

The college has always been placed in a position of some difficulty in respect to admittance. It has had to choose between admitting students, not infrequently not closely connected with agriculture, whose early education make it fairly certain that, with adequate application, they would understand and absorb what they were taught and in consequence pass the University tests, and its duty to sons of the real landowning and farming classes, who might be in a position to take up farming later, but who are for the most part men of a poorer general educational standard, *i.e.*, third division matriculates.

The comparatively poor results at times attained in the Intermediate in the past have undoubtedly arisen from the fact that a large percentage recruited from the latter class were not sufficiently educated to be able to cope with the requirements of a degree course in agriculture and its allied sciences at the end of but two years' study. This has been met by stiffening the first year examinations and by the introduction of qualifying examinations in the course of the second year, so as to eliminate the unfit from the Intermediate and to enforce an additional year of preparation on such men before subjecting them to the University tests.

Experience however indicates that to reach and maintain a satisfactory University standard, admittance to the degree course must in future be restricted to men with a minimum qualification of a first or second division pass in the Central Provinces School Leaving Certificate or its equivalent in real value elsewhere, selecting as far as possible from those men with landed interests, and that the claims of the sons of the agriculturists who fail to secure this minimum will have to be met, whenever the final extension of the hostel can be taken in hand and completed, by the reopening of the two-year certificate course with a third division pass in the school final as its standard of admittance.

The main object of such a course should be to train practical agriculturists in the technique of agriculture, the economics of farming and estate management which on the whole is what the original certificate course did. Though there are a number of men thus trained in the past who are doing good work in the department, the standard of attainment of the degree man is higher and with the advance of agricultural knowledge such men are on the whole better value.

Reviewing the teaching in the Agricultural College as a whole it may be said to have maintained and improved on past standards. The knowledge as shown in examinations throughout the courses taken by the different years has been satisfactory. There are indications that the inroads made on the time, which in the past was devoted to practical agriculture, by English have tended to reduce practical efficiency, though the alteration of the English requirement in the future by the University should allow of a repair of this weakness.

There appears to be also an insufficient correlation of the knowledge of agriculture as taught in the college with that of agriculture as practised in the country. This may in part be the result of a too stereotyped teaching on the part of the lecturers as the outcome of lack of recent district experience, or the outcome of the lack of real interest in his local agriculture on the part of the student when on vacation. It is however a defect which will have to be remedied, as advanced agriculture as taught cannot be divorced from local practice.

During the year under report there was no addition to the hostel, which still awaits the erection of a second storey on the third quadrangle so as to admit of completion. The extensions made in 1928-29 allow of the accommodation of 135 students, but in view of the fact the addition which is awaited implies the reduction of admittances by 36 while construction is in progress, it is not possible to make the fullest use of what is now provided.

The removal of the College of Science to its new buildings last July allowed of steps being taken during the year to reconstruct and refit the part of Victoria Technical Institute, thus vacated, to the requirements of this College.

By the close of the year the Entomological Section had been accommodated in the upper storey of the south wing and alterations to admit of extended class room accommodation and the provision of a college library and reading room completed. This library and the direction of students' reading have been put under the control of a member of the staff. It is hoped that it will be possible thereby to induce some of the students to do more original reading, so as to eradicate the rather stereotyped attention to and knowledge of agriculture which is apt to be shown by them. The libraries of the Victoria Technical Institute and the College are well equipped and it is hoped thereby to make a better use of them.

The number of applications for admission numbered 137 of whom 65 were called for interview and 46 admitted. Of these 43 were still on the roll at the end of the year. The number of students holding the qualification of second division matriculation pass and above this was considerably greater than in past years.

Of the 112 students on the roll at the end of the year, 35 came from the north of the Central Provinces, 18 from the Nagpur and Wardha area, 27 from Berar, 11 from the rest of the Central Provinces and 27 from the Native States and the rest of India. There was no admittance to the certificate class.

**6. Agricultural Schools.**—At the Agricultural Anglo Vernacular Middle School at Powarkhera, Hoshangabad, during the year under report, 69 candidates applied for admission to class V. Of these 40 were admitted bringing

the number up to 110. This is a figure in excess of the real accommodation of the school as it stands to-day. In view of the comparatively small number who will leave VIII class in 1930, the admission for the coming year will have to be curtailed. The actual numbers of boys in the various classes at the end of the year under report were as follows :—

Class V	...	37
„ VI	...	28
„ VII	...	19
„ VIII	...	17
Total	...	<u>101</u>

The following statement shows the number classified according to caste and creed :—

Brahmins.	Rajputs.	Kurmis.	Others.	Muhammadans.	Depressed.	Total.
48	17	16	17	2	1	101

Of the number on the roll 84 were from Hoshangabad district.

The extension of the school buildings to meet efficiency and its requirements is dependent on what can be spared from Departmental Minor Works. During the present year the school was provided with excellent accommodation for messing; but completion of the school block, quarters for the residential staff and menial establishment and a suitable playing ground are all prominent needs.

The prescribed syllabus was followed and the instruction imparted was of a higher standard. Out of 16 boys who appeared at the High School Examination 15 passed. The school received a prize from the Inspector of Schools, Nerbudda Circle, in token of being the best all-round Anglo-Vernacular Middle School in the circle.

The higher classes during the session were taken to Itarsi for market demonstration—a new departure. The farm practical work was active and keen. The area worked by the school covers 6'6 acres. The gross return of all crops was Rs. 259-7-3 of which vegetables contributed Rs. 172-10-0, Deducting some Rs. 97



primarily covering vegetables used in the messes, there was a balance of Rs. 162-8-0 for division giving Re. 1-10-0 per share.

The school is indebted to several gentlemen who have shown their practical interest in its welfare by the foundation of annual prizes and by donations in aid of sport and like school interest.

There is no doubt that this school has established itself in local esteem. It is, however, admittedly expensive to found. The capital expenditure incurred to date is Rs. 53,000 and some Rs. 15,000 are still required to complete it as a school taking 110—120 boys. It is, as now constituted, closely allied to the better type of Agricultural Anglo-Vernacular Middle School in the Punjab in which most of the boys are resident. Its strength as a school does not depend on its control by the Agriculture Department or on its being on a Government farm but in the fact that it is essentially residential, is situated under strictly rural conditions and has a keen and efficient head master. But for the present financial stringency it was intended that Chandkhuri should be reopened this year on like lines and steps to construct a like school in Berar taken in hand. It appears, however, important that the relation of this type to what is termed the Punjab type of agricultural school with its own farm should be fully appreciated. Given that this type is not restricted to vernacular schools only, but is introduced into Rural Anglo-Vernacular Middle Schools by the Education Department, there will not be any very marked difference in syllabus, time spent on Agriculture or provided the teachers are efficient and head master keen, in the quality of the work, apart from that difference, in efficiency which is bound to exist between the practical work in a residential and a non-residential school. The difference in cost however will be marked.

If the Punjab Agricultural School type is to be restricted to existing vernacular middle schools only, then the need for more of the so-called Powarkhera type of residential Anglo-Vernacular schools becomes more apparent. This however does not imply that, because the first school of this type was founded by the Agriculture Department, the finance and control of all schools of this type should rest with this department.

This department has shown that a school of this type is popular and can be effective. As over 90 per cent of the work is that of an ordinary Anglo-Vernacular school, given efficient agricultural teachers and suitable conditions, finance and control appear logically the function of the Educational Department, whether such schools happen to be started in connection with a Government farm or on farms of their own.

7. In addition to this school the department has now two agricultural classes of pre-vocational character at Yeotmal and Buldana, respectively. The former has been in existence some two or three years; but cannot be said to be a living institution or to be made much use of by the district in which placed, as in the year under report there were only three students. In the latter district the school was opened this year. It is housed in the Buldana Peace Memorial building, an excellently found school situated a few yards from the Government seed and demonstration farm. The course given will be of two years' duration. The first year class consisted of 14 boys of whom 12 qualified for promotion to the second year. The teaching was in the hands of the Farm Superintendent and a special agricultural assistant. The school owes a very considerable debt to Mr. Sahasrabudhe who is very largely responsible for its institution, and closely interested in its welfare.

Whatever may be said for or against the control by the Agricultural Department of agricultural schools such as that represented by Powarkhera in which agriculture forms part of a general educational syllabus, there is no doubt that the control of pre-vocational schools of the type referred to above is a correct function of this department. In theory there should be ample scope for schools of this type in an agricultural country. In practice this future development and expansion must rest with the purpose to which such training on its completion is put by the recipients in such schools as now exist. If the boys so trained return to their own lands to apply what they learn or if they meet a demand on the part of well-to-do landlords for jamadars and such like, such schools may be said to be meeting a genuine want and to justify expansion elsewhere where possible. If on the other hand the outlook of such boys rests on the

Department of Agriculture, though the jamadar staff will be strengthened in efficiency by the employment of men of this type, the real *raison d'être* of these schools will be lost. The real demand for such schools can only become active, when the agricultural community of a district awake to the full value of modern methods and in so doing appreciate the possibilities offered by these schools. Buldana is possibly the district which by reason of the activity of the taluq associations is most alive to modern ideas and is thus the best suited district for educational development of this kind.

8. The last method in which the department is attempting to assist in forwarding agricultural instruction lies in the utilization of its local assistants in areas where a rural vernacular middle school coincides with a demonstration plot, in order to give weekly instruction in such schools. The idea of this association of the Agricultural Department with the Educational Department was first considered in 1926. Discussions led to the issue of a Press Note in November 1928, stating that it had been decided to utilize the assistance of the Agricultural Department and to open such schools where the existence of a demonstrational plot permitted. In consequence, in 1929, some 17 of these agricultural classes were started in rural middle schools. It is perhaps too early to express any definite opinion on their progress, popularity or value. In certain cases it looks as if the teaching would be effective in its object; in others factors, such as the inordinate distance of the farm plot from the school and the apathy shown to such training, tend to render the chances or success very doubtful.

At best they can be regarded as makeshifts till something better can be financed and something more stable created. The chief defects appear to lie in—

- (1) the fact that, though agricultural assistants may know their work, it does not follow that they are qualified to impart instruction to the young;
- (2) the insecurity of the term of such teaching in any one school, in that, demonstration plots being set up for the purpose of temporary local improvement, are liable to be closed down in one place and opened in another;

- (3) the limitation of expansion as dependent on the chance co-incidence of a suitable middle school and a plot ;
- (4) the growing demand for the services of the assistant in what may be termed his more legitimate jobs.

In certain places as Chandur Bazar, Itki, Mungeli, Baloda Bazar and Betul, the schools seem to be shaping well. In the two former schools, the number of boys taking the classes number 76 and 69, respectively. In others the number in the schools are less and thus those taking agriculture smaller. The Agricultural Department regard the present stage as experimental and as possibly indicative of where schools after the Punjab model may be started later.

### PART III.—RESEARCH AND EXPERIMENTAL WORK.

9. In the present report the same plan has been followed as in 1928-29. The principal crops have been reviewed, recording the outcome of laboratory and field investigation thereon and the progress of the crop in the wider areas of general cultivation.

Much attention has not been given to field experimental work, as this will be dealt with later in the year when the detail figures of the experimental work of this year and those of the past four years on the several farms of the Province will be analysed and dealt with in the Quinquennial Report on experimental farms which will be issued in accordance with the proposals agreed to by Local Government in 1926.

One of the principal features of interest associated with agricultural research has been the foundation of the Governing Body and the Advisory Council of Agricultural Research by the Government of India on the lines laid down by the late Royal Commission on Agriculture. These bodies met for the first time in December 1929. This organization for stimulating and financing agricultural research is still too young to have had any visible effect, but the indications are that it will, in due course, have a stimulating effect on the many crops and problems of Indian agriculture, similar to that which the Indian Central Cotton Committee has had on the improvement of cotton.

Paddy is one of the great food staples of India and it is probable that this crop will get prior attention. A scheme for research in the many problems of this crop in the Central Provinces has been put up for their consideration and it is likely that it will form one of a chain of like research projects under the Research Council throughout the main rice growing tracts of India.

10. Cotton.—This crop is second in respect of area to rice. It is the only crop, however, in which a special staff is engaged. This has been made possible by the substantial grant contributed by the Indian Central Cotton Committee for this purpose. The sum received this year amounted to Rs. 31,004-7-11. It will be increased substantially in 1930-31. The marked advance in knowledge and the definite improvement effected indicate the extreme advantage which money devoted to special research on individual crops can effect.

Progress has been made in the isolation of a strain of "Chanda Jari" of 1" staple possessed of a white lint; but the chief centre of interest in this crop at the present day lies in the wilt resistant and high yielding cotton of good staple known as *Verum 262*. The work of the Economic Botanist for Cotton has been carried out along the lines already outlined in previous reports. The results obtained this year confirm previous conclusions in regard to the general superiority of this cotton and its wilt resistant qualities. This cotton was essentially bred for Berar, and Western Berar in particular, where the monsoon usually ends by mid-September. There are, however, areas in the cotton tract in which late September and even early October rain is not an unusual occurrence. In such tracts *Verum 262* is apt to suffer from heavy boll shedding, thus reducing yield seriously. This problem has been receiving attention and later strains have been isolated. It is expected, that it will be possible at no distant date to issue a strain otherwise resembling *Verum 262* but which will flower 8 to 10 days later, thus reducing the chances of damage from the cause referred to. Till this is effected, no steps will be taken to press this cotton in areas likely to be affected by late rains and where wilt is not prevalent. In any case it is a matter of sound policy to concentrate attention on its establishment and expansion in definite tracts, as this will hasten the securing of large

stocks of reliable seed and facilitate the marketing of the lint.

460,000 lbs. of seed were distributed by departmental agencies in June 1929 and it is estimated that roughly 40,000 acres were under this variety last year, the greater part, 33,000 acres, being in Western Berar, the area in which during the oncoming year there will be further special propaganda and effort. In wilt affected areas and in those untouched by late September rain there is absolutely no doubt that this cotton is receiving a warm welcome.

During the year under report, the Akola farm which is almost entirely under *Verum* 262, had a yield which was 14 per cent above any previous record, the average over the farm being 1,086 lbs. kapas per acre. The evidence from the districts varies with the local incidence of wilt and late rain. In the Southern Circle where records are available in respect to the influence of wilt, the following illustrates this in comparison with *Roseum*:—

Crop and conditions.	Area observed in acres.	Yield kapas per acre.	Lint obtained per acre.	Average rate per khandi lint.	Value secured per acre.	Advantage over <i>Roseum</i>
		Lbs.	Lbs.	Rs.	Rs. a. p.	Rs. a. p.
<i>Verum</i> ...	578	288	93.6	347	41 7 0	
<i>Roseum</i> on wilted land	257	237	85.3	236	25 12 0	15 10 0
<i>Roseum</i> wilt-free area	451	363	130.6	236	39 7 0	2 0 0

The area was, however, subject to rain in late September, which materially affected the *kapas* yield of *Verum*. In this area the present strain of *Verum* can only be advised with safety on areas in which *Roseum* is affected by wilt, as in this condition the grower gains both in yield and quality.

In 1928-29 the Local Government allotted Rs. 50,000 to be used as part advances to cultivators who were in need of financial assistance and thus unable to wait while the *kapas* was collected, graded, ginned and the lint sold on favourable markets. In that year 728 bales were thus handed and sold for the growers by the department. In the year under report the Government free-of-interest loan was

raised to Rs. 2,00,000. The total crop of *Verum* was estimated at about 6,500 bales. Of this estimate some 5,500 bales were collected, ginned and disposed of through the department. The average premium secured over Oomras throughout the season was Rs. 101, and the added average profit per acre to the growers, as an outcome of the features of the variety and the effect of pooling for sale, was Rs. 12-8-0.

The majority of the crop found its best sale in the local mills of the province which in view of transport and other charges are in a position to offer Rs. 20 or so over the Bombay price to the grower. The average premium is thus higher than it would be, if, as in the future, a large percentage has to rely on sale to the Bombay mills. The evidence of the season, supported by the data secured from Liverpool valuations and sales, recorded later, indicates that this cotton, if its quality and purity is maintained, can count on a premium on the Bombay market of from Rs. 80 to Rs. 50 over Comras, in accordance with quality and earliness of its marketing. The gain to the grower may not be that of the present year, but it can be expected to be substantial.

The above work created a very heavy tax on the time of the assistant staff of the department in the Western and Southern Circles and undoubtedly interfered with the fulfilment of their more ordinary duties during the months of November, December and January.

During the coming year it is expected that the pool will be called on to control and handle some 30,000 to 40,000 bales to be derived primarily from the Buldana and Akola districts, where it is anticipated that over considerable areas *Verum* 262 will be the only cotton grown. This expansion will demand the securing of financial help over and above the two lakhs provided by Government. The ways and means of doing so are at present under consideration.

The field assistant staff has been materially increased, and with the assistance given by the Indian Central Cotton Committee it has been possible to increase the jamadar staff now at work in the principal areas of the crop, so as to ensure a high standard of field purity at picking, while a further staff, to be provided for from

funds placed at our disposal by the Indian Central Cotton Committee, will be employed later in the coming season for the supervision of ginning, marketing and the guarantee of large stocks of high grade seed for 1931-32.

If the proposed pool selling on the scale intended, organized primarily to secure a sufficiency of seed and a fair premium to the grower, can be effectively financed and carried through the coming year, it is anticipated that, given a favourable season, the variety will very shortly be firmly established as the stable cotton over a wide area of Western Berar.

In the year under report the *Verum* 262 grown on the Government farms of the cotton tract to the extent of 95 bales was shipped to Liverpool for valuation and sale. The valuation received averaged Rs. 325 per khandi. Allowing for shipping and other charges this average is equivalent to Rs. 300 at Bombay. At the time of valuation, Broach in Bombay was at Rs. 248 per khandi and middlings at an equivalent of Rs. 357 in Liverpool. Stated in pence per pound *Verum* 262 was priced at 7.37d. with middlings at 8.10d. and Broach at 6.10d. First quality *Verum* thus appears to have a substantial value over Broach.

The reports on *Verum* cotton supplied from Government farms, as received from the Technological Laboratory in Bombay, were good. Opinion was also called for from the several mills which took the cotton this year. Their replies were based on the general district crop. The mills generally agree in stating that the class is good and the blow room loss comparatively low, but there is less uniformity in their opinion on the matter of strength, which it generally appears could be improved with advantage. The lint is being used to spin 20s on the warp and 24s on the weft.

Mycological research in this crop during this year has been directed to further investigations on wilt and the rhizotonia diseases of cotton. Experimental results appear to confirm the belief that the incidence of the former disease is related to the percentage of free aluminium salts in the soil and the rapidity of its development in a field depends on whether these lie near the surface or not. It appears to be possible to induce the disease in



healthy soil by water-logging. Soils which give a strong alkaline reaction appear more prone to develop the disease.

The pink boll worm problem has been receiving the special attention of the Entomological section, which is however at present too weak in personnel to be fully effective. The place of hibernation of the insect is under investigation and observations made during the season show that their attack increases in severity as the season progresses, the percentage of attacked bolls in the later pickings being 32 per cent greater than in the early ones. The problem is one of growing importance and calls for the posting of a special assistant on this investigation and the development of a scheme of far reaching character, if the damage now due to boll worm is to be checked.

**11. Wheat.**—The chief problems associated with the improvement of this crop are concerned with the production of (a) rust resistant and high yielding forms for the main wheat tracts of the north of the province and (b) rapid maturing types of hard wheat for the southern wheat plain. Considerable progress has been made in these directions and quite new forms are now awaiting field trial and multiplication. The mass selection of *hawra* continues to give good results and the individual selection No. 12 has maintained its reputation. It is however becoming quite clear that the selection from commonly grown forms is not likely to be particularly effective in securing wheats of higher value to the grower. The problem of improving the crop, therefore, resolves itself into finding better "ready made" forms or evolving them by hybridization. Both methods are being tried. Exotic forms have so far not done sufficiently well to merit introduction; but hybrids resultant from the crossing of these with local wheats appear promising. A number of hybrids are under observation and certain fixed crosses have given, on small scale trials, indications of promise. A thorough study of the root systems of the more important wheats has been completed and has yielded interesting results. The investigations go to show that the root system of an individual wheat variety plays an important role in its local utility, and in such matters as its need for and response to irrigation and manuring.

The main wheat tract was for the third year in succession subjected to adverse conditions. In the year under report the damage was caused by the early cessation of the monsoon and in the tracts most affected by the absence of later winter rains. Though not so widespread as the outcome of rust in 1927-28 and frost-cum-rust in 1928-29, the untoward conditions at sowing had serious effects on the wheat yields of several districts, in particular Saugor and Damoh.

The calamity of 1928-29 had the effect of causing a marked extension in the sowings of approved types in the autumn of 1929. The supply of seed to make good local deficiencies was made under the heads "Main Relief" and "High Grade". The Revenue Department placed 5 lakhs at the disposal of the department in respect to the latter. This allowed of the purchase of seed from areas in which the better varieties, as for example the *Sharbatis*, were already firmly established and of reliable purity and their widespread distribution in areas not so sown in the past.

The area under improved seed, primarily wheat, from seed farms and reliable sources under the departmental control over the districts comprising the Northern Circle and Plateau Sub-circle, increased in 1929 from 297,000 acres to 385,000 acres or by nearly 100,000 acres. The *Sharbatis* 113 and 115 are in popular demand. There have been in certain areas suggestions put forward that these wheats tend to a poorer crop in a dry year such as the one under report than do the commoner local wheats. This was brought to my attention. A thorough enquiry was instituted. As a result of a number of crop experiments it may be confidently stated that this belief is unfounded. A113 may not yield the difference over local wheats which it does in a normal year, but it does not at any rate yield less. The local wheats like *jalalia*, *hansia* and *kathia* have a leafier growth and in the field in consequence offer a more prosperous appearance, but their actual grain yield has in far the majority of cases been slightly less than the *Sharbatis*.

P100 wheat continues to do well in the Southern and Eastern Circles and is in demand.

The crop was wholly free of rust this year. The primary cause of low yields in certain districts in the

province was an early cessation of the rains. At first sight the relation of this to the investigation of the Mycological section may not be apparent. This department has however been for some time investigating two wheat diseases, "Root Rot" and "Black tip", both the products of the same fungus. Their investigations show that the infection is present in over 90 per cent of ordinary seed samples they examined, in which infected seeds were found to range from 9 per cent to 34 per cent of the seed of the sample. The development of this fungus, when the seed is sown, is governed by the temperature and soil moisture at the time of germination. An early cessation of the rains tends to cause the grower to hurry forward his sowing when the temperature is all in favour of the development of the fungus already in the seed, instead of concentrating on improving his soil mulch to a higher degree than usual and sowing at or near the normal time, when the temperature is unsuited to the fungus. My examination and enquiries in the Saugor and Damoh districts confirm my belief that the low returns in these areas were undoubtedly intensified by such early and untimely sowings. The worst fields, specially in Damoh, where winter rains to some extent relieved the position, were invariably the early sown ones, where the cultivator, urged by fear of too great dryness, had sown early instead of concentrating on a better primary tillage. I came on a number of instances in which fields apparently alike, but sown at an interval of 10 days, gave stands very much in favour of the later sowing and better mulched fields, and in which, I was informed, germination had in both cases been most promising. I have enlarged on this to indicate the bearing which the work of a section apparently of little value to the man in the street, may have on shaping established field practice which, if demonstrated, may in time lead to a considerable reduction in loss in a year like that of 1929-30.

12. Rice.—This crop occupies the largest area under any single crop in the province. Prior to 1915 it received a good deal of Botanical attention. With the loss of Dr. Graham in 1915 this work suffered severely and but little productive scientific investigation was accorded it till the appointment of Mr. Mahta in 1925 as Second Economic Botanist. This does not imply that

there was no progress; but such as there was largely rested with the Deputy Director of Agriculture of the Eastern Circle with many other calls on his time. It took the form of the trial, and, when found effective, propagation of varieties of promise discovered by him while on tour. As the outcome of this we secured a number of useful and high-yielding varieties which were much in advance of those frequently found in cultivation and have provided a good deal of the material to which more recent scientific investigation has been directed. Progress has of late been distinctly satisfactory. The concentration of effort has been towards the improvement of the yield of late and medium paddies. New types and selections of existing favourites have been under close observation and test, and several undoubtedly very much better yielding strains are now available. The area under such seed as was directly derived from seed farms and like seed organizations was 215,363 acres. On the basis of many comparative tests and present prices the increased value to the grower may be taken at Rs. 7 per acre. This work has thus been effective in raising the surplus wealth of the rice tracts by over Rs. 15,00,000. As has been pointed out in the past the actual area under improved strains is much larger than the above area which is based only on the actual area sown by seed organization supplies.

The outstanding feature of the year has been the fixing of a cross between *bhundu* and *parewa* which possesses the characteristics of being readily distinguished from the wild rices, which under the *biasi* system infest with increasing intensity the rice fields of the cultivator. The hybrid compares well in respect to yield with other varieties. Effective crosses have been made between *parewa* and several of our other better paddies. These are being studied. The importance of a ready means of distinction in the early stages between the better yielding paddies and wild rice cannot be underestimated in its influence on securing pure seed on seed farms which largely depend on *biasi* cultivation and the gain per acre which will follow a reduction of the percentage of wild rice, which at times is as high as 30 per cent of the standing crop on a cultivator's field.

The work of the botanical staff includes however the improvement of wheat and other crops and teaching.

The necessity of more intensive work on paddy in respect to a survey of existing types and direct crop improvement and to investigation of the many problems associated with cultivation and irrigation on which yields depend, has long been recognized. It is hoped, with the financial assistance which will be in all probability accorded to this crop by the Imperial Council of Agricultural Research at no distant date, that it will be possible to increase the staff associated with botanical improvement and to undertake in the rice tract itself the many investigations necessary.

Manuring experiments emphasize the value of *sann* grown on rabi land, cut and applied to paddy before transplanting as a substitute for farm yard manure, the marked increase got by using urine earth, and the undoubted influence on yields, and profits of phosphates, whether as super phosphate in conjunction with *sann* or as bone meal applied at the rate of three maunds per acre in conjunction with farm yard manure. The shortage of cattle dung and the technical and economic difficulties of growing *sann in situ* either at the break of the rains or with the help of irrigation in May, make it imperative however that other sources of fertility be investigated. The efficacy of the newer forms of nitrogenous and nitrogenous-phosphatic fertilizers is securing attention. There will be a considerable extension of this work during the next quinquennium.

In the Northern Circle attention has been directed to the cropping and fertility problems associated with the several areas governed by the irrigation works of that circle. The possibilities of a later heavier yielding rice in combination with a pulse utera crop as against a light early rice followed by wheat, together with the important problem of the cheap maintenance of fertility, are receiving increased attention.

The crop was on the whole free of fungoid disease attacks. The root development of the rice plant in different soils and under varying conditions of water application are being studied. There are indications that this is better developed when the water on the surface is frequently changed than when kept under the same standing water for considerable periods.

The Chemical section has been engaged in several investigations under pot culture conditions. Among them have been included studies of the relationship of moisture to paddy growth. These and other investigations will be extended to a field scale when the assistance of the Imperial Council makes bio-chemical research in the rice tract possible.

13. Oilseeds.—The oilseed which is rapidly extending in these provinces, and in particular in Berar, is groundnut. Selection work is yielding some very promising strains. Groundnut as a rotation crop with cotton is likely to play no small part in the agricultural economy of Berar in the near future. Special botanical attention is being in consequence directed to this crop in respect to the provision of better strains and in the investigation of its manurial needs.

The two varieties in commonest demand are Small Japan and Spanish Peanut. The latter is a higher yielder with a better percentage of oil and earlier, but is more prone to a wholesale germination in the field, if exposed to late rains before lifting can be accomplished. It is thus like *Verum* 262 more popular in areas where late rains in September are less common. Efforts are being made to secure a type of this variety possessed of a hardier and more moisture resistant shell, as in other respects it is certainly the better. The disposal of this increasing quantity of produce now coming on the market is being met by the establishment of an increasing number of small oil expeller and rotary crushing plants and by the development of regular groundnut markets, as at Malkapur. 56,518 maunds of seed were distributed by departmental agency and the area put down rose from 15,700 to 23,100 acres. The actual area under the crop at the present day is, however, much greater, as fairly reliable seed can be easily secured from other than departmental seed farms. The expansion of this crop is all in the best interests of the Berar farmer. It provides him with an excellent and much needed leguminous rotational crop, adding materially to the fodder supply, and a commercial crop of very considerable value. The encouragement of local oil extraction plants is desirable. The extension of this crop in other parts of the province is not so marked. In the Eastern Circle, the heavy rains which so favoured paddy this year told against groundnut.

Linseed is receiving increased attention in the plant breeding section of the department. Hitherto the improvement of this crop has largely depended on selections made by field officers. Attention is being directed towards securing types which are heavy yielding, rust resistant and early maturing. A type EB3 is found a very suitable strain for use in the Berar, Nagpur and Chhattisgarh divisions. It has been issued for multiplication and distribution.

14. Other crops.—The work in progress in these can only be mentioned briefly. The leguminous crops, in particular tur and gram, have been receiving close detailed attention. A complete study of the former has been made and is now under publication. Type 8, No. 3 has been isolated as a tur of high yield and good quality and is now available to the public. Further investigation on leguminous fodder crops emphasizes the marked value of *Alysicarpus rugosus* (sheora), a common indigenous weed of the kharif season, as a yielder of valuable fodder. Saoner and ramkel continue to be the two principal *juar* varieties in common distribution. Promising selections of these and other varieties are being tested for higher yielding characters. *B. g. r.* affords great difficulty in the securing of pure strains on account of its liability to cross fertilization, but mass selection in this crop has resulted in seed which gives a higher yield per acre. Selections of *kodon* and *kutki* are under field trial in the Eastern Circle and in the Plateau.

Sugarcane distribution is at the present day almost entirely restricted to one or other of the numerous types which have been raised at Coimbatore and subsequently tested out and proved on the various experimental and demonstration farms of the province, in respect of their yield, quality of *gur* and resistance to disease. They are steadily replacing local canes. The particular Coimbatore cane in popular demand varies slightly from district to district. The Mycologist has had this crop under special observation in respect to the damage done by *Agya* (*Striga*) and its control. It was found that application of a 3 per cent solution of copper sulphate destroyed the parasite without damaging the sugarcane. Mosaic disease, a common cause of loss in most of the sugarcane growing areas, has apparently but little ill effect in these provinces.

The *pan* crop has been receiving the attention of the department for some years. The crop has been found to be very seriously affected by 'foot rot' disease. The gardens at Ramtek have been practically speaking wiped out. One *pan* grower, Mr. Nathoo Bhoji, consented to co-operate with the Mycologist. This garden was planted up some three years ago. The portion under treatment under the Mycologist's recommendation with bordeaux mixture is flourishing, the remainder of the garden fails to bear. Similar results have been achieved in other gardens during this year in Ramtek and in Bhandara, where the gardens have been found to be also attacked by this disease. The Mycological section may rightly claim to have scored a definite success and to have proved conclusively that this disease in a highly valuable crop can be controlled by means which any intelligent grower can apply. Recent work has been directed to discovering the minimum treatment which will be effective.

*Sann* has received a considerable amount of attention during the past year. Extensive experiments, relating to the effects on the fibre of varying conditions of sowing and retting, have been in progress on the College farm under the Agricultural Chemist and at Adhantal and Chhindwara farms under the Deputy Director. This investigation is still in progress, as it includes an examination of the effect of storage of the harvested crop and retting operations in the monsoon. On completion of the extractive processes the fibre samples secured under different conditions will be forwarded to England for exact test and valuation. The general indication to date appear to favour early sowing, a seed rate of 60—90 lbs. and a period of retting of from 6—8 days when the water is cold and of from 4—5 days when the temperature of the water rises to from 70°—80° Fahrenheit. Investigation into most of the effective mechanical means of treating the retted stalks in the extraction of fibre is being undertaken at Chhindwara. A very simple and efficient "breaker" on the lines of the Swedish Flax Breaker has been designed and prepared by the Rev. E. Anderson of the Swedish Mission, Chhindwara.

#### PART IV.—AGRICULTURAL ENGINEERING.

15. This important section has been for some three years past under the administrative control of the Deputy



Director of Agriculture, Southern Circle. In the year under report, Mr. M. S. Paranjpe was appointed as Agricultural Engineer on a temporary basis. The permanent appointment of an Agricultural Engineer as one of the officers constituting the cadre of the Provincial Agricultural Service still awaits fulfilment. This section is one of steadily growing importance. Progress to-day would have been much greater than it is, had the section not lost Mr. Copley in 1926. Progress, though it may be better under a qualified engineer than it has been of recent years, will not be what it should as long as the officer holding it is on a temporary basis and thus not in a position to scheme for future development.

The sheds and equipment are very poor indeed and the working staff much below the present day demand for its services. No really marked advance can be expected till those are adequately financed and a permanent officer is put in charge. The officer now in charge is at present remodelling his buildings on such scanty funds as his curtailed annual budget permits; but very considerable additions to these are needed, if any really effective work is to be forthcoming in the future. Considering the ineffective conditions, a very considerable volume of work has however been done this year.

The purchase of agricultural machinery on taccavi loan is increasing. Technical advice on these was given in 125 cases and machinery, primarily oil engines, pumps and grinders, so financed to the value of Rs. 21,925 was erected by the department. The section has been kept extremely busy in departmental work, such as the overhaul and repairs of tractors and farm machinery and in the erection of buildings. While the demand on the part of cultivators for repair work took up an increased amount of time and was indeed heavier than could be adequately dealt with. In addition, during the year 80 improved Akola hoes and 8 new groundnut shellers were made and sold. A number of feeding and drinking troughs and iron gates were made for departmental use.

This section has three, now very old, International tractors; of these one is now incapable of further contract work. Two were however out in the districts from January. At the time of report they had

effectively ploughed over 700 acres, mostly in the Nimar district. This may be considered as a very good output for tractors of their age. All of them are however getting to the stage when the cost of repairs is out of proportion to value and it will be necessary to replace them. There is ample scope for a fleet of at least six 15—30 H. P. tractors for contract work in the black cotton soil areas of the Central Provinces and Berar. Time has elapsed since these machines and others in the department were purchased. Tractors have improved and our working experience is now greater. It is time that fresh investigation of the merits of modern models and further enquiry into the economics of mechanical cultivation were instituted.

There are some 50 privately owned tractors in the province. Of these about 60 per cent were being operated by their owners. The others were laid up for various reasons, but mostly from lack of spare parts or inability to secure efficient drivers. To meet the latter difficulty, which is to some extent shared by owners of oil engines, this section has for some years been conducting short practical classes of four months' duration on oil engines and tractors. This year there was a record demand for admission. Over 30 applied, of these 24, a number probably greater than the Engineer's accommodation can really effectively deal with, were admitted. Twelve candidates passed the final tests. The class is growing in popularity and, were it not for lack of space and staff, could be increased.

The steam ploughing tackle continues to be in very active demand in the Northern Circle. Indeed the demand is many times greater than can be dealt with in the life time of any one outfit. The tackle indeed has never got outside the Jubbulpore and Patan tahsils of the Jubbulpore district, so active has been the local demand. There is no doubt that 3 or 4 outfits of like character could find unlimited and paying work at from Rs. 17 to Rs. 20 per acre, according to the area operated on, for years to come, if it were possible for the province to find the necessary capital. At present financial stringency stands in the way of further additions and the proposals for even one additional outfit must await a return of normal crop conditions. There is however no

possible doubt of the immense value of this work in cleaning *kans* and restoring production. During the season under report the area ploughed, in spite of some reduction of efficiency on account of the frequent breaking of a defective cable, was, 927 acres.

The need for ample demonstration of working machinery has received every attention. Effective working exhibits have been put up during the past year at agricultural shows at Garraghat (Balaghat), Wardha, Betul and Wun (Yeotmal). The cinema lorry has among its other functions been utilized to carry out, by the aid of a portable engine in its outfit, a large number of demonstrations on pumping, fodder cutting, and the like. Its tours during the past year have been of extended character and a very large amount of effective machine demonstration throughout the province has been made possible by its existence. The lorry and its outfit is maintained and worked by the engineering section.

#### PART V.—ANIMAL HUSBANDRY, INCLUDING CATTLE BREEDING AND DAIRY FARMS.

16. There is probably no section of agriculture which calls for greater attention at the present time than cattle improvement. It is indeed difficult to overestimate its importance. There is a general movement towards a concentration of effort on the part of the development departments on what is termed village uplift—the general raising of the well-being and standard of life of the rural worker. For this work the Department of Agriculture is fully prepared, given it is provided with the working staff, in every respect except one and that one is an adequate supply of good bulls. It has behind it improved strains of seed, and the proven experience of better cultural methods and better capital goods, the where-withal from which increased wealth—the basal essential of any permanent uplift—can be secured. But with the use of these there must come the call for better work stock and the essential by which such better cattle can be created, *i.e.*, proven bulls to sire the village herds. For any immediate demand for these it is not as yet prepared. Advance along the lines of the policy of cattle improvement, accepted by the Provincial Board of Agriculture in 1926, has gone forward, though, primarily from lack

of funds, this rate of the advance has not been what it was hoped it would be, when the policy was decided on. In this connection it must be emphasized, however, that in the matter of stock improvement, the rate of this improvement and the rate of reproduction must of necessity be infinitely slower than they are in the case of improved seed. The need for a replacement of the small scale and ineffective breeding of the past by large scale enterprises was only accepted in 1926 and steps to give effect to it begun in 1928 and thus, even under the most favourable financial circumstances, such a change could not allow of the immediate creation of large new herds of reliable cows, let alone a marked increase in effective bulls for public service by 1930. The absence of bulls to-day, when the demand has become active, arises not so much from lack of progress since 1926 as from the character and size of breeding enterprises in the earlier stages of departmental development. The outturn of bulls to-day is thus not materially different to what it was in 1926, indeed, as an outcome of the breaking up of some of the smaller and less effective herds and their reconstitution under the new scheme, the actual output of bulls, considered without regard to effective quality, may be even less. Given, however, that the scheme, as laid down, is pushed forward vigorously, that the areas required and the funds to develop them are forthcoming and that the officer in charge seeks to develop the stock bearing resources of his primary and subsidiary farms to their maximum effective capacity, there is nothing to prevent a tenfold increase in output in a few years' time and a definite approach to a fulfilment of the ultimate object of the present policy, *i.e.*, the establishment of controlled breeding areas in each division and eventually in every tahsil.

The policy laid down at that time embraced—

- (1) The establishment of one specified breed in each division of the province, selected in accordance with the type of working bullock in demand in each area.
- (2) The consideration of better milking stock as a point of primary importance in the improvement of live-stock near urban centres and of secondary but substantial importance in rural areas.

- (3) The restriction of primary breeding to five main breeding farms to be supported by smaller young stock raising depôts, so as to permit the central breeding farms to carry their maxima of breeding cows.
- (4). The development of grading on a large scale, as illustrative of what could be done to improve local stock by the use of proven sires and as a means of providing in time high grade bulls in sufficient numbers to permit of the rapid fulfilment of the ideal.

To further this policy it became essential that breeding should be on a large scale and that a greater use should be made of existing forest grass lands. In accordance with this policy a breeding farm has been effectively established at Ellichpur carrying a foundation herd of "Harriana", secured from the Punjab, and a substantial block of forest land has been taken up at Bod in the Melghat on which will be developed the grade herd associated with the Ellichpur breed, while the smaller grazing areas of Khandwa and Borgaon are in reserve as the young stock and male stock raising depôts of the central institution. Thus the policy, as applied to Berar, has begun to take form.

The Ellichpur farm was started in 1928 with a herd of pure bred Harriana. During the present year additional stock of the same breed has been imported from the Punjab and steps taken to complete the lay-out of the farm and the removal of the kans grass with which considerable areas of the arable land are at present overrun. The female stock at this centre, while bearing in mind that effective work stock for Berar conditions is the primary purpose of the farm, will be selected in reference to milk yields, as it is hoped that by this means an effective dual purpose strain will in time be secured. The herd on this farm will be raised on the products of arable cultivation. Surplus cows over and above the maximum it can carry will be transferred to Bod. At present the reserve areas at Borgaon and Khandwa have not been called on to take up the young males and females of the herd. Associated with this, we have the Bod farm of some 3,000 acres. During the current year its necessary buildings were erected and steps taken to stock it by the transfer of some 143 head of female stock

from Bargaon and Khandwa and by local purchase which may be regarded as temporary. Further additions of good quality female stock will be drafted in during the coming year. The herd will be sired by Harriana bulls from Ellichpur. The breeding herd will eventually consist of 150 to 200 cows. The early products will be bullocks.

Turning to the centre of the provinces we find the the Garhi cattle-breeding farm in Balaghat—the centre for the Gaolao breed. It at present carries a herd of about 90 cows. The area is being increased from 1,200—1,600 acres and it is anticipated that with this addition, the gradual improvement of the grass areas and the utilization of the subsidiary area at Sindewahi for male stock over a year of age, the area should carry eventually 150 to 180 head of breeding cows.

A notable difference is to be seen in the quality of stock at the present day, a fact reflected in the average price of Rs. 300 per bull now secured, as compared with Rs. 150 the average price in 1920. The birth-rate is also much higher than it was, having risen from 40 per cent to 80 per cent per annum of the cows in the herd.

In Chhattisgarh a beginning has also been made in centralizing the best of the female stock at one time associated with Drug, Chandkhuri and Bilaspur on an area of some 2,500 acres at Pendra. The area worked by the farm is covered with a considerable amount of timber which reduces its stock carrying capacity. It is anticipated, however, that with effective use of the three subsidiary farms recorded above that it will be possible to carry from 150 to 200 breeding cows. The production of a bigger bullock suited to Chhattisgarh conditions is by no means an easy problem.

It will be noted that in Berar, Nagpur and Chhattisgarh, definite steps have been taken towards a forward policy in cattle improvement. In the north of the province the position is, however, as it was in 1926. The only breeding herd is the small and by no means very good herd at Powarkhera. Financial stringency has again prevented the opening of the proposed big farm at Dewal, an area of 5,000 acres of excellent grass land. Till this can be started no progress is possible, nor is it possible to meet from a Government farm the increasing demand in the north

for good bulls, a demand which is likely to be much intensified with the present movement towards village uplift.

The only remaining stock farm of any size is Telinkheri. Being urban in location its development has been chiefly in the improvement of the milk yield. It is thus stocked principally with Montgomeries (Sahiwals). One of the chief results of continued breeding has been the evidence this has given in support of the opinion I expressed in 1926, that this breed, which at that time provided the sires of many of our herds, could never and would never provide bullocks suited to the existing requirements of at any rate the south of the province, whatever effect it might have in raising the milk yield of our cows. The process of grading country cows with bulls of this breed has shown this to be the case. In an urban location, though the production of a marketable bullock is of some consideration, it is not of such primary importance as in breeding for the needs of rural areas. The improvement in the milk yield of the cow may offset the lower market value of the working male. In this respect the use of the Montgomery sire has been effective, as is shown by the fact that the average yield of the 38 Montgomery grades is 2,646 lbs. per head as against an average of 950 lbs. per head, the output of the original foundation cows of local origin in 1920, a very substantial improvement.

Similar success has been achieved in the grading up of local buffaloes by the use of a Delhi bull. The following table illustrates very remarkably the influence of controlled breeding on milk production :—

Year.	No. of cows.	No. of buffaloes.	Total.	Milk produced in seers.	Value at 4 seers per rupee.	Gross return per head.
					Rs.	Rs.
1919-20	20	50	70	36,772	9,193	131
1924-25	27	28	55	48,305	12,076	219
1929-30	44	40	84	95,000	23,750	282

It will be noted that with the addition of only 14 more animals the total yield has risen over 160 per cent and the return per head is more than double. Associated with the Government herd at Telinkheri, there is to

be found the Gaolis' Co-operative Society. The proof of the advantage of better methods and better stock is shown by the fact that in 1919-20 the society had a debt of Rs. 6,172 while to-day, 10 years later, their accounts show a credit balance of Rs. 23,539.

The experimental work at Adhantal in establishing a breed from a cross between the Malvi and Montgomery is being continued. The experiment is still in too young a stage to permit of prophecy, but the indications are promising and it may yet be possible to establish a breed of the Malvi type with improved milk yield.

The improvement of live-stock by breeding is but one part of the work entailed in cattle uplift. The other and possibly more difficult is an improvement of the food supplies—a matter which increases in importance as the live stock themselves improve in breeding. In this it is necessary to call in the assistance of the Botanist and Chemist. The former in co-operation with other officers and on his own areas has shown that the yield and quality of the herbage on many of our grass lands can be easily and profitably improved, if small areas are systematically taken in hand, seeded down, and scientifically managed. A full account of this work has been published in the *Indian Journal of Agriculture*. The latter has been engaged in an examination of the mineral contents of our grasses. An extensive programme of experimental work in cattle feeding, in particular in respect to the influence of mineral deficiency, one of the outstanding defects of much of our grass, and the respective values of different treatments on fodder crops, has been laid down and will be carried out on the sundry stock farms of the department in the immediate future. The value of converting the often heavy grass growths, frequently spear grass, prevalent in the rains into silage is now a definite plank in the demonstration programme in the Eastern Circle and the practice is reported as finding increasing favour.

The number of private breeding farms in the provinces is now reported as 33. Though a number of these can only be said to exist in name in as far as real breeding is concerned, others are being run on improving lines by their interested owners.



## PART VI.—DEMONSTRATION AND PROPAGANDA.

17. Agricultural practice in India has been founded as elsewhere on the outcome of experiment. It is the result of an age long process of trial by generations of farmers. This process has slowly secured effective if empirical results. On these have been built up the different systems of farming, croppings and cultural methods dominant in different areas of the province. The stage of advance in any one tract is the outcome of local conditions and the inventive and adaptive genius of the local farming community. The history of the establishment of farming practice in India is thus exactly alike that in any other part of the world. Progress by a process of trial and error is of necessity slow. Of more recent years the need to accelerate this progress and to stimulate the output of raw products, so as to meet the demands of an increasing use and increasing population have directed the attention of science to agriculture, the application of scientific methods to farming problems and the substitution of the hit or miss process of the past by the more precise process of exact experiment.

The laboratory and the experimental farm can in a few years establish a certain crop or a certain technical process as good or bad. They are in a position to try many crops and many processes and to weigh up this value and their chances of probable adoption in general farming. They thus secure in measurable time what might require generations to establish under the older system and by their concentration and State support save the farmers the money they would have wasted in their own experimentation and, by providing better methods, make it possible for them to gain the profits which this new crop or that new agricultural practice places at their disposal.

The experimental farm may create the wherewithal to improve farming practice, but a wider organization is necessary to introduce this to the farming public and to press it, till in time it becomes absorbed into every day local practice. This is the part played by the field and demonstration organization of the department. This may be examined in respect to (1) the fixed capital with which it works, (2) the personnel who carry on the work, and (3) the ways and means which these use to

secure the adoption of such economic introductions as the work on the experimental farm has proved effective.

The fixed capital engaged in this is represented in the first place by the Government seed and demonstration farms, placed in nearly every district of the province and numbering in all 17. Indeed only two districts have no farms of any kind, Wardha and Mandla, and for both these the schemes exist and require but the return of brighter agricultural conditions for their fulfilment.

These farms are worked on a profit and loss basis. It is intended that they shall pay their way. Many do and nearly all would, were it not for a heavy load of needless buildings and equipment which they carry as a heritage of the day, when they were constructed for experimental rather than demonstrational purposes and without the regard to that correct adjustment of the investment in land and buildings which a paying proposition demands. The writing down of capital, so as to give these farms a fair chance of paying, is highly desirable. There is no doubt that these farms as time goes by are being recognized by the agriculturists of the districts as their own institutions and that the benefits they provide in the form of good seed and demonstrations of improving practice are appreciated.

The seed farm is however a fixture; it cannot go to the villager and the villager but seldom wanders thus far. Its place in village life is taken by the demonstration plot, an area varying in size with the tract but as far as possible the economic farming unit for a man and a pair of bullocks, on which are demonstrated the principal crop varieties, implements and cultural methods which the department seeks to introduce in a particular locality. These are not owned by the State. They are not permanent, but are either leased from the cultivators for five years and worked by the department or are owned and worked by the cultivator himself under the immediate direction of the department. At the present time there are in operation 33 Government plots and 21 private plots throughout the province allocated as below:—

Eastern Circle 20, Southern Circle 5, Western Circle 14 and Northern Circle 15.

During the year under report the total was increased by 9. The greater number of plots in the first and last circle recorded above, arises from the increasing necessity of effective demonstration under the various irrigation works situated in these circles. There is becoming less and less difficulty in getting private plots and indeed in the Eastern Circle the offers of plots on this basis is greater than the department can accept with any hopes of giving adequate supervision. The Government plot is usually more carefully worked and, as it is not infrequent that the only plot available on lease is one in a run down condition, the work entailed is greater and the demonstration is as much one of land improvement as of the growing of certain crops and the adopting of certain practices.

These demonstration plots as a whole pay well, in particular those which are privately owned and worked under departmental direction, being usually on better land, and by the time the lease has run out and the opening of a like plot in another locality becomes necessary, there is usually a distinct difference visible in the crops grown and the practices in vogue as the outcome of the example of the demonstration plot.

The staff directly engaged in district demonstration work number 67 assistants and 152 jamadars. Their distribution during the past year was as follows:—

Name of circle.	Agricultural Assistants.	Jamadars.	Total.
Northern ...	24	42	66
Southern ...	13	48	61
Western ...	18	32	50
Eastern ...	12	30	42
Total ...	67	152	219

In the year under report the staff was increased by 5 assistants and 8 jamadars. The original scheme of expansion was based on a maximum of one assistant and two jamadars per tahsil or taluq. This has hardly as yet been reached in all circles and yet it is already obvious that this allotment is at the present day entirely

inadequate. An assistant per tahsil with the amount of work he has to do and the centres he must visit cannot give that concentration of effort at any one centre which effective and permanent impression demands nor can he, on the other hand, as it is, visit half the villages in his area. In the course of very considerable touring which I have covered since taking over, there was nothing more frequently brought to my notice, specially in Berar, as the paucity of the staff. In many of the larger tahsils two assistants and four jamadars would not be in excess. Though there are at the present day many agriculturists who realize that the department is doing effective work in their interests, yet on the other hand there are thousands who have never even heard of the department. As it is, I am of the opinion that assistants spread their efforts over too wide an area in their efforts to reach as many as they can and that concentrated effort in 6—7 centres in each of their charges, even though it would entail that their existence was known to even fewer than at present, would probably be more effective. The movement towards village uplift, as being likely to permit of the concentration of effort required in at least certain selected localities, is thus to be welcomed.

As an indication of the work done by this body of men over the province, we have merely to turn to the appendices and note the bulk of seed which under Government control has to be issued to growers largely through the efforts of this staff; the areas of seed farm which have to be checked, the number of implements introduced during the year and the demonstrations given to realize how effectively Government and the agriculturist is being served by the meagre personnel engaged in this work of bringing the findings of the experimental farm into general practice.

The effectiveness of demonstration work has been very materially assisted by the departmental cinema lorry introduced into this work in 1928-29. As explained in last year's report, it is fitted out for each tour it takes with the seed, implements and other matters of interest suited to the tract in which it is to work and is provided with a portable engine which not only supplies the power to generate the current needed for the

cinema projector but at other times is used to operate a pump and fodder cutter. During the season under report, the cinema lorry gave no less than 100 demonstrations in the course of planned out tours in each circle. Its interest arousing ability is very great and its demonstrations were attended by hundreds at each place. The films were so worn by frequent use that they will call for considerable replacement. The pictures may or may not be directly effective, but there is no doubt their attractive influence draws many whom an assistant in ordinary touring would not reach and makes possible other effective demonstration work. The touring of this lorry, periods of definite touring off the beaten track demonstrating seed and implements, and touring in company with the Deputy Commissioner, a privilege now accorded by several district officers when in camp, have been among the chief incidents of the year. The total of practical demonstrations given in the districts during the year numbered 4,409.

Another feature has been small plot demonstrations on cultivators' lands of the effect of modern fertilizers, a form of demonstration which will be very largely extended this year.

One of the most effective ways of helping the cultivator, it has long been recognized, lies in the improvement of his seed. The methods adopted to increase the stock of pure seed are many. The commonest is the seed farm, where the individual farmer is the agent who is provided with seed, which is grown under the general supervision of the department in respect to its purity and fitness for seed sale. In the cotton tract this also entails arrangements for pure ginning and in particular in the case of verum a very close supervision of this process. In the case of wheat and paddy the seed farmer is not infrequently a malguzar who distributes his seed among his tenants in the normal process of sowing advances. Indeed in many villages in which the malguzar carries on his business, this is the only way in which the cultivator can be supplied.

Another method which is to be found in particular in the Eastern Circle, though it is developing on a slightly different form of contribution in the rice tract of the Southern Circle and is to be found in wheat in the

Northern Circle, may be described as the small cultivator's self-help seed union. In the form taken in the Eastern Circle, in which there are now 184 societies controlling 3,620 maunds in different stages of seed supply accumulations, each member contributes at harvest. At next sowing this is issued on sawai and on the following harvest the original stock is recovered together with interest. This is augmented by a further contribution by each member and thus each year the stock accumulates till, in certain of the older and better unions, the seed stock is not only entirely sufficient for all the members' needs, but is available for issue on sawai to non-members. This type of union is only possible in villages in which there is no dominant malguzar interested in seed supply. Though limited in this respect, it has ample scope for development and is a popular system. The seed stocks I inspected in several of these unions were of very high purity.

In the northern districts and in this year spreading to the Plateau is what is termed the *P. Barhi* scheme which has been detailed in the past and calls for no repetition here. This system, in spite of the bad years with which it has been beset almost since its inception, to-day consists of some 397 unions with a membership of 2,820 and 33,974 maunds of wheat seed on loan.

Both these forms of seed unions are alike, in that they are gradually collecting a stock of seed which will be entirely their own and on which they will be able in time to secure funds for further self-help and co-operative agricultural improvement.

Finally in the Plateau and in the coming year spreading to the cotton tract for the purposes of establishing pure verum seed, are to be found the seed stores, which, on a capital advanced by the State, purchase and retain till sowing time a pure stock of seed wherewith to extend the seed farm areas. It is thus evident that this section of the department is not lacking in its efforts to bring to the cultivator's door the products of the plant breeding done on its experimental farms.

The last feature of propaganda, which may be taken as common in all circles, is the demonstration and sale of modern implements. The number sold in the various circles in spite of poor crops in some and low prices

in others is substantial, though they are not so great on the whole as in 1928-29.

A number of the implements, in particular ploughs and machinery introduced in the past few years, are becoming fairly widely known. From observations I have made in the course of touring what is now required is more attention to the repair of implements already sold and concentration on improving the owner's knowledge of adjustment and handling rather than further marked extensions of sales. This appears particularly the case in the Central Provinces as distinct from Berar.

**18. Southern Circle.**—This circle suffers from the absence of a satisfactory experimental farm. The proposals to convert Waraseoni into an experimental farm for the Wainganga rice tract and to open a demonstration farm at Wardha in the cotton tract have not as yet been capable of fulfilment, though both are wanted.

There has been some movement towards the utilization of fertilizers in both the rice and cotton tracts which show possibilities of wider extension in the future.

The cultivation of verum 262, as already covered under cotton, expanded. The yield is stated as lower than roseum on wilt-free areas, possibly the result of boll shedding as the outcome of a combination of earliness of crop and the receipt of late rains. This defect, it is expected, will be capable of rectification. The growers, however, under the agency of the departmental cotton pool, secured good prices and actual better profits per acre.

There has been a marked increase in seed farms, and the amount of good seed issued of all crops ranged from 20 per cent to 30 per cent increase over the past year; the issue of whole canes of the Coimbatore varieties more than doubled.

In the rice tracts there has been an extension of the self-help contributory village seed unions. This type of union appears to be gaining in popularity.

There were 16 agricultural shows held in the circle, of which 11 were in the cotton tract. That at Wardha

was the biggest and attracted a very effective number of machinery and implements exhibits from outside the Central Provinces. In most of these there was a considerable amount of machinery in motion. The show drew very considerable crowds and interest was keen.

19. Eastern Circle.—The season was a favourable one for paddy. The demonstration farms in this circle did particularly well. The Ruabhandha Farm (Drug) secured an average yield of 2,889 lbs. of paddy. Demonstration plots form rather a feature of this tract as an outcome of the closer association with the Irrigation Department. There were 9 Government and 11 private plots in operation in 1929-30, and 15 more of the latter type, ten under the Kharung reservoir and five on the heavier soils under Maniari, will be opened in 1930-31. During this year the average net profit per acre on the private demonstration plots of this tract was Rs. 22. In the plots put down under the Kharung reservoir to test the advantage of transplanting over *biasi* and the value of irrigation, the average gain of the former has been 319 lbs. and of the latter 442 lbs. per acre.

The amount of seed available from seed farms for the coming year is 204,195 maunds as against 108,189 a year ago. It is not however possible to increase the number of seed farms till the field staff is strengthened, as supervision in weeding and threshing is essential.

The self-help seed union described above is a promising feature of this circle. Many of them are doing well.

An interesting agricultural feature of this year, though not the direct outcome of departmental effort, is the steady consolidation of holdings which has gone forward on the Balod area of Drug and the very extensive demand for a like settlement in hundreds of other villages. The process of *chakbandi* in the neighbourhood of Balod has been associated with a village uplift campaign. This area, what with the marked economic advantage gained by each holder by consolidation and the co-operative wealth owned by their seed unions, is a particularly favourable field for uplift, as there is definitely a potential increase of wealth which is not so obvious in other areas in which this uplift is being encouraged.



The number of practical demonstrations in the villages nearly doubled, while lectures aided by lantern rose from 29 to 93. An interesting feature of demonstration work has been the effort to encourage the ensilage of spear grass. Some 15 silage pits were made in different villages and with the coming of the hot weather were opened and used. The product was in each case very satisfactory, and created a very decided impression.

The work in this circle as in others increases every year. There is particular need for an Extra-Assistant Director and a distinct increase in the jamadar staff.

**20. Western Circle.**—A good deal of the outcome of the demonstration work in this circle has been recorded under my remarks on cotton and groundnut, the two chief market crops of this tract. This circle suffers possibly more than others from the effects of a shortage of field staff in relation to the size of the taluqs, population density and the advanced progress made by the department. This is being in part rectified in 1930-31. Berar, however, is provided with a number of taluq co-operative agricultural associations. These number 25 and are supported at the present day by some 11 like but smaller societies with a more restricted field of operation. The great majority of the associations are living bodies served by energetic managing committees. Their chief operations lie in the sale and hire of implements, sale of manures and the provision of pure seed. Several have their own demonstrational plots. Certain of them in particular were actively engaged in the collection, ginning and disposal of verum through the departmental pool and did excellent work in this respect in co-operation with the department. The average percentage of profit secured among all such societies during the year was 28.4 per cent as against 13 per cent last year. Many should develop into good verum sale cotton societies in the next year or two. One of their most valuable functions lies in the hire of ploughs, and as many as 911 were thus in use of which 696 were owned by the Buldana associations.

Another interesting feature of progress of recent years is the expansion of the sale and use of fertilizers. This is most marked in the Nimar district.

One of the chief improvements in demonstration work during the past year was an increase in the touring

done by assistants in villages of the more beaten tracts. The assistants travelled by cart from village to village taking their demonstration outfits with them. This arrival of an assistant at a certain centre was advertised in advance in the neighbouring villages by the Revenue Department. There were in consequence large crowds at most centres and good work by practical demonstration and lantern lecture was effected. This is effective in bringing the department to the notice of the farmer, but more prolonged and concentrated work at each centre is necessary. This must however await the increase of the field staff.

There is active co-operation in this circle between this department and the Co-operative Department. Two agricultural assistants have been deputed to work with the latter. One of these is engaged in an interesting experiment at Katangi under the control of the Akola Central Bank in which a considerable area, which has lapsed to the bank on account of indebtedness, is being worked as a large scale farm on behalf of the bank and in the future interest of the debtors. It is interesting to note that the improved practice he is introducing on the bank lands is being already closely followed by the other debt-free tenants of the village.

There was a further increase in the amount of pure seed distributed under departmental control, viz., 164,589 maunds, as against 117,125 maunds in 1928-29.

The expansion of the private demonstration plot is gratifying. This means of emphasizing the value of the methods advocated by the department is obvious. The Deputy Commissioner, Akola, has been particularly active in bringing the value of such plots to the notice of prominent cultivators and it is understood that a number have agreed. The difficulty of wide extension of this method of demonstration lies in the fact that experience has shown that they need more supervision than the layman is apt to imagine and then a taluq staff of one assistant and possibly a couple of jamadars can hope to manage in any number.

21. Northern Circle.—The disastrous harvests of 1929 left the north of the province in almost a worse position than those of 1928. The services of the staff in the early part of the year 1929-30 were almost entirely

engaged in the distribution of seed, of which the majority was derived from Hoshangabad which had largely escaped the frost. This, following on the bad year before it, seriously upset the ordinary work of the department, as assistants had to be taken off their ordinary duties and requisitioned from less seriously affected districts. Though reacting adversely in development in this way it favoured the expansion of the departmental wheat varieties, a fact which was fully made use of.

The P. Barhi scheme of improving the seed stocks, as reported elsewhere, continues to make progress.

In spite of bad crop year, the sale, primarily on taccavi loans, of improved implements, machinery and wire fencing, now rapidly growing in popularity, was steady and of practically the same value as the year before.

In the Pipariya circle of the Hoshangabad district an experiment has been in progress directed towards village uplift. An agricultural assistant, jamadar and peon were put on special duty for six months to assist. His efforts have been directed along the lines usual in agricultural improvement, but it is hoped, that in view of his concentration of effort to a circle rather than to one or even two tahsils, as is usually the case, he will effect some permanent good. When I visited his charge and inspected some three or four villages, improvement, such as were possible in a scheme of this kind started after sowing was over, were in evidence. He had in several cases secured the adoption of the system of conserving urine in dry earth and pits dug in anticipation of the storing manure and refuse were in evidence. An effort of this kind must be continued some years to be fruitful.

The buildings of the new farm at Narsinghpur were under departmental construction during the year. Each district except Mandla in his circle has now got a farm.

**22. General remarks.**—The activities of the Agricultural Department continue to increase and expansion, in spite of financial difficulties, along new lines is steady. It is impossible to record the many details which go to build up the work accomplished in any one year. Only those of more outstanding interest have been dealt with in this report.

The amount of work done and the extent of the progress made to which all sections contribute, becomes more obvious on a comparison of the statistical data of 1921-22, the year when first compiled after the department had been in existence for 17 years with those of the present year.

Year.	Total number of seed farms.	Maunds of pure seed issued.	Cane setts issued.	Area sown under improved seed issued by the department.	Value of implements introduced.	Practical demonstrations given.
				Acres.	Rs.	
1921-22 ...	2,237	95,523	1,807,164	389,985	1,12,855	924
1929-30 ...	14,723	591,741	2,846,484	1,503,417	2,95,959	4,371

What has been done to date to improve agricultural practice is however not a tithe of what remains to be done. The work of moulding existing practice in the light of modern knowledge is immense. It of necessity calls for heavy capital investment by the State, even though such expenditure represents but a microscopic fraction of the ultimate gain secured by the grower, whether this be measured in improved goods or in the outcome of better methods. At present the financial resources of the province are strained and while such factors as unfavourable seasonal and economic conditions prevail, this state will hold and advance along the many lines mapped out for future development must, of necessity, be checked pending the return of better times. In the meantime all that can be done with what is available for the maintenance of existing conditions is being done.

The technical and clerical staffs have had to face steadily increasing demands on their time and effort and the response to this demand has been usually fully forthcoming.

There is a steadily increasing body of non-official and non-departmental help and in certain tracts a keen co-operative effort to aid advance. Indeed, but for this valuable and welcome assistance, progress would have been less marked than it is. Such interest and such help

is gratefully appreciated and the department tenders its thanks to the many well wishers who by their zeal in matters co-operative or by their interest and example have aided in the best way they could the forward march of agricultural progress.

R. G. ALLAN,  
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## APPENDIX A.

*Number of cattle sold from Government Cattle-breeding Farms during the year 1929-30.*

Name of circle.	Bulls.	Bullocks.	Cows.	Male buffaloes.	She-buffaloes	Young stock of cows and buffaloes.	Total for 1929-30.	Total for previous year.
1	2	3	4	5	6	7	8	9
Northern ...	9	10	7	..	...	5	31	19
Southern ...	10	...	14	...	...	...	24	19
Western ...	5	21	49	...	...	64	139	21
Eastern ...	4	24	1	...	...	...	29	154
Agricultural College	...	10	...	...	1	22	33	9
Total ...	28	65	71	...	1	91	256	...
Total for previous year.	24	39	17	9	..	133	...	222

## APPENDIX B.

Name of circle.	Number of private seed farms.						Total for 1929-30.	Total for previous year.
	Wheat.	Rice.	Cotton.	Juar.	Ground nut.	Other crops.		
1	2	3	4	5	6	7	8	9
Northern ...	4,621	543	517	805	255	769	7,490	6,863
Southern ...	220	713	241	49	23	81	1,327	930
Western ...	118	...	1,877	427	1,525	...	3,947	3,201
Eastern ...	611	1,294	7	...	31	16	1,959	1,710
Total ...	5,570	2,550	2,642	1,281	1,814	866	14,723	...
Total for previous year	5,031	1,848	2,373	755	1,552	1,145	...	12,704

is gratefully appreciated and the department tenders its thanks to the many well wishers who by their zeal in matters co-operative or by their interest and example have aided in the best way they could the forward march of agricultural progress.

R. G. ALLAN,  
*Offg. Director of Agriculture,*  
*Central Provinces.*

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APPENDIX B—*concl.*

Name of circle.	Seed distributed in maunds and whole canes.						Total for 1929-30.	Total for previous year.
	Wheat.	Rice.	Juar.	Cotton	Ground-nut.	Whole canes.		
1	10	11	12	13	14	15	16	17
Northern ...	271,552	7,526	221	1,312	533	1,632,947	281,414 6,275*	2,9,050
Southern ...	3,088	24,741	316	4,631	91	879,389	32,870	25,349
Western ...	1,346	...	9,259	100,670	56,881	...	168,156	1,55,457
Eastern ...	12,846	89,981	...	18	143	334,568	107,996	71,605
Total ...	288,832	122,551	9,796	106,634	57,633	2,846,844	591,711	...
Total for previous year.	225,956	84,158	6,107	87,107	47,195	898,273	...	451,461

\* Seeds of other crops distributed in Northern Circle.

## APPENDIX C.

Name of circle.	Approximate area in acres sown with improved seed from private seed farms and other sources						Total for 1929-30.	Total for previous year.	Approximate value of the increased outturn resulting from use of improved seed for	
	Wheat.	Rice.	Cotton.	Juar.	Ground nut.	Other crops.			1925-30.	1928-29
	1	2	3	4	5	6			7	8
Northern	336,093	13,050	11,608	14,779	5,159	11,008	391,729	297,556	Rs. 10,09,233	Rs. 9,72,406
Southern	6,909	82,785	95,929	8,868	1,382	3,909	199,782	149,807	Rs. 8,75,713	Rs. 15,68,101
Western ...	3,701	...	552,401	138,993	76,481	...	771,543	720,614	Rs. 76,5,104	Rs. 72,8,997
Eastern ...	8,152	125,141	243	...	2,148	1,170	140,363	95,85	Rs. 14,77,103	Rs. 14,55,236
Total ...	353,057	220,976	660,199	162,549	85,170	19,466	1,50,347	...	Rs. 20,25,093	...
Total for previous year.	269,907	181,696	627,671	129,773	75,024	20,187	...	1,304,250	...	Rs. 1,12,27,730

\* This does not include figure for Saugor district as wheat suffered heavily in this district on account of drought and no appreciable profits were secured.

## APPENDIX D.

Name of circle.	Number of implements and parts of implements sold.						
	Ploughs.	Sugar-cane mills.	Fodder cutters.	Akola hoes.	Other implements.	Spare parts.	Total for 1929-30.
1	2	3	4	5	6	7	8
Northern ...	543	52	12	47	359	571	1,584
Southern ...	1,537	65	3	26	160	524	2,315
Western ...	3,226	..	13	55	614	15,856	19,764
Eastern ...	289	12	17	4	74	163	559
Agricultural College Farm ...	44	..	..	..	..	2	46
Total ...	5,639	129	45	132	1,207	17,116	24,268
Total for previous year ...	7,613	162	98	99	877	11,494	20,343

Name of circle.	Value of implements in rupees. sold during		Books and bulletins.		Total.	Total for previous year.
	1929-30.	1928-29.	Books sold.	Bulletins sold.		
1	9	10	11	12	13	14
Northern ...	Rs. 32,678	Rs. 40,604	62	235	297	351
Southern ...	87,804	66,061	49	509	558	405
Western ...	1,61,810	1,93,803	270	1,411	1,681	1,536
Eastern ...	10,136	16,211	35	78	753	908
Agricultural College Farm ...	1,531	2,048	..	..	..	..
Total ...	2,95,959	3,87,277	416	2,873	3,289	3,200
Total for previous year ...	3,18,727	2,76,832	495	2,705	3,200	4,304

## APPENDIX E.

Name of circle.	Number of agricultural shows held.	Number of periodical demonstrations carried out by district staff.	Number of illustrated lectures given.
1	2	3	4
Western ...	13	1,629	103
Eastern ...	4	564	93
Northern ...	5	1,105	77
Southern ...	16	1,073	12
Total ...	38	4,371	285
Total for previous year ...	38	4,040	160