



REPORT ON THE OPERATIONS OF THE
DEPARTMENT OF AGRICULTURE,
MADRAS PRESIDENCY
FOR THE YEAR
1934-35

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OFFICE OF THE DIRECTOR OF AGRICULTURE.

Madras, dated the 30th July 1935.

From

M.R.RY. RAO BAHADUR D. ANANDA RAO GARU, B.SC.,
Director of Agriculture,
Madras.

To

THE SECRETARY TO GOVERNMENT,
DEVELOPMENT DEPARTMENT,
Fort St. George, Madras.

SIR,

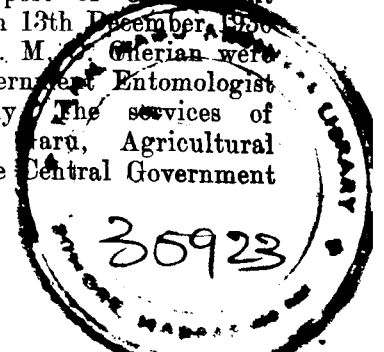
I have the honour to submit the report on the operations of the Department of Agriculture for the year 1934-35.

I.—ADMINISTRATION.

2. S. V. Ramamurti, Esq., I.C.S., continued to be in charge of the department throughout the year except for the first three months when he was on leave outside India. I officiated as Director of Agriculture during his absence on leave.

3. *Indian Agricultural Service*.—Mr. R. C. Broadfoot, Headquarters Deputy Director of Agriculture, continued to officiate as Principal, Agricultural College, till 10th July 1934 during my absence on other duty as Officiating Director of Agriculture. He held the post of Headquarters Deputy Director of Agriculture thereafter. I remained as Principal during the remainder of the year. Mr. Saadat-ul-lah Khan, whose services were lent to the Central Government for appointment as Agricultural Officer, North-West Frontier Province, reverted to this department from 16th December 1934. Since then, he has been on leave. Mr. D. G. Munro, Deputy Director of Agriculture, VIII Circle, has been on leave outside India from 3rd January 1935.

4. *Madras Agricultural Service*.—M.R.Ry. K. Gopalakrishna Raju Garu continued to officiate as Headquarters Deputy Director of Agriculture till 19th July 1934. The lien of M.R.Ry. Rao Sahib Y. Ramachandra Rao Garu on the post of Government Entomologist was suspended with effect from 13th December 1934 and Dr. T. V. Ramakrishna Ayyar and Mr. M. Chierian were appointed provisionally substantive as Government Entomologist and Lecturer in Entomology respectively. The services of M.R.Ry. Rao Bahadur B. Viswanath Garu, Agricultural Chemist, were placed at the disposal of the Central Government



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for appointment as Imperial Agricultural Chemist from 14th August 1934. The following officers have been appointed to selection categories during the year:—

- (1) M.R.Ry. K. Unnikrishna Menon, Deputy Director of Agriculture, VI Circle.
- (2) M.R.Ry. T. Budhavidheya Rao Nayudu, Deputy Director of Agriculture, II Circle.
- (3) M.R.Ry. P. V. Ramayya, Agricultural Chemist.
- (4) M.R.Ry. Y. G. Krishna Rao Nayudu, Deputy Director of Agriculture, VIII Circle.
- (5) M.R.Ry. C. Ramaswami Nayudu, Deputy Director of Agriculture, I Circle.

Mr. V. Ramanatha Ayyar, Cotton Specialist, was on leave for three months from 16th July 1934. During the period, Mr. R. Chokkalingam Pillai officiated as Cotton Specialist. The post of Oil Seed Specialist was made permanent during the year and Dr. J. S. Patel was appointed to it substantively from 1st April 1934.

5. In connexion with the scheme of improving marketing, the post of a Provincial Marketing Officer was sanctioned by Government. M.R.Ry. K. Gopalakrishna Raju Garu was appointed to it and he entered on his duties on the 27th August 1934. To assist the Marketing Officer, three posts of Assistant Marketing Officers were sanctioned out of the funds provided by the Imperial Council of Agricultural Research. Messrs. K. W. Chakrapani Marar, M. P. Kunhikutti and S. N. Venkataramanan were appointed to these posts and they took charge of the posts towards the end of February 1935.

The post of Superintendent, Fruit Research Station in Cuddapah district, was created as early as July 1934 for a period of five years. Mr. K. C. Naik, who was selected for the post, is expected to join duty early in August 1935.

On the recommendation of the Irrigation Development Board, a post of Assistant Agricultural Chemist was created in November 1934 in connexion with the Soil Survey of the Tungabhadra Project area for a period of fifteen months. Mr. C. V. Ramaswami Ayyar, Assistant in Chemistry, was appointed to the post.

In connexion with the Madras Pemppheres and Physiological Scheme financed by the Indian Central Cotton Committee, two posts of Bio-chemist and Physiological Botanist were created in November 1934. Dr. S. Kasinatha Ayyar and Mr. T. R. Narayanan, who were appointed for the posts respectively, joined duty in February 1935.

In addition to the above, the continuance of the following temporary posts was sanctioned during the year.—

- (1) Assistant Director of Agriculture to assist the Deputy Director of Agriculture, VIII Circle, for work connected with the Lower Bhavani Project.

- (2) Superintendent, Dry Farming Scheme, Hagari.
- (3) Temporary post of Business Manager for Cotton Seed Distribution and Extension Scheme.
- (4) Superintendent, Rice Research Station, Berhampur.

M.R.Ry. Rao Sahib V. Muttuswami Ayyar Avargal, Officiating Lecturer in Agriculture, retired from service on the 16th December 1934.

Special posts.—The term of Mr. Murari's appointment as Superintendent, Livestock Research Station, Hosur, was extended on short-term contract till 21st January 1936.

6. *Madras Agricultural Subordinate Service.*—The upper subordinate cadre was increased by one post during the year. This additional post is intended for work in the Bhadrachalam Agency tract. The post has not yet been filled up pending further orders of Government on the subject. Twenty-eight posts were sanctioned during the year as temporary additions to the cadre of the Madras Agricultural Subordinate Service for work in the schemes financed by the Indian Central Cotton Committee, the Imperial Council of Agricultural Research and the Local Government.

Indian Central Cotton Committee Schemes.

- (1) Madras Pemppheres and Physiological Scheme ... 5

Imperial Council of Agricultural Research Schemes.

- (2) Rice Research Station, Berhampur ... 3
- (3) Dry Farming Station, Hagari ... 4
- (4) Sugarcane Station, Gudiyattam ... 3
- (5) Fruit Station, Cuddapah ... 1

Local Government Schemes.

- (6) Agricultural Farm, Cauvery-Mettur Project area ... 2
- (7) Soil Survey of Tungabhadra Project area ... 10

These include posts already in existence for which sanction for continuance in 1934-35 was obtained.

II.—AGRICULTURAL EDUCATION.

7. There was no change in the activities of the department during the year in regard to agricultural education.

8. *Agricultural College, Coimbatore.*—There was still a distinct reduction in the number of applications to the college. During the year 91 applications were received as against 139 in the previous year and 180 the year before last. Of these, only 65 appeared for the interview before the Selection Committee, of whom 44 were selected and 10 were placed in the waiting list.

Only 30 students, however, joined the college at the beginning of the session, but two students resigned subsequently. Three failed students joined later bringing up the final strength of the class to 31. There were no applicants from the Agency tract.

Examinations.—The number of candidates that appeared for the B.Sc. Ag. degree examination in 1934 and passed is as follows:—

	Number appeared.	Number passed.
<i>Old regulations—</i>		
Part I	5	5
Part II	41	39
<i>New regulations—</i>		
First examination	45	39
Second examination	32	* 26

* Includes eight students passed in one subject only and permitted to appear for the final examination next year.

Scholarships.—Of the five scholarships, two were awarded to Muhammadan students and two to backward classes under orders of Government. The fifth scholarship was kept in abeyance pending the results of the University Examination in April 1935.

Some of the existing scholarship-holders failed to get promotion and forfeited the scholarships. These have been in turn awarded to two students in Class III and one in Class II. One scholarship forfeited by a Muhammadan student last year was again sanctioned to him this year in Class III.

Tours.—In October 1934, the senior students of the college were taken on an agricultural tour to Travancore and Cochin States and to the Agricultural Research Stations, Kovilpatti and Pattambi. The students of Class II were taken on tour in January 1935 to the Agricultural Research Stations, Nandyal, Guntur, Palakuppam and Palur and to Dindigul and Usilampatti.

9. *Agricultural Middle Schools.*—The Raja of Panagal expressed his inability to complete the school building at Kalahasti. The Director of Public Instruction had under consideration a scheme to train elementary teachers in the principles of agriculture and it was suggested that teachers from Telugu area could be taught at Kalahasti in which case the proposed Agricultural Middle School at Kalahasti might be replaced by a school for elementary school teachers. Now that the proposal has been dropped and there is no likelihood of the original proposal for an Agricultural Middle School materializing, the question of running the farm as an experimental station without a school being attached to it is under consideration.

The school at Usilampatti continued to be under the management of the District Board, Madura. There were 32 students (15 Kallars and 17 non-Kallars) during the year at the school. The Vocational School at Muthanendal, that was being run by the Ramnad District Board, was closed early in the year. In July 1934 it was formally converted into an Industrial School, the working of which actually commenced from 1st March 1935.

10. *Farm Labourers' Schools.*—The three schools at Anakapalle, Palur and Coimbatore were continued during the year. At Anakapalle there were 26 boys on the rolls during the year as against

28 of the previous year. There were 18 adult labourers in the night school. At Palur, there were 30 on the rolls including one girl as against 27 of last year. In the night school the number on rolls was 17. At Coimbatore, there were five boys in the school with wages and 16 without wages as against 9 and 28 respectively during the last year.

11. *Short courses in Practical Agriculture.*—The short course in "Farm Management" started last year was continued this year. The strength of the class during the year was 13. Besides this, short courses of instruction in four other subjects were instituted during the year, the particulars of which are given below:—

Course.	Time.	Period.	Number attending the course.
1. Malt-making ...	October	... 15 days	... 16
2. Insect pests and diseases ...	November	... 7 days	... 3
3. Jaggery-making.	February	... 1 month	... 24
4. Bee-keeping ...	February	... 1 month	... 24

The students attending the "Farm Management" course were also permitted to take the above courses. These courses seem to be popular and the experiment is worthy of continuance.

12. *A course of study in co-operation.*—In G.O. Ms. No. 250, Development, dated the 23rd February 1934, the Government sanctioned the institution, from the academic year 1934-35, of a course of instruction in Co-operation, Auditing, Book-keeping and Banking at the Agricultural College, Coimbatore, so as to enable the students to qualify themselves for appointment as Inspectors in the Co-operative department. The course was started in July 1934 when Book-keeping was taught to Class I students. The class will be continued next year.

13. *Dairy.*—At the beginning of the year there were on an average 32.3 cows in the herd of which 22.3 were in milk, 10.0 dry as against 34.6 and 22.5, 12.1 dry respectively of the previous year (1933-34). The percentage of cows in milk to the total number in the herd was 69.3 as against 64.9 in the year 1933-34.

The total quantity of milk yield was 116,506 lb. as against 113,163 lb. of which 82,518 lb. were sold, 13,539 lb. fed to calves and 1,243 lb. were colostrum.

The quantity separated was 19,445 lb. as against 28,493 lb. of the previous year, and the quantity of cream obtained was 1,937 lb. Of this 1,903 lb. excluding 55 lb. of cream purchased for students' practice in butter-making was churned and the butter produced was 1,059 lb. Of 1,102 lb. of butter as against 1,594 lb. of the previous year, 713 lb. could be sold as butter, 354 lb. were converted into ghee as against 348 lb. in the previous year.

The receipts during the year amounted to Rs. 12,254 as against Rs. 11,354 and the expenditure was Rs. 18,133 as against Rs. 18,654 in the previous year. A net loss of Rs. 5,900 has resulted as against Rs. 7,341 in the previous year.

14. *Conference.*—The Twenty-third College Day and Conference was held during December 1934 under the presidentship of M.R.Ry. Diwan Bahadur M. Ramachandra Rao Pantulu Garu, President of the Land Mortgage Bank. Several papers were read and discussed at the Conference.

III.—SEASON.

15. The monsoon appeared late during the year but rapidly established itself subsequently. An advance of the monsoon occurred in the south-east Arabian Sea on the 2nd June and it made its actual appearance on 8th June in Malabar. It caused precipitation along the West Coast during the last three weeks of this month. The rainfall during the month was bordering on or above normal in Ganjam, Vizagapatam, Kurnool, Cuddapah, the Carnatic and the Central districts, Madura, Ramnad and the West Coast. Good rains were received in July in all the districts of the Presidency except Salem, Coimbatore, Trichinopoly, Tanjore, Madura and the West Coast. The rainfall in August was below normal, except in Ganjam, Vizagapatam, East Godavari, West Godavari, Chingleput and the West Coast. The monsoon was generally weak in September. On the whole, the south-west monsoon was above normal in Ganjam, Vizagapatam and East Godavari, was normal in Chingleput and below normal in the other districts especially in Bellary, Anantapur, Salem, Coimbatore, Trichinopoly and the south.

North-east monsoon conditions set in late in the south of the Bay of Bengal by the 20th October and extended in south Madras where thunderstorms occurred between the 22nd and 25th. The rainfall during the month was above normal outside the Circars (Vizagapatam Agency and Guntur excepted), the Deccan and South Kanara. The rainfall in November was, however, below normal except in Vizagapatam, Kurnool, Bellary and Trichinopoly, while the fall in December was seriously in defect throughout the Presidency, especially in the Carnatic, the Central districts and the south. The rainfall in January was slight. On the whole the north-east monsoon was above the average, only in Vizagapatam (Agency), North Arcot, Salem, Coimbatore and Trichinopoly and below the normal in other districts.

The effect of the season on the crops at the various Agricultural Research Stations.—The season was not favourable for paddy at Berhampur. The poor summer rains and high temperature affected severely the standing crops of sugarcane and plantain at Samalkota. Combined with this, the delay in the receipt of freshes in Godavari retarded the progress of cultural operations for the first crop of paddy at Maruteru. Unusual continuous drought affected the winter crops and the pastures at Guntur. Early soaking rain at Nandyal and Hagari facilitated the sowing of all crops. Owing to subsequent severe drought, mungari crops at Hagari failed. The north-east monsoon was delayed by a month and the usual late rains also were absent on that station. A heavy

downpour of rain after sowings in July at Palur necessitated resowings in the fields. Palakuppam fared better; the distribution of rainfall was good there and groundnut and castor came up well. In Aduturai rainfall was deficient in all the three seasons. The season was quite favourable to cotton and cumbu at the Koilpatti Research Station but pulses and cholam were severely affected. On the Agricultural Research Stations on the West Coast, both the monsoons were unfavourable and the total absence of rains in summer affected coconuts much. At Nanjanad Research Station, the season was more favourable to samai than for potato and lupins. All the three potato crops were affected by drought and cut worms. At Coimbatore there was an initial set back in the sowings of all crops, as July, August and September were practically rainless. The season was very bad to all crops especially to cholam, redgram and Cambodia cotton.

IV.—RESEARCH.

A.—Botany.

16. Six hundred and sixty-five specimens were identified during the year and 3,353 sheets incorporated into the Herbarium. The survey of bananas was continued in the districts of Ramnad, Tinnevely and Guntur and parts of Madura, Kistna and Nellore. Two new varieties were added to the existing list. Important varieties were exhibited at District Conferences and exhibitions. About 1,600 suckers representing the main varieties were distributed to several places, including the Director, Botanical Gardens, Kew. The study of indigenous fodder grasses also received attention; of these, *Chloris Bournei* gave a promising yield of 25,890 lb. per acre.

B.—Chemistry.

17. During the year under report, soil surveys were undertaken of four irrigation projects, viz., (1) Lower Bhavani, (2) Cauvery Mettur, (3) Tungabhadra, and (4) Toludur, of which reports of the first two have been completed. It has been found that, although alkaline patches are found in the soils of new areas under Cauvery-Mettur Project, there will be no danger of alkalinity developing provided proper drainage facilities are given. These soils were found deficient in all the essential plant foods except potash. The Lower Bhavani soils are porous and it is likely that seepage may cause heavy transmission losses from the canals.

Work was also done on the wilting co-efficient of cholam and cotton. Movements and distribution of soil moisture and Ph. values of several samples of soil from the Presidency were also under study. Efforts were made to utilize the effluent from the activated sludge plant and it was found very useful for paddy, giving an increase of 83 per cent yield over channel watering.

The experiments on plant and animal nutrition were further continued. The feeding of sulphur to sheep did not result in significant increase in quantity or quality of wool. A survey of Malabar pastures was made in respect of mineral matter, and it

showed that the uplands were deficient in phosphoric acid and lime as compared to forest grazing grounds. It was noticed that the composting of Trichinopoly phosphate with sulphur, molasses and bran was capable of producing a mineral mixture for cattle to make up phosphorus deficiency in the ration.

The vitamin contents of some fruits were investigated. Banganapalle mangoes were found rich in vitamin A. Dried chakrakeli plantain figs were deficient in both A and C.

The work on the chemistry of sugarcane received considerable attention. Ripening tests of the sugarcane-sorghum cross showed that they matured in 9½ to 10 months after planting and possessed a high sucrose content. Cane arrowing was found to decrease the weight of cane and increase the fibre, but the quantity of sucrose was unaffected.

Further researches were conducted on the preparation of active carbon in the making of cream jaggery from begasse and cane trash, on a large scale. Extended trials were made with the making of cream jaggery in the various parts of the Presidency and demonstrators from all sugarcane areas were trained for the work. During the year 3,000 lb. of active carbon was supplied to departmental officers and 588 lb. to co-operative societies at Annur, Coimbatore district, and Mallasamudram, Salem district. Laboratory experiments conducted with groundnut shells for the making of active carbon met with considerable success and a cheaper method was worked out for activating with heat alone. Methods were also devised for the accurate estimation of the activity of the carbons produced using the Lovibond Tintometer. Further, a new furnace was designed to combine the operations of the three furnaces now in use thereby effecting a large saving of fuel and costs.

It was found that molasses was inferior to green manure for paddy and was not useful for other cereals.

On the bacteriological side, studies were conducted on the biochemistry of the organism on groundnut nodules. It has been possible to isolate the organism responsible for sulphur oxidization and more studies are in progress. A trial is being made to introduce a saprophytic fungus to act as a parasite on *Fusarium moniliforme* found ravaging paddy plants.

Besides the above special items, the usual advisory work was continued. Seven hundred and twenty-three samples of soils, manures and foodstuffs were analysed and advice given.

C.—Crops.

(1) Cereals.

18. (a) *Millet*s—(i) *Sorghum*.—About 800 units of sorghum were handled during the year at the Millets Breeding Station, Coimbatore, for economic and scientific studies. Of the new strains tested, two whites, A.S. 2095 and A.S. 3023 proved superior to the standard A.S. 367, and one yellow cholam, A.S. 3023 proved

better than the control, A.S. 809. Work was also done on red sorghum and bulk material gathered to meet the demand from Salem district. Besides, a few desirable and economic types have been isolated from the introduced African and American varieties, while a cross has been effected between "Wonder," one of the American Kafirs, with A.S. 367, the best early local sorghum.

Work on the sub-stations also progressed considerably. At Nandyal, strain 28/3 has given consistently high yields in all the three seasons tried. At Koilpatti, strains A.S. 367, 1059, 2095 and 3023 were all found superior to local, strain A.S. 2095 giving 34.8 per cent increase.

At Nandyal, sorghum responded to the direct application of artificial manures during the last three years and appreciable residual effects were noted in the succeeding cotton and sorghum crops. From the studies made at Guntur to find out the effect of deficiency in germination on yield, it was observed that early germinated plants yielded better, flowered earlier and were taller than plants from seeds germinated later. Grading of seed did not give any significant increases in fodder yields.

(ii) *Ragi* (*Eleusine coracana*).—At the Millets Breeding Station, 983 units of ragi were under study. E.C. 593 continued to be the best strain. This strain was found to do well in summer as well as in the main season and was also adaptable to rainfed conditions. In duration, it was found 10 days earlier than local in the Bellary and Koilpatti tracts, but proved later by about the same period in Salem and Chittoor districts.

Due to failure of the monsoon, economic work on rainfed ragi for Kollegal, South Arcot, and Chittoor had a set-back. Types are also being isolated from the crosses between long and short duration varieties.

(iii) *Korra* (*Setaria Italica*).—Strain S.I. 523 maintained its status as the best strain at Coimbatore. Among the 64 strains under trial at Nandyal, twenty have given promising results.

(iv) *Variga* (*Panicum miliaceum*).—At Guntur, 379 selections of this crop were made during the year.

(b) *Paddy*—*Breeding*.—District trials have confirmed the superiority of Kar strains 10372 and Ayyansamba 8252, and these will be named Co. 10 and Co. 11 respectively and released for distribution. From varieties of Chingleput, Periyar and Tinnevely, 267 strains underwent preliminary yield tests, and 40 of these were found better than controls by 15 per cent and more. The hybrid strain from Co. 3 which has once again beaten Co. 3 by over 10 per cent, with a better type of grain and more straw, will be tried in the districts. Of the better quality North Indian rices, three have proved better than Kar strain 10372 and one even better than G.E.D. 24. Methods to evolve a "blast" resistant variety have proved successful, and two hybrid strains from *Korangu samba* and G.E.B. 24 resistant to *Piricularia* disease, have given over 20 per cent increase over control and 10 per cent increase over Adt. 10, an improved strain of *Korangu samba*.

At Maruteru, out of 24 strains tried, one of *akkulu* and two each of *konamani* and *vankisannam* proved better than controls. District trials were conducted in 14 centres; one strain of *attragada* and one of *vankisannam* yielded better than ryots' control in Kistna and Guntur districts. In the inter-varietal trials of main crop varieties *akkulu* maintained its superiority as in last year. Besides, 500 natural crosses of progenies and 377 further selections were under study.

At Berhampore, 139 strains out of 328 proved better than controls in preliminary yield trials and are under further examination.

Trials of *sanna samba* at Aduturai revealed that strains 693 and 706 bulks have yielded better and these will be given out in the districts in the coming season. Besides, work on single plant selections continued with *Pishanam* and *Kamban*.

At Palur, comparative trials of semi-dry paddy were in progress. Some selections were made in *vadan samba*, a dry paddy variety.

19. *Agronomy*—(i) *Cultural experiments*.—At Pattambi, transplanting was found more advantageous than broadcasting for long duration varieties like *thavalaikannan* but not for short duration ones like *thekkan cheera*. At Aduturai, kuruvai seedlings were found to suffer by severe root pruning at transplanting, but *samba* benefited by the operation. Regarding the optimum age of seedlings, results at Pattambi, Berhampore and Maruteru, all showed that irrespective of seed rate or the manured condition of seed bed, there is no difference among ages of 20-50 days, the time of planting being more important. Beyond 50 days the yield is definitely affected at Berhampore. The raising of seedlings in wet or dry nurseries did not show any difference at Pattambi for both first and second crops.

(ii) *Spacing experiments*.—At Pattambi and Berhampore, 6 inches spacing was found to be the optimum. At Maruteru, a wider spacing between lines than between plants in a line was indicated. With regard to the weight of seed, the elimination of small seed in Kar variety appears favourable. At Coimbatore, the conditions of storage of paddy are being investigated in respect of time of harvest, period of storage, method of storage and cooking qualities.

(iii) *Manurial trials*.—Application of lime was beneficial at Pattambi, but not at Berhampore. Increasing dressing of green leaves up to 6,000 lb. gave progressively higher yields at Berhampore. Further, addition of ammophos at 100 lb. per acre to 4,000 lb. green leaf increases the yield, but the increase is not sufficient to cover the cost. Ammonium sulphate also supplements the value of green leaf and super at the same station, while at Pattambi phosphatic dressings were effective over green leaf. At Aduturai, bone jelly and bone meal were found to have the same effects.

Subsidized manurial experiments at Maruteru.—The subsidized scheme of manurial trials for the first crop came to a close this year. The general indications from the experiments were that the application of green leaf definitely increases the yield, and that organic manures as oil-cakes serve the same purpose. Fertilizers like ammonium sulphate, ammophos and niciphos are as good as green leaves in increasing yields and act also in conjunction with them, but phosphatic manures do not show any increase when applied along with green leaves. There were no residual effects on the second crop from any of these treatments. At the present price of paddy it is not economical to apply any of these manures unless a 20 per cent increase of yield is realized.

It was noted during the experiments that high increases of over 20 per cent were noted in some cases where the second crop was manured with green leaves. As there are more than 200,000 acres under second crop in the tract with increased facilities for manuring and as all of it is cropped with one variety *garika sannavari*, any results obtained for the second crop will be immediately applicable to the whole tract. A new scheme was therefore drawn up to try the manures for the second crop and the first set of manurial experiments are just being started under special sanction from Government.

Economics of rice growing.—The net profit per acre in the demonstration area came down to Rs. 47 as against Rs. 65 last year at the Paddy Breeding Station, Coimbatore. The figure for Pattambi is higher being Rs. 65 and Rs. 37 respectively for the first and second crop mainly due to reduction in cultivation expenses. At Maruteru a profit of Rs. 50 for the two crops was realized.

(2) Fibres (Cotton).

20. (i) *Breeding*.—One thousand and forty-two families derived from single plants chosen from the material obtained fresh from Indo-China, from crosses between Cambodia and South African cottons, and also between Indicum and Cernum, were tried in the progeny rows. The crosses between Cambodia and South African cottons proved very promising in respect of yield and earliness, and some of the types appear capable of reducing the duration of Cambodia by at least three weeks, thus cutting down irrigation costs considerably. The three years' trial of strains 920, 1267 and 1742 showed the superiority of the latter two strains over Co. 2 in yield and earliness, and they are multiplied for rapid extension. The plants from the 'X' raying of cotton having proved disappointing the work was discontinued.

In Guntur, 723 selections were under trial and 400 fresh ones made. A new strain No. 12 evolved out of a cross between strains 171 and 45 has given a 45 per cent increase over control. At Nandyal, a number of Indicum strains, viz., 29, 340, 449, 546 and 556 was better than control No. 14, but their spinning qualities

were not so high. The Herbaceum strain H-1 from Hagari was found to give good yields at Nandyal, while the work on crosses between Indicum strains is continued.

At Hagari, 25 out of 123 selections were better than H-1.

At Koilpatti, over 3,500 units of cotton selections were studied. It was decidedly established that Karunganni was superior in yield and quality to Uppam during the last three years. Strain 2622, an early maturing one and which has been found equal to C. 7 at the research station and superior in two out of three district trials, is being multiplied for extension.

(ii) *Agronomy*.—Irrigation experiments at Coimbatore showed that while irrigations once a week increased the yield, they were not profitable as compared to fortnightly waterings. It was also shown in red and black soils that inter-cultivation between lines of cotton did not confer any advantage over ordinarily weeded plots.

The manurial experiments at the several agricultural stations confirm the view that cotton does not directly respond well to manuring, while the effects of indirect manuring lasts even up to the third year at Koilpatti and Nandyal.

(iii) *Schemes financed by the Indian Central Cotton Committee*—(a) *Madras Herbaceum Scheme*.—A special sub-committee appointed by the Indian Central Cotton Committee recommended the extension of this scheme by three more years. This is the fifth year of work in hybridization. Since direct crossings between Uppam and Karunganni have not given economically useful results, back crosses have been attempted during the past two years. For the first time in the scheme, a cross combining the drought resistance of Uppam and spinning qualities of Karunganni, has yielded better than the best strain of the latter and is under further trial.

(b) *The Madras Pempheris and Physiological Scheme*.—It was found this year that the loss due to stem-weevil (*Pempheris affinis*) is twenty per cent by way of mortality and 30 per cent more by crop yield. Amongst several varieties tried, Bourbon was found most resistant to the attack of the insect, Buri, Gadag and Durango coming next. An intensified programme of breeding for resistance is being started, while on the chemical side the conditions favouring the formation of galls and resistant principles like alkaloids and glucosides are being investigated.

(c) *The Madras Fodder Cholam Scheme*.—At Koilpatti, it was found that in years of drought like the present, the differences between soils after cholam or cumbu are not very pronounced. Experiments on ploughing, spacing, manuring, mixtures of cholam and pulse, and prevention of seed setting by using higher seed rate as well as cutting the earheads at shot blade were continued. Attention was also directed to the study of soil colloids. It was observed that in cholam soils the amount of exchangeable sodium was definitely greater and would partly explain the injuries after-effects.

(d) *The Madras Nadam Scheme*.—The object of the scheme is to isolate a suitable annual type to replace Nadam cotton in the Salem and Coimbatore tracts. Various crosses of Co. 2 × U. 4, Co. 2 × Bourbon and Nadam Karunganni were under yield studies and a good number of them came up well and promised to give a type with better spinning qualities and ginning percentage than Nadam. Spacing experiments showed that under conditions prevailing in this tract, wider spacing is not useful for Nadam cotton.

(3) Fodders.

21. At the Central Farm, Coimbatore, comparative trials were conducted of Periamanjil cholam, Thalaivirichan and T. 12 as fodder, but the differences were not significant. Besides, a number of fodders are being tried at the several agricultural stations with guinea grass, elephant grass, lucerne, teosinte, etc. At Coimbatore, elephant grass gave 53,836 lb., guinea grass 39,493 lb., teosinte 37,530 lb., lucerne 25,186 lb., fodder cholam 22,463 lb., and maize 19,383 lb. per acre. A survey of Malabar pastures has been made by the Chemist, while digestibility trials on fodders are also in progress.

(4) Fruit.

22. The experiments on budding and grafting were continued at the pomological station, Coonoor, to find suitable stocks for different genera to suit local climatic conditions. It was found that apple as a stock for pear unites readily while Loquat is a successful stock for the apple and pear. In citrus trees, grafting by the approach method was most satisfactory as opposed to budding. Special attention is being paid to the cultivation of grape fruit and mangosteen while manurial trials have been started on pine-apple. A new system of pruning apple trees by cutting off lateral shoots before the dormant period was found an undoubted success and is being tried on English pears as well.

Plantains.—A number of varieties of plantains were tried in the agricultural stations at Palur and Samalkota. In the latter case, over 40 varieties have been studied for yield and earliness, while attempts are being made to induce the setting of seed for breeding purposes. Manurial experiments showed that an application of potash or ashes increased the keeping quality of plantain by two or three days.

(5) Oil-seeds.

23. (i) *Groundnut*.—At Palakuppam a few selections from spreading varieties have been isolated giving the same high yield as Saloum, but shorter in duration by a week to a fortnight. Selections A.H. 97, 105, 136, 148, 178 and 210 have consistently given good yields, and with another year's trial they will be released for distribution. The inheritance of a number of characters is also under study. At Guntur, A.H. 25 gave a 25 per cent increase over local spreading type.

Experiments at Palakuppam show that the cropping of the same land with groundnut without manuring reduces the yield considerably, particularly in years of poor rainfall, and that it is more profitable to manure every year, the difference in income being Rs. 4-12-0 per acre in favour of the manured plots. At Nandyal, the application of cattle manure gave significant increases in both the bunch and spreading types.

Germination tests conducted on stored material showed that groundnut kernels and pods keep their viability up to four years when stored in air-tight bottles, but deteriorate after 12 months in ordinary gunny bags or tins.

(ii) *Gingelly*.—Eighty-four selections were tested in comparative trials during the year. Spacing experiments at Palakuppam show that the optimum spacing for irrigated gingelly is 12" x 12". The residual effects of manuring the previous crop were very marked on gingelly.

(iii) *Castor*.—At Palakuppam, 98 economic selections and 24 Russian varieties were tested for purity; the latter are getting acclimatised to local conditions. Some of the selfed lines in castor are very promising. At Guntur, only *Cawnpore* 13, out of the sixty types tried, proved better than control.

(iv) *Coconut*.—The work of hybridisation and selfing was carried on as in previous years. Studies showed that ants play a large role in the fertilization of the female flowers. It has been proved that self-fertilization within the bunch is possible. Proportionately more flowers develop on the top than at the bottom of the bunch. Dry and husked nuts germinated well, but those in which the copra rattled did not. Artificially crossed nuts were found to germinate better than selfed or naturally pollinated ones. The pruning of roots before transplanting the seedling was neither harmful nor advantageous. Pruning of roots is harmful only when the seedlings are over three years old. It was found that the presence of a large number of leaves on the palm was associated with early flowering and heavy yields.

(6) Root Crops.

24. *Potato*.—Investigation on this crop is confined to the Agricultural Research Station, Nanjanad. The main object is the improvement of potatoes suited to Nilgiri conditions, and testing the methods of cultivation and manures. Work is done on the following lines:—

- (i) Testing of a large number of varieties for yield and disease resistance;
- (ii) Maintaining the purity of the selections of hill potatoes;
- (iii) Manurial trials with various fertilizers;
- (iv) Study of the best methods of cultivation and suitable rotation crops;
- (v) Treatment of seed to get good results; and
- (vi) Hybridisation to evolve new varieties.

The Imperial Council of Agricultural Research is financing the research work in some of the above items.

The varieties Ben Cruachan, Great Scot and Royal Kidney are being largely grown by ryots, the variety Great Scot being most popular. The results of manurial experiments showed that potash not only increased the yield but also gave resistance against "early blight." Municipal compost manures were found equal to cattle manure. Shallow ridging gave 20 per cent more yield than deep ridging in addition to being more economical. Experiments on the size of tuber and spacing showed that 1½ oz. tubers at 9 inches apart were the most economical for this crop. The work of hybridisation, which was beset with difficulties in this crop, received some measure of success this year. Out of two thousand one hundred and sixty-four flowers, which were artificially pollinated, 631 seedlings were obtained, but only 16 survived. Besides, twenty-one varieties were under row yield trials, and ten under comparative trials, including both early and late types. Ben Cruachan among the late, and Great Scot among the second earlies, have given satisfactory results.

Onions.—Selection work on this crop has been started at Hagari, and 33 types were under study, only five of which proved useful. The extent of cross fertilization on this crop was high, being 90 per cent this year.

(7) Spices, Condiments and Narcotics.

25. *Pepper*.—Manurial experiments on this crop are being conducted at Taliparamba Agricultural Station. The season was very favourable and fairly good yields were obtained from the bulk area.

Chilly.—Work on this crop is confined to the Agricultural Research Station, Guntur. Fifty single plant selections from a number of local varieties as well as from Pusa were under trial, and selections made on the basis of resistance to thrips attack, yield, earliness, persistent calyx and red colour. Comparative trials of the previous year's selections showed that strains Nos. 380 and 390 gave decidedly higher yields with percentage increases of 29 and 36 respectively than the local variety.

Tobacco.—The work of crossing and selection was continued at Guntur on this crop. Selection No. 13 was decidedly the best and gave a 22 per cent increase over local Virginia in the comparative trials. Arrangements are being made to demonstrate flue curing at the station, and an Assistant has returned after special training in it at Pusa.

(8) Sugarcane.

26. Comparative trials of several varieties of canes were in progress at Anakapalle, Samalkota, Hagari and Palur Research Stations. At Anakapalle 81 varieties were under trial. Observations were also made of the root system of the most important varieties to pick out the best of the types that resist drought. Under dry conditions Co. 213 and some of the sorghum sugarcane hybrids developed deep root system and were able to withstand

dry conditions remarkably well. Co. 419 and Co. 243 were also equally good in that respect. Studies of shoot development showed that Co. 349 produced a high percentage of useless tillers. It was noted that wrapping had no influence on the growth of the cane. Growth measurements indicated that the maximum growth takes place in the rainy season and growth generally ceases by the end of October. At present, the crushing season is short in most of the cane growing areas. In order to find out if cane can be successfully planted and harvested in two seasons as in Coimbatore and Madura districts, and thereby prolong the crushing season, monthwar planting trials were in progress at Anakapalle, Samalkota and Palur. The results at Anakapalle showed that there are in the circars two distinct planting seasons, February-April and September-December. Planting may also be done in the months of May, June and December. The other months are unsuitable for planting. The canes begin to mature in the cold weather—those planted in February-April maturing in January-February, and September-November planting maturing in November-December the following year. The results indicate that by a suitable adjustment of varieties the crushing can be started as early as 15th November and continued up to the end of May. At Palur, the monthly planting trials showed January-April as the best season for planting.

The manurial trials at Palur indicated that Sodium nitrate is not as good as a mixture of Ammonium sulphate and oil-cake, while potash is unnecessary and the application of phosphatic manures not economical. An experiment to test the value of ratooning cane crop showed that the saving in the cost of cultivation was not commensurate with the loss of yield. It was also found that the saving in irrigation costs was very small compared to the loss in tonnage.

Trials at Anakapalle indicated that canes could be grown in the dry lands by planting sprouts 3 or 4 weeks old. Fairly good yields were obtained at Samalkota from Co. 213, Co. 281 and Co. 285 planted under swamp conditions.

(9) Miscellaneous crops.

27. (i) *Soya Beans*.—A number of soya bean varieties were under trial at the several agricultural stations. Grown in bulk and small lots this crop did exceedingly well at Aduturai, Pe Ngype variety giving 2,000 lb. of cleaned seed per acre. Crossing this crop with other pulses has proved a failure so far.

(ii) *Redgram*.—A large number of types from various parts of India were tried at the Cotton Breeding Station, Coimbatore, and also F. 3 progenies of a cross between *Arhar* and late local types. Types with duration ranging from 4 to 9 months were isolated for further study.

(iii) *Bengalgram*.—Seven strains from the Cotton Breeding Station, Coimbatore, were tried in a number of centres in the Presidency. Some of them are reported to have yielded above

25 per cent increase over local varieties in Udamalpet, Salem and Samalkota. At Ilagari, where the Coimbatore selections are not faring well, 121 good yielders have been isolated for further study.

D.—Horticulture.

28. Research in the Botanical Gardens at Ootacamund and Coonoor included the raising of cold weather annual plants during the off season and of crossing in different species of *Watsonia*, *Lilium* and *Abutilon*. The grafting of various showy cactaceous plants was continued, and two genera *Phyllocactus* and *Echinopsis* appear to have united. Other activities were the growing of medicinal plants like Jalap (*Ipomea purga*) and Foxglove (*Digitalis purpurea*), and the raising of *Chrysanthemum coccineum* as a source of insect powder.

E.—Implements.

29. The design and improvement of implements received considerable attention this year. New improvements in seed distributor and clutch were made to the mechanical seed drill which greatly enhanced its importance, and several new drills are under trial in the districts. A light ridge plough for use with an average pair of animals has been designed and can be used for chillies or cotton. A number of improvements were made in Cooper's Hindustan Persian Wheel. Other items of research include the designing of steel-framed cart bodies to suit pneumatic tyres, and large bund-forming implements for use in the dry farming areas. Improvements were made to several approved ploughs on the recommendation of the department including the cast chilled shares for the Victory plough. Ball-bearing mhote wheels, made by Messrs. P.S.G. & Sons., Peelamedu, were found very popular and 180 wheels were sold during the year. The bullock gear with 1½ inches centrifugal pump manufactured by Messrs. Ardetwerke G.M.B.H. Eberswalde, Germany, was tested. Though the machine is of high class manufacture, its efficiency as a centrifugal pumping outfit is said to be too low. Experiments are in progress to evolve a suitable machine for polishing turmeric.

F.—Livestock.

30. At Hosur, the total number of livestock at the end of the year was 617 as against 532 last year.

Cross-bred herd.—This herd has been considerably reduced. Most of the milch cattle of this herd are kept in Coimbatore to supply milk to the Agricultural College dairy. The cross-bred cows are served by Scindhi bulls in order to breed back to the country herd. The average milk yield was 13.1 lb. per day per cow.

Ongole herd.—The breeding of this herd at Hosur was discontinued in 1933. The small stock left behind was further reduced by the disposal of some animals during the year. The number at the end of the year was only 8.

Scindhi herd.—This herd continues to do well at Hosur. The demand for bulls is more than the supply. There were 33.5 cows on an average throughout the year and the daily average yield per cow in milk worked out to 12.7 lb. as against 12.9 lb. last year. In the present herd one cow has yielded over 7,000 lb. of milk, three cows over 6,000 lb., four cows over 5,000 lb. and eight cows over 4,000 lb. milk in a lactation.

Kangayam herd.—The building up of a pure Kangayam breed by selection is being continued. Although this is purely a draught breed, efforts are being made to improve the milk yield of the cows as well. On the average there were 59.7 cows in milk throughout the year and the daily average yield was 6.8 lb. per cow in milk as against 6.1 lb. last year.

Hallikar breed.—During the year a foundation stock of Hallikar cattle was started by the purchase, from the Mysore State, of 21 heifers, 1 milch cow with a calf at foot and 2 bulls.

Sheep.—There were at Hosur 144 sheep (Bellary breed) in the flock at the end of the year. 207 lb. 14 oz. of wool was obtained from one shearing which works out to an average of 1 lb. 12 oz. per head per shearing. The second shearing was delayed due to bad health of the animals. The highest individual wool yield in one shearing was 4 lb. 9 oz. given by a white-black face ram.

At the Guntur Agricultural Research Station, there were sixty Ongole head of cattle at the commencement of the year. On the average 7.1 cows were in milk throughout the year as against 6.5 of the previous year. The total milk yield was 30,509 lb with a daily individual average of 12.1 over milch cows and 6.9 lb. over all the herds as against 11.6 and 6.7 respectively, last year. Ongole cow No. 107-H gave in the current lactation the largest yield of 6,687 lb. with a daily average of 17.6 lb. of milk.

The number of buffaloes at the Agricultural Research Station, Guntur, was 25 during the year. 4.4 buffaloes on the average were in milk throughout the year as against 2.6 of the previous year. They yielded 31,555 lb. of milk with a daily individual average of 19.4 lb. over milch buffaloes and 12.4 lb. over the whole herd. The largest yield in a lactation was given by Delhi buffalo No. 54 with 7,922 lb. of milk and a daily average of 25.9 lb.

Poultry.—Flocks of white Leghorns, Rhode Island Reds, Light Sussex, Black Minorcas, Chittagongs and Country (Telli-cherry) are maintained. Trap nesting is being continued. White Leghorn and Black Minorca laid the maximum number of eggs in the pullet year which was 215 and 214 respectively. Besides Hosur, important breeds of poultry were maintained at several other research stations.

G.—Entomology.

31. Special investigations were made of the following important pests, viz., the paddy army worm (*Spodoptera mauritia*), the

paddy stem borer (*Schoenobius incertellus*), the red hairy caterpillar (*Amsacta albistriga*), the pink boll worm of cotton (*Platyedra gossypiella*), the chilly thrips (*Scirtothrips dorsalis* H.), the paddy borer beetle (*Rhizopertha dominica* F.), fruit and cane insects. In the case of the army worm, irrigation and kerosene-ating were effective in destroying caterpillars in the nurseries while in respect of newly hatched caterpillars calcium arsenate mixed with lime (1 : 8) was found profitable. It was found that the incidence of the paddy stem borer is affected largely by climatic conditions at planting, but the use of ammonium sulphate as a top dressing considerably minimised attack in a severe case of infestation in the Coimbatore district. The damage due to the red hairy caterpillar was severe in groundnut, less in gingelly and cumbu and mild in cholam and ragi; a serious outbreak in the Chicacole taluk of the Vizagapatam district was specially attended to and control measures successfully demonstrated. An assistant was posted for special investigation of thrips on chillies at Periakulam taluk of the Madura district. It was conclusively shown that tobacco, either as a dry dust or as a liquid spray is the best and most economical insecticide for the leaf curl of chillies due to thrips attack both in the Guntur and Madura districts.

H.—Mycology.

32. Investigations on the following diseases of crops were done:—

- (i) Foot-rot disease and leaf spot on paddy;
- (ii) Mosaic, red rot, smut and seedling blight on sugarcane;
- (iii) Seedling blight and boll rot on cotton;
- (iv) Storage of fruits and "panama disease" of plantains;
- (v) Cereal rust, leaf shredding and yellowing of cholam;
- (vi) Wilt disease of pulses;
- (vii) Wilt disease of gingelly;
- (viii) Black shank disease, mildew and damping off of tobacco;
- (ix) Betel-vine wilt;
- (x) Leaf curl on chillies; and
- (xi) Mosaic disease of cardamoms.

Foot-rot disease causes considerable damages to paddy seedlings in certain areas. It could be effectively checked by seed treatment with fungicides like copper sulphate, formalin granosan and ceresan, a dry dressing of the last mentioned being the most effective and convenient. Among the local varieties, Gobikar, Garikasannavari, Adt. 3 and Adt. 4 are highly susceptible to the disease while Aryan and G.E.B. 24 are comparatively resistant.

Laboratory and field trials carried out at Coimbatore indicate that *Helminthosporium* on paddy is to a great extent seed borne and that its incidence could be minimized by adequate seed treatment.

Varietal trials of sugarcane showed that P.O.J. 2878, Co. 355, Co. 335 and Co. 205 had a high degree of resistance against

mosaic, that Co. 213, Co. 354, Co. 360, Co. 361, Co. 417, and Co. 419 were highly susceptible and that Co. 363, Co. 411, Co. 412 and Co. 413 were resistant only to a moderate extent.

Inoculation experiments showed that sugarcane mosaic is transmissible to sorghum and some grasses and *vice versa* while the disease is not transmitted through seed.

Seedling blight and boll rot in cotton caused by *Colletotrichum* can be controlled by practising suitable crop rotation as the fungus is not capable of living in the soil for more than a year.

Neem, coconut and groundnut oils were tried as spreaders with fungicides for spraying. Neem oil possessed the additional advantage of being a deterrent against insects. These oils were also cheaper than resin soda.

I.—Trial Plots.

33. *Paddy*.—During the year 669 trials were conducted on paddy, ragi, sorghum, cotton and sugarcane. In the II circle, *Konamani* strain No. 314 proved superior to locals in the three years' trial. In the V circle, *Chitrakali*, compared with local *Kuruvai* gave a 12 per cent increase in yield while strains Adt. 3, 8 and 11 gave increased yields ranging from 11 to 32 per cent. In the VII circle, fourteen trial plots of paddy strains evolved at the Agricultural Research Station, Pattambi, were laid down. Two of the strains, one of *Veluthari Kayama*, a first crop variety of Malabar, and *Athikraya*, a second crop variety, gave yields varying from 13 to 18 per cent over the locals.

Ragi.—E.C. 593 ragi tried at Kadiri in the III circle gave 167 per cent more yield. Equally good results were also obtained in the II, IV, V and VIII circles.

Sorghum.—A.S. 29, a new strain of Periamanjil cholam tried in the VIII circle yielded 34 per cent more than local. A.S. 267 and 1543 have done well in the V circle.

Cotton.—Cambodia cotton in garden lands in the I circle gave an average yield of 644 lb. of Kapas per acre as a pure crop and as a mixture with chillies, 461 lb. per acre. On dry lands it gave 504 lb. per acre. The trial is being continued.

In the III circle, strain No. 340 proved itself superior to No. 14, the present strain, by giving an increased yield of 26 per cent over it.

In the VI circle, Karunganni strain No. 2622 gave 36 to 42 per cent increased yield over the local. It has the additional advantage of being early, a quality favourable for its extension.

Three new strains of Cambodia cotton No. 920, 1742 and 1267 evolved by the Cotton Specialist were under trial in the VI and VIII circles. Of these, the first two are promising.

Sugarcane.—J. 247, Co. 213 and 281, and P.O.J. 2878 are gaining popularity in the I circle. Co. 281 has proved to be superior in the III circle on account of its good cropping power

and maturity within nine and ten months. Co. 413 tried in Coimbatore district gave an increased yield of 42 tons of cane per acre over *poovan* and 25 and 16 tons over Co. 213 and 290 respectively. Sorghum hybrids Co. 352 and 355 yielded 23 and 28 tons respectively per acre in VIII circle and took nine months to mature.

V.—DEMONSTRATION.

34. The several improvements advocated by the department are brought to the notice of ryots by demonstrating them in their own lands and at their own expense but under the supervision of the demonstrators. The concentration method of demonstration in a few selected centres started four years ago, and to which reference has been made in previous reports was modified this year. With a view to increase the number of demonstrations and demonstration plots and at the same time to concentrate work in a definite number of villages, each demonstrator was allowed to extend his activities over eight to ten demonstration centres within his jurisdiction. This change has resulted in a large increase in the number of demonstration plots which was 3,170 as against 1,746 last year. These demonstrations were chiefly in varietal, cultural and manurial methods in paddy, sugarcane, ragi and groundnut. Demonstrations were also conducted with improved iron ploughs, sugarcane mills and furnaces.

Exhibitions and Shows.

35. In order to give publicity to the work of the department and to educate ryots, 178 agricultural exhibitions and shows were held as in the past, taking advantage of cattle fairs and festivals, jamabandi camps, health week celebrations and district co-operative conferences. A large scale exhibition with demonstrations was arranged during the Ryots' and Landholders' Conference in January at the Agricultural Research Station, Palur, over which the Hon'ble the Minister for Public Works presided. This conference was attended by a large number of ryots and landholders from the neighbouring districts who availed themselves of the concessional fares granted by both the South Indian and Madras and Southern Mahratta Railway Companies. A certificate of merit for the exhibition held at Tennuru and a silver jingle for the best bull of the department at the Govada show were awarded. An agricultural show was held at the Agricultural Research Station, Aduturai, in February 1935, when the manufacture of white sugar and preparation of cream jaggery were demonstrated. An exhibition was staged at the Y.M.C.A. Rural Reconstruction Centre at Ramanathapuram (Coimbatore district) which was opened by His Excellency the Governor. Another exhibition was held during the Agricultural College Day and Conference at the Agricultural College, Coimbatore, at which all phases of research activities as well as of demonstration were exhibited.

Suitable opportunities were taken advantage of by Agricultural Demonstrators in delivering lectures with the aid of magic lanterns. Two agricultural dramas written by two demonstrators in the V circle were enacted during the Agricultural and Industrial Exhibition and Annual Ryots' Conference held at Srirangam and at the agricultural shows held at Aduturai and Palur and were appreciated by the public.

The three motor exhibition units toured throughout the Presidency except in the V circle and the Nilgiris district. As usual, the vans halted at important villages where demonstrations and lectures were given.

Items of Propaganda.

(1) Crops.

36. (a) *Methods of cultivation.*—Reduction of seed rate in the paddy nursery has become a fairly common practice in the I circle. In the V and VI circles, 50 per cent of the paddy area is under reduced seed rate. The area under this improvement in the V circle alone is estimated to be about 670,275 acres. Planting of paddy thinly has become a common practice in almost all circles. The area under this improvement in the I, III, V to VIII circles alone is estimated to be 818,336 acres.

In sugarcane, improved methods of cultivation such as line planting, trenching, ploughing with improved implements and wider spacing were introduced. In the I circle, the method of line planting and trenching was followed in 12,431 acres as against 9,265 acres in the year previous. In the III, V, VI and VIII circles, the area under these improvements was 4,295 acres. Three thousand six hundred and eighty-two acres of sugarcane were intercultivated with improved implements in the II circle while 34 acres were trenched with Victory plough in the V circle. The production of good seed material by the short crop planting method referred to in the last year's report was continued in the I circle where an area of 186 acres was short cropped as against 73 acres in the previous year.

The area under drill cultivation of cotton in the V, VI and VIII circles was 18,218 acres. Sowing of cotton with reduced seed rate was advocated in the II circle, the area sown being 725 acres.

Three thousand two hundred and twenty-five acres of coconut gardens were intercultivated in the V and VII circles.

Raising of tobacco seed beds to prevent them from "damping off" disease was demonstrated in important centres of II circle.

The method of sowing groundnut seed in each furrow instead of in alternative furrows was advocated in I circle. The increased yield obtained as a result of this method works out to about 15.4 per cent in favour of thick sowing.

(b) *Methods of manuring.*—Application of green manure supplemented by bone-meal and superphosphate and oil cake in conjunction with ammonium sulphate was recommended for paddy as in the past and a large quantity of concentrated manures was sold to ryots by manure firms. The practice of green manuring of paddy is becoming common in all the districts where facilities for growing them are available. It is estimated that about 115,741 acres are under this improvement in the Presidency. A conservative estimate of increase in yield of grain in the III circle, resulting by the use of green manures may be put down at 15 per cent, which on the basis of average outturns and existing prices, should give an additional cash return of Rs. 4-8-0 per acre.

(c) *Seed distribution—Cotton—(Cambodia).*—As in last year, the distribution of Co. 2 Cambodia seed was the largest in the VIII circle. 321,439 lb. of seed were distributed within the circle for seed purposes. Besides, the Tiruppur Co-operative Trading Society and the Idigarai Agricultural Improvements Co-operative Society distributed 748,000 lb. of seed almost all of which was under the Co. 2 Seed Extension Scheme financed by the Indian Central Cotton Committee. From 954 acres of seed farms, 419 candies and 131 lb. of lint were obtained and sold at an average premium of Rs. 20-12-0 per candy of 500 lb. The cotton seed transaction in the VIII circle resulted in a profit of Rs. 2,243. The seed farm area maintained by the Tiruppur Co-operative Trading Society increased from 4,122 acres to 5,152 acres. The area of departmental seed farms was 954 acres in VIII circle and 175 acres in VI circle. Seed distributed in IV, V, VI and VIII circles amounted to 419,922 lb. The total area under improved strains of Cambodia cotton in the Presidency including the area under natural spread is estimated to be 121,466 acres.

Karunganni cotton.—One thousand three hundred and thirty-six acres of seed farms under A. 10 and C. 7 strains were arranged in the VI circle and 133,785 lb. of seed distributed. 100,500 lb. of Karunganni C. 7 strain seed were obtained out of 809.87 acres of seed farms in the VIII circle. The premium obtained for the seed farm lint in the VIII circle averaged at Rs. 4-2-0 per candy of 500 lb. The total quantity of the seed distributed during the year was 232,515 lb. and the area under it in the V, VI and VIII circles is estimated to be 152,456 acres.

'Westerns' cotton.—253,693 lb. of H. 1 cotton seed, obtained out of 3,588 acres of seed farms were sold to ryots besides advancing 44,300 lb. to seed farm ryots. The area under this improved strain in the III circle is 206,200 acres.

'Northlorns' cotton.—In the previous report, reference was made to the changes that had occurred in market conditions whereby the profitable cultivation of the strain of 'Northlorns' cotton known as N. 14 was no longer possible. During the year, the quantity of seed sold amounted to only about 750 lb. and the area under this strain during the year was 1,450 acres.

Coconut.—The deputation of a subordinate of this department to the Laccadive Islands to demonstrate improved methods of cultivation was again arranged for during the year. According to the suggestion made by the Island Inspecting Officer this year, the work was concentrated in the Islands of Agathi and Kavarathi with the adjoining islets. Three young men, two from Ameni Islands and the one from the Laccadives underwent training in the Coconut Research Stations.

In view of the financial depression and the prevailing low prices of coconut, a large extension in its cultivation was not possible. A great deal of persuasion was necessary to make the ryots even to properly maintain the plantations already started by them. The demand for seedlings and seed nuts obtained at the Coconut Research Station was great. Eleven thousand and six seed nuts and 4,009 seedlings were distributed. Three thousand two hundred and twenty-five acres of coconut gardens were intercultivated in the V and VII circles and improved implements were used on 776 acres of plantation.

Groundnut.—Advice in regard to rotating groundnut with cereals and indigo continued to be given to ryots in the IV circle. Strain A.H. 25 having done well, 1,220 lb. of its seed were distributed to ryots for purposes of seed multiplication. Some quantity of this seed was distributed in Salem district also, where it gave an increased yield ranging from 12 to 29 per cent over the local spreading variety. Spanish bunch groundnut, an early maturing variety, which can be harvested with ease is rapidly replacing the local late spreading variety in the VI circle.

Korai cultivation for mat-making.—To introduce korai cultivation wherever possible intensive propaganda was done in the II circle. The Board of Revenue was addressed to allow the cultivation of this crop in poramboke lands lying waste at present. The area under this crop in North Arcot district is going down; only 98 acres having been grown under it during the year.

Paddy.—In spite of adverse seasonal conditions during the year under report the progress in the distribution of improved strains of paddy seed reported last year was maintained. The total amount of departmental seed distributed to ryots during the year in the whole Presidency was 1,567 tons as against 1,677 tons last year. As in the past, 6,537 acres of seed farms were arranged in I circle, from which 1,475 tons of seed were made available to ryots. Sufficient seed to plant about 71,000 acres were preserved in the II circle. G.E.B. 24 continued to be popular everywhere and particularly so in the III and VI circles on account of its remarkable cosmopolitan nature. Eighteen strains and varieties of paddy were grown in the IV circle under seed farms in 238 acres and 37 tons of seed were made available for sale to ryots. In the V circle, 29 tons of seed were sold by the department and 661 tons by seedsmen sufficient for sowing 39,658 acres. In the VI circle, A.E.B. 65 is rapidly replacing the local Nellore Samba. The growing demand for these high yielding strains is being met

by maintaining 844 acres of seed farms out of which 262 tons of seed have been reserved by ryots. In the west coast more than 76 tons of seed were made available to the ryots. The total area in the Presidency under the different improved strains of paddy including the natural spread is estimated to be 850,415 acres as against 800,000 acres in the previous year.

Onion.—Bellary onions are popular in the VI and VIII circles, where the area under the crop is on the increase. In the latter circle, 153 lb. of seed were distributed and the area under the crop is estimated to be 147 acres.

Pepper.—During the last three or four years, persistent efforts have been made to start pepper cultivation in the compounds of houses in South Kanara as is generally done in Malabar. During the planting season in June, cuttings got down from Taliparamba were taken to garden owners for sale. About 19,000 cuttings were planted in different parts of the district. Twenty-five thousand selected cuttings were also supplied to cultivators in the Wynaad.

Potato.—Nine hundred and eighty maunds of potato seed, mostly 'Great Scot' were issued for seed farm sowings in the Nilgiris. In addition, 64,694 lb. were sold to ryots. 'Great Scot,' 'Royal Kidney' and 'Ben Cruachen' were distributed in Hosur, Dharmapuri and Omalur taluks of Salem district where they are reported to have done well.

Ragi.—Ragi strains No. 525 and 355 evolved at the Agricultural Research Station, Anakapalle, are becoming popular in the I circle and 1,074 acres were grown under them. Over ninety plots were laid down to demonstrate the superiority of these two strains. On an average, they gave 14.8 per cent and 13.30 per cent more yield respectively, than local ragi.

Ragi strains.—T. 8 and E.C. 593 were tried in the II circle and fairly good results were obtained but owing to their shorter duration are not in favour with ryots. E.C. 593 continued to give good results in the IV, V and VIII circles. 4,020 lb. of this seed were distributed in the IV and VIII circles. Another popular strain in Salem district is H. 23 of the Mysore department of which 500 lb. were distributed. It occupies an area of 6,000-7,000 acres in that district.

Sorghum.—T. 1, T. 12 and T. 6 strains of sorghum evolved at the Agricultural Research Station, Hagari, some years ago continued to be popular in the III circle and 2,300 lb. of seed were distributed during the year. It is estimated that T. 6 occupies an area of about 20,800 acres in the III circle. Of the strains evolved at the Millets Breeding Station, Coimbatore, A.S. 367 did well in the IV and V circles.

Sugarcane.—J. 247 and purple Mauritius are the varieties which continue to be grown largely in the I circle. The area under the former cane has increased from 8,316 acres to 11,948 acres. Co. 213 also is becoming popular throughout the circle.

It has increased to 2,664 acres from 514 acres of last year. In the II circle, Co. 213, 243, 281 and P.O.J. 2878 were popular. The area under these canes rose from 2,620 acres in the previous year to 7,900 acres which is phenomenal. Co. 213 planted in June and manured solely with good cattle manure matured in eight months. In South Arcot district, Fiji B. continued to be largely grown. 134,778 setts of improved strains were distributed from the Agricultural Research Station, Palur. In the V, VI and VII circles, the improved varieties of sugarcane have spread over an area of 5,450 acres. The area under these improved varieties in the VIII circle is 1,233 acres. The total area under all the improved varieties of sugarcane in the Presidency is 40,262 acres.

The progress in the construction of improved furnaces for making jaggery referred to in the previous report was maintained and 387 such furnaces were constructed during the year as against 352 in the previous year. 1,045 demonstrations on the method of preparing good jaggery were arranged in the Presidency. White sugar manufacture with the use of centrifugals was demonstrated in the IV and V circles.

Tapioca.—Efforts to popularize this crop in South Kanara and in the Wynad taluks of the Malabar district were continued. Cuttings of the superior variety were supplied to cultivators and some residents in depressed class colonies. In the Wynad, this crop has spread well and about 15 acres have been planted as against five acres in the previous year. The total number of cuttings supplied during the year was 97,653 as against 15,150 in the previous year.

(2) Fodder.

37. The introduction of fodder crops like sunnhemp, *pillipesara*, guinea and elephant grasses, lucerne and fodder sorghum was continued. In the I circle, the area under sunnhemp and *pillipesara* was 15,703 and 5,165 acres respectively. The latter crop is extending largely as a fodder crop in wet and dry lands in the II circle. Apart from the large number of ryots cultivating small areas of guinea grass, the Madura Municipality and the Devasthanams of Palni and Sankarankoil and the Sacred Heart College near Kodaikanal have cultivated it for fodder. Sixty thousand cuttings of Kikuyu grass, 21,375 guinea grass slips, 56 lb. of lucerne seed, 3,528 lb. of fodder cholam, 51 lb. of Teosinte and 6,600 stumps of elephant grass were distributed in the IV, VI and VIII circles. Ensilaging fodders like cholam, maize, ragi and hill grasses was demonstrated which resulted in having 25 silo pits in four circles.

(3) Fruits.

38. Advice on the selection of suitable fruit trees, their correct methods of planting, pruning and manuring and control of pests and diseases continued to be given. Though the price of plantain fruits has gone down to as low as Rs. 20 per 100 bunches in the

I circle, the area planted under it increased to 5,718 acres from 4,750 acres in the last year. In the II and V circles, 660 acres have been newly planted with different kinds of fruit trees. Eight hundred and forty-three acres of fruit trees were intercultivated in the II and III circles. One thousand acres of fruit trees in the V circle were manured with phosphatic manures with good results. The department supplied to ryots 258,378 plantain suckers, 22,701 mango grafts and 78,822 seedlings and plants of various fruit trees like the Sapota, Orange, Grapevine, pine-apple, etc. Eight thousand seven hundred and thirty-three suckers of *Nendran* plantain, an important variety of Malabar, noted for its keeping quality, were distributed. On account of great demand for cashewnut in foreign countries and the good price offered for it, propaganda is being continued to extend the area under it. Ryots are not slow to take advantage of this opportunity and are planting large blocks of waste land with it. Sixty-seven thousand eight hundred seed nuts were supplied by the department during the year.

(4) Implements.

39. The number of demonstrations conducted with different kinds of ploughs, H.M. guntakas, Cooper's Persian Wheel, Archimedian screw water lifts rose from 9,585 last year to 12,111. Although the number of ploughs and other important implements purchased by the ryots cannot be estimated correctly, the number sold in each as far as the departmental figures go, is given below:—

Iron ploughs	...	...	...	...	...	3,050
Guntakas	...	...	...	...	...	132
Roll easy mhote wheels	...	...	...	...	...	268
Persian wheels	...	...	...	...	...	22
Sugarcane mills	...	...	...	...	...	8
Archimedian screws	...	...	...	...	...	5
Pumping sets	...	...	...	...	...	2
Buck scrapers	...	...	...	...	...	5
Sprayers	...	...	...	...	...	23

(5) Livestock.

40. The number of premia bulls at the end of the year was 100. The breeding bulls in the IV and VIII circles performed 2,751 services during the year. The Assistant Agricultural Demonstrator, Livestock, in charge of the breeding bulls stationed in Madras at the Veterinary College inspected 350 calves and continued his weekly inspection of General Hospital Dairy to advise the contractor and milkmen on the methods of clean milking, handling of milk and feeding of cows and calves.

Two thousand two hundred and twenty-seven eggs and 207 chicks of good breeds were supplied to the ryots in I and V to VIII circles.

(6) Loans.

41. As a result of the power delegated to the Deputy Directors of Agriculture, the ryots have commenced to take advantage of takkavi loans of small sums of Rs. 25 and less, in consequence of which there was a slight increase of about Rs. 3,000 over that of last year in the amount of loans sanctioned during the year. The following are the particulars of loans sanctioned for the various agricultural implements:—

	RS.	A.	P.
1. Ploughs	6,031	0	0
2. Persian wheels	500	0	0
3. Sugarcane power crushers	425	0	0
4. Roll easy whote wheels	533	0	0
5. Cane mills and jaggery pans	200	0	0
6. Horticultural implements	20	0	0
7. Miscellaneous implements such as sprayers, seed drills, whote buckets, etc.	7,354	12	0
Total	15,063	12	0

(7) Manures.

42. *Farm yard manure*.—Better methods of preservation of cattle manure to increase its quality and quantity in a ryots' holding continued to form one of the daily routine items of propaganda throughout the year. The ryots adopted during the year the following improved methods in the preservation of cattle manure:—

Manure pits	13,166
Dry earth sheds	5,069
Loose boxes	117

Compost.—The manufacture of compost and poudrette with rubbish and night-soil was continued to be demonstrated wherever possible. In co-operation with the Bellary Municipality 178 tons of compost were prepared and sold at a handsome profit. Similar work was done with the Municipalities of Anantapur, Guntur, Mangalore and Calicut. The method of composting all farm wastes such as litter, stubbles of crops, etc., was demonstrated in all circles. The total number of cases where compost was made during the year rose from 716 last year to 1,250.

Green manures.—The system of growing green manure crops like daincha, sunnhemp, wild indigo, pillipesara and ordinary indigo in wet lands is increasing. Through the efforts of the department, 314 tons of green manure seed were distributed to ryots during the year as compared with 211 tons distributed last year. Seed sold by private agencies has far exceeded the quantity sold by the department. In the V circle, 294,381 lb. of green manure seeds were sold of which 252,449 lb. represent sales by private agencies.

Artificial manures.—Manure firms effected good sales of sulphate of ammonia and fertilizer mixtures in V, VI, VII and VIII circles. In the Nilgiri district, 322 tons of fertilizers were sold on credit to potato growers.

(8) Pests and diseases.

43. Calls for remedial measures against pests and diseases continued to be attended to by the Entomology and Mycology demonstrators. In the I, III and VI circles, 364 such calls were attended to and remedial measures adopted. In the VIII circle, 169 demonstrations for control of various pests and diseases were conducted during the year. Sulphur dust and copper sulphate treatment against smut on sorghum was demonstrated in the II circle and 9,078 acres were sown with such treated seed as against 8,134 acres in the last year. Control measures for thrips on chillies were again successfully demonstrated in the II and VI circles. Nineteen thousand five hundred coconut trees were operated on in the VII circle for 'Nephantis serinopa'—the coconut caterpillar. One lakh sixteen thousand one hundred and fifty arecanut trees were sprayed with bordeaux mixture as a remedy against 'mahali' disease on arecanut in South Kanara. Thirteen thousand palmyra trees were operated in Palghat taluk against 'bud rot' disease.

(9) Agricultural marketing.

44. As a preliminary step to an intensive programme to develop the marketing facilities for crops and animal husbandry products, the Government sanctioned the appointment of a Provincial Marketing Officer and the establishment of a Provincial Marketing Board; both commenced to function from September 1934. The Provincial Marketing Officer was appointed as the ex-officio Secretary to the Marketing Board.

Two meetings of the Board were held at which it urged on the Government the immediate need for taking effective action as regards the prohibition of foreign rice or the levy of a heavy duty thereon, the imposition of a quota for Burma rice and the reduction of railway freight on rice and paddy from important centres of production to prominent areas of consumption. The Board desired the Government to investigate the possibilities of opening more ports for export of rice. It also considered the suggestions of the Provincial Marketing Officer in regard to the starting of Co-operative Sale Societies, the establishment of warehouses in certain localities and the grant of short-term loans on the standing crops. The necessity for the standardization of weights and measures was urged on the Government. Rules to be made under the Sugarcane Prices Act (Act XV of 1934) were considered and recommended to the Government.

In the short period of about six months during which the marketing section functioned, a number of co-operative sale societies dealing in agricultural produce were either started or revived.

The Lalgudi Sivagnanam Agricultural Society, which had hitherto confined itself to demonstration of agricultural improvements, amended its by-laws and took up the marketing of the produce of its members. The co-operative unions at Mayavaram and Shiyali agreed to start paddy sale societies. At Tanjore, the Loan and Sale Society, which now deals mostly in cashewnuts, agreed to deal with paddy and to open branches at Mannargudi and Tiruvarur. Thus in Tanjore there will be soon a number of sale societies which will eventually be affiliated to one or two central societies to serve the needs of the whole district. A groundnut sale society was organized in Udaiyarpalaiyam taluk of Trichinopoly district and arrangements made for the sale of the produce through the groundnut warehouse in Vriddhachalam of South Arcot district. As reliable information about prices of important agricultural commodities in the Presidency is lacking, almost the first thing that was done after the formation of the marketing section was to obtain regularly weekly prices of agricultural commodities from about 30 agricultural demonstrators in the Presidency, several branches of the Imperial Bank of India, a few Agricultural Associations and Chambers of Commerce and record them in a suitable form. Some of the Agricultural Associations have taken up the suggestion of the Provincial Marketing Officer and have begun to publish weekly or fortnightly price lists of commodities important in their districts. These are valued highly by both producers and others interested in trade in the other districts also. For want of funds similar associations in other districts have not taken up the publication of price reports yet. Proposals have been made in this respect to the Government.

Problems connected with the marketing of crops of local importance like the potato, coriander and garlic, not included in the all-India marketing scheme were investigated. A scheme for the improvement of potato marketing has since been drawn up and is under the consideration of the Government. Several enquiries on marketing from merchants and other business men, co-operative societies, associations and individuals were attended to by the section and available information furnished.

The three Assistant Marketing Officers were appointed towards the close of the official year and were engaged in collecting the necessary statistical data preliminary to the enquiry. The special officer deputed for the enquiry about the rice trade in the Madras Presidency submitted his report in September 1934.

Work through other agencies.

(1) Co-operation.

45. One lakh nine thousand and six hundred maunds of jaggery valued at Rs. 1,24,000 were sold through loan and sale society at Anakapalle.

The Tadpatri Co-operative Loan and Sale Society sold 10,466 lb. of H. 1 cotton kappas at a premium of Rs. 5 per bale over the local produce.

The scheme for marketing of groundnut through warehouses established in South Arcot and North Arcot districts was continued as in previous years and 6,749 candies of groundnut valued at Rs. 1,86,390 were sold during the year against 2,978 candies valued at Rs. 58,561 last year.

Out of the 9 co-operative agricultural societies in the V circle, 6 are functioning properly and are putting into effect the agricultural improvements recommended by the department. The Lalgudi Sivagnanam Co-operative Agricultural Society sold 10,250 lb. of paddy seed. It had a marketing section, maintained 4 godowns and issued loans to the extent of Rs. 4,925 to 25 ryots on the security of 2,950 bags of paddy. The Co-operative Agricultural Demonstration Society at Kumbakonam distributed 31,950 lb. of green manure seeds, 64,000 lb. of paddy seed and 3,752 lb. of phosphatic manures. The Tanjore District Co-operative Manure Society, Nidamangalam, and the Sivagnanam Co-operative Agricultural Society, Lalgudi, distributed during the year about 70,000 lb. of bonemeal.

Paddy Loan and Sale Society of Madura did very good work and secured a dividend of 9 per cent. The Dindigul Co-operative Union distributed 2,500 lb. of Cambodia cotton seed.

Co-operative loan and sale societies were started at Taliparamba and Hosdrug for the benefit of pepper growers. The society at Taliparamba gave loans to its members on the security of the produce and the one at Hosdrug did propaganda and supplied market rates for sale of pepper at Tellicherry.

Experiments started on irrigation problems in collaboration with the Engineering department at Perundurai and Modachur were concluded and further experiments were taken up at Kugalur and Chennasamudram in connexion with Lower Bhavani Project.

(2) Agricultural associations.

Three new agricultural associations were formed in the II circle for the improvement of agriculture. The Trichinopoly District Agricultural Association distributed 10,000 lb. of paddy seed and reserved 20,000 lb. for distribution next year. It published marketing intelligence for agricultural products and staged an agricultural and industrial exhibition during the Vaikunta Ekadasi Festival at Srirangam. The Tanjore Delta Mirasdars' Association newly started at Mayavaram conducted an agricultural show at Aduturai. The District Advancement Association, South Kanara, organized a flower and vegetable show at Mangalore. The fruit shop maintained by it continued to market fruits and vegetables produced in the district. The Agricultural Association at Palghat continued to maintain a breeding bull under the premium scheme and also lent a few iron ploughs to the cultivators.

VI.—LEGISLATION.

46. *Cotton Ginning and Pressing Factories Act*.—This Act continued to be in force during the year. There was a marked increase in the number of ginning factories. Thirty-four new ginning factories sprung up during the year making a total of 600 at the end of the year, most of which were working. There were five prosecutions during the year for infringement of the provisions of the Act, as against two in the previous year. There was no increase in the number of pressing factories.

47. *Cotton Transport Act*.—Fourteen single licences were issued as against 15 in the previous year for import of cotton—13 into the Southern area and one into the Northern and Western area.

Annual licences.—Sixteen licences with 285 certified copies were issued during the cotton year 1934–35 (1st February 1934 to 31st January 1935) for use by mills in the Southern area as against seven licences and 134 certified copies issued in the last year. Of these, 214 certified copies were used as against 102 copies in the year previous. Seventy-one certified copies were returned unused. In addition, 12 licences and 114 certified copies were issued to the mills in the Southern area from 1st February to 31st March 1935.

Import by sea.—Fifty-three licences were issued during the year for the import of 45,780 bales of ginned cotton into Tuticorin as compared with the same number of licences for 34,718 bales in the previous year.

48. *Cotton Control Act*.—This Act prohibiting the cultivation and mixing of pulichai (*G. neglectum*) cotton and its sale was continued to be enforced in Tinnevely, Ramnad and Madura. The strict enforcement of the Act in the previous year had a salutary effect in reducing the area as well as the proportion of the mixture. Propaganda was carried out well in advance of the sowing season in all the cotton sub-circles. Provisions of the Act were repeatedly published by beat of tom-tom in villages and shandies. A special demonstrator was on duty from the time of sowing till March 1935 to see to the removal of stray plants of pulichai. In Madura division there was no necessity to take legal proceedings this year whereas in the previous year 83 prosecutions were launched for non-compliance of the provisions of the Act. In the Tinnevely division, a few prosecutions were found necessary only in the Koilpatti circle and 12 defaulters were fined. Government have since ordered that this Act should continue to be in force for another three years from 12th July 1935.

49. *Cotton Market Act*.—Rules under section 18 of the Madras Commercial Crops Markets Act (Act XX of 1933) have been issued by Government. The Tiruppur Municipality has recently been declared as a notified area under the Act to take effect from January 1936.

50. *Pest Act—The Agricultural Pests and Diseases Act III of 1919*.—The Act continued to be in force during the year in respect of the diseases and insects affecting cotton, groundnut, palmyra palm and for the eradication of water hyacinth.

Cotton.—The Act was enforced in respect of two insect pests, stem weevil (*Pempheres affinis*) and pink boll worm (*Gelechia gossypiella*) attacking Cambodia and *pachanadan* cottons in Coimbatore, Salem, Trichinopoly and Madura. It is generally admitted by ryots and firms dealing in Cambodia cotton that its quality has improved since the continuous enforcement of the Act for some years. In the Madura district, there were 234 prosecutions during the year as against 212 in the last year and an area of about 2,230 acres remained uneradicated on 1st September 1934. In Trichinopoly district, an area of nearly 968 acres remained uneradicated until the 20th October 1934 and the penal provisions of the Act were not enforced in this district. Salem district as usual maintained its reputation, in that all the plants were removed from the fields before 31st August 1934. In Coimbatore district, the improvement noted in the previous year was unfortunately not maintained. An area of 658 acres remained uneradicated on 1st September 1934. Thirty-five defaulters were warned and 57 prosecuted and fined. A conference of officials concerned with the exercising of the Act, convened by the Director of Agriculture was held at Coimbatore on 24th October 1934 to discuss its working. Among other matters it was agreed that the exempted villages in the Anamalais tract of the Coimbatore district should be included in the Pest Act area but that time be allowed by the Collector in consultation with the Deputy Director of Agriculture, Coimbatore, if necessary up to 21st September, to the villages of Kottur, Kaliapuram, Vettaikaranpudur, Odaiyakulam, Periapodu, Angalakurichi and Thoraiyur, for pulling out the cotton. It was also decided that the 10 villages of the Madura district which are interspersed in the Ramnad district may be exempted from the operation of the Act. Government have agreed with these decisions and the amended, notifications have been issued accordingly for 1935.

Groundnut.—The Act against the Red Hairy Caterpillar pest (*Amsacta Albistriga*) on groundnut continued to be in force in the same area as in the last year, viz., Vriddhachalam, Kallakurichi and Tirukkoyilur taluks of the South Arcot district, Tiruvannamalai and Polur taluks of the North Arcot district, and all Government, inam and zamindari villages of Andimadam, Jayakundam and Manapathur firkas of the Udayarpalayam taluk in the Trichinopoly district and Salem and Rasipur taluks of the Salem district. The attack was not severe during the year in any of these places. There was no emergence of the moth in Salem and Trichinopoly districts. The penal provisions of the Act were not enforced in the notified areas.

Palmyra.—The Pest Act which was brought into force from the beginning of March 1933 in the Palghat taluk of Malabar

district to control the disease of budroot on palmyra was in force. Portions of other taluks adjoining Palghat were brought under the operations of the Act. Three of the subordinates of the department and a Special Revenue Inspector were at the control work for a period of three months which resulted in 13,000 diseased trees being cut by the end of March 1935. The disease is now said to be confined to a few trees and scattered. The operations are, however, being continued.

Water hyacinth.—The Act was in operation in certain taluks of Guntur, Chingleput, South Arcot, Tanjore and Malabar during the year.

VII.—PUBLICATIONS.

51. The undermentioned leaflets and bulletins were published during the year 1934-35:—

Subject.	Languages in which published.	Price.
<i>Leaflet Series.</i>		
Die back disease of cashewnuts ...	Malayalam (English, Tamil Telugu and Kanarese published already).	Free.
The paddy grasshopper and its control.	Malayalam (English, Tamil, Telugu, Kanarese and Oriya published before).	Do.
Koleroga or Mahali disease of arecanut and coconuts.	Tamil, Telugu, Kanarese and Malayalam (English published in 1933-34).	Do.
Some advantages of poultry keeping ...	Tamil and Malayalam (English, Telugu and Kanarese published in 1933-34).	Do.
Natural incubation of poultry ...	Tamil, Telugu and Malayalam (English and Kanarese published in 1933-34).	Do.
Brooding and rearing of chicks ...	Tamil, Kanarese and Malayalam (English and Telugu published in 1933-34).	Do.
Housing of poultry ...	Tamil, Telugu, Kanarese and Malayalam (English published in 1933-34).	Do.
Lucerne ...	English, Tamil, Telugu, Kanarese and Malayalam.	Do.
The improvement of coconut under dry cultivation.	English, Kanarese and Malayalam.	Do.
Cambodia cotton as a rainfed crop in heavy black cotton soils.	Telugu ...	Do.
A bund forming implement ...	English (Vernacular editions under print).	Do.
Coriander—how to improve its quality for marketing.	English, Tamil, Telugu, Kanarese and Malayalam.	Do.
Picking and marketing of Cambodia cotton in the Salem district.	English and Tamil ...	Do.
The house fly nuisance and its control.	English (Vernacular editions under print).	Do.
A pest on stored paddy ...	English (Vernacular editions under print).	Do.

Subject.	Languages in which published.	Price.
<i>Leaflet Series—cont.</i>		
Cotton ...	English (Vernacular editions under print).	Free.
Making of poudrette from nightsoil ...	English (Vernacular editions under print).	Do.
Insect and fungus pest of stored paddy.	English (Vernacular editions under print).	Do.
Tokra—Orabanche Sp. A pest on tobacco.	English (Vernacular editions under print).	Do.

Notes.

A simple and cheap process for the Telugu ... conservation of Farm Yard Manure. Free.

Bulletins.

Malayalam sayings and proverbs in Malayalam with translation in English. 0 3 0

52. The number of copies of Villagers' Calendar printed in each language during 1934-35 was as follows:—

English ...	4,700
Tamil ...	19,800
Telugu ...	23,600
Malayalam ...	7,150
Kanarese ...	3,250
Total ...	58,500

VIII.—STATISTICS.

53. *Weekly cotton mill and press returns.*—There were 28 spinning mills during the year all of which continued to send their returns of cotton received in their mills every week. Returns from the cotton presses and the Collectors of Customs were also received every week.

54. *Enquiry into the cost of production of crops.*—This enquiry financed by the Imperial Council of Agricultural Research was continued during the year.

IX.—EXPENDITURE.

55. The receipts and expenditure for the year 1934-35 and the corresponding figures for the previous year 1933-34 are as below:—

	1933-34.	1934-35.
	RS.	RS.
Expenditure ...	17,45,928	18,44,341
Receipts ...	1,86,065	1,82,436
Net expenditure ...	15,59,863	16,61,905

NOTE.—The above figures do not include the schemes financed by the Imperial Council of Agricultural Research and the Indian Central Cotton Committee and expenditure on stores purchased in England.

The excess expenditure in 1934-35 is due to the Local Government's contribution towards the cost of acquisition of lands for the Sugarcane Station at Gudiyattam and Fruit-Research Station at Anantarazupet, Cuddapah, financed by the Imperial Council of Agricultural Research and the opening of an agricultural research station at Pattukkottai in the Tanjore district during the year.

The decrease under 'Receipts' is mainly due to the transfer of Rs. 4,225 being a portion of the receipts from the Agricultural Station at Anakapalle in 1934-35 to the credit of the Imperial Council of Agricultural Research who financed the sugarcane schemes.

X.—PROGRAMME OF WORK FOR 1935-36.

(i) Research.

A.—Research Stations.

(1) *Botany*.—Further study of the viability of banana seed and pollen grains, survey of plantains in the Presidency, study of indigenous grasses, floristic survey in Tinnevely and Agency tracts of Vizagapatam. Studies on *Colletotrichum* sp. from safflower and *Vermicularia capsici* with special reference to pH value referred to in the previous year's report will be continued.

(2) *Chemistry*.—In addition to the items outlined in last year's report it is proposed to take up the subject of "Investigation into the changes that superphosphates undergo in the South Indian soils."

Manures and plant nutrition.—Besides the items mentioned under this heading in the previous year's report, the composting of guinea grass, stubbles and all other waste materials according to the Indian method will be carried out.

Animal nutrition.—Work mentioned under this head in the previous year's report will be continued.

Bacteriological.—Work mentioned in last year's report will be continued.

General.—In addition to items mentioned under this heading, the economics of milk production in the rural parts round about the College estate and the Coimbatore town will be studied with a view to giving the student training in making such enquiries.

(3) *Crops*—(a) *Millets*.—Continuance of study of mode of inheritance of characters in millets and varietal survey of the sorghums; single plant selections of sorghum, *setaria* and *coracana*; experiments on dry farming in relation to millets.

Korra.—Improvement of yield and selection of good yielding strains for different tracts.

(b) *Paddy*.—Maintenance of purity of strains already released; trials of progenies of promising hybrids; breeding for disease resistance; study of inherent qualitative and quantitative

characters; chromosome studies of the cultivated and wild rices and their bearing on the occurrence of spikelet sterility; histological studies of the nutritive value of grains; cultural, varietal and manurial experiments.

(c) *Cotton*.—Study of the inheritance of seed and lint weights and of jassid resistance in Cambodia; study of the physiology of drought resistance, yield and rotation experiments, isolation of strains suitable to different tracts.

Investigation into the problem of (a) undeveloped ovules, (b) production of long bracts, (c) presence of fuzz, (d) the control of stem weevil and boll worms, (e) reduction in bud and boll shedding, (f) utilization of the empty pericarps, and (g) utilization of cotton stems.

(d) *Oil seeds*.—Cultural and varietal trials of groundnut; manurial trials and self-fertilization of heavy yielders; study of coconut pollen, varietal trials of castor for seed and for leaf for eri silk culture; varietal trials of gingelly; study of seedlings of cashewnuts to select desirable types; crossing of soya beans with local beans and pulses.

(e) *Pulses*.—Soya beans and cluster beans. Hybridization with other pulses with a view to the introduction of the oil of the former and the prolificness of the latter into other pulses. Study of variations in lablab and horsegram and selection work on redgram and bengalgram.

(f) *Fruits*.—Budding and grafting experiments will be continued at Ootacamund, Coonoor and Burliar. Vegetative propaganda of plants will be continued at Burliar and Kallar fruit gardens—the raising of new strains and varieties of various ornamental plants—by cross-breeding and other methods will be continued as in past year. Seed selection in cape gooseberry and tomatoes will be done and stocks of seedlings of fruit trees will be made available for distribution. Varieties of Lupin seeds received from Russia will be grown and tested for their value for human and animal consumption. The growing and study of medicinal plants will also be continued.

Sugarcane.—The work outlined in last year's report will be continued. Items of research work on this crop will also be done at the newly opened station at Gudiyattam and at Anakapalle with grants obtained from the Imperial Council of Agricultural Research.

(4) *Entomology*.—Continuance of apicultural work, study of specific problems in circles by assistants stationed there, economic work such as testing different kinds of insecticides against various kinds of pests including pests of stored products.

(5) *Implements*.—Experimentation with groundnut decorticators; experiments with oven drying of grain; further trials of tractor and equipment including recently purchased subsoiler; continuation of trials of oil engines on agricultural research

stations; continuation of trials of Cooper and other makes of turn-wrest ploughs; trial of Chattanooga and other makes of bullock-drawn subsoil ploughs; continuation of trials of ridging ploughs including new designs developed in the section; continuation of trials of McCormick Deering rotary hoe, also trials of the Howard rotary hoe the purchase of which has been budgeted for next year; continuation of windmill pumping and wind velocity records; continuation of trials of bullock power and engine power cane-crushing mills; further investigation of Persian wheel and other types of water lift; continuation of trials of pneumatic tyred bullock carts including development of improved designs; continuation of production of cine films of agricultural operations; trials and development of small hand and bullock-drawn cultivators; investigation of hand-shelling devices for paddy; experiments with improved designs of winnowers; experiments with a view to the development of a simplified design of cotton seed crusher; further experiments with and further development of seed drills; investigation of oil milling practices; experimentation with special knives for cutting cane sets and for shelling and slicing arecanut; experiments with a view to development of improved means of hand-shelling of coconuts; investigation of present methods of polishing turmeric; investigation of present village methods of rope-making; experiments on the hand extraction of fibre; investigation of possibility of devising improved methods of harvesting plantains; trials of bullock yokes of new designs; and experiments with FalKamesam arsenic treatment of timber and fence post.

Irrigation.—Irrigation experiments to study the duty of water, study of the water requirements of crops with V notches at Agricultural Research Stations at Palur, Aduturai and Samalkota.

Continuation of water experiments at Kugalur and Chennasamudram in the Lower Bhavan Irrigation area for study of seepage and transmission losses and of water requirements of dry crops.

(6) *Livestock.*—Maintenance of breeding bulls through district boards as well as other agencies.

Scindhe herds.—Continuance of building up a good herd of cows by selection which will breed true to type, regular breeders and good milkers.

Cross breds.—Breeding back on cross breds to country by the use of pure Scindhe bulls.

Kangayams.—The continuance of building up a herd of cows regularly and true to type and of milk recording. Elimination of animals with undesirable points, attention to be paid to the horns of young stock.

Hallikar breed.—Maintenance of a small herd and distribution of bulls of this breed in Salem, Chittoor and Anantapur districts.

Sheep breeding.—Efforts to evolve a pure white strain of Bellary sheep will continue.

Poultry.—Maintenance of various breeds—imported and country—efforts to improve the egg production of each breed.

(7) *Mycology.*—Investigation of foot-rot of paddy, blast of paddy, false smut of paddy, pollu of pepper, wilt in betel-vine, diseases of redgram and bengalgram, mosaic of sugarcane, shoot-rot of coconut, die-back of cashewnut, diseases of citrus, clump and wilt diseases of groundnut, yellowing disease of cholam and panama disease of plantains; study of promising indigenous drugs with a view to their application as fungicides and spreaders.

B.—Agricultural Research Stations.

Anakapalle—Sugarcane.—Study of varietal and comparative tests including a large number of varieties from Coimbatore, study and behaviour of sorghum hybrids, trials on cultural methods to determine spacing in relation to varieties, source of irrigation, and methods of planting. Reduction in cost of production with relation to study under restricted supplies of water and manure, and study into the fundamentals of cane nutrition, irrigational trials and trials of other cultural operations, prolongation of cane crushing period and investigation in the manufacture of end products.

Paddy.—Manurial experiments, maintenance of purity of strains, and comparison of the promising ones.

Other crops.—Maintenance of the purity of ragi strains, trial of Cambodia cotton, castors, gingelly, soya beans, *gogus* and grams.

Side lines.—Apiculture, sericulture and poultry.

Samalkota—Sugarcane.—Study and yield trials of Coimbatore seedlings, sorghum hybrids and other varieties. Manuring of ratoon crops, comparison of intensely manured against unmanured seed material. Cultural studies including seasonal planting, spacing, ratooning, short-cropping, trench planting. Ripening studies and periodical analysis. Study of drought resisting capacities and study of tillering and growth in height. Preparation of jaggery and sugar on improved lines.

Paddy.—Selection work in the main and second-crop varieties, comparison of selections and trial of pure lines.

Plantains.—Study of various varieties under *punasa* and winter plantings, manurial trials with reference to keeping qualities. Cultural studies and preparation of banana figs on a commercial scale.

Other crops.—Trial of garden crops including cotton, gingelly, wheat, linseed, bengalgram and soy beans. Trial of betel-vine, pepper, pine-apple and manilla hemp, trial of teosinte grass under different seasonal conditions.

Side lines.—Poultry, bee-keeping, sericulture, pisciculture and study of water requirements of important crops.

Guntur—Cotton—Trials.—Mixing Cambodia cotton in different cereals against pure crop, selection work in local cotton. Spacing experiment with Cambodia cotton, district trials with strains of local cotton. Rotation experiments on small plots.

Tobacco.—Selection work, flue curing in private barns. Varietal trials—local—Virginian and Pusa.

Chillies.—Study of thrip resisting varieties, thrip control experiments with insecticides. Purity test and row yield test of selections, hybridization.

Other crops.—Selection work and grading experiments on *variga*, *jonna*, *maize* and *sajja*. Trials with groundnut, castor, bengalgram, gingelly, coriander, soya beans and wheat.

General.—Trial of medicinal plants, senna, foreign grasses and some fruit trees.

Nandyal and Hagari—Hagari.—Soil studies having as their purpose the accumulation of detailed knowledge concerning the effect of tillage, manuring, and bunding on soil moisture, pH, available nitrogen, and mechanical constituents will be made. Soil erosion and run off which have been found to be the two main causes for low yields will be further investigated and further work in regard to the experiment will be done on ryots' lands. Improvements in regard to supply of pure seed of important crops will be continued. Exercise of biological and chemical control in the making of composts. Work on manure supply and composts. Improvement will be sought in a better quality of the products and reduction in loss of nitrogen. Trials with implements, viz., ploughs, a large bund former, and a seed drill to be designed for the tract.

Nandyal.—Study of main types of soil in Kurnool and Cuddapah districts and their origin, seed improvement and isolation of strains of cotton, cholam, bengalgram and groundnut. Trial of promising ones obtained elsewhere with those isolated from the local crops. Introduction of new crops like soya beans and lupins. Isolation of strains of pillipesara and types of cholam suitable for fodder. Rotational experiments in relation to the response of crops to manurial treatment. Intensive study of the manufacture of composts and study of the value of different forms of fencing.

Palur—Sugarcane.—Varietal trials both in the wet lands and garden lands, raising of new thick and thin cane seedlings, study of the yielding capacities under water-logged and restricted irrigated conditions. Manurial experiments to study the effect of nitrate of soda, potash, super and oil cakes, multiplication of the promising varieties, monthly planting of sorghum crosses and Coimbatore seedling canes.

Paddy.—Selection work on *garudan samba*, *chitrakali*, *swarnavari*, *seevan samba* and *chinna samba*.

Other crops.—Selection in local ragi, varagu and cumbu, comparative trial of A.H. 25 with local Mauritius, strip trials of gingelly and castor, experiments to study the effect of ash on the keeping qualities of plantain, economic rotation experiments, cultivation of fodder crop and sweet flag (*Acorus calamus*).

General.—Poultry, ericulture, trials with the Persian wheel water lift, preparation of activated carbon, manufacture of cream jaggery and white sugar with the centrifugal machine.

Aduturai.—Distribution of bulk seed of the strains already released, trials of strains of *sanna samba*, *pedda samba*, *thattan samba*, *chinna samba* and *korangu samba* cross progenies. Cultural and manurial trials regarding the effect of age of seedlings in the nursery on yield of paddy and determination of the optimum dose of green manure in conjunction with varying doses of phosphatic manure.

Other crops.—Growing of soy beans, groundnut, maize, cholam, cotton during the off season. Trials with sugarcane, turmeric and plantains will be continued. Growing of important Indian and English vegetables will also be done.

Side lines.—Breeding of fish, grading of country hens and hiving wild colonies of bees.

Koilpatti.—Trial of new strains of karunganni, study of the residual effect of manuring cotton with sulphate of ammonia and groundnut cake. Trials with the application of ammonium sulphate to Cambodia cotton at the time of flowering will be continued. Selection work on *periyamanjal cholam* will be continued. Trials with summer *cholam*, *irungu cholam*, sweet sorghum and Sudan grass, will be made. Selection from irrigated *cumbu*, intercultivation and rotation experiments, trial of coriander as a mixture with cotton, trials with the Indore method of making compost with the help of rain water will be repeated.

Taliparamba.—Varietal trials of paddy, sugarcane, plantains, ginger, chillies, ragi and arecanut, study of fruit plants, pineapple, mango, cashew and sapota, study of the manurial requirements of pepper, watching the progress of coffee in the interspaces between pepper. Demonstration of systematic cultivation of dry land, demonstration of bee-keeping, maintenance of a small buffalo herd with a view to meet the demand for breeding stock of the district.

Nanjanad.—Trials to test the superiority of the different potato fertilisers. Permanent manurials to test the effect of liming, cattle manure and fertilisers, deep ridging versus shallow ridging, trials with no manure versus sulphate of ammonia versus calcium cyanamide, trials with the time of sowing of barley, oats, wheat and teosinte.

Trial Plots.

First Circle.—Trial of new strains of paddy, sugarcane No. POJ. 2878, Co. 243, Co. 313 and sorghum hybrids. Improved strains of ragi No. 525 and No. 355, bunch varieties of groundnuts, jonna and korra strains from the Millet Station.

Second Circle.—Trial of ragi strains E.C. 593 and AKP. No. 274, Pusa wheat No. 4 and jonna strains, T. 1, T. 6, T. 12 and No. 23/10 of Nandyal.

Third Circle.—Trial of a large number of promising varieties of sugarcane obtained from Coimbatore and Mysore and local cane called *tella cheruku*, introduction of varieties of chillies and comparison of strains of ragi.

Fourth Circle.—Trial plots will be arranged in different localities to try new strains, improved methods, etc., under ryots' conditions to find out and demonstrate their superiority.

Fifth Circle.—Trial of millet strains of *ragi*, *cholam*, *cumbu*, versus local variety, continuation of the trial of Coimbatore paddy strains and improved varieties of cane Co. 281, 213, 285, etc. Bellary onion versus local onions, trial of *periamanjil cholam*, Cambodia, *karunganni* and *Uppam* strains, paddy strains Adt. 9 and 11 and A.H. 25 and H.G. 1 groundnut strain.

Sixth Circle.—Trial of Pusa type of blackgram, lentils and linseed on the black soil, *cumbu* and *tenai* selections from the Millet Specialist, and trial of sugarcane varieties.

Seventh Circle.—Trial of local strains of paddy produced at the Pattambi Agricultural Research Station, pepper, pine-apple, cashew and sugarcane varieties.

Eighth Circle.—Trials with select cholam varieties, Cambodia cotton in wet lands, bunch groundnut, Co. 213 cane under limited water conditions, linseed, varieties of cigarette tobacco, potatoes and bengalgram strains.

Demonstration.

(1) *Crops.*—Strains of paddy, *ragi*, sorghum and cotton. Improved varieties of groundnut. Varieties of sugarcane, short planting and line planting of sugarcane; low seed rate for paddy nurseries and clean cultivation.

(2) *Implements.*—Introduction of standard types of ploughs, H.M. guntakas, drill sowing implements and bund formers; improved sugarcane pans.

(3) *Manures.*—Proper methods of preserving cattle manure and manufacture of composts. Preparation of poudrette from night-soil and village rubbish. Introduction of green manure crop for increasing organic matter in both garden and wet lands. Use of oil-cakes and bonemeal for paddy and sugarcane.

(4) *Seed supply.*—Increase of seed in different varieties, especially paddy, cotton, sugarcane, groundnut and green manures.

(5) *Cattle.*—Stationing of stud bulls; advice on proper care of cattle; demonstration of ensilage, fodder crops.

(6) *Jaggery manufacture.*—Preparation of cream jaggery, improved methods of preparing jaggery; manufacture of sugar with centrifugals.

(7) *Insect pests and diseases.*—Advice on proper methods of combating plant pests and diseases; sprayers, insecticides, etc.

(8) Demonstration plots in all centre villages in the holdings of ryots under departmental supervision.

(9) Exhibitions at important fairs and festivals; motor exhibition vans, lantern lectures.

(10) *Associations.*—Formation of agricultural or co-operative associations to take up stocking and sale of implements, seeds, etc.

Agricultural marketing.

The possibility of creating an internal trade for Southern India bananas in Northern India will be further investigated.

I have the honour to be,

Sir,

Your most obedient servant,

D. ANANDA RAO,
Director of Agriculture.

GLOSSARY.

Avocado	...	...	...	<i>Persia gratissima.</i>
Barley	...	...	...	<i>Hordeum vulgare.</i>
Bengalgram	...	...	...	<i>Vicer arictinum.</i>
Betel-vine	...	...	...	<i>Piper betel.</i>
Castor	...	...	...	<i>Ricinus communis.</i>
Cashewnut	...	...	...	<i>Anacardium occidentale.</i>
Cholam	...	...	...	<i>Sorghum vulgare.</i>
Cotton	...	...	...	<i>Gossypium.</i>
(i) Cambodia cotton	...	...	...	<i>Gossypium hirsutum.</i>
(ii) Karunganni cotton	...	...	...	<i>Gossypium indicum.</i>
(iii) Uppam cotton	...	...	...	<i>Gossypium herbaceum.</i>
(iv) Pulichai cotton	...	...	...	<i>Gossypium neglectum.</i>
(v) Westerns cotton	...	...	...	} Mixture of <i>Gossypium herba-</i> <i>ceum</i> and <i>indicum.</i>
(vi) Northern cotton	...	...	...	
Chillies	...	...	...	<i>Capiscum sp.</i>
Coconut	...	...	...	<i>Cocos-nucifera.</i>
Cumbu	...	...	...	<i>Pennisetum typhoideum.</i>
Dhaincha	...	...	...	<i>Sesbania aculeata.</i>
Fox glove	...	...	...	<i>Digitalis purpurea.</i>
Gingelly	...	...	...	<i>Sesamum indicum.</i>
Groundnut	...	...	...	<i>Arachis hypogaea.</i>
Grape-vine	...	...	...	<i>Citrus decumana.</i>
Guinea grass	...	...	...	<i>Panicum maximum.</i>
Horsegram	...	...	...	<i>Dolichos biflorus.</i>
Jalap	...	...	...	<i>Ipomea purga.</i>
Khaki weed	...	...	...	<i>Alternanthera echinata.</i>
Kolinji	...	...	...	<i>Tephrosia purpurea.</i>
Kolukattai grass	...	...	...	<i>Pennisetum cenchroides.</i>
Korai	...	...	...	<i>Cyperus rotundus.</i>
Korra	...	...	...	<i>Setaria italica.</i>
Lucerne	...	...	...	<i>Medicago sativa.</i>
Loquat	...	...	...	<i>Eriobotrya japonica.</i>
Maize	...	...	...	<i>Zea mays.</i>
Mangoes	...	...	...	<i>Mangifera indica.</i>
Manilla hemp	...	...	...	<i>Musa Textilis.</i>
Onion	...	...	...	<i>Allium sativum.</i>
Orange	...	...	...	<i>Citrus aurantium.</i>
Paddy	...	...	...	<i>Oryza sativa.</i>
Pani varagu	...	...	...	<i>Panicum miliaceum.</i>
Pepper	...	...	...	<i>Piper nigrum.</i>
Peach	...	...	...	<i>Persica vulgaris.</i>
Pillipesara	...	...	...	<i>Phaseolus trilobus, Ait.</i>
Pine-apple	...	...	...	<i>Ananas sativa.</i>
Plantains	...	...	...	<i>Musa sapientum.</i>
Plum	...	...	...	<i>Prunus salicina.</i>
Potato	...	...	...	<i>Solanum tuberosum.</i>
Ragi	...	...	...	<i>Eleusine coracana.</i>
Redgram	...	...	...	<i>Cajanus indicus.</i>
Samai	...	...	...	<i>Panicum miliare.</i>
Sapota	...	...	...	<i>Achras sapota.</i>
Soya bean	...	...	...	<i>Glycine soja.</i>
Sugarcane	...	...	...	<i>Saccharum officinarum.</i>
Sunn hemp	...	...	...	<i>Crotolaria juncea.</i>
Sweet flag	...	...	...	<i>Acorus calamus.</i>
Tapioca	...	...	...	<i>Manihot utilissima.</i>
Teosinte	...	...	...	<i>Euchloa mexicana—schröd.</i>
Tobacco	...	...	...	<i>Nicotiana tabacum.</i>
Turmeric	...	...	...	<i>Curcuma longa.</i>
Varagu	...	...	...	<i>Paspalum scrobiculatum.</i>
Variga	...	...	...	<i>Panicum miliaceum.</i>
Wheat	...	...	...	<i>Triticum spp.</i>

Government of Madras

DEVELOPMENT DEPARTMENT

G.O. No. 1335, 26th September 1935

Agriculture—Administration Report—1934-35—Recorded with remarks.

READ—the following paper :—

From the Director of Agriculture, dated 24th—30th July 1935,
R.O.C. No. 68-Pdl./35.

Order—No. 1335, Development, dated 26th September 1935.

Recorded.

2. There was a further marked reduction in the number of applications for admission to the Agricultural College, Coimbatore, although there are still many more applicants than can be selected for admission. The results of the examination for the B.Sc. (Agr.) were fairly satisfactory. Besides the short courses in "farm management" started at the College last year, other courses of instruction in the subjects of malt-making, insect pests and diseases, jaggery-making and bee-keeping were instituted during the year. The Government are glad to learn that these short courses are becoming popular. A course of instruction in co-operation, auditing, book-keeping and banking was also started at the College.

3. The season was generally unfavourable to cultural operations at agricultural stations during the year.

4. Research followed the usual lines. The survey of bananas, a crop which has come into prominence recently as one well suited for inter-cultivation, was continued in six districts. Soil surveys were undertaken of four irrigation projects.

The chemistry of sugarcane received considerable attention from the department. Extended trials were made of the manufacture of cream jaggery in various parts of the Presidency and a number of demonstrators from sugarcane areas were trained for the work. Laboratory experiments on groundnut shells for the manufacture of active carbon met with considerable success. It is noteworthy that a 'blast' resistant variety of paddy has been evolved. The subsidized manurial experiments at Maruteru on the first-crop of paddy have achieved definite results; the extension of these experiments to the second-crop should prove equally valuable.

5. Cultural experiments on cotton and other crops continued with useful results. At Anakapalle, Samalkota and Palur an

attempt is being made to extend the season for the crushing of sugarcane by the selection of varieties which can be planted both earlier and later than the normal months for planting cane.

6. The design and improvement of implements is reported to have received considerable attention during the year. It is hoped that the improvements which have been effected will be brought to the ryots' notice through departmental propaganda and demonstration as soon as may be.

In the Entomology section special studies were made of the more important pests and one definite conclusion reached: that tobacco, either as a dry dust or as a liquid spray, is the best and most economical insecticide for the leaf curl of chillies due to thrips which occurs in the Guntur and Madura districts. Investigations were conducted in the Mycology section on several diseases.

7. Good results are reported to have been obtained from the demonstration on trial plots of the superiority over local varieties of new and improved strains of paddy, ragi, sorghum, cotton and sugarcane. Demonstrations of varietal, cultural and manurial methods in the cultivation of paddy, sugarcane, ragi and groundnut continued during the year. There was a marked increase in the number of demonstration plots from 1,746 to 3,170. This year each Demonstrator has been allowed to extend his activities over eight to ten demonstration centres within his jurisdiction, instead of concentrating his work in fewer selected centres. It is hoped that this comparatively small extension will not obscure the necessity for intensive demonstration work. Progress in the adoption of improved methods of cultivation is maintained. There was an increase in the acreage of sugarcane under improved methods of cultivation in the I Circle from 9,265 to 12,431 acres, and an increase of acreage under improved strains of cane in the II Circle from 2,630 to 7,900 acres. There was a slight fall in the total amount of departmental improved strains of paddy seed distributed to the ryots during the year from 1,677 tons to 1,567 tons, which is probably attributable to adverse seasonal conditions. There was an increase in the distribution of green manure seeds from 211 tons to 311 tons. The following statement shows the quantity of improved strains of seed of certain important crops distributed by the department and that made through co-operative societies.

I. Seed distributed by the Department.

Crops.	Total quantity.	Total area (including natural spread).
		ACS.
1. Cotton	951,180 lb.	481,572
2. Groundnut	1,220 "	..
3. Paddy	1,567 tons.	850,415
4. Sugarcane	134,778 setts (in the IV Circle).	40,262

II. Sold through Co-operative Societies.

Crops.	Total quantity. LB.
1. Cotton	750,500
2. Paddy	74,250

It is reported that ryots have begun to take advantage of the takkavi loans of small sums of Rs. 25 and less now issued by Deputy Directors of this department; in consequence there was a slight increase of about Rs. 3,000 in the amount of loans sanctioned during the year.

8. A Provincial Marketing Board was constituted and a Provincial Marketing Officer appointed in the course of the year. The All-India Marketing Scheme, with which these developments are connected, started to work in February 1935. Special investigations, amounting to a survey of marketing conditions in respect of most important products, are being carried out by the Provincial Marketing Officer and his assistants. It is expected that the final results of this survey will supply the data necessary for the formulation of a programme of marketing.

A number of Co-operative Sale Societies dealing in agricultural produce have either been started or revived. Co-operative Societies also continued to be helpful in the distribution of improved strains of paddy, green manure and Cambodia cotton and in marketing agricultural produce, such as, jaggery, cotton kappas and groundnut.

A scheme is under consideration for making available to the grower wholesale prices of important agricultural commodities from the several commercial centres of the Province. Three new Agricultural Associations in the II Circle were formed for the improvement of agriculture. An important and useful function which may be commended to these Associations is the distribution of improved seed to the ryots.

(By order of the Government, Ministry of Public Works)

G. A. HENDERSON,
Secretary to Government.

To the Director of Agriculture.
 " Director of Veterinary Services.
 " Registrar of Co-operative Societies.
 " Law (Education) Department.
 " Public Works and Labour Department.
 " Public Department.
 " Finance Department.
 " Accountant-General.
 " Government of India, Department of Education, Health and Lands (with C.L.).

Press,

R

J. 207/134

11/2/35

தமிழ்நாடு ஆவணக்காப்பக நூலகம்,
எழும்பூர், சென்னை-600 008.

துவணைத்தாள்.

சே. எண் :

ப. எண் :

வழங்கிய நாள். (1)	திரும்பிய நாள். (2)	வழங்கிய நாள். (1)	திரும்பிய நாள். (2)
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12/5/51			

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