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ADMINISTRATION REPORT
OF THE
AGRICULTURAL DEPARTMENT
FOR THE YEAR 1954-55



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AGRICULTURE DEPARTMENT

G.O. No. 294, 7th February 1956

Annual Report—Agricultural Department—1954-55—Recorded

—the following paper:—

Letter from the Director of Agriculture dated 30th September 1955,
No. E. 2. Pdl. 38/55.

Order—No. 294, Agriculture, dated 7th February 1956.

The report on the working of the Agricultural Department for the year 1954-55, submitted by the Director of Agriculture is recorded with the following remarks.

2. *Seasonal conditions.*—During the year the south-west monsoon was more or less normal. But the north-east monsoon was practically a failure throughout the State. The rainfed crops depending entirely on this monsoon received a set back on this account. The rains during the dry weather period of January and February were, however, normal throughout the State. The rains during the hot weather period were of benefit to the garden land crops and appreciably improved the supplies in tanks and wells. On the whole in 1954 the rains were unevenly distributed in both the monsoons. Crops were damaged by gales in certain taluks of Coimbatore and South Kanara districts. Loss due to floods was also reported from South Arcot, North Malabar and Tanjore districts. Thus agriculturally the year under review was not so favourable as the previous year. However there was an increase in the production of rice from 2.98 million tons to 3.10 million tons which is gratifying.

3. *Food production schemes.*—The fourth year programme of the Five-Year Plan of the State was executed during the year under review. The Plan aimed at a target of 175,047 tons of additional foodgrains through agricultural schemes during the year. Most of the schemes under the Plan are continuations of those under the old three-year Grow More Food Plan, but intensified for attaining self-sufficiency by the end of 1956. An additional quantity of 190,320 tons of foodgrains is estimated to have been produced during the year as a result of the operation of all schemes which directly contributed increased production. This quantity exceeds the target by 15,273 tons. Under the seed multiplication and distribution schemes 10,734 tons of improved seeds of paddy were distributed against a target of 20,370 tons. About 139 tons of improved millet seeds were also distributed.

Under the scheme of mechanized cultivation, an area of 21,182 brought under cultivation by utilising 159 tractors out of which 85 equipped with bull dozer attachments as against 16,635 acres brought under cultivation during the previous year. The additional production on account of reclaiming lands by tractors was 2,092 tons of food against 1,481 tons of foodgrains during the previous year. Under purchase system 617 oil engines and 311 electric motor pumpsets were with the Department for supply to the ryots. As many as 895 tube wells were sunk as against a target of 600 wells.

From April 1954 onwards, the direction, control and supervision of distribution of Ammonium Sulphate was transferred from the Director of Agriculture to Collectors in the districts with a view to relieve the agricultural staff of trading activities and enable them to devote all their time to legitimate work of Agricultural Extension.

A scheme for the survey of fertilizer practices in Coimbatore sponsored by the Indian Council of Agricultural Research was worked during the period of nine months during the year. The object of the scheme was to collect factual information on the distribution of manurial consumption between different crops grown in the tract, cultivator's practices in regard to quality and quantity of manure applied, time and method of application, availability of manures, prices, cropping practices, availability of irrigation facility, etc. The final report on the working of the Scheme is awaited.

As many as 8,000 demonstration trials in ryots' fields were conducted during the year to demonstrate the utility of commercial fertilizers, ammonium sulphate, super phosphate, urea and ammonium nitrate in increasing crop production and thereby to encourage the extensive use of such fertilizers. The required quantity of fertilizers was supplied by the Indian Council of Agricultural Research free of cost.

A quantity of 135,976 tons of rural compost was prepared during the year to cover an area of 74,079 acres resulting in an estimated additional production of 12,176 tons of foodgrains. A total quantity of 15,093 tons of urban compost was also prepared against a target of 300,600 tons and out of this a quantity of 208,430 tons was sold.

During the period under report the area raised under "Sesbania Spine" as a pure crop was over 1.35 million acres and the area raised under Sesbania as a border crop was over 22,000 acres, the quantity produced being equivalent to 2 lakhs of acres of paddy. A quantity of about 361 tons of Sesbania seeds was sold by the Department to the ryots during the year against a target of 150½ tons during the previous year. With a view to remove the doubts of practical agriculturists about the effect of Sesbania grown as a line crop in the margin of paddy fields the Director of Agriculture was asked by the Government to conduct a few demonstrations and publish the results. It is reported by the Director of Agriculture that instructions have been issued to the District Agricultural Officers to arrange for demonstration plots for Sesbania both as a border crop as well as a pure crop to demonstrate the relative advantage. But it is not reported by him whether the instructions were carried out, how many demonstration plots were laid and whether the results were published. The Director of Agriculture is requested to include the above particulars in his next report. The Director of Agriculture is requested to mention in his future reports the quantity of each one of the several varieties of green manure seeds distributed by the Department.

lincha, Pillipesara, Sunnhemp, etc. Ryots should be allowed free to select the green manure they need although Sesbania is a land and manure crop if grown on field bunds.

Plants and insecticides were sold at 50 per cent of the cost price in emergency cases declared as such by the District Collector and approved by the Director of Agriculture, so as to help the ryots in the pest affected areas with large scale application of chemicals to save their food crops. During the year under review, 300,576 acres of food crops and 135,550 fruit and other crops have been saved from destruction by pests and diseases. The plant protection staff in the control of pests and diseases weekly reports are sent by the Director of Agriculture to all District Agricultural Officers and they are also transmitted through the All-India Radio at Madras, Tiruchirappalli and Kozhikode. The progress of the production schemes was satisfactory.

Cotton Extension Scheme.—The Cotton Extension Plan continued to be worked during the year as part of an All-India Plan for increasing the production of cotton alongside food-grains. Under the Plan, an additional area of 42,296 acres was covered against a target of 42,296 acres. The additional production is estimated at 30,268 bales only as against a target of 43,318 bales. Seasonal conditions were not quite favourable. However the total production during the year is estimated at 270,500 bales as against 264,600 bales of the previous year. Against a total quantity of 44,150 maunds of seeds to be procured and distributed, only 26,034 maunds were procured which 21,550 maunds of seeds were distributed leaving a balance of 4,484 maunds as undistributed. A new field for co-operative effort was opened by the Government at the Srivilliputhur Uganda Cotton Growers' Marketing Society, Lemana, the multiplication and distribution with departmental assistance at the advice of M.C.U. 2 cotton seeds. The Society distributed over a lakh of maunds of cotton seeds under seed farm conditions meeting the requirements of 17 acres. It was pointed out to the Director of Agriculture in the previous year that improved cotton seeds which should have been used for cultivation were sold as cattle feed or diverted to research stations as manure and in January 1954 it was found that a quantity of 4,484 maunds of improved seeds were left undistributed during 1954-55. The Director of Agriculture was requested to see that all seeds which are procured are distributed in proper time to the ryots instead of allowing them to go to waste. On the whole the Cotton Extension Scheme was working satisfactorily. But greater attention has to be paid to the proper utilization of seeds.

Agricultural education.—The number of admissions to the Agricultural College and Research Institute, Coimbatore, was raised from 96 to 108 during the year in order to offset to some extent the loss of the Bapatla Agricultural College which is now in the Andhra State and which was admitting non-Andhra students also. Ninety-one per cent of the students sent up for the final examination in the B.Sc. (Agriculture) courses were successful as against 80.3 per cent of the previous year. The short course in Agriculture and allied subjects for women could not be run during the year due to the increased admission to the College and want of sufficient accommodation.

The Refresher Course in Agriculture for young farmers between 17 to 25 years which was started last year to give an all round practical training in agriculture and allied subjects to farmers was however continued. Twenty-six farmers underwent the Course as against 15 last year.

6. *Agricultural research.*—During the year under review, a new Research Station was started at Bhavanisagar on 9th February and commenced regular work from 1st March 1955. The Satyamangalam previously started was converted as a demonstration farm from 9th February 1955.

The year under report witnessed the launching of a large number of research schemes. A scheme to effectively tackle the stem borer problem was sanctioned under the auspices of the Indian Council of Agricultural Research. Four schemes were sanctioned during the year for the irrigation of oilseeds with financial assistance from the Indian Central Oilseeds Research Board. Research work in unirrigated Sea-Island cotton aimed at a climatic adaptation of this cotton in the West Coast districts as a rainfed crop was in progress. A scheme for the breeding of suitable varieties of cotton in the rice fallow deltaic and non-deltaic regions was started on 1st April 1954.

The Revised Sugarcane Research Scheme was sanctioned during the year and the Central Sugarcane Research Station at Palur started functioning on 15th April 1955. A scheme for increasing the production and quality of sugarcane by isolation of high yielding and superior trees, their perpetuation by vegetative propagation and distribution of such plants to the public was sanctioned during the year. A scheme for the preservation of fruits and fruit products with the object of demonstrating scientific methods of preserving fruit products for adoption as a cottage industry was started on 25th May 1955.

In several places in the report, it is vaguely stated that further research work is needed for confirming the results, which conveys the impression that the problems included in the programme of work are not being successfully tackled. It was pointed out in the previous review that future reports should furnish information regarding the actual progress made during the year, the economic gain to the ryots and to the State by the adoption of the results of research such as percentage of increase in yield per acre, area benefited, total additional production and its monetary value, etc. This suggestion has been adopted in the report only in some cases.

The expenditure of the Agricultural Research Stations was reduced from Rs. 5.95 lakhs to Rs. 5.77 lakhs and the income increased from Rs. 5.19 lakhs to Rs. 5.34 lakhs making a total saving of Rs. 33,480. This is a matter for satisfaction.

7. *Crop improvement and seed multiplication.*—Three new strains of paddy were released during the year and these are expected to cover an area of 50,000 acres in South Kanara district. Two new strains were got ready for release and these are expected to serve an area of 20,000 acres in the West Coast.

Several new strains of millets were released during the year. Two cultures of cholam and one of ragi were awaiting release as new strains. In addition, several cultures of cholam, two of cumbu and one of varagu were under trial in the fields of cultivators.

The following quantities of improved strains of millets and pulses were distributed by the department during the year under report as compared with the previous year :—

	Quantity distributed.	Area expected to be covered.	Estimated additional production.
	LB.	ACRES.	TONS.
1953-54 ..	74,706	9,340	628
1954-55 ..	87,423	9,570	567

A total quantity of 10,734 tons of improved strains of paddy seeds were distributed against a target of 20,370 tons. The total area under improved paddy during 1954-55 was only 46.3 per cent as against 44.1 per cent in 1953-54. There has thus been no appreciable improvement during the year under review. As this is a very important scheme for crop improvement, the Director of Agriculture was asked in the previous reviews to institute a vigorous drive and see that the targets fixed are reached in future years. Much larger quantities of improved seeds are supplied to ryots at the same time besides maintaining the purity of seeds. The reasons for the low percentage of the area under improved strains should be investigated and the defects remedied. On the whole the quantum of results of research, both in the main breeding sections and the sections like Chemistry, Entomology and the like, was poor. The Director of Agriculture should take steps to increase the efficiency. Now that Research Officers have been relieved of routine work by the centralization of such work under an Administrative Officer, they should be able to pay undivided attention to accomplish results.

8. *Cultural improvements.*—The area under the modified Japanese method of paddy cultivation during 1954-55 was 4,93,377 acres and this is said to be the highest for all States in India. This modified method has been extended to cotton, millets and sugarcane in 1955-56. The experiment on the Japanese method of cultivation versus farm method of cultivation of paddy is stated to have indicated that though the Japanese method recorded higher yields, the increase was not commensurate with the extra expenditure due to the application of heavier doses of manures. This finding is not in accord with the experience of several ryots who consider that the Japanese method is a far superior method in every way and with reports of the success of this method in other States. The Japanese method has already been modified to suit conditions in this State and the Government consider that every item in this method should be experimented with further in order to assess its superiority and the method generally should be advocated. The lukewarmness of the department in propagating this method has met with criticism in some quarters and this could have been avoided.

9. *Crop sampling.*—During the year 1,240 crop cutting experiments in paddy were planned of which 1,177 were finalized as against 1,476 planned and 1,353 completed during 1953-54. The average yield of rice per acre determined according to these experiments is 1,135 lb. Based on this average yield, the total production of rice in the State during the year is estimated as 3,258,000 tons. As regards millets, 2,280 experiments were planned during the year of which 1,348 were completed as against 3,266 planned and 1,602 completed during the previous year. There has been a considerable fall in the number of experiments planned and completed during the year under review as compared with the previous year. This must be looked into by the Director of Statistics. During the year, a crop sample survey on sugarcane, a pilot survey of crop cutting experiments for assessing the effect of soil conservation measures on the yields of crops and a pilot scheme for estimating the area and yield of pepper crop were conducted.

10. *Soil conservation.*—Schemes for carrying out soil conservation measures in an area of 6,000 acres in the two firkas of Kangayam and Vellakoil in the Dharapuram taluk of the Coimbatore district and for tackling 4,046 acres in the Kothamangalam Fuel Series by direct contouring were put into operation during the year. A detailed proposal for executing soil conservation measures

in an area of 60,000 acres in the whole of the Nilgiris district is under consideration. The Government have sanctioned the grant of taluk to ryots at the rate of Rs. 300 per acre subject to the maximum of Rs. 100 for each individual for soil conservation works. In this connexion it is mentioned that a scheme to give training in the practical aspect of soil conservation measures to the interested ryots of Nilgiris district is under consideration. The Government had occasion to observe that there was not adequate enthusiasm for the soil conservation programme due to lack of co-ordination in the department. This defect requires to be remedied.

11. *Agricultural engineering.*—The application of mechanized aids for increasing food production continued to be popular and there is increasing demand for these aids from the farmers. The strength of the department's tractors continued to be 158 of which 85 are with bulldozer attachments. Twenty-one thousand eight hundred and twelve acres were brought under cultivation by these tractors during the year as against 16,635 acres in the previous year. An additional production of 2,092 tons of food grain was estimated as against 1,481 tons last year. The receipts by way of hire of tractors during the year amounted to Rs. 9.82 lakhs as against Rs. 7.77 lakhs in the previous year. The Government have approved of the grant of Rs. 10 lakhs to agriculturists to meet tractor hire charges in order to reduce idle hours of the tractors.

The decentralisation in the distribution of oil engine pumpsets by keeping them at taluk headquarters instead of at district headquarters for hiring to ryots has resulted in all round improvement in the utilization of the pumpsets, obviating the unnecessary movement of the machines over long distances. Four hundred and forty oil engine pumpsets were available with the department for hire to the ryots. The hiring of petrol pumpsets to ryots was discontinued this year as all the sets have become unserviceable.

The Government of India sanctioned a loan of Rs. 20 lakhs for sinking filter point tube wells and 895 wells were successfully sunk against a target of 600 wells.

This department is holding a stock of 268,315 feet of pipes for distribution. With a view to divert the department to unimportant work and enable it to concentrate on engineering research and land improvement work, the Government have since ordered the transfer of the entire stock of pipes and fittings to the Public Works Department.

A State Advisory Committee was set up to review periodically the progress in the manufacture of improved agricultural implements. With a view to collect basic data of the indigenous implements in common use in the State for carrying out improvements and standardizing the implements, the Government have sanctioned a scheme for the survey of indigenous implements with the financial assistance from the Indian Council of Agricultural Research. Photographs and diagrams of new designs of agricultural implements and designs tested have been added to this year's report as a new feature. The noteworthy new designs are a coir filter point which is said to be far cheaper than the wiremesh filter point now in vogue with the added advantage of being suitable even for strata of fine sand and a delivery rake suitable of being drawn by a pair of bullocks. The progress of work in filter point tube well scheme is gratifying but the scheme for tractors was not being run with the maximum efficiency and economy whatever might be the inherent difficulties. Research in Agricultural engineering is still poor. The Government would insist on adequate attention being paid to it.

Propaganda, publicity and extension work.—During the year 20,587 propaganda meetings were held by the Department and 18,016 demonstration plots were laid out in ryots' fields as against 10,269 propaganda meetings and 5,885 demonstration plots during 1953-54. There are 21,000 villages in the State and the Director of Agriculture is requested to see that the objective of one demonstration plot for each village is achieved during the current year. During the year under review, 16,317 agricultural associations were formed and all agricultural improvements were attempted to be put across through the members of these associations. 31,880 copies of the popular Grow More Food Monthly Journals in three regional languages were circulated during the year as against 26,085 last year. Besides 31 articles were sent for publication in the Agricultural News Letter published by the Director of Information and Publicity. 1,15,675 copies of leaflets on subjects of topical interest were distributed to the ryots. Seven radio talks on several agricultural subjects were given in the Rural Broadcasting service for the benefit of farmers and rural people. The Department took part in 192 exhibitions as against 136 during 1953-54.

The Pongal Week in January 1955 was celebrated enthusiastically as an Agricultural Week throughout the State by agriculturists in response to an appeal issued by the Government. In view of the successful observance of the Pongal Week during the year under review, the Government have since made it an annual feature. There has been increasing attention paid to propaganda and publicity during the year but more remains to be done. The Agricultural Information Committee set up by the Government should be utilized to the best advantage and more attention should be paid to audio-visual methods. The Exhibitions organized should be less stereotyped and more educative and Demonstrators should be trained in the art of propaganda.

13. *Community Projects and National Extension Service.*—During the year 20 National Extension Service Development Blocks in the State were ordered to be converted into Community Development Blocks. Ten new National Extension Service blocks were set up during the year in addition to the existing 28 blocks. The Special National Extension Service Scheme which was introduced in the Mayuram and Kumbakonam divisions of the Tanjore district was intensified. The scheme will be gradually extended to the rest of the district with a view to increase the annual exportable surplus of rice of the Tanjore district by 75,000 tons. An additional production of 20,000 tons of rice is estimated even in the first year of its operation in the two divisions alone. The scheme is working satisfactorily. In respect of National Extension Service and Community Projects areas generally this Department wished to have undivided authority so far as agricultural work was concerned. Co-ordination and integration are of the essence of the Community Projects and National Extension Service pattern and this should not be given up.

14. *Agricultural marketing.*—It is observed that the volume of commodities graded has gone down considerably during the year under report. The Director of Agriculture is requested to investigate the reasons for this in respect of each commodity and take necessary steps to step up the quantity of graded commodities progressively. The development of grading is essential for increased activity under marketing, warehousing and processing contemplated in the second Five Year Plan. As regards the progress of regulated markets, the activities of almost all the Market Committees set up under the Madras Commercial Crops Market Act continued to be at a standstill owing to the appeal filed in the Supreme Court by certain merchants against the

decision of the Madras High Court upholding the said Act and the rules issued thereunder as a valid piece of legislation but for section 5 (4) (a) of the Act which is void to the extent it confers on the Collector the power to refuse a licence at his own discretion and rule 37 of the rules which is void in so far as it prohibits persons whose names have not yet been registered as buyers or sellers from carrying on business in a notified area. Good work was turned out only by the South Arcot Market Committee while a fair measure of progress was achieved by the North Arcot and Malabar Committees also. The Department should undertake more educative propaganda to drive home benefits of regulated markets and remove misconceptions among traders. The department was rather slow in bringing about compromise arrangements in Virudhunagar and Koilpatti centres.

15. *Finance*.—The expenditure and receipts for the Department for the financial year 1954-55 and the corresponding figures for the previous year are as follows :—

	1953-54	1954-55
	RS. IN LAKHS.	RS. IN LAKHS.
Expenditure	174.02	127.48
Receipts	102.14	64.16

There has been an overall decrease of expenditure amounting to Rs. 46.54 lakhs due mainly to the postponement of purchase of machinery, equipment, etc., general restriction in the indents for spare parts under Agricultural Engineering and economy and small savings under other items. The decrease in receipts is due mainly to the non-collection of recoveries due from the ryots for hire of machinery and selling of improved seeds at a lower price. The Director of Agriculture should institute a vigorous drive to have all dues collected within the fasli year itself without allowing any arrears to remain uncollected. The following amounts were issued as loans :—

	1953-54	1954-55
	RS. IN LAKHS.	RS. IN LAKHS.
Seeds and manures	9.26	13.44
Implements	0.10	0.29
Chemical manures	40	42.35

16. *Administration and Supervision*.—Three hundred and sixty-seven offices were inspected during the year by the superior officers of the Department as against 271 during 1953-54. It is gratifying to note the increase in the number of offices inspected. In spite of this, instances of defalcations and misappropriations in the Department continue to be on the increase. Appendix 51 of the Report which shows the number of cases of defalcations pending does not appear to include all items of irregularities and it does not also indicate when the irregularities were noticed and for what periods they have been kept unremedied. The Director of Agriculture is requested to furnish in future a complete list arranged chronologically. Laxity on the part of the Head of Offices, their failure to exercise supervision and control and to enforce the various provisions in the Financial and Treasury Codes and the non-observance of the Departmental orders are the main reasons for the large number of cases resulting in heavy loss to Government. As controlling authority, the Director of Agriculture is requested to enforce the due observance by his subordinate officers of the rules and orders and to take suitable

disciplinary action against the persons concerned for the negligence on their part. While fixing the responsibility on the subordinate staff for their irregularities, the Director of Agriculture is requested to take into consideration the responsibility of the Heads of offices for the lapses on their part. Besides the number of regular inspections, the Director of Agriculture is requested to see that the Inspecting Officers also make surprise inspections. His attention is invited in this connection to the orders issued in G.O. Ms. No. 1910, Agriculture, dated 30th July 1955 and in Government Memorandum No. 83226/Accts./55-1, Finance, dated 27th October 1955. Even in the headquarters office the control and supervision could have been more effective. Some of the instances that have come to the notice of Government are losses in the purchase and distribution of green manure and cotton seeds, irregularities in the Cash Section, the Central Agricultural Engineering Store and the non-observance of the statutory communal reservation rule in the appointment of fieldmen in a very large number of cases. The Government trust that these defects will be remedied quickly in the light of past experience.

17. *Audit Report*.—The Director of Agriculture is requested to instruct his officers to scrutinize the audit reports thoroughly and take prompt action to clear all audit objections expeditiously and suitable action against those persons responsible for avoidable delays. He is also requested to mention in his future reports the total number of audit objections received during the year, the number disposed of, and the action taken against those responsible for avoidable delays. The non-clearance of audit objections promptly by the Director of Agriculture has been frequently the subject of correspondence by the Accountant-General with the Government. The state of affairs in this respect should therefore improve and if the impediments are lack of response by the Treasury Officers, they should be quickly brought to the notice of the Accountant-General and the Government. The internal audit and audit by the Chief Auditor of State Trading Schemes should also be prompt and effective. The Government cannot afford to allow neglect of the accounts and audit side of the working of the Department whose activities and spending and receipts have considerably increased in recent years.

18. *Preparation of the Report*.—The chapter on special problems and programme of work in each district is sketchy. The Director of Agriculture is requested to see that in future this chapter really furnishes information regarding the peculiar problems, if any, with which were tackled in each district and what the important special items of work turned out in each district were.

Information regarding the work done on vegetables is found scattered in the report in more than one place. The Director of Agriculture is requested to consolidate this information and bring it under the broad heading "Horticulture" in future reports.

19. *Conclusion*.—The work of the Department during 1954-1955 was on the whole satisfactory. Some of the measures of reorganization taken during the year under report are bound to improve the tone of work of the Department. One of them is the re-organization of the field set up of the Department. In order to avoid overlapping of functions of the normal staff of the Agriculture Department and the special staff in the areas covered by the Community Projects and National Extension Service schemes the field set up of the Department was re-organized with effect from 1st December 1954. The normal staff of the Department employed in or having jurisdiction over the areas covered by the Community Projects and National Extension Service. Schemes was withdrawn and only the special staff of Extension Officers in Agriculture,

etc., were retained in these areas and made responsible for the entire work of the Agricultural Department in the areas within their jurisdiction. The jurisdiction of the Agricultural Demonstrators in the other areas was fixed at 3 firkas each for 91 of them 2 firkas each for 84 of them and one firka each for 2 of them. Seventy-five additional agricultural depots were opened in order that each Agricultural Demonstrator may have a depot. Thus the re-organization has led to an appreciable decrease in the area of jurisdiction of each Agricultural Demonstrator and an increase in the number of Agricultural Depots catering to the needs of the agriculturists with the result that they are now getting better service from the Department.

Another measure of re-organization implemented during the year under report was the centralization of the offices of the Heads of Research Sections at the Agricultural College and Research Institute with effect from 13th April 1955 with a view to relieve them of the work of office, management, maintenance of accounts, stores, etc., and thereby enable them to devote greater attention to their legitimate work of carrying on research. The control of distribution of Ammonium Sulphate fertilizer has been transferred to the Collectors. This should give considerable relief to the District officers and field staff to carry on extension work rigorously.

The restriction of the expansion of the agricultural Engineering branch and the elimination of unessential work like distribution of pipes should enable the branch being run more efficiently and with better control.

The Department should consolidate its work in the last year of the first Five Year Plan which is now running and make efficient arrangements to start the much enlarged Second Five Year Plan. In an expanding economy agriculture will not only be expected to maintain its own development but also sustain the other sectors. Its operational efficiency should therefore be maintained at the highest level possible.

(By order of the Governor)

T. K. SANKARAVADIVELU,
Secretary to Government.

Forwarded to the

Public Works Department
(Secretariat)

(By order)

R. Vasudha
Superintendent.

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ADMINISTRATION REPORT OF THE AGRICULTURAL DEPARTMENT FOR THE YEAR 1954-55.

I. ADMINISTRATION.

1. Sri M. S. Sivaraman, I.C.S., continued as Director of Agriculture throughout the period under report. The following Headquarters Deputy Directors of Agriculture also continued throughout the period under report :—

(1) Sri S. N. Venkataramana Iyer, Headquarters Deputy Director of Agriculture (Inspection and General).

(2) Dr. K. C. Naik, Headquarters Deputy Director of Agriculture (Research).

(3) Sri B. M. Lakshmipathi, Headquarters Deputy Director of Agriculture (Engineering).

Sri W. G. Janakiraman was Personal Assistant to the Director of Agriculture, throughout the year.

2. The cadre strength in the Madras Agricultural Service increased from 63 to 68.

3. The following officers were on other duty under other departments :—

(1) Sri P. S. Narayanaswami, Assistant Entomologist, as Assistant Entomologist (Civil Supplies) from 15th July 1954.

(2) Sri Md. Basheer, Assistant Entomologist, as Assistant Entomologist (Civil Supplies) from 13th July 1954 to 9th January 1955.

(3) Sri U. B. Md. Abbas, District Agricultural Officer, as Special Officer for Rice, Visakhapatnam from 19th October 1953 to 28th September 1954.

4. The following officers were on deputation under the Government of India :—

(1) Sri P. S. Krishnamurthy, Assistant Entomologist, as Assistant Director (Storage), Madras, from 16th October 1952.

(2) Sri V. Marghabandu, Assistant Entomologist, as Assistant Director (Storage), Madras, from 6th August 1946.

(3) Dr. G. S. Siddappa, Bio-Chemist as Senior Scientific Officer, Government Food Technological Institute, Mysore, from 8th December 1950.

(4) Sri K. V. Srinivasan, Assistant Mycologist as Mycologist, Sugarcane Breeding Institute, Coimbatore, from 1st December 1953.

(5) Sri J. P. Walter Devasahayam, Assistant Agricultural Engineer (Mechanical), as Assistant Executive Engineer (Electrical and Mechanical) in the Ministry of Defence, from 18th June 1954.

(6) Sri G. K. Chidambaram, Assistant Agricultural Chemist as Regional Officer, Fertilizer Demonstration Scheme, Coimbatore, from 26th June 1954.

(7) Sri N. C. Thirumalacharya, District Agricultural Officer, as Regional Campaign Officer (Japanese Method of Paddy Cultivation), Madras, from 21st July 1954 to 28th February 1955.

(8) Sri R. G. Menon, Assistant Agricultural Engineer (Research), as Agricultural Engineer, Indian Institute of Sugarcane Research Bhaduk, Lucknow, from 15th November 1954.

(9) Sri S. Sundaram, Assistant Cotton Specialist, as Officer on Special duty for the development of coffee industry at Bangalore in the Ministry of Commerce and Industry, from 13th November 1954.

(10) Sri K. R. Nagarajan, Assistant Entomologist as Technical Officer under Regional Director (Food), Southern Region, Madras, from 30th September 1954.

(11) Sri C. Raman Moosad, Assistant Marketing Officer as Assistant Director (Movements) under the Government of India, Vijayawada, from 2nd September 1954.

(12) Dr. P. Abraham, Plant Physiologist, as Special Officer (Spices) (Indian Council of Agricultural Research) at Ernakulam, from 16th February 1955.

(13) Sri P. P. Syed Muhammad, District Agricultural Officer, as Agricultural Officer, Pondicherry Administration, from 15th February 1955.

(14) Sri C. S. Balasubramaniam, Assistant Entomologist as Assistant Director (Storage), Nagpur, from 25th December 1954.

(15) Sri S. Narayanaswami, Assistant Agricultural Engineer, as Assistant Soil Conservation Officer (Engineering) under the Government of India, Ministry of Food and Agriculture (Agriculture), from 10th March 1955.

5. *Officers who were on Foreign Service.*—(1) Sri K. Kunhikannan Nambiar, Superintendent, Agricultural Research Station, as Secretary, Indian Central Arecanut Committee, Kozhikode, from 25th October 1949.

(2) Sri E. J. Varghese, Assistant Agricultural Chemist as Analytical Chemist, Central Coconut Research Station, Kasaragod, from 21st August 1951.

(3) Dr. S. Krishnamurthy, Curator, Government Botanical Gardens, Ootacamund, as Professor and Head of the Department of Agriculture, Annamalai University, from 26th July 1951.

(4) Sri K. Sivasankara Menon, District Agricultural Officer, as Secretary, Malabar District Market Committee, from 4th May 1952.

(5) Sri K. V. Natesa Iyer, District Agricultural Officer, as Secretary, South Arcot District Market Committee, from 17th January 1954.

(6) Sri K. Tejappa Shetty, District Agricultural Officer, as Secretary, South Kanara District Market Committee, from 1st June 1953.

(7) Sri S. Sampath, Cytogeneticist as Cytogeneticist at the Central Rice Research Institute, Cuttack, from 28th January 1953.

(8) Sri M. M. Krishna Marar, Assistant Oilseeds Specialist on other duty under Central Coconut Research Station, Kasargod.

(9) Sri S. V. Doraiswami Iyer, Lecturer in Agricultural Economics as officer on special duty for economics survey in Coimbatore and Salem districts under the University of Madras, from 16th June 1954 to 15th June 1955.

(10) Sri K. Narayanan Nair, Assistant Marketing Officer, as Secretary, Coimbatore Market Committee, Tiruppur, from 7th April 1955.

6. *Officers on deputation under Andhra and Mysore Government.*—(1) Sri S. E. Anantharaman, Assistant Agricultural Engineer (Mechanical), as Assistant Agricultural Engineer, Headquarters, Director of Agriculture and Fisheries, Andhra State, Madras, from 1st October 1953.

(2) Sri P. K. Radhakanth, Assistant Agricultural Engineer (Mechanical) as Assistant Agricultural Engineer (Inspection), Cuddapah, from 1st October 1953 to 11th April 1955.

(3) Sri S. Rajarathnam Chetty, District Agricultural Officer as Agronomist, Agricultural Research Station, Siruguppa (Mysore State), from 1st October 1953.

7. *New posts sanctioned.*—(1) Additional District Agricultural Officers (Intensive Manuring Scheme) at Tanjore, Pattukkottai, Tiruchirappalli and Madurai.

(2) Sugarcane Specialist, Palur.

(3) Assistant Fruit Specialist (Vegetables), Coimbatore.

(4) Cytogeneticist (Groundnut Scheme), Coimbatore.

(5) Oilseeds Development Officer, Coimbatore.

(6) Administrative Officer, Agricultural College and Research Institute, Coimbatore.

(7) Assistant Agricultural Engineer (Indigenous Implements Survey), Coimbatore.

(8) Assistant Paddy Specialist (Scheme for drought resistant strains in Paddy), Coimbatore.

(9) Pepper Development Officer, Cannanore.

(10) Assistant Mycologist (Foot Rot of Rice), Coimbatore.

(11) Assistant Entomologist (Stem borer Scheme).

(12) Compost Development Officer under the control of Inspector of Local Boards and Municipal Councils.

8. *Posts abolished and kept in abeyance.*—(1) Sugarcane Agronomist, Gudiyattam, abolished on 16th April 1955.

(2) Superintendent, Sugarcane Liaison Farm, Nellikuppam, abolished on 31st May 1955 afternoon.

(3) Principal, Gramasevaks Training Centre (Basic), Bhavanisagar, kept in abeyance.

(4) Assistant Oilseeds Specialist (Nucleus Seed Farm Scheme), Coimbatore, kept in abeyance.

9. *Change of headquarters of certain posts.*—(1) District Agricultural Officer, Shoranur, to Kozhikode.

(2) Special District Agricultural Officer (Crop Sampling), Shoranur, to Kozhikode.

(3) Agronomist, Agricultural Research Station, Satyamangalam, to Bhavanisagar (post converted into Superintendent, Agricultural Research Station).

(4) Assistant Agricultural Chemist, Tanjore, to Coimbatore.

10. *Posts made permanent during the year.*—(1) Accounts Officer, Director of Agriculture's Office, Madras.

(2) Headquarters Deputy Director of Agriculture (Inspection and General).

II. INSPECTION AND AUDIT.

1. The Director of Agriculture inspected the following Agricultural Research Stations :—

(1) Aduthurai. *

(2) Pattukkottai.

(3) Koilpatti.

(4) Ambasamudram.

(5) Paramakudi. *

(6) Gudiyattam.

(7) Ambalavayal.

(8) Pattambi.

* Visited more than once.

- (9) Bhavanisagar.
- (10) Breeding Stations at Coimbatore.*
- (11) Mangalore.
- (12) Kallar and Burliar Fruit Stations.
- (13) Nanjanad.
- (14) Sims' Park, Coonoor.*
- (15) Pomological Station, Coonoor.*
- (16) Model Orchard, Periakulam.
- (17) Demonstration Farm, Satyamangalam.
- (18) Regional Millet Station, Tirupattur.
- (19) Coconut Nursery at Tikkoti, Badagara.
- (20) Model Orchard-cum-Nursery, Coonoor.

The Director of Agriculture also inspected the Ergot Scheme at Ootacamund and Bhavanisagar.

The offices of the Principal, Agricultural College and Research Institute, Administrative Officer, Agricultural College and Research Institute, Research Engineer's workshops and Tractor workshops, Coimbatore, were also inspected by the Director of Agriculture.

2. List of stations and centres inspected by the Headquarters Deputy Director of Agriculture (Research) :—

- (1) Chemistry Section, Coimbatore.
- (2) Cotton Section, Coimbatore.
- (3) Agronomy Section, Coimbatore.
- (4) Agricultural Meteorology Section, Coimbatore.
- (5) Rice Research Station, Ambasamudram.
- (6) Agricultural Research Station, Koilpatti.
- (7) Karunganni Cotton Scheme, Koilpatti.
- (8) Agricultural Research Station, Taliparamba.
- (9) Pepper Research Station, Panniyur.
- (10) Botany Section, Coimbatore.
- (11) Plant Physiology Section, Coimbatore.
- (12) Cytogenetics Section, Coimbatore.
- (13) Mycology Section, Coimbatore.
- (14) Agricultural Research Station, Pilicode.
- (15) Agricultural Research Station, Nileshtar II.
- (16) Agricultural Research Station, Nileshtar III.
- (17) Coconut Nursery, Nileshtar.
- (18) Arecanut Research Station, Vittal.
- (19) Model Orchard-cum-Nursery, Mangalore.
- (20) Paddy Breeding Station, Mangalore.
- (21) Tuber Scheme, Mangalore.
- (22) Cashewnut Research Station, Ullal.
- (23) Rice Research Station, Tirurkuppam.
- (24) Paddy Section, Coimbatore.
- (25) Research Engineering Section, Coimbatore.
- (26) Sugarcane Research Station, Gudiyattam.
- (27) Model Orchard-cum-Nursery, Periakulam.
- (28) Cotton work, Periakulam.
- (29) Cotton trials, Tiruchengode.
- (30) Model Orchard-cum-Nursery, Thimmapuram.

* Visited more than once.

- (31) Zonal Nucleus Seed Farm (Groundnut), Salem.
- (32) Regional Millet Station, Tirupattur.
- (33) Sugarcane Liaison Farm, Kulitalai.
- (34) Regional Millet Station, Ariyalur.
- (35) Agricultural Research Station, Pattukottai.
- (36) Coconut Nursery, Pattukottai.
- (37) Agricultural Research Station, Ambalavayal, Wynaad.
- (38) Ginger Scheme, Wynaad.
- (39) Pomological Station, Coonoor.

3. The following offices were inspected by the Headquarters Deputy Director of Agriculture (Inspection) :—

- (1) Deputy Director of Agriculture, Coimbatore.
- (2) Paddy Specialist, Coimbatore.
- (3) Cotton Extension Officer, Coimbatore.
- (4) Oilseeds Specialist, Coimbatore.
- (5) Deputy Director of Agriculture, Vellore.
- (6) Seed Development Officer, Vellore.
- (7) Sugarcane Agronomist, Gudiyattam.
- (8) State Marketing Officer, Madras.
- (9) Government Entomologist, Coimbatore.
- (10) Government Mycologist, Coimbatore.
- (11) Horticulturist and Professor of Horticulture, Coimbatore.
- (12) Crop and Plant Protection Officer (Entomology), Coimbatore.
- (13) Crop and Plant Protection Officer (Mycology), Coimbatore.
- (14) Millet and Pulses Specialist, Coimbatore.
- (15) Agronomist and Professor of Agriculture, Coimbatore.
- (16) Seed Development Officer (Millets), Coimbatore.
- (17) Systematic Botanist and Professor of Botany, Coimbatore.
- (18) Government Agricultural Chemist, Coimbatore.
- (19) Banana Research Station, Aduthurai.
- (20) Cotton Specialist, Coimbatore.

4. The Headquarters Deputy Director of Agriculture (Engineering) inspected the offices of the Assistant Agricultural Engineer, Tractor workshop, Coimbatore, Assistant Agricultural Engineer, Research, Coimbatore, and Assistant Agricultural Engineer, Central Agricultural Engineering Stores, Saidapet.

5. Regional Deputy Directors of Agriculture.—The Regional Deputy Directors of Agriculture inspected the offices of the District Agricultural Officers and the Agricultural Demonstrators.

The following are the particulars of inspections made :—

Deputy Director of Agriculture.					Number of offices required to be inspected.	Number actually inspected.	Remarks.
Tanjore	..	..	..	..	10	10	Satisfactory.
Vellore	..	..	..	..	7	3	*
Madurai	..	..	..	..	10	10	†
Coimbatore	..	..	..	..	15	15	‡

REMARKS.—

* The inspection of the other offices will be taken up in the second half year.

† Satisfactory; adequate touring.

‡ Touring adequate; minor defects noticed during inspection are being rectified.

6. *Heads of Research Sections.*—The following are the details of inspection done by the Heads of Research Sections:—

Sections.	Number of offices required to be inspected.	Number actually inspected.
Government Agricultural Chemist	3	3
Government Mycologist	2	2
Cotton Specialist	3	3
Paddy Specialist	3	3
Millets and Pulses Specialist	3	3
Oilseeds Specialist	9	8
Horticulturist and Professor of Horticulture	3	3

The work in the offices was found in general to be satisfactory.

7. *Audit and inspection by the Internal Audit Parties.*—The four Internal Audit Parties each consisting of one Auditor and two upper division clerks continued throughout the year and conducted internal audit of accounts of the offices in the State.

During the fasli year 1954-55, the audit and inspection of the following offices and institutions were completed:—

Agricultural Research Stations, including Coconut Nursery Schemes and Sugarcane Liaison Farms.	29
Offices of the Deputy Director of Agriculture	2
Offices of the District Agricultural Officer, including Engineering.	19
Offices of the Special District Agricultural Officers (Crop Sampling).	3
Offices of Seed Development Officers	2
Office of the Assistant Marketing Officer	1
Offices of the Assistant Agricultural Engineers	8
Offices of the Assistant Cotton Specialists	4
Offices of heads of sections and the heads of offices	41
Agricultural Depots (including sub-depots)	108
Total ..	217

III. AGRICULTURAL EDUCATION.

(a) *Agricultural College, Coimbatore—B.Sc. (Ag.) Degree Course.*—The second and final year B.Sc. (Ag.) classes were in session from the beginning of the year under report. The regular classes for students of the First year B.Sc. (Ag.) selected by the Selection Committee commenced from 13th July 1955.

The total strength of the First year B.Sc. (Ag.) classes during the academic year 1954-55 under report was raised and fixed at 108 as against 96 in the previous years. Of these, two seats for the nominees of the Travancore-Cochin State, one seat for the nominee of the Government of Coorg, one seat

for a failed student of the first year of B.Sc. (Ag.) at the Agricultural College, Bapatla, were reserved. The total number of applications received during 1954-55 for admission to first year B.Sc. (Ag.) course at the Agricultural College, Coimbatore was 311 of which four were rejected. The distribution of 108 candidates admitted into the Agricultural College, Coimbatore, during the year 1954-55 was as detailed below:—

Candidates from Madras State selected by the Selection Committee:—

Madras	4
Chingleput	3
North Arcot	6
South Arcot	8
Tanjore	9
Tiruchirappalli	4
Salem	13
Coimbatore	17
Nilgiris	3
Mathurai	8
Ramanathapuram	6
Tirunelveli	7
Malabar	11
South Kanara	5
Total ..	104

Candidates nominated by the Travancore-Cochin State ..	2
Candidates nominated by the Government of Coorg ..	1
Total ..	3

Readmission of the failed student of the Agricultural College, Bapatla.	1
Total ..	108

The number of students on roll in each of the three classes of B.Sc. (Ag.) at the end of the academic year 1954-55 was as under:—

	Boys.	Girls.	Total.
First year B.Sc. (Ag.)	106*	1	107
Second year B.Sc. (Ag.)	88	1	89
Final year B.Sc. (Ag.)	80	2	82

* One student discontinued the studies due to ill health.

(b) *Post-graduate Diploma course in Horticulture.*—The post-graduate Diploma course in Horticulture of the academic year 1953-54 was in session during July 1953. The University Examination in respect of the above batch of trainees was conducted in July 1954. Out of 25 candidates who sat for the examination, twenty-four candidates came out successful. The percentage of pass works out to 96 per cent.

There was no course during the year 1954-55.

(c) *Short Course.*—The short course in Agriculture and allied subjects could not be run during the year due to the increased admissions to B.Sc. (Ag.) and want of sufficient accommodation in the hostel during the year.

(d) *Refresher course in Agriculture for young farmers.*—Government sanctioned in their G.O. Ms. No. 1918, Agriculture, dated 10th June 1954, the second year “ Refresher course in Agriculture for young farmers ” for a period of six months in order to give an all round practical training in Agriculture and allied subjects to the farmers within the age group of 17 to 25. Twenty-six trainees underwent the course in the regional language at the Central Farm, Coimbatore, for a period of six months commencing from 16th July 1954 under an Agricultural Instructor appointed for this purpose. During the period of the course, the trainees were taken on tour to the Agricultural Research Stations, Koilpatti, Aduthurai and Palur as also the Poultry Farm at Katpadi and Cattle Farm at Palayakottai in order to give the trainees an opportunity of studying the regional and the practical aspects of improved farming methods. The trainees secured the full benefit of the training.

(e) *Students' tour.*—The students of B.Sc. (Ag.) were taken on short and long tours to study the Agricultural practices in vogue in different centres within the State as well as outside the State. During the year, the second year B.Sc. (Ag.) students went on educational tour to the Botanical Gardens, Ootacamund, Agricultural Research Station, Nanjanad, Pomological Station, Coonoor, and Fruit Research Station, Kallar in Nilgiris and Coimbatore districts and again on long tour to Dindigul, Madurai, Ambadurai, Mettupalayam and to Agricultural Research Stations, Koilpatti, Aduthurai and Tindivanam. The final year B.Sc. (Ag.) students were taken on tour to Sugar Factory, Mandya, Fertilizer Factory, Ballagula, Indian Dairy Institute, Bangalore, Military Dairy Farm at Bangalore, Livestock Research Station, Hosur, Poultry Farm and Milk Supply Union at Madras as well as to the cattle farm at Palayakottai and to Cotton Market and Ghee Grading centres at Tiruppur. Besides the above, the students were also taken on visits to the neighbouring villages for rural enquiry.

(f) All the candidates were sent up for the University Examinations as their performances were satisfactory. The University Examinations for the First year B.Sc. (Ag.) under New Regulations were conducted in October 1954 (Supplementary) and in the third week of March 1955 whereas the Examination of the second B.Sc. (Ag.) under New and Old Regulations and the Final examination of B.Sc. (Ag.) under Old Regulations were held in January and April 1955 respectively.

Details of the results of the University examinations for the three classes of B.Sc. (Ag.) are furnished below :—

Examination.	Number of candidates registered for the examination and appeared.	Number of successful candidates.	Percentage of pass.
First Examination of B.Sc. (Ag.) under New Regulations,	128 *	89	70
Second Examination of B.Sc. (Ag.) under New Regulations,	88	53	60
Second Examination of B.Sc. (Ag.) under Old Regulations,	22	22	100
Final Examination of B.Sc. (Ag.) under Old Regulations.	97	88	91

* Includes candidates who sat for both the examinations held in October 1954 and March 1955.

(g) *College Board.*—The Board met ten times and discussed the results of College Terminal Examinations, holidays, proposals connected with the short and long tours, syllabus, laboratory facilities and other subjects connected with education. The recommendations of the Board regarding the intensive practical farm training in Agriculture for a period of six months were adopted by the University and Government.

(h) *Revised Regulations.*—The second batch of students in respect of the first year B.Sc. (Ag.) as well as the first batch of the students of second year B.Sc. (Ag.) took the examinations under revised Regulations in the months of March and January 1955. The supplementary examination for the first year B.Sc. (Ag.) was also conducted in October 1954.

(i) *College Hostel.*—The Hostel remained under the control of the Principal as ex-Officio Warden assisted by a Gazetted Officer as Senior Deputy Warden and a Non-Gazetted Officer as Junior Deputy Warden.

Under the direction of the Principal as ex-Officio Warden, a committee of Hostel Representatives was formed to consider and decide on the efficient running of the Hostel and attached messes, with effect from November 1954. Six periodical meetings were held under the Presidentship of the Principal and suggestions to improve the management and running of the messes were made. The actual running of the messes continued to be under the management of the elected student representatives.

Under the Revised new regulations for the B.Sc. (Ag.) the Hostel remained in sessions almost throughout the year without a break.

During the year three messes were run for a major portion of the period (one vegetarian and two non-vegetarian section) to cater to the needs of the inmates. The average strength in each mess and the average daily rate of each mess are furnished below :—

Name of the mess.	Average attendance.	Average daily rate.
		RS. A. P.
Vegetarian mess	96	1 4 6
Non-Vegetarian A	72	1 7 6
Non-Vegetarian B	52	1 4 9

The College Students' canteen catered to the needs of the students in the supply of stationery and other consumers goods.

The tree planting around the Hostel living rooms and vacant places was done in connexion with the celebration of the Vanamahotsavam Week.

The general health of the inmates remained normal except for some stray cases of mumps. The infected cases were segregated in time to avoid spread of infection.

The usual medical examination of all the students at the College (resident and non-resident) was conducted by the Medical Officer of the Hostel.

The annual Hostel Day was celebrated on the 13th March 1955 under the presidentship of the Collector of Coimbatore.

All possible efforts are taken to bring down the mess rates as low as possible. With this object in view a purchase committee was constituted for reviewing mess rates and selecting lowest tender in purchase of grocery articles.

(j) *Students' Club*.—All the students of the College including the young farmers were members of the club. The new regulations of the University affected to a great extent the club activities. In spite of it, the students brought credit to the college in various items. Two issues of *Tatler* were brought out during the year and the third annual number is a great success. The College team won a number of prizes in the inter-collegiate competitions. Since the University Examinations synchronized with the inter-collegiate dramatic competitions the college was not able to participate. For the same reason the college was forced to withdraw in the zone finals of the University inter-collegiate Football tournament. In the Hockey, the college won the Coimbatore inter-collegiate championship; in sports, the second year students could not participate due to the examinations but still the college occupied second place in the Coimbatore Inter-Collegiate Athletic Association meet. The first year students who alone participated in the Government Arts College Tennis Tournaments did creditably well for a single class. Our photographers made notable contributions to the two issues of *Tatler*. Our Social Service League ran a night school and did very good service in the neighbouring villages. The Volunteer Corps did commendable service during all the major celebrations in the College. The Club Day had to be held earlier than usual due to the departure of the second year students. It was presided over by Sri Nallasenapathi Sarkarai Mandradiar, M.L.C., Pattagar of Palayakottai, President, Coimbatore District Board.

(k) *Visitors*.—The following are the important visitors who evinced great interest in the work of the Agricultural College and Research Institute and the activities of the Madras Agricultural Department :—

- (1) Mr. Sanniny, Inspector-General for Agriculture, Iran.
- (2) Mr. Kenneth Farmer, American Farm Boy.
- (3) District Veterinary Officer, Coimbatore (Hon. Visitor).
- (4) Deputy Registrar of Co-operative Societies, Coimbatore.

(Honorary Visitors.)

- | | |
|--|---|
| (5) Dr. K. L. Shirmali | } Members of International Committee on Rural Higher Education. |
| (6) Dr. L. H. Foster | |
| (7) Sri J. C. Mathur | |
| (8) Mr. L. K. Elmhirst | |
| (9) District Collector, Coimbatore (Honorary Visitor). | |
| (10) Dr. S. C. Harland, sc. D., F.R.S. | |
| (11) Sri Syed Ibrahim Abee Syed, Trainee from Egypt. | |
| (12) The Chief Minister for Sourashtra. | |
| (13) Dr. Panse, Statistical Adviser, Indian Council of Agricultural Research, New Delhi. | |
| (14) Sri N. M. Lalasu, Dar-es-Salaan, British East Africa. | |
| (15) Sri V. T. Krishnamachari, Vice-Chairman, Planning Commission. | |
| (16) Sri S. V. Ramamurthy, Adviser to the Vice-Chairman, Planning Commission. | |
| (17) Sri Gagotham Reddy, Member from Hyderabad for Planning Commission. | |
| (18) Mr. John K. Sewall, Audio-Visual Education Officer, Technical Co-operation Mission to India, American Embassy, New Delhi. | |
| (19) Sri G. V. Ramaswamy Naidu, Honorary Visitor. | |
| (20) Sri V. Subbiah Gounder, Honorary Visitor. | |
| (21) Sri M. S. Palaniappa Mudaliar, Honorary Visitor. | |
| (22) Mr. J. H. Buzacott, Senior Plant Breeder, Queensland. | |

- (23) Two Yugoslavean Experts.
- (24) Sri E. A. R. Banerji, M.Sc. (Cal.), DIP. AGRI. (Cantab.), J.D.A., West Bengal.
- (25) Drs. Richard Bradfield and R. F. Chandler, Directors of Agriculture, Rock Feller Foundation, New York.
- (26) Sri J. F. Alex } Department of Agriculture, University of
- (27) Sri R. P. Appadurai } Ceylon, Peradeniya.
- (28) Sri N. S. Arunachalam, I.C.S., Secretary, Agriculture Department, Government of Madras.

IV. SPECIAL FEATURES OF THE YEAR.

1. *Centralization of offices of Research Sections*.—In G.O. Ms. No. 356, Agriculture, dated 8th February 1955, Government sanctioned a scheme for the centralization of offices of Research Sections of the Agricultural College and Research Institute in order to give relief to the heads of sections in management, maintenance of accounts, stores, etc., and to enable them to bestow greater attention to the technical side of the work. The orders were implemented from April 1955.

A Central Office under the charge of an Administrative Officer, with staff, commenced to function with effect from 13th April 1955.

2. *Reorganization of District Staff*.—In G.O. No. 3330, Agriculture, dated 12th November 1954, the Government ordered the reorganization of the set up of the District staff excluding the special areas and Tanjore district, revising the jurisdiction of the Agricultural Demonstrators. The object of the reorganization orders was to avoid overlapping of the functions of the normal staff of the Agricultural department and the special staff working in areas covered by Community Projects and National Extension Service Schemes. The reorganization was given effect to from 1st December 1954 with two to three firkas for each demonstrator, for more intensive work.

3. *Agricultural Research Station, Bhavanisagar*, was started on 9th February 1955 forenoon, although regular work commenced on 1st March 1955. From 9th February 1955, the Satyamangalam farm worked as a demonstration farm.

An area of 414.42 acres was taken over and reclamation work was started.

Three Subdivisional Officers' quarters were occupied as detailed below :—

- (1) Superintendent's office.
- (2) Farm Office.
- (3) Stores.

But the buildings are allotted only on a temporary basis and whenever the necessity for the Government officers' quarters arises, these will be taken back. The staff have been duly provided with necessary quarters for residence.

A programme of work has been drawn up and approved by the Research Council.

4. *Modified better (Japanese) method of cultivation*.—The campaign for propagating the Japanese method of rice cultivation was started in the year 1953. It was found that the method circulated by the Government of India contained practices not suitable to Madras and therefore, the method was modified to suit the conditions of the State, based on the research and experience of over 40 years in this State. This modified method is very popular in

all the 17 Agricultural districts of this State. The area actually under the modified method of cultivation under paddy during 1954-55 was 493,377 acres and this is the highest for all States in India. The average increased yield per acre in the treatment plots ranged from 400 to 800 lb.

During 1954-55, 30,000 copies of Tamil, 6,000 copies in each of Malayalam and Kannada leaflets on this method were printed and distributed to the ryots.

This modified method is proposed to be extended to cotton, millets and sugarcane in 1955-56. The targets fixed for these crops are as follows, with a million acres for paddy :—

	ACS.
Paddy	100,000
Cotton	30,000
Millets	10,000
Sugarcane	10,000

5. Special drive was continued for large scale planting of *Prosopis juliflora*. A large quantity of seeds was procured for supply to ryots for fencing and for growing in waste lands. Road margins and sides of railway lines were specially tackled in co-operation with other departments.

The following are the details of achievement in 1954-55 :—

- (1) Quantity of seeds distributed to ryots—

Seeds	23,614 lb.
Pods	4,151 „
- (2) Quantity of seeds distributed to other—

Seeds	4,084 „
Pods	557 „
- (3) Mileage covered along road sides and along railway lines. 15,798 miles.
- (4) Area covered as fencing or paddock .. 26,804 acres.

6. *Reduction in expenditure and increase in income.*—The drive to reduce the expenditure and increase the revenue of the Agricultural Research Stations was continued and favourable results achieved. The expenditure was reduced from 5.95 lakhs to Rs. 5.77 and the income increased from Rs. 5.19 lakhs to Rs. 5.34 lakhs making a total saving of Rs. 33,480.

7. The Agricultural week was celebrated during Pongal.

V. SEASON.

South-west monsoon period.—Rains in the south-west monsoon period of June to September 1954 were plenty in the West Coast and decidedly above normal elsewhere except in the hills and in the districts of Tirunelveli, Coimbatore and Ramanathapuram. Even in Ramanathapuram rains were nearly normal.

North-east monsoon period.—Barring the solitary exception of Coimbatore district the north-east monsoon was practically a failure throughout the State. The three months of October, November and December form the north-east monsoon period. The performance of the monsoon was very bad in the districts of Madurai-Ramanathapuram, South Malabar and South Kanara. The rainfed crops depending solely on the north-east monsoon rains really received a set back.

Dry weather period (January and February 1955).—The rains in the first two months of the year were nearly normal throughout the State.

Hot weather period (March, April and May 1955).—In March rains were slightly below normal. In April the deficiency was made good considerably. In May heavy rains were received throughout, particularly in the West Coast. Agriculturally these rains were of immense good to the garden land crops and further they appreciably improved water position in the wells and tanks.

Commencement of the south-west monsoon in 1935.—The onset and development of the monsoon along the West Coast is satisfactory. In certain interior districts of the Tamilnad the onset of the monsoon is rather delayed.

Conclusion.—In 1954 the rains were very unevenly distributed in both the monsoons. Crops had heavy infestation of pests and diseases due to inadequate rains. The first six months in 1955 happen to be fairly favourable for agriculture.

Crops were damaged by gales in certain taluks of Coimbatore and South Kanara districts. Loss due to floods was also had in the districts of South Arcot, North Malabar and the Pattukkottai division of the Tanjore district.

In conclusion, it may be said that the fasli year 1954-55 was not so favourable as the previous fasli year 1953-54 so far as crop production is concerned. But the production and area of rice were more or less the same as last year being 3.1 million tons and 6.4 million acres respectively in the final forecast.

VI. FIVE-YEAR PLAN.

INTENSIVE CULTIVATION SCHEMES.

The year under report is the fourth year of operation of the Intensive cultivation schemes under the Five-Year National Plan.

The following schemes were continued :—

I. Land Development Schemes—

- (a) Reclamation of waste lands and old fallow with tractors.
- (b) Soil conservation.

II. Irrigation Schemes—

- (a) Oil engines and electric motors on hire and on hire-purchase.
- (b) River Pumping Schemes.
- (c) Filter point tube wells.

III. Distribution of manures—

- (a) Rural compost.
- (b) Urban compost.
- (c) Green manures.

IV. Distribution of improved seeds—

- (a) Paddy.
- (b) Millets.
- (c) Pulses.

V. Control of pests and diseases of crops.

The control, direction and distribution of chemical fertilizers are now with the Board of Revenue.

I. Land Development Schemes—(a) Reclamation of waste lands with tractors.—Reclamation of waste lands and old fallows to increase the area under cultivation at a moderate cost and with speed, is done with tractors and

bulldozers. The tractors were also used for ploughing regularly and for puddling operations in wet lands. Bulldozers were used not only for clearing and levelling virgin waste lands but also for restoring sand-cast areas and silted tanks. Tractors and bulldozers are now used in Soil Conservation work in Nilgiris also. There were 85 tractors with bulldozers and another 73 without bulldozers in the Residuary State and an area of 21,182 acres tackled leading to a production of 2,092 tons of foodgrains.

To enable enterprising and progressive agriculturists to own their tractors for cultivation the scheme of hire purchase system was also continued to operate. Thirty-eight tractors with matched implements were supplied under the scheme. They were put to good use and it is estimated that 15,200 acres have been tackled by these.

(b) *Soil Conservation*.—Full details regarding the soil conservation measures adopted by the department during the year are furnished separately under the heading "Soil Conservation".

II. *Irrigation Schemes*.—(a) *Oil engines and Electric Motors for Hire and Hire-Purchase System*.—As there was great scope for power lift irrigation the department was stocking power pumping sets for hire especially to small agriculturists. The department had 440 sets available for hiring of which 366 were in working order. Sixteen oil engines were purchased for hiring on 28th June 1955. There was heavy demand for oil engine pumpsets.

To help poor and deserving ryots to have their own power pumping sets the scheme of supply of oil engine and electric motor pumpsets on hire purchase system was continued and the following units were acquired under the scheme :—

Oil engines—156.

Electric motors—69.

The scheme commanded a wide response and is making steady progress.

(b) *River Pumping Schemes*.—The object of the scheme is to provide irrigation facilities through big pumping units to a group of ryots in a suitable village by lifting water from rivers, for areas which cannot be irrigated by gravity flow. Details of the scheme are given under Agricultural Engineering.

(c) *Filter point tube well scheme*.—The scheme for sinking filter point tube wells was continued. Against a target of 600, filter points 895 were installed. About 8,950 acres are expected to be covered by irrigation by these filter points and an addition yield of 4,475 tons may be estimated. The work was beneficial to ryots for raising short crops in summer and ascelition (crops) as supply of water was made available throughout the year.

More details on these engineering schemes are furnished in section on Agricultural Engineering.

III. *Distribution of Chemical Fertilizers*.—From April 1954 onwards, the direction, control and supervision over the distribution of ammonium sulphate has been transferred from this department, to the Board of Revenue (Food Production) and Collectors in the districts. The District Co-operative Wholesale Stores in each district, acting as stock holders for the Government will receive, stock and sell the stock to the retail distributors. There are four retail distributors in each taluk, out of which one is a co-operative institution. Each distributor has to open 3 or 5 depots in his taluk for sale of ammonium sulphate to consumers. This department does not receive any

stock. The stock which remained on 1st April 1954 has been almost sold away by this department, to the ryots. Seventy-nine thousand three hundred and six tons were distributed through arrangements made by the Board of Revenue against a target of 88,820 tons.

(1) *Intensive Manuring Scheme, 1954*.—In the order Ms. No. 132, Agriculture (Food Production), dated 21st April 1954, the Government have sanctioned the continuance of the Intensive Manuring Scheme for the year 1954-55 also. The scheme was in operation for a continuous period of six months within the period from 1st May 1954 to 31st December 1954 in all the districts except Nilgiris and Madras. The scheme was extended in the districts of Salem and Madurai till 31st January 1955. A sum of Rs. 70 lakhs was sanctioned by the Government for disbursement of loans to ryots in the shape of chemical fertilizer. Out of the above allotment only a sum of rupees 42,25,576 was distributed to ryots for the purchase of chemical manures. The entire allotment could not be utilized in full as sufficient stock of ammonium sulphate was not readily available during the manuring season. The quantity of ammonium sulphate to be issued was restricted to 80 lb. per acre till it was relaxed by Government on 28th October 1954. Since the inception of the scheme the special staff explained the value of application of chemical fertilizers to increase the yield of paddy and canvassed loan application for the purpose. The increase in rate of loan to Rs. 35 per acre and the increase of maximum loan per individual from Rs. 200 to Rs. 500 had the desired advantage of manuring the fields adequately giving more credit facilities to each ryot.

Since April 1954 the distribution of ammonium sulphate is being done by the co-operative societies and merchants selected by the Collector in the district. As the stocking and distribution of manures is being done by them, the procedure of issue loan order permits was adopted. The loan and permits were issued to Co-operative Societies and selected merchants on 50 : 50 basis.

Under the intensive manuring scheme a quantity of 14,050 tons 733½ lb. of chemical manures (both ammonium sulphate and super phosphate) was supplied to ryots for applying to the paddy crop. Against the above supply during 1954-55 an additional production of about 28,116 tons of paddy is expected in the Madras State. The total expenditure incurred in respect of the special staff appointed under the scheme is Rs. 1,04,425-4-0.

The continuation of credit facilities for some year to come especially in the case of ryots with small holdings will be one of the best ways of encouraging the use of chemical fertilizer for increased food production.

(2) *Agronomic trials with T.C.A. Fertilizers*.—Agronomic trials to test the performance of the chemical fertilizers sponsored by the Indian Agricultural and Research Institute, has been continued in 1954-55 also at Aduthurai and Mangalore Centres. The Government Agricultural Chemist is in charge of the work. The fertilizers are supplied by Indian Agricultural and Research Institute, free of cost.

(3) *Storage trial with T.C.A. Fertilizers*.—These trials sponsored by the Indian Agricultural and Research Institute, New Delhi with the object of studying the physical and chemical properties of some of the new type of chemical fertilizer received under T.C.A. programme, under different storage conditions was continued up to 31st August 1954. The scheme came to a close at both the centres of Madras and Coimbatore on 31st August 1954. The Government Agricultural Chemist was in charge of the scheme. The final

report has been sent by the Government Agricultural Chemist, Coimbatore, to the Indian Agricultural and Research Institute, New Delhi, for study. All the fertilizers left over on the expiry of the scheme have been handed over to this State free of cost.

(4) *Scheme for the survey of fertilizer practices in Coimbatore district.*—This scheme has been sponsored by the Indian Council of Agricultural Research, New Delhi, from Khariff 1954 in Coimbatore district. The District Agricultural Officer, Coimbatore, is in charge of scheme. The object is to collect the factual information on the distribution of manurial consumption between different crops grown in the tract, cultivator's practices, in regard to the quality and quantity of manure applied, source of manure applied, time and method of application, availability of manures, prices, cropping practices, quality and quantity sown, availability of irrigation facility, etc. The Indian Council of Agricultural Research has sanctioned to State Government a grant of Rs. 5,000 to conduct this survey in Coimbatore in 1954-55. The survey commenced in 20th September 1954 with three fieldmen employed under the scheme, under the supervision of the District Agricultural Officer, Coimbatore. The scheme came to a close on 19th June 1955 after the sanctioned period of nine months. The final report on the working of the scheme is awaited from the District Agricultural Officer, Coimbatore.

(5) *Scheme to test the efficacy of reinforcement of composts with phosphates.*—On orders from Government, it has been proposed to conduct trials at Agricultural Research Station, Aduthurai, during the samba crop, 1955, and at Agricultural Research Station, Pattambi, during the second crop, 1954-55, to test the efficacy of reinforcement of composts with phosphates especially in laterite soils where the problem of immobilization of soluble phosphatic fertilizers assumes considerable dimensions. The Government Agricultural Chemist has been put in charge of these trials at the two stations. The first progress report is due from him in September 1955. The financial implication is nil.

(6) *Fertilizer demonstration scheme.*—To demonstrate to the cultivators the utility of commercial fertilizers such as ammonium sulphate, super, urea, ammonium nitrate in increasing the crop production and thereby to encourage the extensive use of such fertilizers as also to collect data on the fertilizer requirement of different crops on different soil types, relative efficiencies, of different fertilizers effect of combination of nitrogen and phosphate, the Indian Council of Agricultural Research is supplying free of cost these fertilizers to this State for supply to ryots during 1954-55. The supply made during Khariff and Rabi thereon, 1954-55 :—

Season.	Ammonium sulphate.	Super.	Urea.	Ammonium sulphate nitrate.
	TONS.	TONS.	TONS.	TONS.
Khariff 1954 ..	94	110	54	..
Rabi 1954-55 ..	65	75	65	75

During the above two seasons, the District Agricultural Officer, Block Development Officers, Project Executive Officers and Principals of Gramasevaks Training Centres, conducted about 8,000 demonstration trials in ryots' fields with the above fertilizers. The transport charges on these fertilizers are met initially by State Government and finally recovered from Government of India. The trials are continued in 1955-56 and the Indian Council of Agricultural Research is now supplying fertilizers free of cost for 1955-56 trials. A Regional Officer has been appointed by the Indian Council of Agricultural Research, to supervise the technical aspect of the work of the scheme.

IV. (a) *Rural compost making from waste vegetable matter.*—Government in G.O. Ms. No. 186, Agriculture (Food Production), dated 10th June 1954, have ordered that the compost week should be celebrated along with the National Tree Planting Week (Vanamahotsava). Compost week was celebrated in all the districts of this State in the first week of July 1954, in co-operation with the officers of the Revenue, Agriculture and National Extension Service Department. Local Board servants, school teachers and prominent citizens and ryots took part in the celebrations. The importance of using compost in increasing production, was explained in the meeting which were held in different villages. Suitable demonstrations were conducted in all the villages to show the correct method of rural compost. Number of pits were dug and waste matter composted. Wide publicity was given regarding the award of certificates of merits to those who prepared the maximum compost in the respective taluks and the ryots were instructed to bestow more attention to achieve better results in the competitive manner and the celebration was great success in all the districts. The list of persons who were considered the prize winners for preparation of compost was submitted to Government in the Agriculture (Food Production) Department and the names of these persons were published in Grow More Food Journals.

No subsidy is granted for compost making from June 1952. The quantity of rural compost prepared during the period under report is 135,976 tons.

The area covered by compost manuring is 74,079 acres and additional food grain is 12,176 tons estimated to cost at about Rs. 36,00,000.

(b) *Urban compost.*—The Urban Compost Scheme continued to be in operation under the control of the Inspector of Municipal Councils and Local Boards.

(i) *Expansion of the compost work.*—All the municipalities except Fort Cochin continued to manufacture compost. Of 307 notified panchayats in the State 252 panchayats were doing the work. The Corporation of Madras and 80 non-notified panchayats were also manufacturing compost. Details of compost manufactured and disposed of are appended separately.

The target fixed for the State for 1954-55 was 300,600 tons, against which 251,093 tons were prepared and 208,430 tons were sold.

(ii) *Celebration of Compost Week and Vanamahotsava Week.*—The week was celebrated in almost all the municipalities and panchayats. Actual demonstration of urban composting was given in addition to lectures on utility of compost. The District Agricultural Staff also assisted the panchayats in this respect. The local bodies also planted 165,439 trees during 1954-55.

(iii) *Preparation of blood meal.*—Palayamkottai Municipality prepared blood meal as an experiment and produced 1,983 lb. at a cost of Rs. 525-5-6 and they have not been able to find a sale for it. The other slaughter house wastes are being utilized for composting.

Sewage utilization.—Sewage water is being used for growing ginnea grass in Madurai, Coimbatore and Ootacamund. In Periakulam a part of the sewage is being diverted to water a garden of coconut and lime. The Government have sanctioned a loan of Rs. 16 lakhs to the Corporation of Madras for the Madras City Sewage Utilization Scheme.

(c) *Green manures*.—Green manuring of paddy is an important and cheap means of increasing crop production. Of all green manure crops, tried in Madras, *Sesbania speciosa* was found cheapest and best. It is a quick growing leguminous green manure crop producing abundant foliage and is very easily multiplied. This is similar to Daincha in respect of soil requirements, but gives much higher yield of green matter than any other green manure crop. An acre of pure crop gives from 50,000 to 70,000 lb. of green matter per acre, enough to manure 10 acres of land as only 6,000 lb. per acre is the optimum dose. Besides, the agricultural department has evolved cheap methods of growing sesbania along the margins of paddy fields, occupying no extra area of cultivable lands. Nurseries are raised along with the nurseries of long duration paddy or two to three weeks earlier in case of short duration paddy varieties and the seedlings are transplanted along field margins along with paddy seedlings. The plants grow well and give when close planted, about 6,000 lb. of green leaf per acre in 2 to 3 months. This is very cheap as only $\frac{1}{4}$ lb. of sesbania seed costing about one anna is required to manure one acre. In Tanjore district sesbania is raised along with Kuruvai and the green matter is used for the 'Thaladi crop' that follows. In other districts the line crop is used to manure the next crop.

The quantity of sesbania seed required for a border crop is about $\frac{1}{4}$ lb. costing about one anna. This can yield 2 to 3 cart-loads of green matter. The ryots are able to secure the above quantity of green leaf at such an incredible cheap cost and hence the raising of sesbania for green manure purposes is becoming popular among the cultivators. The advantage of this, is that with a small quantity of seed, it is possible to cover a large area. Seed collection is also very easy as few plants left on the margins provide enough seed for raising a green manure crop for the field, or a small plot of one cent can give enough seed to manure one acre of paddy. Thus the ryot is made self-sufficient for seed and raising his own green manure.

Because of its cheapness, easy availability and its adoptability to be used as a pure crop or line crop in all wet and garden lands this plant has been extremely popular with ryots and has substantially raised food production in the past few years. The area raised as a line crop in 1954-55 was over 1.35 million acres and as a pure crop over 22,000 acres enough to manure over 2 lakhs of acres of paddy.

During the period under report, a quantity of about 361 tons of sesbania seeds was sold to the ryots.

With a view to clear up misgivings, if any, in the minds of some ryots, and as required by Government in G.O. No. 890, dated 29th March 1955, instructions have been issued to the District Agricultural Officers to arrange for demonstration plots for sesbania both as a border crop as well as a pure crop to demonstrate the advantage of raising sesbania.

The progress of work done on planting of sesbania as border crop and gliricidia in field bunds is as follows :—

		1953-54.	1954-55.
		ACS.	ACS.
Sesbania	.. .. .	905,158	1,373,675
Gliricidia	.. .. .	29,133	41,930

Besides, sesbania was raised as a pure crop in over 22,000 acres, enough to manure over 2 lakhs of acres.

Indigofera Teysmanii.—A perennial green leaf yielding shrub was found very promising. It stands lopping and yields a good quantity of green leaf. It was observed to grow as much as six feet tall in about 5 months, thus growing beyond the height which the goats can reach and browse. This plant is prolific in seed production. About 150 lb. of seeds were collected and supplied to the District Agricultural Officers for distribution to ryots. About one lakh of plants were introduced.

Besides sesbania, small quantities of other green manure seeds, like Daincha, Kolinji, Sunnhemp, Pillipesara, etc., were also sold to the ryots.

The total quantity of all varieties of green manure seeds distributed was as follows :—

		TONS.	LB.
1 Sesbania	.. .. .	360	1,752
2 Sunnhemp	.. .. .	68	1,110
3 Pillipesara	.. .. .	0	2,184
4 Indigo	.. .. .	2	828
5 Kolinji	.. .. .	21	445
6 Daincha	.. .. .	8	203
Total	.. .. .	461	2,042

Government sanctioned the continuance of the scheme for the award of prizes and rolling cups for intensifying the cultivation of green manure trees and shrubs in 1954-55 in G.O. No. 289, Agriculture (Food Production), dated 20th September 1954.

V. *Multiplication and distribution of improved seeds*.—(a) This item of work is given a high place in the Grow More Food Campaign. The increase in yield on account of the utilization of improved seeds is estimated at 10 to 15 per cent over the local seeds. The department has evolved a large number of improved strains of paddy suited for different local conditions and seasons. Some of these are cosmopolitan strains. Strains largely in demand are multiplied and distributed to farmers so that they could use pure improved strains and step up food production. The improved strains produced in the Agricultural Research Stations are multiplied in "Primary" and "Secondary" seed farms in ryots' holdings. Expenditure on supervision of seed farms, roguing charges and premium to seed farm ryots is met by the Government. Seeds procured from secondary seed farms are stocked in several departmental depots for general distribution to ryots. Care is taken to maintain purity of seed and high germination capacity.

A premium of 10 per cent over the local market rate is paid to the seed farm ryots to enable them to give clean dry seed to the department. Half the premium paid to the seed farm ryot is recovered through sales and the balance subsidised by Government.

During the period 10,427 acres of primary and secondary seed farms were raised.

A quantity of 972 tons of paddy seeds was procured and a quantity of 1,955 tons of paddy seeds was distributed during the period. This is estimated to cover an area of 87,975 acres resulting in an additional production of 5,891 tons of rice and the economic gain to the State will be about Rs. 17,67,300.

Thirty-four tons of millets were procured and 36 tons of millets were distributed during the period. This is estimated to cover an area of 5,400 acres resulting in additional production of 307 tons and the economic gain to the State will be Rs. 76,750.

Procurement of improved seeds were made on a restricted scale in view of the fluctuations in the market trends so as to avoid accumulation of stocks in departmental depots and consequent loss to Government.

(b) *Village seed farms.*—Instructions have been issued to the District Agricultural Officers to start "Village Seed Farms" and to cover as many villages as possible. According to this scheme primary seeds will be distributed to the villages at the rate of one pound per acre to selected ryots through village agricultural associations for further multiplication. These selected ryots should be prominent persons interested in developing agriculture and having considerable influence in the locality. These selected ryots will be entrusted with the multiplication of seed carefully. These will be called "Village Seed Farms". All the seeds from the village seed farms will be distributed to the ryots of the village. The aim is to cover the entire village as quickly as possible. This method will not only save the huge labour and expense of procuring from secondary seed farms but will also have the advantage of covering the entire village in a short time.

Instructions were issued to the District Agricultural Officers to do extensive propaganda with a view to spread the use of improved seeds, so that a very large extent of the cropped area may be covered by the improved strains. By popularizing the village seed farm scheme, a large area can be covered by the improved strains quickly. The progress of the village seed farm scheme during the year is very encouraging.

Village seed farms were run in 11,339 villages (8,078 for paddy and 3,261 millets). Eight thousand seven hundred and seventy-nine tons of paddy and 264 tons of millets were distributed among the ryots under this scheme.

The scheme for the distribution of improved seeds through village co-operatives was in operation in the districts of Tirunelveli, Madurai, Coimbatore, Tanjore, Tiruchirappalli, South Arcot, South Kanara and Malabar.

Area under improved strains.—The strains produced by the department have spread to ryots over large areas. The areas covered so far are as follows:—

		Area under improved strains.	
		1953-54.	1954-55.
		(Lakhs of acres).	(Lakhs of acres).
Paddy .. .. .	.. .. .	25.7	29.8
Millets .. .. .	.. .. .	7.9	8.7

Crop yield competitions.—The crop yield competition fortnight was celebrated in all districts from 1st to 14th June 1954. Prizes to winners of crop yield competition were distributed by high officials and personages. Meetings were held and the object of the competition was explained to the ryots. Intensive propaganda was done to enlist a large number of competitors.

During the fortnight 1,897 competitions were enlisted.

VI. *Control of pests and diseases of crops (Plant Protection Service).*—The scheme of plant protection was continued with two Plant Protection

Officers, one for Mycology, other for Entomology at Coimbatore and two corresponding Plant Protection Assistants for each district. Proposals have been sent to Government for the sanction of a separate special staff for Mayuram and Kumbakonam divisions in Tanjore district. Orders of Government are awaited. Insecticides and pesticides for sale to ryots and sprayers and dusters for application of pesticides were stocked in all the agricultural depots.

The scheme was started in 1949 as part of Grow More Food drive. The staff sanctioned for the scheme are doing intensive work for control of pests and diseases. The ryots are being taught the correct treatments with pesticides and insecticides, while demonstrations are also made how best to apply the remedies. Sufficient quantities of pesticides are stocked in all the depots to meet the requirements of ryots. In March 1955, Government have sanctioned the purchase of 282 sprayers (270 hand operated, 10 knapsack and two power sprayers) and 150 dusters at a total cost of Rs. 56,985 and the supply has already received by the various district officers. There are 875 sprayers and 513 dusters in stock in this department which is distributed in 177 agricultural depots. On an average 50 sprayers and 3 dusters are available in each depot. Power sprayers are issued on hire to ryots. Ordinary sprayers are generally intended for demonstration purposes.

With reference to the orders issued in G.O. Ms. No. 269, Agriculture (Food Production), dated 31st August 1954, pesticides and insecticides were sold at 50 per cent cost price in specific emergency cases declared by the District Collector and approved by the Director of Agriculture, so as to enable the ryots in affected area to take to large scale application of chemicals. The concession was allowed till 31st March 1955. The demand from the ryots for help increased considerably and large quantities of pesticides and insecticides were sold. A total quantity of 736 tons of insecticides was sold during the calendar year 1954. During the period under report, 300,576 acres were treated and 135,550 numbers of fruit and economic plants have been protected from pests and diseases. Due to timely action, it has been estimated, 32,380 tons foodgrains have been saved.

Weekly forecast reports on the break of pests and diseases of crops.—To help the plant protection staff in the control of pests and diseases weekly forecast reports are sent to all District Agricultural Officers. Based on the reports of plant and diseases received from the District Agricultural Officers, Government Mycologist and Government Entomologist, Coimbatore, prepare every week a forecast of pest and diseases and likely incidence and this report is transmitted to the Director of Information and Publicity, Madras, and Station Directors of All-India Radio, Madras, Tiruchirappalli and Kozhikode, for giving wide publicity. Copies of these reports are sent to the District Agricultural Officers to enable the ryots to take prompt action against the pest and diseases of crops. The special feature during the year is the transmission of Tamil and Malayalam translation of weekly forecast to the Station Directors, Tiruchirappalli and Kozhikode, from 11th March 1955.

Total effect of Intensive Cultivation Scheme.—As a result of working the Intensive Cultivation schemes under the control of the Director of Agriculture it is estimated that an additional production of 190,320 tons of foodgrains have been achieved which is in excess of the target of 175,047 tons. As compared to an achievement of 74 per cent of targets in 1952-53 and 90 per cent in 1953-54, the achievement this year was 109 per cent which is the highest so far. The details are as follows:

Community Development Blocks set up in 1953-54.

Name of the Project.	Details of the area.	Headquarters.	Number of villages.	Area in square miles.	Population.
(1)	(2)	(3)	(4)	(5)	(6)
1 South Arcot district.	A portion of Chidambaram taluk round Sethiathope excluding the urban area of Chidambaram.	Chidambaram ..	123	150.30	95,253
2 Chingleput district.	A portion of Chingleput district.	Tirukkalikundram.	115	153.82	80,993
3 Tirunelveli district.	A portion of Ambasamudram.	Cheranmahadevi.	55	121.12	102,825
4 Madurai district.	A portion of Dindigul taluk.	Gandhigram ..	18	82.81	89,285
		Total ..	311	508.05	368,356
				(368,356)	

Serial number and name of district.

	(1)		(2)
1 North Arcot		1 Tiruvannamalai.	
2 South Arcot		2 Kalasapakkam.	
3 Chingleput ..		3 Panruti.	
4 Coimbatore ..		4 Kadambathur.	
5 South Kanara		5 Tiruvellur.	
6 Madurai ..		6 Palladam.	
7 Malabar ..		7 Sullia.	
8 Nilgiris ..		8 Usilampatti.	
9 Ramanathapuram		9 Kuttuparamba firka in Tellicherry Block.	
10 Salem .		10 Ootacamund.	
11 Tanjore ..		11 Srivilliputtur.	
12 Tiruchirappalli		12 Sivakasi.	
13 Tirunelveli ..		13 Athur.	
		14 Krishnagiri.	
		15 Vedaranyam.	
		16 Tiruturaipundi.	
		17 Karur.	
		18 Perambalur.	
		19 Sankarankoil.	
		20 Kuruvikulam.	

Malampuzha Project.—An area of about 3,324 acres was covered by improved seeds. Three hundred and forty-three paddy seed farms were arranged. Eighty-seven tons and 1,426 lb. of paddy seeds were distributed and 12 tons and 160 lb. of paddy seeds were procured. Fifteen thousand five hundred and thirty-two acres were planted with sesbania, 762 acres were planted with glyricidia and 1,208 acres were planted with other green manure. About 8 tons and 1,082 lb. of green manure seeds were distributed. Sixty-three and a half pounds of vegetable seeds and 466 lb. of groundnut, samai and millets were sold. One thousand three hundred and eighty-two fruit plants were distributed. About 2,100 lb. of cotton seeds were distributed. A quantity of four thousand one hundred and thirty tons of compost was

VII. COMMUNITY PROJECTS.

The Community Development programmes are in operation in this State in four Community Projects set up in 1952-53 and in four Community Development Blocks set up in 1953-54 as detailed below :-

Community Project set-up in 1952-53.

Name of the Project.	Details of the area.	Headquarters.	Number of villages.	Area in square miles.	Population.
(1)	(2)	(3)	(4)	(5)	(6)
1 Lower Bhavani Project.	Parts of Gobichettipalayam, Erode, Bhavani and Dharpuram taluks in Coimbatore district and three villages in Karur taluk in Tiruchirappalli district.	Erode	187	701.3	562,996
2 Malampuzha Project.	Palghat taluk in Malabar district.	Palghat	113	613.2	598,410
3 Periyar Project.	Parts of Melur, Nilakottai and Madurai taluks, Gandhigram in Madurai district.	Gandhigram ..	306	494.3	395,993
4 South Kanara Project.	Karkal and Mangalore taluk and part of Coondapoor taluk in South Kanara district.	Mangalore ..	302	1,247.7	618,152
Total ..			908	3,086.5	2,175,351

prepared and 3,160 tons utilized. 1,835.50 acres of village seed farms were arranged and 184 Japanese method of demonstration plots were laid. 64.50 acres of land was reclaimed and levelled and 7.00 acres were ploughed.

South Kanara Project.—Three hundred and fifty-five acres of primary and secondary seed farms were arranged. Two hundred and fifty-six bags of seed paddy were procured from seed farm ryots. Five hundred bags of paddy were distributed. One thousand six hundred acres were covered by improved paddy seeds. Six hundred and seventy acres were brought under modified Japanese method of paddy cultivation. Four thousand eight hundred and twenty-five acres were covered under *sesbania speciosa* and 708 acres were covered by *glyricidia maculata*. Five thousand seven hundred and fifty-seven *Indigofera Tyesmanii* seedlings were planted. Two hundred and twenty-five acres were covered by other green manure crops. Fifty-nine lb. of vegetable seeds were sold. Five thousand eight hundred and fifty-eight perennial vegetable seedlings and cuttings were distributed. One thousand five hundred and six fruit plants were distributed. One thousand nine hundred and twenty tons of compost was manufactured. Cattle manure and urine were stored in 102 pits. Seventy-seven acres were extended under fodder grass. Two thousand two hundred and sixty-seven coconut seedlings were distributed. Twenty-six thousand three hundred and thirty-four trees of economic importance were planted. Eighty-seven bee-hives were introduced. Six tons and 1,568 lb. of pesticides and chemicals were sold. Two hundred and seven demonstrations of improved implements were conducted. Two hundred and twenty acres were brought under contour cultivation and 93 demonstration plots were laid. Rs. 6,780 was distributed as loan under Intensive Manuring Scheme.

Periyar Project Area.—Five hundred and seventy-three acres of village seed farms were arranged. Seven thousand eight hundred and fourteen compost pits were dug. Nine thousand three hundred and sixty old manure pits were rectified. Twenty-one thousand seven hundred and fifty-four tons of compost were prepared. Thirty-five thousand seven hundred and forty tons of fertilizers were distributed. Thirty-two tons of green manure seeds were sold. Three thousand seven hundred and fifty-seven maunds of improved seeds, 5,589 fruit plants and 2,449 coconut seedlings were distributed. *Takkavi* loans for the purchase of implements, seeds and manures, etc., were sanctioned to the value of Rs. 1,80,622. One hundred and eighty-four implements were distributed. Eight thousand seven hundred and eighty-seven acres were planted with *sesbania* along with paddy on field bunds. Nine hundred and sixty acres were brought under modified Japanese method of cultivation. Twenty-six oil engines were supplied. One thousand four hundred and seventy acres were treated with insecticides. Seven thousand two hundred and seventy seedlings of economic plants were planted. Fifty acres of *sesbania* as pure crop were planted. Sixty thousand six hundred and thirty-five *glyricidia* cuttings sufficient to produce manure for 600 acres were planted.

Lower Bhavani Project.—About 328 compost pits have been laid and 1,235 tons of compost from last year's pits have already been used with satisfactory results. Besides, 276 manure pits have been rectified and 1,524 pits now dug up and 24,200 tons of town compost were manufactured. Short-term loans for purchase of seeds and manures to the extent of Rs. 98,720 were disbursed. Ten tons—2,060 lb. of improved seeds and 6,900 tons of fertilizers including town compost and 51 tons of green manures have been distributed. Two thousand six hundred and fifty acres of land were brought under modified Japanese method of cultivation.

VIII. NATIONAL EXTENSION SERVICE.

In G.O. Ms. No. 1775, Public (Rural Development Projects), dated 25th September 1954, 10 new blocks were set up under the National Extension Service Scheme. Details are given below :—

Name of block.				Headquarters.
1	Nandakolathur	...	...	Polur.
2	Uthukkottai	...	...	Uthukkottai.
3	Palladam	...	...	Palladam.
4	Baindur	...	...	Baindur.
5	Taliparamba	...	...	Taliparamba.
6	Coonoor	...	...	Coonoor.
7	Rajapalayam	...	...	Rajapalayam.
8	Peddanaickenpalayam	...	...	Peddanaickenpalayam.
9	Alangudi	...	...	Pudukkottai.
10	Koilpatti	...	...	Koilpatti.

Twenty-eight blocks were set up in 1953-54, the details of which are given in the report for the year 1953-54. There are now 38 National Extension Service Blocks. Out of these 38 National Extension Service Blocks, 20 Blocks were converted into Community Development Blocks with effect from 1st April 1955. The details of such blocks were furnished under paragraph "Community Projects".

2. In G.O. Ms. No. 2558, Public (Rural Development Projects), dated 21st December 1954, Government ordered that the Agricultural Extension Officer for each National Extension Scheme or Agricultural Demonstrator in the Community Project area should be provided with a depot in the blocks and that where there is already an Agricultural depot in the area, such depots should be placed in charge of the Extension Officer in the National Extension Service Block or the Agricultural Demonstrator in the Community Project area. They also ordered that new depots in block areas should be opened only when there are no depots already in existence. Instruction were issued to the District Agricultural Officers to implement these orders and a report was also sent to Government furnishing the information as to the number of depots newly opened and the number of depots placed in charge of Extension Officers.

3. In order to avoid overlapping of function of the normal staff of the Agricultural Department and the special staff in the areas covered by Community Project or National Extension Service Blocks, Government have had under their consideration the question of reorganizing the field set up. In G.O. Ms. No. 1232, Agriculture, dated 15th April 1954, it was ordered that the territorial charges of the Agricultural Demonstrators borne on the normal establishment of the Department of Agriculture should be resettled outside the limits of the National Extension Service Blocks. Detailed proposals were sent in May 1954 for reorganizing the field staff of the department based on the instructions of the Government and in G.O. Ms. No. 3330, Agriculture, dated 12th November 1954, Government issued orders of reorganization and revision of jurisdiction of Agricultural Demonstrators consequent on the introduction of Community Project and National Extension Service Schemes. There are 443 firkas in the State excluding Tanjore district and the areas

covered by Community Project and National Extension Service Schemes and these 443 firkas were allocated at the rate of three firkas for 91 Agricultural Demonstrators, two firkas each for 84 Agricultural Demonstrators and one firka for 2 Agricultural Demonstrators.

Tanjore National Extension Scheme.—With a view to intensify the production of rice in Tanjore district, a scheme was sanctioned to increase the number of District Agricultural Officers to one per division, of Agricultural Demonstrators to one for each firka and of demonstration maistries to one for every 5,000 acres, so that the rice surplus of the district can be increased by 75,000 tons. The scheme was first applied in the two divisions of Kumbakonam and Mayuram and intensive work was effectively carried out on important items, green manures, application of fertilizers and improved seeds. Every one of the 556 villages was covered with a village seed farm and improved seeds exchanged at meetings arranged through Agricultural Associations. Sesbania for green manure as a line crop was grown over 259,070 acres of paddy and as a pure crop over 6,430 acres. An additional 5,300 acres were covered under Gliricidia. Besides, 358 filter points were installed as compared to 895 for the whole. Because of the above intensive work, an additional production of 20,000 tons of rice is estimated even in the first year of its working in the two divisions alone.

IX. COTTON EXTENSION PLAN, 1954-55.

The Cotton Extension Scheme in the Madras State was commenced in June 1950 under the Integrated Production Plan of the Government of India. The scheme was subsequently included in the National First Five-Year Plan from July 1951. The report relates to the progress of work done in the schemes for the extension of cotton for the fifth year under the Integrated Production Plan and fourth year under the National First Five-Year Plan.

2. *Work done under the Cotton Extension Plan.*—The different items of the Cotton Extension Plan approved and adopted for the Madras State for 1954-55 season are furnished below :—

- (i) Cultivation of cotton in newly reclaimed waste and fallow lands.
- (ii) Extension of area by replacement of other crops.
- (iii) Double cropping—cultivation of cotton in rice fallows.
- (iv) Inter cropping of cotton with groundnut, ragi, chilli, etc., and in coconut topes, banana gardens, other fruit gardens, casuarina topes, etc.
- (v) Distribution of improved seeds.
- (vi) Application of fertilizers.
- (vii) Adoption of plant protection measures.
- (viii) Improved cultivation methods.

Besides the items of the approved plan detailed above, Moco cotton was recommended to be grown as perennial plants in public gardens in rural areas, school gardens, house compounds, etc.

3. *Procurement and distribution of improved seeds.*—Seed multiplication schemes with separate staff, were in operation in the Coimbatore district for MCU. 1 (winter crop) and K. 5 cottons and in the Ramanathapuram and Tirunelveli districts for MCU. 1 and MCU. 2 (Masipattam) and K. 2 cottons. The multiplication of MCU. 2 cotton seed in the Masipattam of 1955 was entrusted to the Srivilliputhur Uganda Cotton Growers' Co-operative Marketing Society. MCU. 2 is a new improved strain of cotton which was distributed for general cultivation for the first time in 1955 summer. To obtain

seed of the short duration variety P.216F recommended for cultivation in rice fallows and as inter-crops, arrangements were made to procure the seed from the cultivators of the Tanjore district who ginned their cotton in the ginning factory in the Tanjore District Co-operative Cotton Marketing Society, Aduthurai. As the procurement was short of requirements, the balance was procured in East Punjab. The seed of Moco cotton was being produced at the Cotton Breeding Station, Coimbatore, and at the Agricultural Research Stations, Tirurkuppam, Palur, Aduthurai, Pattukottai and Koilpatti. The particulars of improved seeds targetted to be procured and procured and distributed are furnished below :—

Procurement and distribution of improved seeds.

Variety.	Quantity targetted.	Quantity procured.	Quantity distributed.
	MDS.	MDS.	MDS.
Co. 2	4,500	..	..
MCU. 1.	15,000	11,748	10,095
MCU. 2.	..	4,335	4,143
K. 2	14,000	2,910	1,969
K. 5	7,000	5,548	4,148
P 216 F	3,650	1,493	1,195
Total	44,150	26,034	21,550

Against a total quantity of 44,150 maunds of seeds targetted to be procured and distributed, 26,034 maunds of seeds were procured and 21,550 maunds of seeds were distributed during the year up to end of June 1955. Seed of Co. 2 cotton was not procured as it was not available due to failure of crop and it was also being replaced by MCU. 1. Sufficient seed of K. 2 also was not available for procurement due to the adverse season for Karunganni crop in the Southern districts during 1954-55 and consequent low production. In the case of P216F the procurement was limited to anticipated requirement for the year. Of the total quantity of 1,493 maunds of P216F procured, 293 maunds of seed were procured in Tanjore and 1,200 maunds in East Punjab. A total quantity of 10 lb. of Moco cotton was also distributed.

The total expenditure incurred on the procurement of improved seeds was about Rs. 2.63 lakhs. This was met from a loan of Rs. 3 lakhs placed at the disposal of the State Government by the Government of India for the purchase of improved seeds.

4. *Fertilizers and pesticides.*—Three thousand tons of ammonium sulphate had been targetted for distribution under the Cotton Extension Plan. As the fertilizer was in short supply during the beginning of the year under report, the quantities available were restricted to be distributed to food crops. Subsequently with the improvement in the stock position, the restriction was removed. As the fertilizer was distributed by dealers and not by departmental agencies, actual particulars of quantities distributed for application to cotton crop were not available.

For the control of pests on cotton "Cotton dust" was advocated. Where this was not available BHC, Hexidol, etc., were also advocated and distributed. A few enlightened and enterprising cultivators used Endrin and Folidol, two new pesticides introduced by the trade, which were reported to be effective for controlling Boll worm pest also. Pesticides were distributed by dealers also; besides by departmental agencies.

5. *Publications.*—Four popular articles on some of the aspects of the extension of cotton were published in the monthly agricultural journals and in the Villagers' Guide and Calendar.

6. *Achievements of area and production under the Plan.*—The details of targets and achievements of area and production during the year with those of the previous year are furnished in the Statement appended.

Under "Reclamation of waste and fallow lands" an area of 4,560 acres was achieved against a target of 5,400 acres. Under "Replacement of crops" the area achieved is 32,638 acres against a target of 9,000 acres. The attainment of this increased area was due to increased irrigation facilities afforded in the Lower Bhavani Project area this year. The additional area of cotton in the area was about 20,000 acres. The variety grown was mostly of the long staple Cambodia (Uganda) type. The item "Double cropping pertains to the cultivation of cotton during summer in wet lands which were generally left fallow. To facilitate extension of area by this means, irrigation facilities such as filter point tube wells and ordinary deep tube wells with pumpsets and river pumping schemes, were advocated. But as the irrigation facilities by these means were limited, the area achieved was only 5,800 acres against a target of 13,700 acres. Of the total area achieved, about 3,000 acres are in the districts of South Arcot, Tanjore and Tiruchirappalli. This practice of cultivation of cotton in rice fallows, was being recommended in other districts where there are large areas of wet lands irrigated from tanks or river channels. Wherever there were irrigation facilities in the form of wells small areas of other crops are grown.

Under "Intensive cultivation" no separate target has been fixed for area of dry crop and irrigated. Mixed cropping is a common practice on dry lands. In the Coimbatore and adjacent districts mixed crops of cotton and Tenai are common. In this, cotton is a major crop. But growing of cotton as a mixed crop with others is a new method now advocated. It can be successfully and profitably grown as a mixed crop with groundnut and ragi, dry and irrigated and varagu, samai, etc., on dry lands, and chilli on garden lands. Cotton can also be grown as inter-crop in coconut topes, banana gardens, fruit gardens in the initial stages and casuarina topes during the first year. Such systems of cultivation are only gradually gaining ground. So the achievement under this item was only about 23,000 acres against a target of 233,300 acres. The particulars of improved seeds distributed are furnished in Table in paragraph 3 above. Under this item, an area of nearly 116,000 acres was covered against the target of 192,000 acres. Non-availability of sufficient quantities of improved seeds was the chief factor responsible for the non-attainment of the target. With reference to the control of pests and diseases, the work on this item depends upon their incidence. There was severe pest attack this year on Cambodia in the Coimbatore district and whenever pest control measures were adopted normal yields were obtained. But as the pesticides were also distributed by dealers, full particulars of areas on which the pesticides were applied were not available.

The area targeted under "Improved cultivation methods" relates to the growing of Indigo as mixed crop with Irungu which is usually grown in rotation with cotton on dry lands in alternate years. As this practice was still in the trial stage and had not become popular it was discontinued. But improved cultivation practices, such as, sowing adequate quantity of seed, sowing in lines, ridging for irrigated crops, timely inter-cultivation and irrigation and clean picking and drying of kapas before storing, were advocated, and these are being gradually adopted by the cultivators.

As the seasonal conditions were not quite favourable for cotton, the yield was less than normal, particularly that of Cambodia in the Coimbatore district. Hence, though a total area of 41,445 acres was achieved against a target of 42,296 acres, the production was estimated at 30,268 bales only against a target of 43,318 bales.

According to the fifth and final forecast report on the cotton crop in the State, issued by the Director of Statistics, Madras, the area under cotton in 1954-55 up to 25th March 1955 has been estimated at 871,000 acres as against the finally recorded area of 859,000 during the previous year and an average area of 784,200 acres for the past five years, ending with 1953-54. The total production during the year is now estimated at 270,500 bales (of 392 lb. each) of lint, as against 264,600 bales in the previous year and an average of 261,000 bales for the past five years.

X. RESEARCH.

The research work pertaining to the department is carried on at the Agricultural Research Institute and the breeding stations attached to it at Coimbatore as well as in the Agricultural Research Stations and Regional Research Centres throughout the State. The review of research work reported is presented below under the following heads:—

- (1) Research Council.
- (2) Agricultural Chemistry.
- (3) Agricultural Entomology.
- (4) Agricultural Mycology.
- (5) Agricultural Meteorology.
- (6) Crop Improvement.
- (7) Systematic Botany.
- (8) Plant Physiology.
- (9) Cyto-genetics.
- (10) Botanic gardens and Park.
- (11) Agronomy.
- (12) Agricultural Engineering.
- (13) Agro-Industries.
- (14) Agricultural Research Station.

Government in their G.O. Ms. No. 356, Agriculture, dated 8th February 1955, sanctioned a scheme for the centralization of offices of research sections of the Agricultural College and Research Institute in order to give relief to the Heads of Sections in management, maintenance of accounts, stores, etc., and to enable them to bestow greater attention on the technical side of the work. This scheme was implemented from April 1955.

1. RESEARCH COUNCIL.

The Principal and Vice-Principal continued to be President and Secretary of Research Council. Thirty-two meetings were held for the scrutiny of Research programmes, progress reports and miscellaneous items pertaining to research.

2. AGRICULTURAL CHEMISTRY.

Analytical and advisory.—This branch of the section continued to cater to the needs of the ryots, and Government Departments, Industrial concerns and general public by analysing soils, manures, irrigation waters, plant products, foodstuffs and other agricultural products received and giving advice wherever necessary.

Sponsoring advice on matters relating to the day-to-day problems facing the ryots such as fertility status of their soils, the manurial requirements of different crops grown by them, the amount of plant nutrients contained in their manures, reclamation of alkaline lands, quality of their irrigation waters, etc., was the main work of this branch of the section.

In the beginning of the period under report there were 233 samples pending analysis. Besides these 1,687 samples were received and registered for analysis during the fasli year. Out of the total of 1,920 samples (233 old plus 1,687 new) 1,598 samples were analysed leaving a balance of 322 samples still to be analysed at the close of the year. The nature and the number of samples received and analysed during the year are detailed below:—

Particulars.	Total number pending on 1st July 1954.	Receipts during the year.	Disposals during the year.	Samples pending on 30th June 1955.
(1)	(2)	(3)	(4)	(5)
Soils	200	756	662	294
Grains and straws (permanent manurials).	30	269	282	17
Foodstuffs and fodder	..	45	45	..
Plant products	..	338	338	..
Waters	..	61	61	..
Miscellaneous	3	218	210	11
	<u>233</u>	<u>1,687</u>	<u>1,598</u>	<u>322</u>

A sum of Rs. 3,266-8-0 was realized by way of analytical fee from private concerns.

Soils.—Results of analysis of the soil samples drawn from plots growing ginger plants at Agricultural Research Station, Pattambi, showed that the pH was increased so appreciably by the application of lime as to cause unavailability of manganese. This induced chlorosis. Soil samples obtained from T. Kallupatti showed that they were highly alkaline. The matter samples from that place contained high amounts of total solids and this was declared unsuitable for irrigation. It was suggested that soil amendments such as gypsum at 3 to 5 tons per acre may be applied and the sodium salts removed by flooding with good water and drainage.

Cotton in paddy fallows.—One hundred soil samples were analysed. The results confirmed the previous findings that cotton growing in rice fallows is not harmful to the succeeding paddy crop provided adequate manures are given to the paddy crop.

Soils irrigated by artesian wells near the Neiveli lignite project area.—Top and sub-soil samples from two representative soil pits and six water samples were collected from the lands irrigated by artesian wells near the Neiveli project area. The soil samples were analysed for their mechanical composition and for the quantity and quality of water soluble compounds as well as pH. Water samples were examined. Similarly for dissolved salts including sulphates and iron salts which were suspected to be present. From the results of analysis of the samples and from field observations, it was concluded that the problem demanding immediate attention in the area was drainage. It was observed that fields with natural drainage facilities performed well, whereas those with poor drainage were unable to support a

good crop growth. The quality of irrigation water was found to be satisfactory. It was, however, noted that to avoid any possible risk of alkalinity developing in the area due to accumulation of salts, the soils should be kept well drained.

Water-logged areas near Tiruchendur.—The water-logged areas near Tiruchendur were inspected between the 28th and 31st October 1954. Typical profile pits were dug from the area of more than 1,000 acres for detailed analysis. The land in question gets filled up with water during the north-east monsoon, in the months of November and December and gets dried only in March-April. The soil in the entire area is sandy clay and saline up to a depth of two feet. With improvement in drainage and irrigation facilities that could be had from Tambaraparani river, most of the area can be brought under profitable cultivation of paddy, ragi, plantains and also continues in the elevated places. The underground water in the nearby wells is also good and supply copious. The possibility of putting filter points in the area and round about can also be investigated after reclamation by improving the drainage of the land. As the sea is only half a mile from the locality a drainage channel can be dug for letting out the stagnant water into the sea. This has to be examined in detail by the Works Department authorities and the Collector of the district at whose instance the inspection was undertaken.

Reclamation of alkaline land in zamindari areas of Ramanathapuram district.—The saline and water-logged areas near Tirupalani, Thekkuthavarai and Chitrakottai were inspected along with the Assistant Agricultural Engineer (Inspection), Madurai. Samples of soil profiles and irrigation waters from the areas visited were taken for analysis. The soil samples were analysed for alkalinity and mechanical composition. There is the possibility of reclaiming these areas by washing out the sodium salts present mostly as chlorides with good water from tanks and other sources available in the localities and affording adequate drainage facilities.

Irrigation water from Pinji village, North Arcot.—It was reported by the Collector of North Arcot that petitions had been received from ayacutdars of Pinji village stating that the drainage water from Messrs. Parry & Co., Ranipet, mixes with the spring channel water irrigating the lands and that due to the high acidity of the mixed water the crops wither away. Results of analysis of the samples of water before mixing and after mixing showed that the Parry & Co. drainage water was highly acidic with a pH of 2.4 and contained as much as 456.6 parts of total solids per 100,000. It was, therefore, suggested that the Parry & Co. drainage water should not be allowed to mix with the channel water or the drainage water should be suitably treated with chemicals and rendered harmless to crop growth.

Water from the new bore-well in Paddy Breeding Station, Coimbatore.—Water from the new bore-well in plot H. 4d in Paddy Breeding Station was analysed and was found to contain 60.60 parts of total solids per 100,000. The water was declared as good for irrigation purposes.

Water from bore-wells in Negapatam.—Two samples of waters from two bore-wells in Negapatam were analysed and found to contain as much as 436.19 and 270.10 parts of total solids per 100,000. As the lime content was low and sodium salts pre-dominated, the waters were declared unsuitable for irrigation purposes.

Waste products from pearl fishery operations at Tuticorin.—Two samples of waste materials from pearl fishery operation at Tuticorin were analysed to find out the possibility of utilizing them as manure after composting. One

of the samples—the fleshy matter after extraction of pearls—contained 2 per cent N and was found to be useful in composting along with municipal sweepings of low N content. The other sample effluent contained over 95 per cent of moisture and hence was unfit for composting.

Chemical composition of stored pepper.—Three samples of pepper (1) mouldy, (2) not mouldy and (3) insect-infested received from Pepper Specialist, Taliparamba, were analysed. A comparison of analytical results revealed that there was very little difference in their chemical composition. The insect-infested sample however showed the maximum piperine content and the not-mouldy the maximum essential oil contents.

Wild grapes.—A sample of wild grapes received from the Cytogeneticist, Coimbatore, analysed as follows :—

Sucrose	..	..	..	..	0.51	per cent.
Glucose	..	..	..	..	2.07	„
Total reducing sugars					2.61	

Soils—Research—Standardization of methods—Hunger signs in crops.—Work on the detection of hunger signs in crops employing rapid tissue tests was done. The Purdue, Morgan and B.D.H. systems of rapid tests were tried for their usefulness and reliability with solutions containing known ingredients. Leaves of paddy plants raised in pots containing soils taken from old permanent manurial plots at Coimbatore, the permanent manurial plots at the Agricultural Research Station, Aduthurai, and from two lands owned by private parties at Tanjore were tested at about 20 days interval for N.K. and P. employing rapid tissue tests. The work is being continued for determining the part of the plant and the stage of growth at which symptoms of deficiency of nutrients could be detected most satisfactorily.

Trace elements.—Estimation of manganese, total available and water soluble in soils has been studied in the typical soils of the State. The results indicate that the manganese content of the soil seems to depend on the rock from which it is derived and that it varies considerably with climatic factors. The heavily leached soils of the West Coast contain the lowest amount of manganese while the soils formed under semi-arid conditions like the soils of Kolhapatti contain high amounts. The sandy soils and sandy loams of Ralur and Tirurkuppam are intermediate between the two groups. The surface soil contains more available manganese than the sub-soil. Sandy soils, sandy loams and red soils contain a higher proportion of the total manganese in the available form than the black soil. Water soluble manganese is present in negligible proportions in the Madras soils.

Cobalt.—Methods are being standardized for the estimation of traces of Cobalt in soils. The method due to Bayliss and Picering has been found to be fairly satisfactory.

Studies on laterite soils.—These studies were started three years ago to find out the best combination of manures to prevent the immobilization of phosphate which takes place to a considerable extent in laterite soils. The work was continued on the lines planned previously with 36 treatments having different dosages of superphosphate, green leaf and lime. Pot culture trials to assess the relative values of superphosphate and rock phosphate as sources of available phosphoric acid were also continued. The results obtained from the three years of study indicate that the best crop production

is obtained in laterite soils by applying lime at 3,000 lb. and superphosphate to give 60 lb. P_2O_5 per acre over a basal dressing of 7,500 lb. of green leaf in the first two crop seasons. Thereafter the dosage of lime and superphosphate can be reduced to half while the green manure should be continued at the original level. The nutritive quality of the paddy grain has been found to improve with the increasing dosage of lime.

Studies on the soils of Satyamangalam.—The Physico-chemical investigations on the soils of the Agricultural Research Station, Satyamangalam, were continued. Soils from the blocks I and II differ from those of III and IV in their fertility status, texture, lime status, etc. There is no appreciable increase of residual nitrogen in the soil as is usually expected in the case of legumes grown with application of P_2O_5 . A fair correlation exists between nitrogen and organic matter of the respective depths. Nitrogen available P_2O_5 and organic matter are found to decrease with depth. Application of phosphate to legume crop is found to increase its yield as well as its manurial value. The legume crop raised under the project has a better manurial value than that receiving irrigation from the well at the early stages.

There seems to be no immediate increase of nitrogen and organic matter in the soils under the dose of organic matter experiment. The effect of the different kinds of organic manures on the soil is almost the same. Though the soils are deficient in P_2O_5 more than 50 per cent of the total P_2O_5 is found to be in the available form.

Soil survey in Tanjore district (Indian Council of Agricultural Research Scheme).—Soil samples from the taluks of Tiruvarur, Mannargudi, Nannilam and Tiruthurai, were analysed for mechanical and chemical composition. The soils are fairly well supplied with plant nutrients. A soil map based on the analytical data of the profile samples was prepared for the district to indicate the fertility status of the soils in the surveyed areas.

Soil Survey T.C.M. Scheme.—The profile samples collected in Coorg were analysed for mechanical and chemical composition. The pH water soluble salts and exchangeable bases were also estimated. The clay fractions from these samples have been separated for detailed analysis. They were analysed for moisture loss on ignition, insoluble matter, soluble silica, sesqui-oxides and organic matter.

Manures and Plant Nutrition—Permanent Manurial experiments.—These experiments have been continued with different crop rotations to study the effect of continuous cropping on soil manured with cattle manure and artificials supplying nitrogen, phosphoric acid and potash singly and in combination continuously year after year in the same plots.

Old permanent manurial plots.—These plots were laid out in 1909 and till the end of last year 84 crops were grown. The 85th crop of periamanjil cholam was grown during the period under report. The yields from the 'no manure', K and cattle manure residual plots were poor. The treatment N plus P gave the maximum yield of 517 lb. while cattle manure gave the second best yield of 466 lb.

The analysis of the soil samples taken in 1953-54 indicated that in the surface soils, the continuous application of fertilisers has resulted in the increase of total and available phosphoric acid and potash in the respective treatments. There is not much difference in the total base exchange capacity

for the different soils except in the case of K and N treatments which indicated lower values than the others. The values for exchangeable calcium for soils from 'no manure' N and K plots were lower than the rest. The organic carbon of the subsoils was found to be higher than that of surface soils.

New permanent manurial plots.—Experiments have been in progress in these plots since 1925. During the period under report two crops Nos. 48 and 49 were grown under irrigated conditions. The 48th crop of Cumbu (Co. 3) was sown from 30th September to 2nd October 1954. Cattle manure plot gave the highest yield of grain and straw in both the eastern and western series. N plus P plus K plot gave the next best yield of grain in eastern series while its performance was not quite so good in the Western series. The 49th crop of summer cholan seedlings were transplanted from 13th to 16th April 1955 and they established themselves satisfactorily. The crop came up well till the milk stage when it was affected by earhead bugs. A spraying with 50 per cent BHC. wettable powder was given on 3rd June 1955 which controlled the pest. However, the crop yields were rather low. N plus K treatment in the Eastern series and cattle manure in the western series gave the maximum yields of grain. N plus P plus K in the Eastern series and cattle manure in the Western series gave the highest yields of straw.

The analysis of the surface soils (0-9 inches) taken in 1952-53 was carried out during the year. It is seen from the data that continuous application of fertilisers has resulted in higher amounts of total and available phosphoric acid and potash in the respective treatments. The basal application of cattle manure has resulted in a slightly higher total base exchange capacity and exchangeable calcium in the Western series.

Studies on Silico-phosphate and basic slag.—Fusion studies were continued on Tiruchirappalli phosphate using the naturally occurring Olivine and Serpentine as the source of magnesium silicate. A citric solubility of 70 per cent has been obtained using Tiruchirappalli phosphate, Olivine and sodium phosphate. The phosphate in the Tiruchirappalli nodules has been rendered almost completely soluble (95 per cent) in 2 per cent citric acid by fusing a mixture of 10:3:3 of Tiruchirappalli phosphate, serpentine and sodium sulphate using the graphite arc for fusion. The studies on the reversion of phosphate in lateritic soils of the Nilgiris using superphosphate, basic slag and silicophosphate has shown that though basic slag is superior to superphosphate in increasing the availability of phosphoric acid, it is not as good as silico-phosphate. The fused silico-phosphate does not undergo reversion in laterite soils as readily as superphosphate.

Studies on the indirect application of phosphate to paddy through legumes.—To test the efficacy of phosphates applied to green manure crop on the succeeding crop of paddy, an experiment was started this year in the D. block, Central Farm Wetlands. Daincha and Sunnhemp were the two crops raised with and without phosphates. These crops were later ploughed in and paddy was raised. Phosphate was applied to the plots that did not receive the same at the time of raising green manures, at the time of transplanting paddy. It was found that Daincha receiving phosphates gave nearly 50 per cent more of green matter over that receiving no phosphate. In the case of sunnhemp no such advantage was seen. In the matter of paddy yield there was no difference in yield between the treatments namely phosphate applied at the time of planting of paddy and phosphate applied at the time of sowing green manure.

Determination of Nitrogen and Phosphoric acid requirements of the soil types of the paddy area in Tanjore district on ryots' fields (Indian Council of Agricultural Research Scheme).—Fifty-five experiments on Samba on ryots' fields selected at random and distributed throughout the district were conducted with the following treatments: (i) Ryots' method, (ii) 5,000 lb. green leaf per acre, (iii) 5,000 lb. green leaf plus 30 lb. Nitrogen per acre as Ammonium sulphate and (iv) 5,000 lb. green leaf plus 30 lb. Nitrogen as Ammonium sulphate plus 30 lb. P_2O_5 as superphosphate. The soils of the district were found to respond significantly to the application of Ammonium sulphate and superphosphate. The soils of the district were found to respond significantly to the application of Ammonium sulphate and superphosphate over green leaf manure in the dosage tried.

The analysis of soil samples from 1952-53 season were completed. Ninety-six samples of soil from the Samba experimental plots of 1953-54 taken before transplantation were analysed for mechanical composition, alkalinity and fertiliser status.

Agronomic trials under the T.C.M. Project.—The object of the scheme is to find the effect of the different types of nitrogenous and phosphatic manures, singly and in combination on paddy in the ryots' fields in two soil climatic zones namely Mangalore and Aduthurai. The experiments were conducted at the two centres. At Aduthurai the yield data indicated that there is response to both nitrogen and phosphoric acid. The difference between ammonium sulphate and urea is not significant. The time of application of the nitrogenous fertilisers did not reveal significant difference in yield. The yield data on the trials at Mangalore are being gathered and no conclusions can be drawn at this stage.

Chilean nitrate experiments.—Experiments were conducted at Mangalore, Pattambi, Palur, Nellikuppam, Gudiyatham, Kulitalai, Nanjanad and Tindivanam to compare the efficiency of Chilean nitrate with that of ammonium sulphate with and without lime and basal dressing. The results of the experiments indicate the following:—

Sugarcane.—Ammonium sulphate has been found to be superior to Chilean nitrate at all places.

Paddy.—Ammonium sulphate and Chilean nitrate alone at higher dose depress yield. Between the two fertilisers, sometimes the one and sometimes the other has proved slightly better.

Ragi.—The general trend of the results is that ammonium sulphate seems to be better than Chilean nitrate.

Potato.—No general conclusions could be drawn since the differences in yield were not statistically significant. Groundnut cake and ammonium sulphate were found to be superior to the other fertilizers.

Cotton (Sea Island).—The results at Pattambi were not significant though ammonium sulphate was found to be better than Chilean nitrate. At Mangalore it was noted that in equal levels of nitrogen Chilean nitrate was superior.

The data on banana and gingelly are not yet available.

Studies on the use of Sesbania speciosa in the dry form.—An experiment was laid out at the Agricultural Research Station, Aduthurai, with three treatments, viz., (i) no manure (control), (ii) Sesbania-green at 5,000 lb. per acre, (iii) Sesbania dry equivalent to 5,000 lb. of green sesbania. The

yield data of kuruvai crop indicated that green sesbania is superior to dry sesbania.

Legume in rotation to build up soil fertility.—A scheme of experiment on the role of legume for increasing soil fertility on the lines recommended by the Indian Council of Agricultural Research, Crop and Soil Wing, has been programmed at the following Agricultural Research Stations, viz., Koilpatti, Palur, Pattambi and Satyamangalam. The green manures tried at Satyamangalam are daincha, sunnhemp, cowpea, dew gram and indigo. The dosage of P_2O_5 is 30 lb. per acre. The results of experiments on cotton conducted at Satyamangalam indicate that the differences in yield between the main treatments P_2O_5 and no P_2O_5 are not significant. The yield differences due to different green manures with and without P_2O_5 are also not significant. In the case of cereals tried, viz., cumbu and ragi, the treatments green manure with P_2O_5 has given higher yields of grain in general but the data have not yet been statistically analysed.

Intake of major plant nutrients by ragi.—Experiments were conducted in pots to study the influence of water on the growth of ragi and on the utilisation of nutrients present in the soil. Ragi was raised at four levels of moisture, viz., about 12 per cent, 18 per cent, 27 per cent and 36 per cent (about 25, 40, 60 and 80 per cent of the water holding capacity of the soil). Another set of experiments was conducted with farm yard manure at 5 tons per acre. The dry weight of plants increased with soil moisture up to 27 per cent. The nitrogen in the plants increased with decreasing soil moisture. Total P_2O_5 was maximum in plants grown with a moisture content of 60 per cent of the water holding capacity.

Water requirements of green manure crops.—The experiment was started in pots with cowpea (c.521) with three levels of nitrogen at 15, 30 and 60 lb. per acre. The yield of dry matter was the maximum at the lowest level of nitrogen. The water requirement was reduced at the lowest and highest levels of manuring. The experiments were continued with three levels of P_2O_5 alone, viz., 25, 50 and 75 lb. P_2O_5 per acre. The soil moisture was maintained at 50 per cent of the saturation capacity. The results are awaited.

Storage of fertilisers under T.C.M. Scheme.—The keeping qualities of six chemical fertilisers urea, ammonium phosphate, ammonium nitrate, ammonium sulphate, nitro-phosphate and triple superphosphate were studied under different conditions of storage in the two centres, Madras and Coimbatore. The studies indicate the superiority of ammonium phosphate and ammonium sulphate with regard to keeping quality and also the superiority of 'Alkathene' packing for purposes of storage over the other types of packings tried especially with hygroscopic fertilisers like urea, nitrophosphate and ammonium nitrate and also with highly acidic fertilisers like triple superphosphate.

Soil biology—Studies on compost making.—The comparative efficiency of Dr. Pfeiffer's B.D., compost starter, cowdung and pigdung as starters for composting farm waste was studied in three compost piles prepared from the same material. A study of the cellulose decomposers during the process of decomposition in the three differently treated heaps showed that while aerobic cellulose decomposers were predominant in all the three piles, only B.D. compost starter pile and pigdung pile showed presence of thermophilic aerobic cellulose decomposers. The results of chemical analysis of the composted material at intervals of 10 days during the first month and

every month, subsequently up to four months showed that Dr. Pfeiffer's B.D. starter was in no way better than cowdung or pigdung, judged from the percentage of nitrogen in the final product. Although the total nitrogen was nearly the same in all the heaps, compost prepared with pigdung as a starter had the highest nitrogen content. Aerobic and anaerobic cellulose decomposing organisms from all the three composts including the thermophilic forms from the pigdung and B.D. starter composts were isolated and enriched in Omeliansky's, Dubo's and cellulose peptone media for laboratory studies. Paddy straw supplied with available nitrogen at about one per cent level and moisture level at 50 per cent was inoculated with the aerobic cellulose decomposing organisms and the rate of decomposition was studied by the carbon-nitrogen ratio at intervals. The rate of decomposition after two months' period was not very satisfactory.

Legume cultures.—During the period under report, 32 flasks and 20 tubes of different bacterial cultures of legumes were supplied to parties. Isolation of root nodule organisms of the following legumes and their purification and maintenance were continued. Daincha, pillipesara, cowpea, lucerne, sesbania, blackgram, greengram, horsegram, bengalgram, berseem, groundnut and sunnhemp. Efficiency of pure cultures previously isolated from the above were tested in pot cultures and were found to be quite effective.

3. AGRICULTURAL ENTOMOLOGY.

Investigations on crop pests.—Work on the control of tissue borers, coccids and hairy caterpillars was intensified. The more recent synthetic chemicals, viz., folidol, endrin, diazinon and system in chemicals like systox are being critically tested regarding their usefulness in the control of the abovementioned categories of crop pests. Studies on the adverse effects of these pesticides were also in progress side by side.

(a) *Pests of paddy*—(i) *The paddy stem-borer—Schoenobius incertellus* W.—Research on the control of this borer was continued at Aduthurai, Coimbatore and Pattambi. At Aduthurai, three sets of experiments were conducted with reference to the thaladi crop. The variants comprised of sprays of folidol (one ounce in 12½ gallons), endrin (one ounce in three gallons and one ounce in six gallons) BHC. dust 10 per cent, a mixture of BHC. 10 per cent and DDT. 5 per cent dusts, isodrin dust 2 per cent and spray at 0.1 per cent concentration. Three rounds of insecticidal treatments were given at the following stages (i) nursery stage, (ii) soon after transplanting and (iii) at the short blade stage, coinciding with the season of mass emergencies of the moths. Data on the percentage of infested tillers were recorded from the experimental plots at periodical intervals. The yield figures were also gathered. Endrin, isodrin and folidol have given the best results both with reference to an increase in yield as well as by a gradual reduction in the percentage of infestation. The experiments are being repeated to confirm these findings.

Similar work was in progress in Coimbatore and Pattambi. At the former centre, the investigations were in progress with reference to the main season crop as well as the summer crop (Navarai). Folidol has given better results than Endrin at Coimbatore, at Pattambi, work was concentrated with reference to the second crop, which is usually more susceptible for the stem borer. The incidence of the pest during the period under

report was on the whole very mild in this locality and hence no conclusions could be drawn. It is proposed to tackle this problem effectively under the auspices of an Indian Council of Agricultural Research Scheme, which has just been sanctioned.

(ii) *The Paddy Mealy Bug: Rippersia Oryzae-Gr.*—Nursery treatment with sprays of Folidol, Endrin and Systox did not give encouraging results with reference to the elimination of the 'Soorai patches' in the transplanted crop, as in previous years. Applications of Folidol and Systox at higher concentration on the infested patches as and when they appear in the field have given better results.

(iii) *Field Rats (Bandicota Bengalensis G & K and Millardia Meltada).*—Studies on the utility of warfarin baits in the control of these rodents, were again taken up for verifying the previous findings regarding the suitability of these baits. Detailed observations made during April, have once again confirmed that the male rat prefers its natural food. There was no appreciable difference in the tiller damage, in the baited and non-baited areas. Other rodenticides have just been taken up for tests.

(iv) *The Paddy Jassid Nephrotettia Bipunctatus L and the Fulgorid: Nilaparvata Lugense.*—Observations on the bionomics and life history of these were continued at the Agricultural Research Station, Aduthurai, in which locality, these pests are assuming some importance. The fulgorid generally makes its appearance only at the short blade stage of the 'Kuru-vai crop'. The long duration varieties of 'Samba' and 'Thaladi' appear to be more resistant than the 'Kuruvai' types. A couple of dustings with a mixture of DDT, 5 per cent plus BHC, 10 per cent where the pests are just making their appearance have given appreciable relief. Further work is in progress.

(b) *Pests of vegetables*—(i) *The little leaf disease of brinjal and the vein clearing disease of bhendai.*—These studies were pursued on previous years' lines. The insecticidal treatments were commenced when the plants were about six weeks old and repeated at tri-weekly intervals. There were in all four such insecticidal applications. Brinjal showed no virus infestation in all the treatments including the controls. The experiments, conducted with reference to bhendi on the main season crop as well as summer crop also did not lead to positive conclusions. The incidence of the virus disease was common in all the plots though the percentage was lower in the case of DDT. Isolated planting of a resistant variety of bhendai bulk K4—and removing the infested plants as and when they appeared gave more promising results. The work will be continued for one more season.

(ii) *The Sweet Potato Weevil—Cylas Formicarius Fb.*—Six fortnightly applications commencing at a time when the crop is about six weeks old indicated the usefulness of Aldrin and Dieldrin either as dust at 2.5 per cent or spray at 0.1 per cent in the control of this borer. Increased yields were also evident as a result of adopting this treatment.

(iii) *The Potato Tubermoth: Gnorimoschema Opercullella Z.*—The control experiments against this pest were in progress at the Agricultural Research Station, Nanjanad, with reference to the three crops raised at that station. One round of insecticidal treatment with DDT, BHC, Folidol, Dieldrin, Endrin and Aldrin was given when the crop was about 40 days old. The results were assessed with reference to the percentage of affected tubers at harvest. The percentage of infestation, with reference to the irrigated crop, ranged from 2.6 to 5.1 in the treated as against 12.4 in control. Best results were obtained in the case of DDT, closely followed by Dieldrin.

(c) *Pests of fruits—Fruit flies on plums—Chaetodacus Sp.*—Studies were continued on the bionomics and control of these flies at the Pomological Station, Coonoor. A fair trial was given to some of the inert dusts like French chalk, Vadavalli clay, etc., and their properties as a repellent were studied. The 'Kelsey' variety which comes to harvest late in the season and is therefore, the most affected variety by fruit flies, was fixed up for the experiments. Six rounds of insecticidal applications at fortnightly intervals were given. The trials did not lead to any positive conclusions, owing to the low incidence of the fly and the mechanical damage caused to the fruits by the advent of a hail storm when the trees were in bearing.

(d) *Pests of cotton.*—Work on the spotted boll worm of Cotton Earias Sp. was intensified at the Agricultural Research Station, Aduthurai and Coimbatore. In the former locality, the pest has assumed serious proportion during recent years on the cotton crop raised in rice fallows. The 1954 crop received in all seven rounds of insecticidal treatments at fortnightly intervals. The results were in favour of Parathin spray 0.025 per cent (Folidol E605 and Ekatox-20) with reference to a lowering of pest incidence and increase in yield. At Coimbatore experiments were in progress with reference to the main season crop, the variety being MU1. Two sets of trials were conducted. In the first set, the insecticidal treatments were restricted to three rounds, applied at fortnightly intervals. In the second set the number of rounds was increased to five, the first round application being made when the crop reached the sixth week stage in both cases. Endrin (one ounce in six gallons) has given the best results as judged by a reduction in pest incidence as well as an increase in yield. Folidol (one ounce in twelve gallons) came next in the order of efficiency. The investigations are being pursued, with reference to the cotton crop raised in rice fallows at the paddy breeding station and Central Farm, Coimbatore.

(e) *Pests of stored products*—(i) *Chemical treatment of seeds.*—Cowpea, pillipesara, cumbu and cholam seeds treated with Lindane 0.65 per cent and DDT 10 per cent dust, as various dosages ranging from 1 : 100 to 1 : 500 parts of seeds were kept in storage for one year. The different samples were being examined at periodical intervals. The lots treated with DDT remained immune against insect at all the concentrations, even up to a period of one year. Lindane was less effective. In the course of another set of trials, the insecticidal properties of dusts of *Milletia Pachacarpa* and *Acorus* were critically studied. Both the products offer some promise.

(ii) *Preservation of dry ginger.*—Fumigation with calcium cyanide and Methyl Bromide did not confer any lasting benefits with reference to the incidence of the beetle—*Lasioderma Serricornis F.* Sulphur dioxide treatment was less effective.

(iii) *Fumigation of oil seeds with methyl bromide.*—It has been tentatively concluded that a dosage of two pounds per 1,000 c.ft. with an exposure of 24 hours methyl bromide is a safe fumigant for the treatment of seeds having a high oil content. The voluminous data gathered on bromine residue have been sent to the Director-General of Health Services, New Delhi, for an authoritative opinion.

(iv) *Bionomics and control of bruchids.*—Studies on the evolution of a suitable method to preserve pulses seeds against bruchid damage have indicated the usefulness of maintaining a layer of sand or acorus dust up to a height of one inch above the seed in conferring immunity against the pest.

(f) *Pests of oil seeds*—(i) *The red hairy caterpillar*—*Amsacta Albistriga*, M.—Toxaphene dust 20 per cent, folidol and endrin sprays (one ounce in 12 gallons) have proved highly effective against medium-sized caterpillars, which is the most destructive stage of the pest. Higher concentrations of the last two mentioned chemicals, cause appreciable kill of even full-grown caterpillars. The method, now evolved, is a definite improvement and is easy of adoption in the control of this serious pest.

(ii) *The castor semi-looper*, *achoea janata* L.—The efficacy of certain newer formulations of pesticides, viz., BHC, DDT, Toxaphene, Aldrin, Diel-drin and Agrocide cotton dust is being studied against this pest. There was practically no incidence of the caterpillar, in the fields where the insecticidal applications have been made once, twice and thrice, in separate sets of plots.

(g) *Work on insecticides and fumigants*—(i) *Test of proprietary products and new chemicals*.—As in previous years, this item constituted an important feature of the work of the section in the sense that the results obtained are of considerable help in improving the standard of plant protection work in the districts. Different brands of BHC, viz., Hexamar, Hexidol, Gammexane, Benexide, Lathalrock, etc., were tested against insect pests and their comparative performance studied. Three commercial brands of BHC were also got analysed for their technical BHC and Gammexomer contents. Endrin, Isodrin, Diazinon formulations, Pival and Pivalyn constitute the new chemicals that are under intensive tests.

(ii) Tea fluff, and extracts obtained from soapnut, wattle bark, *cassia auriculata*, *acacia concinna* and cashewgum were tested against a few species of aphids and mites. None of these vegetable preparations offered any degree of relief.

(iii) Soil treatment with DDT and Chlordane proved effective against cockchafer grubs. Applied as soil insecticides at normal dosages, none of the synthetic chemicals now in common use in the districts, affected adversely the viability of seeds sown in such treated plots.

(iv) Studies on the adverse as well as beneficial effects as a result of repeated applications of the new synthetic chemicals were also pursued. DDT applied as a dust or spray was found to result in a better growth of groundnut and bhendai.

(h) *Biological control*—*The Australian predator beetle*—*Cryptolaemus montrouzieri* muls—was under mass rearing, having the Cactus Cochineal as the host material. A total of 36,213 beetles was reared and utilized for trial releases against different species of Coccids. The predator was able to establish itself well in nature and was noted to feed freely on the brinjal mealy bug—*Phenacoccus Insolitus*, Gr. Detailed observations are in progress, to note the effects of repeated releases, with reference to lowering of the pest incidence. The specific parasites of the black-headed caterpillar of coconut—*Eulophids* and *bethylids*—were also under rearing. A total of 50,900 Eulophid parasites were supplied to the districts for liberation in affected gardens. Nucleus stock of *Trichogramma* was maintained. General observations on the parasite complex of *earians* sp. and *schoenobius incertellus* W were continued as and when possible.

Systematic work.—Particular attention was paid to Thysanoptera, Aphididae and Lipidoptera. Other groups also received some attention as and when time permitted.

Fundamental work.—Studies on the bionomics of *Coccinella Septempunctata* F were in progress. The predator was found to feed on a number of species of aphids. Pestox 3 H spray was found to exterminate the aphid population leaving the adults and grubs of *Chilomenes Sp* unaffected.

Plant quarantine work.—The Plant Quarantine Stations, Mettupalayam and Shembhaganur, were closed by December 1954 in accordance with the orders issued in G.O. No. 3424, Agriculture, dated 26th November 1954. A total quantity of 398 tons of wattle bark was fumigated, besides the examination of a number of consignments of notified plants, at these centres.

Scheme for the establishment of a Regional Bee Research Station, Coimbatore (financed by Indian Council of Agricultural Research).—The work was carried on as per the approved technical programme. In respect of pedigree queens sixteen colonies were requeened with the progenies of the selected colonies that were bred during the period under report. Besides queens reared out from a colony that gave the maximum yield of honey during the current year are heading three other colonies.

It was observed that the quantity of nectar secreted varied from plant to plant in the same locality due to soil, nearness to irrigation sources, etc., but the concentrations were more or less the same.

The study of biometry revealed that the difference in number of hooks and wing and tongue lengths between good and poor yielders in a locality were highly significant.

From a study of the pollen substitute trials conducted so far, it appears that the brood rearing is affected by the monsoonish weather, pollen being available to the bees almost throughout the year around Coimbatore.

The season in general was not very encouraging to the bees and as such none of the colonies developed the impulse to swarm and hence swarm prevention trials could not be undertaken.

Sugarcane Borer Pests Scheme (financed by the Indian Central Sugarcane Committee).—A detailed study of the borer pests was conducted at Coimbatore, on the three varieties Co. 413, 419 and 421 with reference to their incidence and damage, the influence of weather factors on population of borers, their alternative host plants, natural enemies, varietal resistance of the borers, etc.

The varieties were planted on 20th and 21st April 1954 in plots of 6-4 cents replicated six times. Fortnightly examinations were conducted from the date of appearance of dead hearts till harvest time, in four marked-out rows of 11 feet unit length in each row for each plot for the mortality and compensation indices study. Tri-weekly examinations were also conducted to assess the borer incidence and population by digging out clump samples in 11-feet lengths from all the plots.

This year's data indicate that Co. 419 is the least affected by *chilotraea*, compared to the other two varieties. Similarly Co. 413 showed least incidence with regard to infestation by *proceros*. As regards alternative host plants, larvae of *Proceros* were noted for the first time in *echinocloa colona*. No new parasites were recorded on any stage of the borers.

Insecticidal trials were conducted against termites at Neikuppam using DDT, BHC, lead arsenate and lime. As the termite infestation was very light in the area, no conclusive results could be drawn and further trials are necessary.

Miscellaneous—Fumigation and phytosanitary work.—Thirty-nine phytosanitary certificates were issued for the despatch of plant and plant materials to countries outside India by departmental and other agencies.

4. AGRICULTURAL MYCOLOGY.

Disease of rice—1. Blast Piricularia Oruzae—Varietal resistance trials.—Field experiments were laid out at two different places, viz., Central Farm, Coimbatore, and Agricultural Research Station, Aduthurai. At Coimbatore 64 long, 54 medium and 28 short-duration cultures were tested. These were made up of 84 promising cultures carried over from previous years' trial, 69 new cultures supplied by the Paddy Specialist, Coimbatore, and 3 cultures received from Cuttack. At Aduthurai all the above cultures excepting the Cuttack Cultures were under trial. At both the centres, the incidence of blast was light in spite of repeated spray inoculations due to unfavourable seasonal conditions as was the case in some of the previous years.

At Coimbatore in the short-duration series, three varieties reported to be resistant and received from Central Rice Research Institute, Cuttack, remained free from infection, while infection in the susceptible control Co. 13 was 25.47 per cent.

At Aduthurai, the percentage of neck infection was found very light even in the susceptible control Co. 13 and all the other cultures have recorded significantly lower incidence of disease than the control.

In the medium and long-duration cultures at both the centres, the incidence of infections was very light in spite of repeated spray inoculations owing to unfavourable weather conditions. The susceptible control, viz., ADT 10 exhibited only about 10 per cent infection and all the other cultures showed lesser infection.

Fungicidal trial.—The comparative efficacy of the application of Bordeaux mixture 1 per cent Perenox, Cupravit, Trifungal, Fungicopper, Coppesan, Shell Copper fungicide and Fungimar all at a strength of 1 lb. in 40 gallons of water in controlling the disease was tested on a susceptible variety Co. 13 at Coimbatore and on ADT 10 at Aduthurai. At Aduthurai only the first 3 fungicides were used. The disease was prevalent in all the plots and the results were not conclusive.

B. Foot-rot—Fusarium moniliforme var majus—(i) *Fungicidal trials.*—The relative efficacy of five seed dressings in controlling foot-rot was tested. The following three fungicides, viz., Ceresan, Harvesan and Agrosan G.N. were found effective in controlling the disease.

(ii) *Varietal resistance trials.*—Eleven cultures including the susceptible control, viz., Co. 10 were tested and 3 of them exhibited less than 5 per cent infection.

C. Stem-rot—Sclerotium—(1) *Varietal resistance trials.*—Twenty-eight 'kuruva' varieties of paddy including nine Chinese varieties were tested for their relative reaction to stem-rot at the Agricultural Research Station, Aduthurai. The incidence of disease was low and the variety ADT. 4 recorded the maximum infection of 9.9 per cent, while the varieties Ch. 62, ADT 15 and Co. 22 remained free from infection.

(2) *Fungicidal trials.*—In order to study the relative efficacy of the fungicides in controlling stem-rot, three fungicides were used for drenching

the soil. The susceptible variety ADT 3 was grown in the experimental plots. The disease was prevalent in all the plots and the infection percentage ranged up to 30 per cent. However, there was little difference between the treated and control plots.

(3) *Manurial trials.*—The effect of varying levels of nitrogen, potash and phosphorus on the incidence of the disease was investigated under field conditions at the Agricultural Research Station, Aduthurai. The highly susceptible variety ADT 3 was grown in the experimental plots. The disease was found prevalent in all the plots and the difference between treatments were not statistically significant.

(4) *Regulated water-supply.*—In order to study the effect of varying levels of water on the incidence of stem-rot an observation plot was laid out with four treatments. The variety ADT 20 was planted in the experimental plots. The incidence of disease was low in the experimental plots; hence no conclusions could be drawn.

(5) *Role of Insects on the incidence of Stem-rot.*—In order to study the role of insects on the incidence of stem-rot, an experiment was conducted in pots with five treatments. The results revealed that maximum incidence of stem-rot occurred when all the three, viz., jassid, fulgorid and fungus, were introduced.

(6) *Effect of organic matter on the incidence of stem-rot.*—In order to determine the effect of organic matter on the incidence of stem-rot, an observation plot was laid out with two treatments. The plots were planted with the susceptible variety ADT 3. The disease was prevalent in both the plots and the percentage of infection is given below. The plot with 5,000 lb. of green leaf per acre showed 30 per cent infection, while that with 10,000 lb. of green leaf showed 27 per cent infection.

Ragi Blast—Piricularia Sp.—One hundred and twenty-six cultures were tested for their relative resistance to blast in collaboration with the Millets Specialist. Among the cultures tested, 32 of them exhibited less than 10 per cent neck infection.

The effect of varying levels of nitrogen, potash and phosphorus on the incidence of the disease was investigated under field conditions. From the results the indications are that the incidence of blast increases with the increase in the dosage of N, while P2O5 and K2O do not seem to have any influence on the incidence of blast.

General rusts—(a) *Wheat rusts—Puccinia Graminis P. Triticina and P. Glumaram.*—Three exotic varieties were grown on the Nilgiris to assess their reaction to rusts. It was observed that Kenphad 28 and Kenya variety were infected with brown rust with the intensity of infection ranging from 20–40 per cent and 40–60 per cent respectively, while the third one was free from all the three rusts. At Coimbatore eleven varieties were grown, nine in replicated plots and two in observation plots to assess their reaction to rusts. It was observed in the replicated trial that the variety "Charter" exhibited only stray incidence of black rust and recorded 82.31 per cent increased yield over the control.

(b) *Sorghum rust—Puccinia Purpurea.*—Fifty-three cultures of Sorghum were assessed for their relative reaction to rust. Seven cultures exhibited freedom from infection.

(c) *Cumbu rust—Puccinia Penniseti.*—The agronomically important cultures of cumbu grown at the Millets Breeding Station were assessed

for their relative reaction to rust infection. The percentage of infection in the different cultures varied from 20—100 per cent. Eleven important hybrids raised by the Millets Specialist were found susceptible to rust, their intensity of infection ranging from 20—100 per cent.

(d) *Tenai rust*—*Uromyces Setaiae*—*Italicae*.—The fifteen Japanese cultures of Tenai were tested for their relative resistance to rust. Rust incidence was observed only on Shinden and Kokubu awa. But the incidence of rust even on Co. 1, the susceptible control, was very low. The same cultures were also grown in pot culture house and subjected to artificial inoculation. Six cultures were free from rust, while the others exhibited rust incidence varying from 5—40 per cent.

Investigations of diseases of pulses—(i) *Anthracnose of French Bean and Dolichos Lab Lab Colletotrichum Lindemuthianum*.—Comparative studies made on the cultural characters of the two isolates of the fungus revealed that the isolate from Dolichos Lab Lab showed good growth at laboratory temperature, while the isolate from *P. Vulgaris* grew well only at 60 degrees F. Pathogenicity studies of the casual organisms revealed the presence of two races of the fungus each capable of infecting its own host only.

(ii) *Root-rot of pulses*—*Rhizoctonia Bataticola* was found responsible for causing root-rot of pulses. The fungus has been isolated from wilted specimens of greengram, cowpea and pillipesara obtained from different localities. The promising varieties of greengram, horsegram, blackgram and cowpea received from the Millets Specialist are being tested for their resistance to the disease. Wilt of pillipesara caused by *Rhizoctonia Sp.* was effectively controlled in the field by drenching the soil with 1 per cent Bordeaux Mixture, 0.1 per cent Ceresan (wet) and cheshant compound.

Investigation of diseases of cotton—(a) *Black Arm*—*Xanthomonas Malvacearum*.—Thirty-six cultures including two susceptible cultures were tested for their relative reaction to black arm at the Cotton Breeding Station. In general, the incidence of disease was low in spite of repeated spray inoculation due to want of favourable seasonal conditions, for the development of the disease. However, among the cultures tested selections of 2196A and 2196B were found to be free from both leaf and stem infection. Seed treatment with four seed dressings, viz., Streptomycin, sulphate 100 ppm. and 200 ppm., Agrosan GN and sulphuric acid were carried out to assess their relative efficacy in controlling seed-borne infection with suitable controls. All the treated series recorded less than 4 per cent primary infection as against 13 per cent infection in the control. The comparative effects of spraying the crop with fungicides were assessed for the control of secondary infection. The stand and growth of the crop were adversely affected by heavy incidence of insect pests. Hence the correct assessment of the effects of the different treatments could not be made.

(b) *Root-rot (Rhizoctonia Bataticola)*.—In order to find out whether root-rot can be controlled by the soil application of the fungicides, a field experiment was laid out using eight fungicides. From the mortality counts it was found that all the treatments recorded less incidence of the disease than the control. Among the treatments Ceresan (wet), Bordeaux mixture and Leytosal recorded the least incidence of disease.

Investigations of diseases of fruits and vegetables—(a) *Deterioration of Mandarin Oranges*.—The experiment was repeated at the Agricultural Research Station, Ambalavayal, to find out whether deterioration of the trees could be improved by manurial applications and spraying the foliage with certain chemicals. Five treatments were included, viz., (1) soil application

of manures (cattle manure, ammonium sulphate, super-phosphate, urea and lime); (2) soil application of the same manures plus spraying the foliage with urea; (3) soil application plus spraying the foliage with urea and zinc, magnesium and manganese sulphate solutions; (4) soil application plus spraying the foliage with solutions of zinc, magnesium and manganese sulphate and (5) control (no treatment). The treatments were given twice in a year. From the observations made at the end of the year, the treated trees showed an improvement in condition and gave significant increase in yield while the control trees exhibited further deterioration.

(b) *Limb breakage*.—*Diplodia* and two basidiomycetous fungi, viz., *Ganoderma Lucidum* and *Trametes Cervina* were found to be associated with limb breakage. The inoculations with the two fungi were repeated on young *Citrus* plants and positive infection of the bark was evident.

Banana Wilt—*Fusarium Oxysporum var Cubense*.—A field experiment has been laid out on the Central Farm with 28 varieties to observe their resistance to wilt. They have been artificially inoculated and the following varieties, viz., Vellavazhai, Anakomban, Kali, Karivazhai, Pachandan, Monthan, Kunnan, Tellachakkarakeli, Thattilakunna, Chenkadali, Peyan, Ney Poovan, Aiyramkarasthali and Malavazhai have so far been found infected. The incubation period of the fungus multiplied on sand oats medium is less by two weeks when compared to that multiplied on sterilized host material. Comparative cultural studies of the three isolates of *Fusarium* from Monthan, Pachanadan and Kali were made. Considerable variations were observed between the three isolates in their reaction on various media. Physiological studies with the three isolates revealed that the isolates from Monthan and Pachanadan produced the endymes emulsin, erpsin; diastase; trypsin, amidase and oxidase whereas the isolate from Kali produced only diastase; oxidase and amidase. Drenching the soil with fungicides, viz., Ceresan Wet and Cheshant compound were found not effective in controlling the disease when applied 24 hours after inoculation.

(i) *Root-rot of Chilli and Yam*—*Sclerotium Rolfsii*.—The two isolates of *S. Rolfsii* from yam and chilli were found pathogenic to various other vegetables, pulses, etc., in varying degrees. The fungus was able to infect young chilli seedlings within three days whereas it failed to infect older plants. Infection was maximum when inoculation was done on the soil surface and it decreased with the increase in depth at which the inoculum was placed in the soil. It was also found that high humidity favoured the infection. Comparative cultural studies with the two isolates revealed quicker growth in oats and french bean agar. Chilli isolate produced spherical sclerotia in singles whereas the yam isolates produced sclerotia sparsely in cultures in inseparable, irregular mass. It was found that the maximum, minimum and optimum temperatures for the growth of chilli isolate were 35 degree C, 15 degree C and 30 degree C respectively and for the yam isolate it was 30 degree C, 15 degree C, and 26 degree C respectively. Both the isolates completely died out at 45 degree C. Extracts of germinating pulses when added to culture media favoured the growth of *S. Rolfsii* whereas the extract of betel vine leaf inhibited the growth. One month old chilli seedlings were grown in the two filtrates of the fungus, in the control solution and in tap water. The seedlings grow in the filtrates wilted in an hour's time whereas in the control solution and in water they remained fresh and turgid. The filtrates were tested and found to contain oxalic acid. 0.1 per cent solution of Agallol was found very effective in reducing root-rot of chilli caused by *S. Rolfsii* and 0.1 per cent solution of wet ceresan was very effective in controlling root-rot of cucumber, zinnia and cotton induced by inoculating

chilli isolate of *S. Rolfsii*. **Potato** : With the object of maintaining a nucleus stock of virus free seed tubers of 'great scot' seed materials supplied by the Superintendent, Agricultural Research Station, Nanjanad, have been multiplied on the Ergot farm by systematic roguing of all plants showing virus infection. An area of 9.90 acres was put under potato and planting was done towards the end of March 1955 using the seed material obtained from the second crop of 1954-55. Germination and growth of the crop are good. Systematic roguing of virus infected plants is being attended to.

Investigation of the Stem-breaking disease of Arecanut.—The investigations were continued. Sixteen more areca gardens in South Kanara were surveyed and stem-breaking was prevalent in all the gardens. The incidence was less in gardens where coconut and arecanut were grown together. Several fungi were isolated from the affected portions of the stem, viz., *Ganoderma Lucidum*, *Polyporus Sp.*, *Lenzites Sp.* and *Ceratostomela Paradoxa*. These when inoculated on to young areca palms through wounds were found capable of producing infection. Recording of temperature of the surface of young areca palms showed a wide variation of temperature up to 17.5 degree F between the South Western and North Western sides, the former side showing a higher temperature. The same side was subject to a very high fluctuations of 32 degree F during the course of the day. Palms coated with tar and 2 per cent Bordeaux mixture with resin and soda on their stems were completely scorched on the south-western side only. Whereas zinc white painted and non-painted controls were quite unaffected. All these go to show that initial scorching is caused by the afternoon sun and further deterioration and damage is caused by the several woodrotting fungi. Spraying acid and neutral Bordeaux mixtures on the stems of palms resulted in higher percentage of incidence than spraying alkaline, Bordeaux mixture and no spraying. Painting zinc white over the surface of stems, was able to protect the trees from the incidence of stem-breaking to some extent. Prophylactic treatment with crescent(?) was of no avail in preventing further deterioration of the patches. Spraying 1 per cent solution of urea on the foliage of palms did not have any effect in reducing the incidence of stem-breaking. However spraying solutions of zinc sulphate, magnesium sulphate and boric acid and combination of all these was found to improve the general condition of the crowns of palms, particularly those showing symptoms of "Band" disease. Preliminary observations on the 'nut splitting' showed that it can be reduced by making three longitudinal slits at the base of the spadix. Preliminary transmission tests to find out if 'Band' disease is of virus nature, were negative. Relative efficacy of the different fungicides in controlling 'koleroga' could not be assessed due to the absence of disease in the garden.

Ergot production.—A total quantity of 125 lb. of ergot was produced and 9,243 lb. of rye grains were obtained.

Plant quarantine.—Seeds and plant materials intended for export were examined and phytosanitary certificates were issued.

5. AGRICULTURAL METEOROLOGY.

The object of the section is to collect data on the influence of climatic factors on crop growth and yield and also on the incidence of pests and diseases on crops. Long range collection of data is essential before the prediction of the incidence of pests and diseases on crops from a knowledge of the existing weather conditions is attempted with a fair degree of success.

Main lines of research pursued in this Section.—(i) Collection of daily meteorological and micro-climatic data, the latter both in the open and in crop fields at 07.00 and 14.00 hours is being attended to regularly.

(ii) The crops that are under crop-weather experiments in the four agricultural research stations are detailed below :—

- (a) Coimbatore—Paddy, Cotton and Chulam.
- (b) Aduthurai—Paddy, Kuruvai and Samba.
- (c) Pattambi—Paddy, First Crop and Second Crop.
- (d) Koilpatti—Cotton and Cumbu.

Precision observations are recorded in the abovementioned crops as per the technical programme drawn up by the Director, Agricultural Meteorology, Poona, on all-India basis.

A record of the outbreak of pests and diseases on these crops is being maintained in addition to the collection of exhaustive data on weather conditions in order to assess the influence of weather conditions on the extent of damage done by pests and diseases to crops. Data are also collected on soil moisture in the open observatory as well as in the cropped fields in the case of rainfed crops.

Statistical analysis.—(a) The analysis of data on thunder, lightning and pressure in relation to rainfall at Coimbatore was finalized and a short note in this connection was published in the journal of meteorology and geophysics.

(b) The crop climate relationship of pepper at Taliparamba was assessed statistically.

(c) The nature of lag between evaporation from a petridish, kept in shade and rainfall at Coimbatore was estimated statistically.

(d) The effect of solar insolation on soil temperature at 5 cms. and 10 cms. depths at Coimbatore was determined with the available fifteen years' data.

(e) The role of climatic factors in the cultivation of groundnut at Tindivanam (South Arcot district) was assessed statistically.

(f) The data on coconut trials conducted by the Oilseeds Specialist were statistically analysed.

(g) The "Friducial limits" of the expected monthly rainfall at Taliparamba were estimated.

(h) The variation of soil moisture at different depths in the open observatory at Coimbatore was assessed with reference to maximum temperature and rainfall.

(i) Compilation of soil temperature data at intervals of two hours for 3 inches, 6 inches and 12 inches depths from the soil thermograph charts was attended to.

(j) The seasonal showers were worked out districtwise for the years 1952, 1953 and 1954 and the concerned poster was revised including the data of these three years also.

(k) Compilation of soil moisture data collected at Coimbatore and rainfall data received from the District Collectors was regularly attended to.

(iii) **Influence of Meteorological Factors on the incidence of pests and diseases on cultivated crops.**—In this connection, the following pests and diseases were studied :—

(1) Stemborer on paddy at the Agricultural Research Station, Pattambi.

(2) Stemborer, early shoot borer and top shoot borer on sugarcane at Coimbatore.

(3) Surulpoochi and Tikka leaf spot disease on groundnut at Tindivanam.

(4) 'Pollu' on pepper at Taliparamba.

Collaboration studies with the Government Entomologist and Government Mycologist in the prediction of outbreak of pests and diseases on crops.—(a) Systematic data are being collected for the second year in succession on groundnut, ragi and cholam crops to assess the relationship existing between the meteorological elements and the incidence of pests and diseases on crops. On cotton, data have been collected for one year. Collection of data on this crop will be resumed when the next season starts.

(b) Ten Agricultural Research Stations up to April 1955 and eleven stations from May 1955 are collecting details by eye observation on the influence of meteorological conditions on the incidence of pests and diseases on crops.

(iv) *Research.*—To collect precise data on the influence of the various meteorological factors on the growth of cholam crop, systematic data were collected for the second year in succession on height, number of tillers, number of fully opened leaves and number of internodes on 24 plants selected at random in each of the two varieties of cholam, namely, Co. 1, and Co. 3. The observations were recorded in the bulk area of the crop-weather plots.

6. CROP IMPROVEMENT WORK.

(a) Paddy.

(1) *Pure line selection for evolution of high yielding strains.*—The object of this work is to improve local varieties by selecting pure lines. Culture 1828 in Halluga, Culture 1958 in Kanwa and Culture 3159 in Mascothy were released from the Paddy Breeding Station, Mangalore, as strains MGL. 1, MGL. 2 and MGL. 3 respectively. They will serve an area of 50,000 acres in South Kanara district. Culture 2482 in Athikriya (a second-crop variety for South Kanara) and Culture 6027 of Arikkirai (for Malabar) are ready for release as strains. These strains will serve an area of not less than 20,000 acres in West Coast. Other cultures of some of the popular varieties in which there are no improved strains are in different stages of study and useful material have been retained.

(2) *Varietal trials.*—The object of the trials is to find out if the strains and varieties already evolved for certain regions would suit other regions and tracts. At Mangalore, out of 28 outstation strains studied, PTB. 22, PTB. 23 and PTB. 28 in the first-crop season and SR 26 B in the second crop season were found to be promising. Ten short duration Chinese varieties were compared for yield against the local strains at Aduthurai, Coimbatore, Wynaad and Tirurkuppam. Three types, namely, Ch. 41, Ch. 62 and Ch. 63 were found promising at Coimbatore.

(3) *Hybridization.*—This study is calculated to evolve strains suitable for different situations with the object of combining certain desirable characters such as resistance to drought, floods and blast disease, stiff straw, dormancy, earliness, etc., along with the high yield of existing strains released for cultivation. From the different sets of hybrid progenies that were studied, two cultures of *Kavinginpoothala* × *GEB 24* were found to retain their viability in South Kanara while one Culture 5103 recorded 6 to 27 per cent increased yield over the popular strain ASD. 5 in Tirunelveli district. Two promising

blast resistant cultures have been fixed at Coimbatore, namely, 6517 and 6522 of Cross Co. 13 × Co. 4 and one medium duration Culture 6538 of Cross *GEB. 24* × Co. 4, which are being tried on cultivator's fields in the districts. These cultures when released as strains will serve extensive areas in the State where the popular short duration strain Co. 13 and medium duration strain *GEB. 24* are at present grown. The following progenies were carried forward for further studies :—

	Number of progenies carried forward.
Blast resistance	3,860
Drought resistance	709
Saline resistance	232
Dormant short duration strains	183
Japanica × Indica crosses	1,597
Short and medium duration strains with stiff straw.	10
Non-deteriorating Co. 3 type	136
Short duration strain with fine quality rice	389
Short duration strain with non-shedding character	190
High Yielding Cosmopolitan strain	22

(4) *Agronomic trials.*—(a) *Manurial trials.*—At Mangalore, chilean nitrate was found to be more efficacious than ammonium sulphate in the first-crop season while ammonium sulphate was better for the second crop. At Pattambi, chilean nitrate to supply 40 lb. N over basal dressing was on a par with 60 lb. N. in the form of ammonium sulphate. It was found that the yield difference between plots applied with phosphate direct or through green manures was not significant. *Varietal manurial* trials showed that the varieties used respond equally well to the manuring and that high dose of nitrogen in the form of ammonium sulphate contribute to high yields irrespective of the dose of super applied. *Compost experiment* conducted at Pattambi to test the relative merits of compost prepared from leaves of deep, medium and shallow rooted plants, namely, Jack, Gliricidia, and Sesbania showed that Gliricidia leaf compost to supply 30 lb. N. was on a par with Sesbania compost to supply 30 lb. N. Sesbania applied in the dry form resulted in 8 per cent increased yield while green Sesbania gave 16 per cent more yield than no manure plot in experiments conducted at Aduthurai. Seaweed compost was found unsuitable as a manure for paddy crop at Aduthurai. At Coimbatore 30 lb. N. in the form of ammonium sulphate when placed deep to the root zone recorded as much yield as 45 lb. N. applied by broadcast method.

(b) *Cultural trials.*—The experiment on Japanese method of cultivation versus Farm method of cultivation was conducted at eight Research Stations of the State with two varieties as main plot treatments and the two methods, namely, Japanese and Farm, as sub-plot treatments. The results showed that the Japanese method in which larger dose of manure was applied recorded higher yields than the Farm Method in all the stations except at Aduthurai and Pattukkottai. But the yield increase was not commensurate with the extra expenditure due to application of heavier doses of manures. To investigate the benefits, if any, due to inter-culture and also to find out the

optimum spacing to be given in the row for the Japanese method of paddy cultivation, an experiment was conducted at Coimbatore, Mangalore, Palur and Ambasanudram. It was found that the effect of inter-cultivation is not significant in any of the centres. From the results of "Udu" trials conducted, to find out the optimum ratio of Kuruvai to Ottadan seed mixture to be used for "Udu" cultivation, it was concluded that a provision 3 : 1 of Kuruvai to Ottadan is the best.

(5) *Fundamental work*.—Treatment of seed with Caresan at higher doses, namely, 4 g.m. and 5 g.m. per lb. of seed treatment of the germinating seed with Acenaphthene and exposing the blooming spikelets to Benzene vapour have resulted in spotting out some mutants. A total of 14 Cultures were under yield trial out of which seven high yielding ones were carried forward. One mutant of Co. 13 obtained by Acenaphthene treatment is under largescale multiplication.

(6) *Seed distribution*.—A total quantity of 464,736 lb. of seeds of improved strains of paddy was distributed during the year from the Agricultural Research Stations, Coimbatore, Pattambi, Mangalore, Aduthurai, Pattukkottai, Tirukuppam, Palur, Ambasanudram and Paramakudi. This would serve to raise at least 15,000 acres of primary seed farms.

The increase in yield on account of the use of improved seeds is estimated at 10 to 15 per cent over the locals. During the year, 1955 tons of improved seeds raised in Seed Farms have been distributed to the ryots. This quantity is estimated to cover an area of 87,975 acres resulting in additional production of 5,891 tons of rice and the economic gain to the State will be about Rs. 17,67,300.

(b) Millets and Pulses.

Selection work and hybridization for the evolution of improved strains of millets and pulses were continued at Coimbatore and the regional centres of work at Ariyalur and Tirupattur. The chief objects were the evolution of high yielding strains, synthesizing new cultures with better quality of grain and straw, resistance to diseases, pests and parasites. A brief account of work done and the results achieved is given under each crop.

(A) *Cholam*.—Five hundred and thirty-five types representing 20 species were grown and maintained. In Periamanjai, the major dry land variety of Coimbatore, 11 families of the third generation of crosses between bold grained reddish straw types and juicy types have been taken for further studies. In addition, 13 hybrids for combining juiciness with high grain yield have also been carried forward for further trials. Culture A.S. 8006 of Talai-virichan, the chief variety in the central districts with pearly white grains has been released as a new strain TPT. 1. This is capable of spreading in an area of 5,100 acres in Salem and North Arcot districts giving an additional production of 230 tons grain valued at Rs. 51,000. Another Culture T.S. 29 with white chalky grains isolated at Tirupattur has given 38-50 per cent increased yield of grain over the local varieties in Chengam and Cheyyar taluks of North Arcot. This and another culture A.S. 7657 with juicy stalks have been issued for trials in North Arcot and Salem districts. Ten bold grain selections and 15 with bold grains and juicy stalks from the progenies of crosses await trials in compact family blocks. At Ariyalur, a culture A. Ch. 213 has been advanced to yield trials. In Makkattai cholam, the major dry land variety in South Arcot and Tiruchirappalli districts, three cultures of the yellow grain group (Manjamakkattai) were superior to the local in yield trials

conducted at Ariyalur. In Vellaimakkatai, two cultures A.S. No. 7537 and A. Ch. 183 have been issued for trials in the districts as they were superior to the local in three years of comparative yield trials conducted at Ariyalur. In Irungu, culture A.S. 7081 (Periamanjai × Irungu) awaits release as a new strain of Irungu for grain fodder purposes after successfully completing trials in the districts. At Coimbatore, two cultures A.S. No. 8543 and A.S. 8806 combining juiciness with bold grains and significantly superior to A.S. 7081 both in grain and straw yields, have been brought to final yield trials. Six bold grain types from the progenies of crosses have been taken for further trials at the Agricultural Research Station, Koilpatti. In yield trials conducted at Ariyalur, two cultures in each of Kaka Irungu and Sev Irungu were superior to the local bulk samples of the respective varieties. Two cultures of dry land Sen Cholam significantly superior to the local bulk samples have been advanced to yield trials at Ariyalur. A culture A.S. 9028 from the progenies of crosses between strain Co. 1 and A.S. 4003 (Bonganhilo) a type reported for striga resistance, superior to Co. 1 in grain and straw yields and as resistant to the parasite as A.S. 4003 in a striga sick field has been issued for trials in places where striga attack was reported to be severe in Coimbatore taluk.

Irrigated cholam varieties.—Culture K.S. 288, Vellai cholam isolated at Koilpatti found promising in trials conducted in Tirunelveli district, awaits release as a new strain. Culture AS. 8746 of Chinnamanjal, superior to Co. 5 both in quality and quantity of fodder and equal to it in grain yield, has been issued for trials in the Chinnamanjal area. Another culture, AS. 8388 of Vellai cholam superior to the short duration strain Co. 12 in grain yield is also under trials in the irrigated areas of the State. Seven cultures of Sen cholam are in final yield trials. A bold grain culture AS. 7589 of this variety is under district trials for confirmatory results in parts of Salem district.

In the studies on the linkage relationship between axil colour and sheath pigmentation, a linkage was observed between reddish purple sheath and purple axil, the cross over percentage being 29.1 and 31.5, respectively.

(B) *Cumbu*.—Work was in progress on the evolution of highyielding hybrids under a scheme partly financed by the Indian Council of Agricultural Research. Two hundred and fifty-three inbreds in various selfed generations were studied. Of the 16 hybrids of medium duration and 13 of short duration tested in advanced stages of yield trials, 14 of the former and 11 of the latter were significantly superior to their standards Co. 1 and Co. 3 respectively. Studies on the reduction of yield from F. 1 to F. 2 in cumbu hybrids indicated that for the hybrids chosen, the reduction between the two generations is varying and that there is statistical equality between the F. 2 yield of hybrid and of the standard. Investigations were continued on the feasibility of producing economic hybrids by double cross method. Three hybrids of short duration H. 863, H. 866 and H. 874 tested in three centres of Coimbatore district, have given increased yields ranging from 32 to 51 per cent over the local varieties. These and another H. 422 have been issued for trials in six districts under irrigated conditions. Culture PT. 833, Kullan cumbu, Maduran, of short duration has been released as strain cumbu Co. 5 which is capable of spreading in an area of 8,100 acres yielding an additional production of 360 tons grain valued at Rs. 79,200. A culture A.C. 50 (Arisi cumbu) of short duration isolated at Ariyalur suitable for cultivation in June-September and another culture T.C. 97 isolated at Tirupattur have been

issued for trials in Tiruchirappalli and North Arcot districts. One hybrid P.T. 248/3-4 Co. 1-2 was significantly superior to K. 1 in yield trials conducted at Koilpatti.

(C) *Ragi*.—In the evolution of short duration strains, 56 selections have been advanced to row yields at Coimbatore. Twenty promising selections manifesting less than 10 per cent infection of *Piricularia* have been advanced to further trials. In the age of seedlings experiment, the optimum age of seedlings for transplanting was found to be 30 days in the case of Co. 7 with a duration of 100 days. There was general reduction in vigour and yield if the seedlings remain in the nursery for over 30 days. White ragi strain Co. 6 is getting popular on account of its white grain with high protein content. Non-lodging culture KR. 4, isolated at Koilpatti and found promising in Tirunelveli awaits release as a new strain. This will gradually replace K. 1 which is lodging. At Palur, ten cultures are promising in yield trials. In observation trials conducted at Pattambi and Paddy Breeding Station, Mangalore, Strains Co. 5 and AKP. 7 recorded the highest yields of 2,860 lb. and 1,058 lb. of grain respectively. At Palur, of the 78 selections tested in preliminary yield trials, ten have been advanced to yield trials.

(D) *Tenai*.—A short duration culture S.I. 4894 has been issued for trials in the districts. Twelve short duration selections significantly superior to S.I. 4894 have been advanced to preliminary yield trials. Two selections superior to Co. 1 and seven superior to Co. 2 have been advanced to comparative trials. Sixty-four single plants from eight promising samples from Japan highly tolerant to rust have been taken for further trials.

(E) *Minor millets*.—Culture A.V. 155 of varagu isolated at Ariyalur has been sent out for trials in Tiruchirappalli and South Arcot districts. Short duration culture P.M. 269 of samai has been released as a new strain samai Co. 1. This is capable of spreading in an area of 14,000 acres yielding 380 tons additional grain valued at Rs. 84,000. One culture of panivaragu and four of kudiraivali superior to their standards are in advanced yield trials at Coimbatore. A list of new strains of millets issued during the year is given in Appendix.

Pulses.—In redgram, of the 24 cultures tested in preliminary yield trials at Coimbatore, nine gave increased yields ranging from 2 to 15 per cent, the increases being not significant. Seven of these have been advanced to yield trials. At Tirupattur in yield trials conducted at the station, two cultures Nos. 55 and 63 have given 31 and 24 per cent more yields than the local. Strain SA. 1 was multiplied for distribution and 1,080 lb. of seeds was distributed. Nine cultures of field lablab significantly superior to their standards in preliminary yield trials conducted at Coimbatore and two cultures giving higher yields than the local in yield trials conducted at Tirupattur were advanced to yield trials. In horsegram, of the 57 and five cultures tested in preliminary yield trials at Coimbatore and Tirupattur respectively, 23 of the former and one of the latter that were significantly superior to their standards, have been advanced to yield trials. Cultures D.B. 7 and No. 35 have given 4 to 80 per cent more yield of grain than the local varieties in trials conducted in the Central and Southern districts. They have again been issued for trials. Seventeen types of soyabeans were grown for maintenance. Blackgram culture 212 and greengram Co. 1 have recorded acre yields of 420 and 403 lb. grain at Tirurkuppam. Greengram Mung T. 1 did not compare favourably with the local as an after paddy-crop at Aduthurai. Strains of Bengalgram Co. 1 and greengram Co. 1 were multiplied at Coimbatore.

Distribution of seeds of improved strains of millets and pulses during the fasli 1364.

Crops.	Quantity distributed in lb.	Area expected to be covered in acres.	Additional production estimated in tons.	Economic gain to the State.
(1)	(2)	(3)	(4)	(5)
				rs.
Cholam	30,890	2,810	152	33,340
Cumbu	37,776	4,170	213	46,860
Ragi	14,026	2,004	176	42,240
Tenai	1,171	234	15	3,000
Minor Millets ..	900	128	5	1,100
Pulses	2,660	224	6	1,800
Total	87,423	9,570	567	1,28,340

These seeds are expected to cover 9,570 acres in the first instance and in later years will cover larger areas through natural spread.

(c) Oilseeds.

Groundnut—Experiments and Research.—Research work on groundnut was continued with the main object of evolving strains with high yield, oil content and shelling percentage and resistance to pests and diseases. The optimum cultural and manurial requirements of the crop and the advantage of growing it as mixture and in rotation with other crops were also under investigation.

Trials of varieties and selections for evolving high yielding strains with high oil contents—Comparative yield trials.—Two bunch strains from Bombay, a white seeded bunch variety from Australia and two dormant bunch selections were compared with TMV. 2 strains. All except the strain K. 3 from Bombay were on a par with the control. Seven among twenty spreading selections and one among two strains from Pakistan were superior to the local. In another trial with five bunch selections and TMV. 2 strains, the differences in yield were not significant.

Preliminary yield trials.—Three big seeded selections, three selections from varieties and seven selections from progenies of crosses were compared. Nine among them recorded significantly higher yields over the local.

Seed multiplication of selections.—Nine bunch and nineteen spreading selections were multiplied for rigid trials. In replicated row tests sixty-seven bunch and 56 spreading selections were tested. Thirteen bunch and eleven spreading selections among them promising. Among 285 and 115 spreading selections under row tests, 44 bunch and 52 spreading selections outyielded their adjoining controls. One hundred and fifteen bunch and 105 spreading selections were made afresh from varieties and progenies of crosses.

Hybridization.—Thirty-nine new crosses were effected between selected bunch and spreading pure lines with the following objects:—

- To evolve a high yielding dormant bunch strain,
- to evolve a white seeded strain,
- to improve the shelling outturn of TMV. 1 strain,
- to evolve a large seeded strain for dessert purposes, and
- to study the inheritance of smooth and wrinkled seeds and the genetic contribution of the new type of white seed coat.

The hybrid seeds were collected and preserved. Among seventy selections from progenies of previous crosses tested in various stages of trial, nineteen were promising. Forty fresh selections were made.

Rotation experiment.—The experiment was continued for the tenth year. The differences in yield between the crops in the rotations were not significant but cholam after groundnut yielded better than cholam after cholam.

Cultural experiment.—The experiment was continued for the seventh year. No significant differences in yield were recorded between treatments. But, the highest yields were recorded in the treatment "ploughing twice with mouldboard plough and working junior hoe four times".

Manurial experiment.—A new manurial experiment was laid out with two manure mixtures (complete fertilizers) and three methods of application. The differences in yield between the treatments were not significant.

Mixed cropping experiment.—The experiment was repeated with three strains of cotton grown as mixture with groundnut. The results were not significant. While the performance of all the three cotton strains was poor, the strain P. 216 F appeared to be better than the other two.

Spacing trials—Rain-fed trial.—The trial with wider spaced rows of plants was repeated. The spacing 24 inches by 3 inches recorded the maximum yield. The wider spacing also facilitated inter-cultivation with bullock drawn *Danthia* thus reducing cultivation costs markedly.

Irrigated trials.—In the trial conducted during 1954 summer, the spacing 6 inches by 6 inches recorded significantly higher yields than the other spacings while last year the spacing 9 inches by 6 inches recorded the highest yields. The experiment has been repeated in 1955 summer. The crop has not yet been harvested.

Anatomical studies.—Root, stem and leaf material of TMV. 1 and TMV. 2 groundnuts were fixed in formacetic alcohol for processing and sectioning for the study.

District trials.—Five bunch and four semi-spreading pure lines were under trial in the districts. None of the bunch pure lines was superior to the TMV. 2 strain at Coimbatore. At the Agricultural Research Station, Koilpatti, two bunch selections A.H. 4111 and A.H. 4515 among six gave 11 per cent increased yields over the TMV. 2 strain. In four out of six centres in Ramanathapuram, Madurai, Coimbatore and Salem districts, the semi-spreading pure lines recorded higher yields the increase ranging from 1.5 per cent to 166.7 per cent over the local groundnut. At the Dindigul Centre, only one was promising while at Coimbatore the differences in yield were not significant.

All the four big seeded selections, viz., A.H. 6716, A.H. 6718, A.H. 6719 and A.H. 6720 recorded higher yields than the local in one out of three centres in Tiruchirappalli, Ramanathapuram and Tanjore districts, the increase ranging from 20 to 80 per cent. At Tiruchirappalli and Tanjore centres, only two selections recorded higher yields.

Gingelly—Experiments and research.—Research work on gingelly was continued with the main object of evolving high yielding strains with other economic characters like short duration, high oil content, white colour of seed, suitability for cultivation in different seasons, etc. The optimum manurial and cultural requirements of the crop were also under investigation.

Summer (irrigated) crop, 1954—Comparative yield trials.—Two selections from Karur and Tindivanam local compared with the strains did not give significant results.

Preliminary yield trials.—Nine selections from crosses and varieties failed to give significant results.

Replicated row tests.—None among fifteen selections was promising.

Row tests.—Twenty-three among seventy selections out-yielded their adjoining controls.

Eighty further selections were made from varieties and progenies of crosses.

Time of sowing experiment.—The experiment was repeated. The results conclusively showed that sowing of summer gingelly in February and early March is definitely better than sowing the crop later in the season as regards proper growth and development of plants, yield and freedom from pests and diseases.

Hybridization.—Hybridization work in gingelly was continued with the object of (a) evolving a white seeded strain, (b) evolving a cosmopolitan type and (c) combining all the desirable characters in one and the same strain. Sixteen out of fifty-one selections from progenies of crosses were promising. Seventeen fresh crosses were effected.

Manurial experiment.—In a new manurial experiment to compare the effect of manuring gingelly with ammonium sulphate and Chilean nitrate, the difference in yield was not significant.

Cultural experiment.—A new cultural experiment to determine the optimum tillage necessary for gingelly was in progress but the results did not attain the level of significance.

Cold weather crop, 1954-55—Comparative yield trials.—The differences in yield between the white seeded Pakistan variety and the TMV. 2 strain were not significant.

Row tests.—Among 394 selections, 138 outyielded their adjoining controls.

Single plant selections.—Two hundred single plant selections were made from ryots' bulk crop.

New varieties.—Ten white seeded cultures from the Indian Agricultural Research Institute, New Delhi, were tried and three among them were found to have desirable characters of use in breeding work. Fifteen X-rayed cultures from the Bose Institute, Calcutta, did not show any promise.

Hybridization.—Two new crosses were effected during the season to evolve economic forms.

Summer (irrigated) crop, 1955—Replicated row tests.—Five among twenty selections were promising.

Row tests.—Eighty-four selections were under test. The results are not yet available.

Single plant selections.—Fourteen single plant selections were made from varieties and types.

New varieties.—The ten cultures from the Indian Agricultural Research Institute, New Delhi, the fifteen X-rayed cultures from Calcutta and two local varieties from Malabar were tried and found to be unsuitable for summer cropping.

Hybridization.—Forty single plant selections were made from the F. 1 and F. 2 progenies of previous crosses. Fourteen new crosses were effected and the hybrid seeds gathered.

Castor—Improved strains.—There was good demand for the improved strains. Seeds of the improved strains were supplied to the States of Andhra, Coorg and Junagadh.

Experiments and research.—Research work on castor was continued with the object of evolving strains with high yield and oil content, early maturity, non-shattering capsules, resistance to the semi-looper pest, etc. The manurial requirements of castor were also under investigation.

Comparative yield trials.—The three extra State strains from Bombay, Uttar Pradesh and Madhya Pradesh were compared with the local strains TMV. 1 and TMV. 2 for the final year. They yielded significantly less than the latter strains. The quality of TMV. 1 was also the best.

Preliminary yield trials.—Eleven selections from progenies of crosses and varieties were compared with the TMV. 2 strain. The results were not significant. Seven selections gave higher yields than the strain and were shorter in duration.

Replicated row tests.—Two among 20 selections compared with TMV. 1 and TMV. 2 strains were promising.

Purity studies.—Among 64 selections from the progenies of a cross and from varieties, 24 were found to be pure for their morphological characters and high yield. Twenty-seven further selections were made.

Hybridization.—Four fresh crosses were effected with the object of (i) reducing the duration of the strains, (ii) imparting distinct colour to the strains for easy identification and (iii) studying the inheritance of the number of nodes to first inflorescence. A large number of selections from progenies of crosses were in different stages of yield trials. A pure line which compactly set coloured capsules and good branching was isolated. In the F. 2 progenies of two crosses, a majority of the plants commenced flowering almost as early as the short duration parent. The number of nodes to first inflorescence was intermediate between the parents.

Maintenance of purity and vigour—Inbred types.—The 140 inbred types were grown and maintained and five single plants with desirable characters selected for further work.

Ornamental types.—The eight ornamental types were grown and maintained and large quantity of selfed seeds collected and distributed to over 200 centres for ornamental gardening.

Strains.—Thirty-five outstanding single plants were selected from the bulk crop raised with pooled bulk seeds of previous selections in the three strains. Three among six selections in TMV. 2 and two among six in TMV. 3 strain raised in progeny row trials were found promising. The performance of the sixteen selections in TMV. 1 was not encouraging.

Manurial experiment.—A new manurial experiment was laid out during the year to determine the effect of application of ammonium sulphate, super phosphate and potassium sulphate on castor both singly and in combination over a basal dressing of cattle manure at $2\frac{1}{2}$ tons per acre. The combinations NP and NPK recorded significantly higher yields over other treatments. The NP combination also resulted in better quality of produce.

Semi-looper pest control.—The incidence of the semi-looper pest during the year was almost negligible and no observations could be made on the relative resistance of different types and varieties to the pest.

District trials.—In the trials conducted at three centres in the districts of Ramanathapuram and Madurai, the strains TMV. 1 and TMV. 2 were found suitable for two centres in Ramanathapuram district. The trial at one centre in Madurai district was a failure.

Coconut—Experiments and research.—Research work on the coconut was continued with the main object of determining of optimum and economical manuring and cultivation practices and for breeding better forms.

Manurial experiments.—The experiment started in 1948 to find out the best method of applying manures was continued. The results of analysis of the yield data for the past five years showed that applying manures broadcast and ploughing in is the best. The experiment started in 1951 to find out whether ash can be replaced by muriate of potash on equal K. 20 basis so as to supply 1 lb. of K_2O per tree per year was continued. The results of analysis of the yield data for the past two years indicated that muriate of potash can be effectively substituted for ash.

Cultural experiments.—The experiments started in 1942 and 1948 to compare the effects of ploughing and digging coconut gardens and to determine the optimum depth of cultivation were continued. It was found that ploughing thrice a year gives the highest yields. As regards the depth of cultivation, no conclusive results were obtained.

Depth of planting experiments.—The growth and flowering of the seedlings planted in 3 feet and 6 feet deep pits showed decided advantage of planting in 3 feet deep pits.

Trial of subsidiary crops.—Among various subsidiary crops tried under the shade of the coconut TMV. 2 groundnut gave the highest monetary return, recording an acre yield of 2,233 lb. of dry, picked pods.

Trial of green manure and cover crops.—*Gliricidia maculata* continued to be the best green leaf yielding plant and its large scale planting was extended to all the coconut stations. *Indigofera Tyesmanii* is also very useful in this respect. The performance of *Calapogonium mucunoides* as a green manure-cum-overcrop is commendable. It suppressed weeds and is self-sown. The self-sown crop puts on very quick growth. An area of over 70 acres has been sown to the crop. A total of 920 lb. of seed was collected for fresh sowings and distribution.

Coconut breeding.—Among the progenies of the various crosses, the F. 1 progenies of the tall × dwarf continued to be the most outstanding. The production of these hybrid seedlings was further intensified. The F. 2 progenies of this cross were also quite vigorous. Among the intra-varietal cyclic crosses, the one involving 'thick meat' and 'big nut size' in the male and female parents respectively and the crosses involving 'high setting' in the female parent and the 'high female flower production' in the male parent are promising. Progenies of high yielders and those obtained by cross-pollination continued to be more vigorous than progenies of low yielders and those obtained by selfing. The natural progenies of Cochin China, Laccadive small, Laccadive ordinary and Andaman ordinary are promising, judged by their vegetative characters. Among the progenies of crosses between exotic varieties, (i) Strait Settlements × Andaman dwarf, (ii) Laccadive × Chowghat dwarf and (iii) Andaman giant × Laccadive pink were found promising. The six-year old progenies of the cross tall × Gangabondam and of Laccadive ordinary and Gangabondam continued to be vigorous. Four hybrids of the latter cross have also flowered.

Study of exotic varieties.—Observations on these palms were continued. The varieties Laccadive small and Laccadive ordinary are outstanding types. Andaman ordinary and Java are also high yielding types. Cochin China and Philippines are outstanding in the quality of their tender nuts. The performance of the Naigur gading variety from Malaya, the Bansa hybrid and of the four new introductions from Ceylon is under observation.

Comprehensive Coconut Nursery Scheme.—With the closure of the two nursery centres at Pattambi and Marudur on 30th September 1954, the scheme work is now confined to only nursery centres, viz., Nileshwar, Badagara and Pattukkottai with an annual target of production of 90,000 selected seedlings. From June to September 1954, 120,000 seednuts obtained from 6,067 selected mother palms were planted in the 1954 nursery at the three centres and an average germination of 89.6 per cent was recorded. A total of 120,000 seednuts were procured from 5,322 selected mother palms during 1955 season, and out of these 63,699 seednuts were planted in the 1955 nursery at the three centres up to the end of June 1954. During the year under report, 86,120 selected seedlings from the 1953 and 1954 nurseries were distributed, besides 1,957 seedlings planted in 12 private holdings and at the Agricultural Research Station, Nileshwar, under the progeny study.

Scheme for the multiplication of improved strains of groundnut and castor.—This is a five-year Scheme financed jointly by the Indian Central Oilseeds Committee and the State Government. It has for its object the maintenance of a regular supply of nucleus seeds of the improved strains of groundnut and castor for their further multiplication and distribution to growers on a larger scale was continued with the four nucleus seed farm centres. From 1st June 1955, the centre at Salem was shifted to the Agricultural Research Station, Bhavanisagar. During the year a total area of 190.38 acres was sown to the four groundnut strains and 9.23 acres to the TMV. 2 castor strain. The season was favourable at Pollachi and Srivilliputhur and normal yields were obtained. At Salem and Tindivanam, the rains were ill-distributed and the groundnut crop was badly affected. Hence yields were below normal at these two centres. A total of 116,017 lb. of picked seed pods of groundnut and 831 lb. of picked beans of TMV. 2 castor were obtained. Out of this quantity, 16,777 lb. of TMV. 2 groundnut were supplied during December 1954 and January 1955 for organizing primary seed farms in rice fallows and garden lands during 1955 summer. After reserving the requisite quantity of seeds for sowing at the seed farms during 1955 season, the entire balance of groundnut seed pods was distributed for organizing primary seed farms during 1955 monsoon season. A total of 1,952 lb. of TMV. 2 castor which included 1,121 lb. from 1953 season produce was distributed for organizing seed farms in ryot's holdings.

Scheme for increasing production of oilseeds in Madras State.—This two-year scheme financed jointly by the Indian Central Oilseeds Committee and the State Government was commenced on 18th January 1955 with the object of increasing the production of oilseeds, viz., groundnut, gingelly and castor in the State by (i) increasing the area under improved strains, (ii) intensive cultivation and (iii) extension of area. The target of increased production of all the oilseeds for 1954-55 by these methods was fixed at 26,563 tons. As the scheme was started only in January 1955, almost the entire produce from the seed farms organized during 1954-55 season in an area of 1,840 acres became unavailable for procurement by the Oilseeds Department staff stationed at the four centres, viz., Coimbatore, Tiruchirappalli, Madurai and Vellore. However, with such quantities of seeds if the improved strains as could be

procured and distributed, an area of 1,800 acres of primary seed farms under the three oilseeds during 1955 summer and monsoon seasons is estimated. Also, due to intensive propaganda, an additional area of about 25,000 acres was sown to groundnut and gingelly during 1955 summer in wet and dry land fallows of Chingleput, Salem, Coimbatore and Tirunelveli districts.

Schemes for fundamental research on Cytology of groundnut.—This five-year scheme financed by the Indian Central Oilseeds Committee started functioning from 3rd January 1955 with the object of (i) collection of all available species and varieties of groundnut and their taxonomical and cytological study, (ii) determining the origin of the cultivated species and their improvement by the introduction of desirable genes from other species, (iii) study of interspecific hybrids and their progenies and (iv) induction of polyploidy and mutation to produce new forms. One hundred and four samples of seeds of cultivated groundnut varieties were collected and indents were placed with foreign countries for more varieties and species. Lewitskys fluid was found to be satisfactory for fixing root tips. Treatment of germinating seeds with 0.1 per cent aqueous solution of colchicine induced polyploidy in groundnut.

Scheme for research on the physiology of groundnut.—This scheme is also financed jointly by the Indian Central Oilseeds Committee and the State Government. It was started on 18th February 1955 with the object of carrying out studies on the physiological aspects of the groundnut plant, viz., nutrition, pre-treatment of seeds, dormancy and duration, drought resistance and the effect of trace elements. Work done so far has indicated that the deficiency symptoms are more pronounced in the case of nitrogen, phosphorus and potassium deficiency than in the other macro-nutrients. Flower production was found to increase when the seeds were pre-treated with potassium phosphate solution and when trace elements were applied to the soil. Foliar application of trace elements tended to depress flower production.

Scheme for intensive breeding of groundnut.—This scheme financed jointly by the Indian Central Oilseeds Committee and the State Government was sanctioned for the intensive breeding of groundnut to be worked at the Agricultural Research Station, Tindivanam. The scheme was started on 30th June 1955.

Arecanut grading scheme.—This scheme is financed by the Indian Central Arecanut Committee. The scheme was started on 11th February 1955 with the appointment of an Arecanut Analyst and is scheduled to run for a period of nine months up to 10th November 1955. The scheme has for its object the determination of the different fractions and other qualitative tests of about 250 samples of sliced and boiled arecanut collected from the chief assembling and consuming centres in the Indian Union, with a view to the drawing up of grade specifications under AG mark to prevent adulteration of arecanuts. Besides the preliminary work connected with the standardization of the various observations, the complete analysis of 73 samples was carried out which included analysis of 23 samples for oil content. The results were tabulated and further work is in progress.

Scheme for an arboretum of oil-bearing trees.—The Government have sanctioned the establishment of a regional arboretum of oil-bearing trees under a grant from the Indian Central Oilseeds Committee for the purpose of suitable land for starting the arboretum selected in the vicinity of the Agricultural Research Station, Pilicode, and arrangements for acquisition of that area are under way.

Minor oilseeds.—In sunflower, the 'local' variety recorded the highest yields followed by the indigenous 'many in axil'. In safflower, among five varieties tried at the Agricultural Research Station, Koilpatti, during the last five years, the variety C.T. 66 recorded the highest yields. Ten selections of safflower among 32 under row tests were promising. In niger, the varieties 'Araku Valley' and 'Hadagalle' appeared promising. Six among eight selections from two varieties of niger were promising. In Linseed, the variety 'N.P. 68' recorded the highest yields followed by the variety 'K2 Punjab'. The oysternut is quite promising in Wynaad and arrangements are being made to raise and supply seedlings to the colonists in the area.

Seed Distribution.—The following quantities of improved seeds and seedlings were distributed during the year :—

Crop.		Quantity of seeds distributed.	Estimated area covered.	Additional production.	Monetary gain.
		LB.	ACS.	TONS.	RS.
1 Groundnut pods	.. ..	122,417	1,080	80	24,000
2 Groundnut kernels	.. ..	478			
3 Gingelly seeds	.. ..	2,514	500	12	6,000
4 Castor seeds	.. ..	2,996	300	15	4,500
5 Coconut seedlings	.. ..	94,023 (Nos.)	1,340	670 (copras)	6,03,000

(d) Cotton.

I. The work on Cotton Improvement in Madras covers a wide range of problems including in its scope improvement of yield and quality and building up of resistance to pests, diseases and drought in all the important commercial varieties of cultivated cotton in Madras State. In addition, new areas like the rice-fallows of the deltaic and non-deltaic region and coastal districts of Malabar and South Kanara are also being tackled for cultivation and introduction of suitable varieties.

The assessment and maintenance of purity and multiplication and distribution of seeds of improved strains continued to engage the attention under the specific schemes. Another important item of work undertaken is certification of superior cottons (Madras Cambodia Uganda 1 and Madras Cambodia Uganda 2) which are exempted from price control by Textile Commissioner, Bombay.

Most of the research work are being tackled under separate schemes partly financed by the Indian Central Cotton Committee and partly by the Madras Government. The salient points in the research work done during the year under the different items are given below :—

(1) *Irrigated Winter Cambodia (Cotton Breeding Station, Coimbatore, Agricultural Research Station, Satyamangalam and Cotton Breeding Centres, Avanashi and Tiruchengode).*—This item of research, aimed at the improvement of irrigated Winter Cambodia grown in the central districts, has for its objective the evolution of an American Cotton Variety superior to Madras Cambodia Uganda 1 in quality with a ginning per cent of 38. In yield trials

conducted in a co-ordinated fashion at the four representative sub-zones of the tract, viz., Coimbatore, Avanashi, Satyamangalam and Tiruchengode, culture 9030-G-Bulk was found to record 18 per cent increased lint yield over the existing strain Madras Cambodia Uganda 1. This culture was also found to register a spinning value of 50 counts as against 44 counts in Madras Cambodia Uganda 1, as judged from the spinning tests results of the produce obtained in the previous season. Another culture, viz., 9030-D was also better than strain Madras Cambodia Uganda 1 in ginning per cent and fibre length (1.01 inch). One other culture in the small bulk trial, viz., 01545-C exceeded Madras Cambodia Uganda 1 in all the economic attributes. Improvements in individual attributes have also been noticed in the material in the lower breeding stages.

(2) *Irrigated Summer Cambodia (Cotton Research Centre, Srivilliputhur).*—The object of the breeding project at this Centre is the evolution of a long-staple American cotton of 1-1/16 inch staple capable of maturing in 5½ months and suitable for cultivation under irrigation in the summer season. Part of the work under this scheme being done at Palur from 1946 onwards was closed from 1st April 1954 owing to the phenomenon of contabascence of anthers which resulted in ill-filled seeds at that centre. From a review of the results obtained in a total of 93 scattered block trials laid out in the districts for the past seven years, it was proved that strain Madras Cambodia Uganda 2 was superior to the hitherto recommended strain Madras Cambodia Uganda 1 in the summer tract on account of its high yield and earliness. This new strain was therefore released for general cultivation from 1st April 1955 and a total area of 11,500 acres has been covered by this strain in 1955 summer. In the Bulk Yield trials conducted during 1954 summer, seven cultures derived from crosses involving Kampala, RU.4. and 7733 were noticed to be better than strain Madras Cambodia Uganda 1 in one or more characters like yield, halo length, ginning per cent and leaf strength. These seven cultures are being tested again in bulk yield trial with six other cultures drawn from the Progeny Row Trial, the latter being derivatives of crosses involving the Upland type Kampala. In the Lower Breeding stages, seventeen cultures are being tested in Small Bulk Trial and Compact Family Block, 541 selections in Progeny Row trial and 118 in the second generation. In a spacing trial conducted to assess the optimum spacing to be adopted for summer cotton, it was found that a close spacing of 2' x 4" resulted in increased yield. The trial is being repeated.

(3) *Unirrigated American Cotton for Central and Southern districts (Cotton Research Centre, Periyakulam).*—The object of this item of research is the evolution of a strain of American Cotton suitable for growing in the districts of Coimbatore, Salem, Madurai and Tiruchirappalli under rainfed conditions and capable of giving a good yield with a staple of 15/16 inch and above. In Bulk Yield Trials 9030-8-5 and P.K. 239 were found to be superior to Madras Cambodia Uganda 1 in halo length. Culture P.K. 239 recorded a fibre length of 0.97 inch and a spinning of 47's highest standard warp counts. The comparative figures recorded by culture 9030-8-5 and strain Madras Cambodia Uganda 1 were 0.96 inch and 43's and 0.95 inch and 41's respectively. 9030-8-5 was also superior to Madras Cambodia Uganda 1 in ginning per cent.

In point of jassid resistance and productivity one culture derived from G.I. x Co. 2-4-4-1-1 was outstanding. Arrangements have been made for conducting full spinning test for all these cultures. None of the 12 cultures tested in small bulk trials was found to be pure. However four of these

recorded significantly better yield than Madras Cambodia Uganda 1 and offered scope for selection. None of the 16 new varieties tested during the year was found suitable for the tract.

(4) *Unirrigated Sea-Island Cotton (Agricultural Research Station, Pattambi, and Paddy Breeding Station, Mangalore).*—The object of this item of work is to explore the possibilities of acclimatising Sea-Island, the world's finest cotton in the West Coast districts of Malabar and South Kanara as a rain grown crop in the 'Modan' and 'Kumeri' lands. In conformity with the results obtained previously transplanted crop of Sea-Island recorded significantly better yields than direct seed sown crop. In the varietal trials a new variety Andrews was found to be more suitable than Montserrat recording 40 per cent increased lint yield over the latter. The former was adjudged suitable for spinning 80's, the standard of imported Egyptian Styles. From the manurial trials the indications obtained were (1) the optimum manurial schedule for Sea-Island cotton would be the usual basal dressing plus 40 lb. nitrogen as top-dressing and (2) fractional application of manure was not beneficial if the last dose was given in August or later. First generation hybrids of the inter-specific cross Co.2 × Sea Island recorded high yields as in former years the value being 129 per cent over 'Montserrat' during 1954-55.

(5-a) *Unirrigated Karunganni (Cotton Breeding Station, Coimbatore).*—This item of work has for its object the evolution of a Karunganni strain superior to Karunganni 5, the existing strain in ginning per cent and lint quality. Almost a similar objective is envisaged in the work done at Kovilpatti where it is sought to evolve strains of Karunganni cotton capable of spinning 40's standard warp counts and suited to the entire area in the Southern and Central districts of Madras State where unirrigated 'Desi' type of cotton is cultivated. Two purified cultures, namely, 5341-D and 7417 were subjected to bulk yield trial with strain Karunganni 5 as control. Both these cultures were found to be superior to control in ginning per cent while being equal in yield and halo length. Three cultures in Family Block have been noticed to excel strain Karunganni 5 in halo length and ginning per cent on the basis of the equal yield. The laboratory examination of 41 selections tested in a progeny row trial is in progress.

(5-b) *Unirrigated Tinnevellies (Agricultural Research Station, Koilpatti).*—As stated in (5-a) the object of research work here is to evolve strains of Karunganni cotton capable of spinning 40's standard warp counts and suited to the entire desi cotton areas of Central and Southern districts of Madras State. The results from the district trials conducted with four hybrid cultures, namely, 6186, 6188, 6874 and 5312 during the past two years, whose spinning capacity ranged from 35's to 41's as against the 30's of the existing strains indicated the superiority of the first three cultures in quality over the existing strains. In yield these stood equal to the controls of the respective tracts. Deleting culture 6312 which fell short in yield the district trials were repeated in 1954-55 over 14 locations spread in Central and Southern districts. From the results obtained so far culture 6186 has been found to be the best. Out to the entire desi cotton areas of Central and Southern districts of Madras 8005A. Its superiority in yield at both Koilpatti and Coimbatore over the control was consistent. It was also adjudged to spin 40's counts. Further trials are however needed for confirmation. Among other cultures in Family Block Trials three, namely, 7907, 9705 and 9471 combined lint quality with

ginning per cent of 34 or more. In addition large number of selections in progeny row and second generation stages have been secured with good combinations for yield ginning per cent and lint quality.

(6) *Unirrigated Nadam Cotton (Cotton Breeding Station, Coimbatore and Agricultural Research Station, Satyamangalam).*—The object of this item of work is to evolve an early maturing annual type of *desi* cotton of medium staple that can replace the existing coarse perennial Nadam cotton cultivated in poor gravelly soils of the Erode taluk of Coimbatore district. Though a large part of this area has been converted into an irrigable tract on account of the Lower Bhavani Project, limited work was continued with the existing breeding material for introduction into the small pockets that might still cultivate Nadam cotton.

Five cent observation plots were laid out at Agricultural Research Station, Satyamangalam, with the two best cultures on hand, namely, B. 32-48 and B. 32-47. The results are awaited. Out of the 32 selections tested in progeny row trials at Coimbatore, culture 7470 was superior in halo length and ginning per cent to the control B. 32-48 and in yield it was equal. Nine other cultures have excelled control in either halo length or ginning per cent values.

(7) *Perennial cottons.*—The object of this item of work is the selection of an exotic perennial cotton suitable for growing in the backyards, wastelands and other marginal lands and thus increase raw cotton production with least disturbance to area under food crops. Purification of the type 'Moco' recommended at present was taken up. One purified line, namely P5 was isolated and 39 plants were raised for study. In addition 46 plants have been selected from two parent plants that possessed high level of economic characters. Progenies of two other types, namely, 'Merie gelante' from the West Indies and a natural hybrid capable of spinning 60 counts have been raised for critical study. During the year 20 lb. of Moco seeds were distributed to 26 interested parties.

(8) *Wild cottons (Cotton Breeding Station, Coimbatore).*—This item of research work aims at the transference of useful attributes like resistance to diseases and pests and fineness of lint possessed by wild cottons to cultivated types. Hybrids of wild cottons like *darwinii*, *taitense* and *raimodii* with cultivated improved American types like 4463 Madras Cambodia Uganda 1 and Madras Cambodia Uganda 2 were under study. Four selections in progeny row trials were found to excel the standard strain Madras Cambodia Uganda 1 in halo length and ginning per cent while being equal in yield of seeds cotton. Apart from these first, second and first backcross generation hybrids of *arboreum* × *armoalum* crosses possessing good fibre fineness were also studied. Elaborate data on boll size, boll number, number of boll loculi, seeds per boll, weight of boll, halo length, ginning per cent, lint index and seed index have been gathered for study. Based on these the best ones will be studied in subsequent generations.

(9) *Fundamental studies (Cotton Breeding Station, Coimbatore).*—This item of work is pursued with the object of gaining knowledge on the heritable behaviour of several characters in Asiatic cottons with a view to utilize the knowledge in the breeding work. The study of F.1. between 'normal-lint' sparse-lint and 'no-lint' types showed that (1) the lintless gene in the mutant PHL was dominant over the normal, (2) the lintless types, namely, '1027-lintless' and 'NHL' produced 'normal-linted' FLS in crosses with 'short lint' type-CST.1. and 'Sparse-lint' type 1711 and (3) lintless types, namely, 'Viramgam-Lingless' and 'NHL' produced normal linted flowers

with 'immature-lint' type—CST 4. From the phenotypic expression of the F1 of crosses of the two new dwarf types, 1016 and 1058 with 'Anakapalle-dwarf' and '1767 dwarf' it was found that the genes concerned behaved as complementary to produce normal habit in the F1s.

(10) *Studies on heterosis and vegetative propagation (Cotton Breeding Station, Coimbatore).*—The object of this item of work is to study the manifestation of heterosis in different first generation hybrids and explore the possibility of utilizing the phenomenon in the production of extra long staple cotton in the State. Observations showed that the first year ratoons from a seed sown crop and a crop raised from stem cuttings of the first generation hybrids of cross Co.2 × SI.V.135 give high yields. Among the six first generation hybrids of crosses involving four perennial American Cottons, Moco × Quebradinho hybrids were found to be the best from the point of yields of seed cotton and quality of fibres. In the cross persistence of heterosis for these two attributes was evident in the third year of planting. This cross would therefore seem to offer scope for further exploitation. The hybrids between a few annual *barbadense* types and two perennial *hirsutum*s, namely, Moco and Caramura were found to register better halo length and yield than the *hirsutum* parents.

(11) *Trials on grafting of cotton (Cotton Breeding Station, Coimbatore and Agricultural Research Station, Pattambi).*—The object of this piece of research work is to obtain and study grafts of rare and delicate varieties of cotton on hardy stocks of both 'Deshi' and American cottons. The studies were initiated during the year. Sea Island variety 'Montserrat' was selected as 'Scion' and was grafted on hardy 'stocks' of annual and perennial cottons like Co. 2 Karunganni 5, Moco and Nadam. Eighty-one successful grafts have been obtained for study. It was found that good results were obtained when seedlings aged 18 to 25 days were used for grafting.

(12) *Studies on induced parthenogenesis (Cotton Breeding Station, Coimbatore).*—The object of this work is to study the parthenogenetic origin of maternal plants, arising from the crosses between (*Hirsutum* × *Raimona* hexaploid cottons as male parents and diploid Asiatic species as female and to explore the possibility of utilizing such a phenomenon in building up homozygous cultures for multiplication. A total of 815 pollinations were effected with (*hirsutum* × *raimondii*) hexaploid as male parent and several Asiatic types as female parent. From a large number of crosses attempted seven seeds were secured for study from seven bolls.

(13) *Cotton in rice fallows (Agricultural Research Stations, Aduthurai, and Palur and Central Farm, Coimbatore).*—The object of the work is the evolution of a short duration American variety suitable for growing in the rice fallows of the deltaic and non-deltaic regions of Madras State, with suitable agronomic recommendations. One Punjab variety, namely P. 216 F. is recommended at present for general cultivations. The Indian Central Cotton Committee sanctioned a scheme with the above objective from 1st April 1954 with Aduthurai, Palur and Coimbatore as centres of work. Accordingly, studies on varietal spacing, manurial and residual effect were undertaken in all the three centres in 1955. In addition, breeding work comprising of small bulk trials, progeny row trials and newly acquired varieties is also conducted at Aduthurai alone. The harvest of the crop is in progress in all the three centres.

In addition to the above breeding projects the scheme for the certification of superior cottons, namely, Madras Cambodia Uganda 1 and Madras

Cambodia Uganda 2 which are exempted from price control continued to function with its headquarters at Rajapalayam. This scheme provides an organization for the inspection of the crops and produce of these superior cottons and the issue of certificates of purity that will help the cultivators and traders to fetch better price in the market. This scheme is financed by the State Government.

II. *Seed Multiplication Schemes.*—The following Seed Distribution schemes were run during the year :—

(a) The scheme for the multiplication and distribution of Madras Cambodia Uganda 1 and Karunganni 5 cottons at Tiruppur. The part relating to Karunganni 5 seeds was closed with effect from 30th June 1955 afternoon and since revived with effect from 1st July 1955 with minimum staff.

(b) The scheme for multiplication and distribution of Karunganni 2, Madras Cambodia Uganda 1 and Madras Cambodia Uganda 2 at Koilpatti.

(c) In addition to the above, seed nucleus plots for Cambodia 2, Madras Cambodia Uganda 1 and Karunganni 5 at Coimbatore and Karunganni 2, Madras Cambodia Uganda 1 and Madras Cambodia Uganda 2 at Koilpatti were maintained under a separate scheme financed by the State Government.

A scheme for breeding of suitable varieties of cotton for rice fallows areas sanctioned by the Indian Central Cotton Committee was approved by the State Government and commenced to function from 1st April 1954.

III. *Total quantity of seeds of improved strains distributed during the year 1954-55 :—*

Madras Cambodia Uganda 1 (Winter) ..	7,761 maunds (of 82-2/7 lb. each).
Madras Cambodia Uganda 1 and Madras Cambodia Uganda 2 (Summer).	11,059 „ „
Karunganni 2	9,282 „ „
Karunganni 5	7,171 „ „

The probable economic gain to the cultivators of improved strains of cotton calculated on modest estimates is furnished in the statement below :—

Improved strain.	Extra lint yield in lb.	Additional income in lb.	Probable area covered in acres (000's) 1954-55 (Preliminary estimates).	Estimated extra income for the State (in lakhs of rupees).
			ACS.	RS. IN LAKHS.
1 Cambodia 2	30	42	34.0	14.8
2 Madras Cambodia Uganda 1 ..	27	55	126.0	69.3
3 Madras Cambodia Uganda 2 ..	27	65	11.5	7.5
4 Karunganni 2	23	30	215.8	64.7
5 Karunganni 5	35	40	111.2	44.5
			Total ..	200.3

(e) Sugarcane.

The revised Sugarcane Research Scheme for the Residuary Madras State was sanctioned early in the year 1955 and the Central Sugarcane Research Station, Palur, started functioning from 15th April 1955, i.e., the date on which the Sugarcane Specialist assumed charge.

Sugarcane Research Station, Palur.—A total area of 12.50 acres was planted under the several experiments and bulk observation. The following are the experiments that have been planted after the inauguration of the scheme on 15th April 1955 :—

- (1) Water in relation to form of Nitrogen experiment.
- (2) Permanent Manurial experiment—garden land.
- (3) Permanent Manurial experiment—Wet land.
- (4) Monthly planting and harvesting experiment.
- (5) Main yield trial of early varieties first series.
- (6) Main yield trial of early varieties second series.
- (7) Preliminary yield trial of early varieties.

During the period under report only the planting of the cane crop has been completed.

Sugarcane Research Station, Gudiyattam.—A total of 71 Coimbatore varieties were under study for selection of variety superior to the existing standard varieties for this tract. Eight varieties, namely, Co. 859, Co. 910, Co. 956, Co. 939, Co. 980, Co. 998, Co. 974 and Co. 997 fit for early season crushing and seven varieties, namely, Co. 723, Co. 853, Co. 856, Co. 910, Co. 971, Co. 975 and Co. 981 for late season crushing were selected and promoted to further yield trials before passing on to the ryots.

Co. 726, Co. 732, Co. 792 and Co. 913 recorded high yield combined with quality in the preliminary yield trials and these varieties have been promoted to the final yield trial stage. Similarly for the late season crushing Co. 678, Co. 683, Co. 750, Co. 782, Co. 785 and Co. 810 have been selected and promoted to the final yield trial stage.

Time of planting and harvesting experiment.—The results of this experiment indicated that the planting sugarcane early in the month of January was the best in respect of yield, quality and sugar per acre. Planting late in the season was found to be bad both in respect of yield and quality of the cane harvested.

Rayungans trial.—Rayungans were found to yield better at wider spacings and setts at closer spacings. The trials did not indicate the utility of the rayungans as seed material for wider adoption. The disadvantage is increased by low establishment in the field under lift irrigation and the severe summer months.

Chilean nitrate trial.—The use of Chilean nitrate as a nitrogenous manure to sugarcane crop was tested in this experiment and the results indicated that the Chilean nitrate yielded better than normal manuring with cake and ammonium sulphate.

Pit method of planting sugarcane.—The practice of planting cane in pits as against normal planting in trenches did not show any advantage in increasing the yield. But there was the disadvantage of high initial cost in digging the pits.

Improved Poona Furnace.—The improved Poona furnace for jaggery boiling was conducted during the year and trial boilings conducted to assess its advantage over the present furnace in vogue in this tract. The ryots of the tract having been accustomed to use 4½ feet to 5 feet diameter pans, Poona furnace is at present found to be too big for the area. In Pugalur tract where big pans are already in use this type of furnace may be useful with the elimination of certain small defects. It has been proposed to conduct further trials with this furnace during the coming season.

Seed distribution.—A quantity of 64,473 lb. of sugarcane setts were distributed.

Sugarcane Liaison Farms.—These farms were started with the object of testing under local conditions the results achieved in research. The Liaison Farm at Kulittalai functioned during the entire period under report but the one at Nellikuppam was closed down on 1st June 1955.

Sugarcane cess collection.—The total cess collections during the year under report was Rs. 3,99,742-6-1. Expenditure incurred on the following items of work during the year under report is debitable to sugarcane cess fund.

	1954-55.
	RS.
1 For administration Madras Sugar Factories Control Act.	3,556
2 Sugarcane research and development schemes	97,519
3 Sugarcane crop yield competition	5,620
4 Smut and borer pests scheme	3,296
Total ..	1,09,991

Nellikuppam—Summary of work.—In Nellikuppam zone, Co. 658 is a promising variety for early season. Statistically it is on par with Co. 527. In the mid-season trials, Co. 650 yielded the highest of 54.20 tons cane per acre, but it is on par with Co. 449 which recorded 50.66 tons. In a bulk comparison of standard varieties Co. 419 recorded the highest yield of 58.52 tons of cane per acre followed by Co. 527 with 51.72 tons cane and Co. 449 with 44.38 tons cane per acre. In the mid-season trials, Co. 349 which was hitherto adopted as a dominant mid-season cane has proved inferior to the departmental standard Co. 449. The two varieties Co. 527 and Co. 449 are on par and are to be further tested for their comparative merits for mid and late seasons in this factory zone. Ammonium sulphate was found to be superior to chilean nitrate as a nitrogenous fertilizer. Application of press mud at 10 tons per acre as basal dressing with 200 lb. nitrogen per acre as top dressing has given increase in yield over the control.

Application of compost as basal dressing was equally good with a slight increase in juice quality.

In Rayungan trial, the crop from setts and Rayungans were almost on par. The periodical planting trial revealed that planting in November and harvesting in fifteen months in February, recorded the highest yield and quality. Planting in May records high yield of cane and C.C.S. per acre but the quality of juice is comparatively poor. Harvest of this crop in April, improves quality, and yet the sugar per acre is lower than in the case of earlier plantings and earlier harvests. May and August plantings are generally inferior to earlier plantings and main season harvests. In respect of special season the conclusions of last year are broadly confirmed.

The behaviour of ratoon was closely similar to that of the plant crop. As is to be expected, the ratoon crop recorded better quality juice in the special season harvest than the corresponding plant crop. Pre-treatment of setts with chemicals was found useful in increasing the percentage of germination. In the observation plots on deep *versus* shallow trench plantings, planting in deep trenches was superior in respect of yield and quality. The control measures of clipping the affected shoot and spraying with 0.32 per cent D.D.T. were found to be effective for the control of the early shoot-borer.

Kulitalai.—In the Kulitalai zone, Co. 419 recorded the best yield, Co. 449 was the next best and this variety is already under spread in this area. In the trial for the dose of application of manure, 250 lb. nitrogen per acre was found to be optimum and beyond that level, there was no response in yield. However this was on par with 200 lb. nitrogen per acre. In the trial for time of application of manure, the treatment differences were not statistically significant. The application of the manure in two doses, generally recorded higher yield than the application in one single dose. In the special season planting, application of the second dose up to 150 days after planting did not depress the quality of juice so much as its application in one dose at 150 days. Application of green manure, daincha, sesbania and sunn hemp intersown in cane crop and incorporated at 5,000 lb. per acre was found to be superior to the control without the green manure crop. Sunn hemp was better than the other two green manures. In the time of planting experiment, ratoons recorded rich quality juice even by the age of ten months. In the month of May, there was depression in the quality and thereafter progressive improvement. The peak was recorded in September and there was a second peak after January.

(f) Horticulture.

Research—Fruits—Mango.—In the hybridization programme at Taliparamba, a total number of 3,066 crosses in 32 parental combinations were effected. Out of these 103 hybrid progenies in 22 combinations became available which were under study. The other features of interest with regard to the research on this fruit is the finding at Coimbatore that pruning of terminal buds of lateral shoots induced a number of axillary buds to produce flowers in the place of vegetative growth and the indications that at least two of the poly-embryonic varieties of the West Coast have given as possible rootstocks in respect of vigour of the seedlings in the nursery stage.

Mandarin orange.—Among the seedling and clonal progenies of 23 parental types assembled from representative mandarin growing tracts at Kallar, the selections, viz., Poona Sangtra, Nagpur Sangtra, Kookal, Kolakombay and Lower Palnis main season have come to bearing so far. In the root-stock trials for mandarin orange at Kallar and Wynaad, Jambhari accounted for the maximum free growth. Hybrid seedlings arising out of five interspecific crosses among citrus fruits were progressing satisfactorily. At Wynaad the mandarin trees which were manured and mulched put on more growth and were able to withstand drought better than others.

Banana.—Hybrid seedlings in four combinations were secured from interspecific crosses. One of these, Laden $\times$ Musa acuminata was found to be intermediary in characters between the two parents and was male sterile. Hence, back crossing with the female parent Laden was effected. The back crossed progenies and the other interspecific hybrid progenies were under study.

Apple.—Among the new introductions, Parlins Beauty from Auckland, Paragon and two other selections produced fruits and were under observation. The root-stocks Merton 778 and 779 accounted for greater tree vigour and yield in the root-stock trials with Rome Beauty. The results of spraying trials with Sandolin 'A' confirmed its efficacy in inducing early blossoming and promoting yields in apples.

Plum.—In the root-stock trial with seedling stocks of plums and the common peach for the two scion varieties, Czar and Gaviota, increasing stock scion incompatibility was noticed in most of the combinations. Common peach however accounted for the maximum mean tree yields with both the scions. Topworking choice but shybearing varieties like Shiro with Hale and interplanting with Kotagiri recorded again in the seventh year of bearing increased yields representing 101.6 and 285.7 per cent over trees situated farther away from the Pollinisers. The results of the spraying trials with Sandolin 'A' on four varieties of plums indicated that while there was no difference in the time of blossoming, the sprayed trees gave increased yields ranging from two to thirteen times over the untreated trees.

Peach.—Among the common peach seedling stocks of three different age groups, eight-month old stocks continued to impart greater vigour and higher yields to the two scions, viz., Red Shanghai and Shanghai Seedling.

Jack.—In the root-stock trial at Kallar, Rudrakshi continued to be the most vigorous. The grafts on Rudrakshi and A. hirsuta flowered but the most vigorous. The grafts on Rudrakshi and A. hirsuta flowered but and Burliar Estate No. 1 clonal selections were leading the rest in tree vigour. Seeds of superior types of jack from Indonesia, Burma, Ceylon and Malaya as well as from other States in the Union were obtained and sown at Burliar and Taliparamba. Clonal progenies of outstanding selections located in different parts of the State were also assembled at Taliparamba for trial. At Taliparamba hybrid seedlings between hard and soft flaked types were planted for study.

Annonaceous fruits.—In the root-stock trial with four root-stocks for the custard apple, bull's heart confirmed its superiority in respect of tree growth, yield and stionic incompatibility. The interspecific hybrid progenies between the different annonas were under field study. At Coimbatore, among the new introductions made, the custard apple types from Hyderabad produced fruits and their quality was being assessed.

Sapota.—The fifteen hybrid seedlings between Cricket Ball and Oval varieties were planted at Coimbatore. In the root-stock trial at Taliparamba Madhuca longifolia continued to give evidence of its unsuitability as a root-stock for Sapota.

Pineapple.—At Kallar hybridization between Kew and Mauritius varieties did not yield any result. Further work in this direction was planned. At Taliparamba, trials with ice water and granulated calcium carbide applied to growing points of eight months old suckers induced 45 per cent of treated suckers to come to flower 35 to 53 days after treatment while untreated plants were yet to flower. Based on these results comprehensive trials to test the efficacy of alphanaphthalene acetic acid and ice water and granulated calcium carbide have been planned for pursuit at Wynaad and Taliparamba. At Taliparamba propagation of pineapple from stem slices proved feasible and it was also found possible to force up the growth of the suckers raised from stem slices by application of fertilizers and irrigation so as to have them ready for setting out in the main field within six months. Planting for varietal studies, progeny tests and cultural experiments were completed at Wynaad and Taliparamba.

Papaya.—Inbreeding for purification of selected lines through sibmating was continued at Coimbatore. The named type Ranchi, which attained purity was extended to district trials.

Cashew.—Seeds of 105 selections from East Africa, Brazil, Madras, Travancore-Cochin, Andhra, Bombay, West Bengal, Mysore and Orissa were sown in the field for study of performance. A survey of Cashew growing areas in Travancore-Cochin and Andhra States was made and seeds of eight individual tree selections of merit were collected. In the vegetative propagation trials, stems cutting and layering methods were unsuccessful. Air layering of shoots through the method of cincturing using Alkathene wrappers was found to be promising with one-year old and current season's shoots and the air layered shoots could be planted directly after separation in the period between June and August. Further trials showed that other rooting media such as coir fibre, sand, wood shavings, etc., could be successfully substituted for moss in air layering and thus the cost of production could be considerably reduced. Budding failed to give any success. Inarching and a new method known as Y-cutting nurse method of grafting gave encouraging results. It was also found that cashew seedlings could be successfully transplanted when they were cut back to $\frac{1}{3}$ to $\frac{1}{2}$ their height at the time of lifting. Studies on the blossom biology of Cashew were initiated and it was found that fruit set under open pollination was only 3 per cent as against 55.5 per cent under controlled pollination. Spraying of trees with water at the time of flowering indicated the possibilities of securing higher fruit set.

Vegetables.—A survey of vegetable growing tracts in some of the districts of the State was undertaken and seven types of brinjal and eight types of cucurbits were collected. A comprehensive collection of 125 types in six kinds of vegetables was established for study. The improvement work on bhendi and brinjal and the fundamental study of classification of these two vegetables were continued. Work on improvement of leafy vegetables was initiated during the year. Level beds for sowing seeds was found to lead to more incidence of "damping off" disease. In entomological studies bhendi plants sprayed with Toxaphene 0.1 per cent were less affected with vein-clearing disease. The type Pocha's Red and individual plants of Indian Bhendi were isolated as resistant to the disease.

Pepper.—Fifty-seven hybrid seedlings involving three parental combinations resulting from controlled pollinations were planted for study. Hybrids of two combinations indicated promise in respect of vigour and possession of a strong climbing root-system. There were indications that spike shedding in pepper could be got over by selection of individual vines and varieties showing less incidence, for planting. Side grafting of Pepper on its own and Piper attenuatum root-stocks emerged as a successful operation. It was found that close proximity to bisexual types increased berry setting in shybearing varieties.

Ginger.—Late planting of ginger resulted in poor yields. Heavier seed rate and larger spacing were found to contribute to increased yields in ginger. Mulching with green leaves promoted higher yields.

Other spices.—Inarching of clove on its own seedling stock gave 80 to 100 per cent in the period between July and January. It was found that nutmeg could be successfully inarched in the period between May and July on its own seedling stock as well as two other wild species.

Tuber crops.—(a) *Sweet potato.*—The performance of the types V.2, V.6 and V.8 at Coimbatore and V.4 and Bhadrakali Long Pure White at Mangalore was outstanding. In the manurial trials with different levels of nitrogen, potash and phosphoric acid at Mangalore, maximum yield was

secured in the treatment of green manure as basal dressing and N, K₂O and P₂O₅ in the ratio of 100 : 160 : 80 lb. per acre. These results, however, remain to be confirmed. In the studies on control of stem weevil of sweet potato the insecticides Dieldrin and Aldrin gave encouraging results.

(b) *Tapioca.*—The performance of Sundarivellai, Malavillai and Chaum types was promising. In the manurial trials, application of nitrogen generally tended to increase the yields.

(c) *Elephant yam.*—A collection of five varieties was established for study at Coimbatore and Mangalore.

Ornamental plants.—Records of the growth and flowering features of ornamental shrubs and trees at the Government Botanical Gardens, Ootacamund and Sim's Park, Coonoor, facilitated their grouping into three and four major groups depending upon their flowering periods and their use in designs in mixed shrubberies and for particular effects in ornamental layout. The colour schemes in garden designs were permanently recorded for use in making suitable recommendations to the public. Double transplantation of annual was found to lead generally to greater stand in flower beds at Ootacamund. Trials to determine the optimum budding and pruning techniques in roses and optimum potting medium for orchids were put under way at Ootacamund and Coonoor. Survey and collection of information on arboreal plants were commenced with a view to record their natural habitats and their economic values.

Other economic crops.—Twenty species of Eucalyptus from Australia, an extra sized garlic from Mussorie, a casuarina type from Siam, grafts of almond from Chaubattia, the white Bougain-villea, the Malayan leafy vegetable "Chekur Manis" (Sauropus androgynous) were some of the more important introductions at the several stations and centres during the year.

Supply of plants.—The following statement furnishes the details of plants supplied and seeds made available to indentors in 1954-55 along with those of 1953-54 for comparison :—

Centre.	Number of plants including vegetable seedlings supplied.		Quantity of seeds distributed (pounds).	
	1953-54.	1954-55.	1953-54.	1954-55.
(1)	(2)	(3)	(4)	(5)
1 Pomological Station, Coonoor.	18,699	37,258	36	88
2 Kallar and Burliar Fruit Stations.	13,095	18,575	837	61
3 College Orchards, Coimbatore.	21,283	15,564	350	278
4 Fruit Centre, Wynaad ..	29,075	25,827	5,385	10
5 Fruit Centre, Taliparamba ..	23,532	48,211	..	..
6 Cashew Research Station, Mangalore.	..	1,429	62	146
7 Model Orchard-cum-Nursery, Periakulam.	196	226	..	151
8 Model Orchard-cum-Nursery, Mangalore.	2,645	2,413	168	2,828
9 Model Orchard-cum-Nursery, Thimmapuram.	890	3,985	42	499
10 Pepper Research Station, Taliparamba.	2,355	21,419	..	65
11 Ginger Scheme, Pattambi ..	..	..	—	—

Centro.	Number of plants including vegetable seedlings supplied.		Quantity of seeds distributed (pounds).	
	1953-54.	1954-55.	1953-54.	1954-55.
(1)	(2)	(3)	(4)	(5)
12 Tuber Crop Scheme, Coimbatore.	..	..	960	2,135
13 Tuber Crop Scheme, Mangalore.	..	..	2,205	3,282
14 Government Botanical Gardens, Ootacamund.	52,101	1,19,494	59	44
15 Sim's Park, Coonoor ..	66,261	66,939	7	99
16 Vegetable Scheme, Coimbatore.	..	..	..	..
Total ..	230,162	361,340	10,111	9,686

* This constitutes the quantity of vegetable seeds alone supplied during the year.

Nearly 360,000 fruit and other plants raised from tested parents and adopted to the different regions have been distributed. These are expected to bring at least 1,800 acres under improved plant material which can form secondary centres for further dissemination of desirable types in due course. The estimated increased production in terms of yield and monetary value by adoption of improved types and practices is given below:—

Due to.	Estimated area in acres.	Increase in production at the rate of 2½ tons per acre.	Increase in monetary value at the rate of Rs. 100 per ton.
(1)	(2)	(3)	(4)
Improved types	1,800	4,500	4,50,000
Improved orchard and cultural practices.	10,000	25,000	25,00,000
Total ..	11,800	29,500	29,50,000

Scheme for the establishment of Model Orchards-cum-Nurseries in Madras State.—During the year under report the establishment of live hedges and wind-break lines was completed. Intensification of nursery activities, cultivation of inter-crops on a well-prepared cropping programme and provision of adequate irrigation facilities were all pursued on planned lines. The construction of quarters, office, etc., was completed.

Scheme for increasing the production and quality of fruits.—A scheme for increasing the production and quality of fruits by isolation of high yielding and superior trees, their perpetuation by vegetative propagation and distribution of such plants to the public was sanctioned in 1954 under Grow More Food Scheme with financial assistance from the Government of India. The scheme was in operation at the Model Orchard-cum-Nurseries in the State at Thimmapuram, Periakulam and Mangalore. The work on the schemes was commenced in October 1954 and was directed towards selection of trees of merit in the important fruit-growing areas of the State and propagating such trees by vegetative means.

Under this scheme, a total number of 3,694 plants were propagated from selected trees during the year under report as against the targeted figure of 54,000 plants for the whole year. The area estimated to be benefited by the distribution of these 'Pedigree' plants is 100 acres, which will produce

nearly 50 tons more fruits of better quality when the first year's supply of plants reached bearing age.

Bananas—I. Varietal collections.—The total number of varieties maintained to date is 171. The varieties Onakkan Mannan, Manga Kaya, Sodari Gali Bale, Deva Bale from West Coast and Alshi, Kari Bale, Dodda Bale, Bargi Bale from Bombay were added to the collection. A survey of banana growing areas in the districts of Ramanathapuram, Tirunelveli, North Malabar, South Kanara, Nilgiris, Coimbatore and parts of Salem, Chingleput and Madurai districts was undertaken. Detailed morphological descriptions of fifty-five varieties were completed during the period under report and five more varieties were added to the list of synonyms. A trial was initiated to test the performance of different varieties under swampy conditions. Among these, Batheesa types, Lambi, Kachkol and Supari turned out to be promising so far.

The following wild banana species were collected during the year:—

- (1) Wild Banana from Assam.
- (2) Wild Banana from Anamalais.
- (3) Kallu bale (*Musa Balbisiana*).
- (4) Kattu Vazhai from Wynaad.

The Banana varieties which have performed well at the station and which have given bunch weight of 20 lb. and more under both perennial and wet land conditions are listed below:—

Dessert varieties.—Walya, Kullam, Poovan, Rasthali, Ayiranka-Rasthali, Sungathi, Gross Michel, Kodappanilla-Kunnan, Kapur, Mannan, Lady's finger, Nendra Padathi, Cheena bale, Raja Vazhai, Boothi bale, Peyan, Enna banian, Krishna Vazhai, Sirumalai, Virupakshi, Venneettin Kunnan, Mayilvazhai, Safet velchi, Padathi, Melbhog, Vellakadali, Puttu Vazhai, Peykunnan, Motta Poovan, Venneettin Mannan, Monthan Poovan, Then Kunnan, Ney Poovan, Pacha Nadan, Ney Vannan, Nendran, Nanguneri Peyan and Pey ladan.

Culinary varieties.—Monthan, Ponthan, Malai Monthan, Sambrani Monthan, Kallu Monthan, Pidi Monthan, Bontha, Kuri Bontha, Nalla Bontha, Pacha Bontha Batheesa, Booditha Bontha Batheesa, Adukku Monthan, Ash Monthan, Kanch Kelam, Bainsa, Madhuranga Bale, Nalla Bontha Batheesa, Thella Bontha, Supari, lambi, Kachkol, Nendran and Batheesa green.

II. Hybridisation.—The following wild species were utilized for crossing with the cultivated varieties:—

- (1) *Musa Balbisiana* and its clones, Elavazhai, Neer Bale, Kadu Bale and Sawai.
- (2) *Musa Acuminata*.
- (3) *Musa Banksii*.
- (4) *Musa Chiloocarpa*.
- (5) *Musa Coccinea*.
- (6) Wild Banana from Anamalais.

Two hundred and thirty-four inflorescences of 57 cultivated varieties were crossed. Among these, only twenty-two parental combinations have set seeds of which, the following have germinated and are under study:—

- (1) Thote × *Musa Balbisiana*.
- (2) Thote × *Musa Balbisiana*—Clone Elavazhai.
- (3) Pey Kunnan × *Musa Coccinea*.

The seedlings of Venneettin Kunnan $\times$ *Musa Balbisiana* and Raja vazhai $\times$ *Musa Balbisiana* clone Elavazhai obtained last year are still in the pre-flowering stage and are under study.

III. Mutants and selections.—One selection of Poovan chosen for high grade of bunch did not keep up the parental characteristics, confirming the similar results in the case of Monthan and Rasthali. The ashy coated nature on the fruits was found to be an inherited character in the clonal progenies in the variety Nanguneri Peyan. Other selections made during the period are as follows:—

- (i) Two Monthan selections for persistent male flower.
- (ii) One Mauritius for its semi-tall stature.
- (iii) One Gali Bale for superior fruit quality.
- (iv) One Gali Bale for male bud branching character.
- (v) One Motta Poovan for its reversion to Poovan.
- (vi) One Rasthali for its multiple inflorescences.

The promising new additions to the horticultural crops during the year included three apple varieties, one type of garlic and several types of Pepper and Cashew. Among vegetable eight varieties in brinjal, eight in bhendi, four in sweet potato and two in tapioca stood out as promising. Among root-stocks for the several crops, Mertons 779 and 778 for apples, common peach for plums and peaches, Jamberi for mandarin orange, bull's heart for custard apple and *Mimusops Hexandra* for Sapota continued to exhibit promise already recorded previously.

In propagation and cultural trials the following findings were of practical importance:—

In Cashew, a successful method of transplanting the seedlings has been devised. Propagation of clones by air layering cashew shoots in March followed by their separation and planting during early south-west monsoon period has been achieved. In addition inarching and 'Y' cutting nurse graft method gave indications of promise. In pineapple regulation of fruit harvests has gained additional possibility of execution by the application of ice carbide in addition to alpha naphthalene acetic acid already found to be promising. Highly successful results of inarching and side grafting of pepper on wild and cultivated varieties and even of betel vine on wild pepper have been obtained. It was newly found that 'pollu' in pepper can be caused by the maggot of a *Cocidomyidae* fly. In pepper the period from March to June was found to be the most suitable in Malabar for planting of cuttings in beds for rooting. The papaya type Ranchi obtained cent per cent purity and was advanced to district trials. Optimum manurial, mulching and spacing treatments have been determined for ginger and sweet potato. Growing ginger under mulch gave higher yield than growing them without much. Ginger rhizomes smoked and stored in closed pits preserved better than when smoked and left in the open. Bleaching the rhizomes with lime water imparted a good colour to the produce.

The hybridization work in citrus, Banana, annonaceous fruits and sapota continued on approved lines and the hybrid seedlings were under study. It has been found possible to propagate durian, clove and nutmeg on allied wild and cultivated species in addition to their own seedlings by inarching. The root-stock potentialities of these several species were under study. The suitability of Hale and Kotagiri plums as pollinisers, the

former for top-working and the latter for inter-planting, for the shy bearing Shiro and abundance varieties was confirmed. Contrary to expectations, jack grafts on jack seedlings and Rudrakshi root-stocks did not come to bearing even after eight years of orchard life. Sandolin "A" spray has promoted increased yields in three plum varieties in addition to being effective in breaking the dormant period of apple trees and enhancing their yields better than linseed oil spray. Hybridisation in mango was taken up for the first time in the residuary State to evolve new types combining the desirable characters found dispersed now in several varieties. At the Botanic Gardens, Ootacamund, double transplanting of annuals was found to be conducive for better establishment of seedlings.

1. Varietal collection—(a) & (b) Progress and results in Bananas.—Ten varieties were added to the collection making a total of 171 varieties. Description work was continued and five more varieties were added to the list of synonyms. Thirty-nine dessert varieties and twenty-five culinary varieties recorded bunch weight of 20 lb. and above. Batheesa types, Lambi and Supari proved to be promising under swampy conditions. Survey of Banana growing areas was completed in the districts of Ramanathapuram, North Malabar, South Kanara and parts of Coimbatore, Chingleput, Salem and Madurai districts.

(c) Economic gain.—Seven thousand seven hundred and thirty-five Banana suckers of superior and heavy yielding varieties were sold to the public. It was not possible to estimate the percentage of increase in yield per acre, area benefited, total additional production and its monetary value as the area covered is small. So far about 11.37 acres have been covered by Banana suckers of improved varieties supplied from the station.

7. SYSTEMATIC BOTANY.

Centenary celebrations.—The Centenary Celebrations of the Madras Herbarium was celebrated on 20th August 1954 to mark the completion of 100 years of very useful work. Dr. A. Lakshmanaswami Mudaliar, Vice-Chancellor of the Madras University, delivered the Centenary address and Sri M. Bakthavatsalam, Minister for Agriculture, Madras State, presided over the function. To mark the occasion a souvenir was brought forth, containing messages from important persons and leading Herbaria of the world. The publication also contained several interesting articles on Systematic Botany, besides life-sketches of the botanists who were in-charge in earlier years and who were closely connected with building up the Herbarium collections.

Identifications and incorporations.—A total of 1,430 specimens were identified during the period under report. These consisted of specimens collected during survey tours and those received for identification from departmental officers and private persons. The important officers for whom the identifications were done were the Government Mycologist, State Sylviculturist, Curator, Hebbal College Herbarium, Prof. J. Venkateswaradu, Central College, Bangalore, and Sheep and Goat Development Officer, Hosur, etc.

Ten species were added to the Herbarium as new collections recorded for the first time.

Compilation of District Flora—(a) Flora of Tirunelveli district.—The flora was finalized during the year and typescript was sent to the Chief

Botanist, Botanical Survey of India, for scrutiny and remarks. The Chief Botanist has observed that it is fit for publication, with certain improvements which he has suggested. Further, he has consented to publish it in the Records of the Botanical Survey of India. The improvements suggested by him will be carried out.

(b) *Flora of Ramanathapuram district*.—Detailed surveys were conducted in taluks of Paramakudi, Rajapalayam and Sattur of the district and over 300 species were collected from the above surveys. Out of these collections about 150 species were new distributions for the above district, i.e., collected for the first time from Ramanathapuram district. The surveys also resulted in providing interesting forms of a few species such as *Celosia argentea* and *Opuntia* species.

(c) *Flora of Coimbatore district*.—As the flora of Ramanathapuram was attended to in detail surveys could not be conducted in Coimbatore district. However compilation work from Herbarium material was concluded with regard to this district.

Economic Botany and acclimatisation trials—(i) *Fodder grasses*.—*Cenchrus sp.* (Blou Buffel) can be said to be the best performer during the year in all seasons. The species is promising both under irrigated and dry conditions and is being popularized. Besides the above species a few new introductions from Delhi, viz., *Amphilophis Odorata*, *Eragrostis curvula var Valida* and *Pennisetum Pedicellatum* did well under irrigated conditions. Under dry conditions *Blou buffel* *Cenchrus ciliaris*, *Cenchrus Setigerus* and *Ophiuros exaltata* performed well, showing good growth habits and drought-resistant capacities.

(ii) *Fodder legumes and forage plants*.—Among fodder legumes *Desmodium tortuosum*, *Phaseolus lathyoides* and *Rhynchosia Limalensis* gave good results under irrigated conditions while *Crotalaria orizensis*, *Rhynchosia minima*, *Stylosanthus gracilis* (Hosur) and *Phaseolus trilobus* (Nazerettu) maintained good growth under dry conditions. A triplex vesicaria, a non-leguminous fodder showed successful rooting habits. The species has acclimatized itself to Coimbatore conditions but the cuttings give very low percentage of rooting and it is found difficult to multiply the species on a large scale.

(iii) *Green manure plants*.—Among several species of green manure tried at Coimbatore and other Research Stations the following, viz., *Crotalaria retusa*, *C. brownii*, *C. Anagyroides*, *Cassia leschenaultiana* and *Indigofera oblongia folia* continued to maintain very good growth, though in the case of last two species the leaf output was not very abundant.

Soil-binding and cover crops.—Among the recently introduced species *Urochloa mosembicensis* and *Digitaria sp.* have been successful as soil binders. The former species is particularly efficient inasmuch as it possesses spreading habits with capacities to root at nodes. The species is very drought-resistant also, having showed good growth habits during summer months. Slips of *U. Mosembicensis* were supplied to the public and to the Bhavanisagar project for trial purposes, to examine the soil binding capacities of the species.

Bothriochloa insculpta another introduction from Indian Agricultural Research Institute, New Delhi, has given satisfactory preliminary results and large-scale trials are being contemplated at Coimbatore and other Research Stations. Among cover crops *Centrosema pubescens* and *Glycine*

javanica continue to maintain their performance and these species are being recommended to the public.

Essential—Oil-yielding plants.—The collection of *Cymbopogon* was improved by a few more additions. Other species such as *Pogostemon*, *Mentha spicata*, *M. Piperita*, *Bursera delpechiana* were tried at Coimbatore to determine their suitability on the plains. *Pogostemon patchouli* has established well and *Mentha piperita* was tried in small plots and the species showed normal growth habits. The harvests have been sent for analysis with a view to study whether the oil content in the plants grown here agrees in quality and quantity with the material grown on the hills.

About 25 species of essential oil-yielding plants have been indented for trial, which will form valuable additions to the existing collection.

The following quantities of seeds and slips of grasses were supplied to private correspondent and departmental officers:—

	LB.
(1) <i>Panicum antidotale</i>	121
(2) <i>Cenchrus ciliaris</i>	9
(3) <i>Cenchrus setigerus</i>	61
(4) <i>Blou buffel</i>	11
(5) <i>Cenchrus ciliaris var echinoides</i>	5
(6) <i>Chloris bournen</i>	4
(7) <i>Iseilema laxum</i>	1
(8) <i>Thinnapier</i>	31

Viability studies in grass seeds.—The results of the above study can be summarized as follows:—For the first two months after harvest the germination is poor in all the four grasses, but from the sixth month onwards, it improved and attains a kind of peak period between the 15th to 20th month after which a decrease is noticeable. The germination trends are similar in the case of three grasses, viz., *Cenchrus ciliaris* *C. Setigerus* and *Blou buffel*. *C. Ciliaris* and *C. Setigerus* are best sown in the second year after harvesting the seeds. *Blou buffel* seeds may be used under unavoidable circumstances even up to the third year. *Panicum antidotale* shows 30 to 40 per cent germination by the fourth month after harvest, improves 40 to 50 per cent by the tenth month and reaches a peak period of 50 to 60 per cent between 11th and 12th months. The maximum germination was 78 per cent in the 31st month after harvest and the seeds give over 50 per cent up to 36th months after harvest and this species can be kept for three years without fear of poor germination.

Result of trial with Panicum antidotale (Australian Drought resistant Grass).—The Australian strain of the above species is one of the important introductions made by the section, which has gained popularity and been taken up by ryots. In July 1938 a small quantity of seeds of the species labeled as "Drought resistant fodder grass" was first obtained from Mr. J. N. Whilet, Government Agrostologist, Department of Agriculture, Sydney. During the years 1938-40 the species was under trial in pots as well as specimen plots and it was observed to be well suited to Coimbatore conditions. It exhibited an encouraging drought resistant habit.

At the end of 1939, the species was included along with other grasses under trial, in trial plots of 2½ cents, to study the performance of the species in comparison with other introductions. The annual yields under dry conditions

(i.e., rainfed) were calculated for five years and the number of cuttings taken for year also recorded. The data are summarized below :—

Year.				Yield.	Number of cuttings.
				IN LBS.	
1940	..	..	..	12,880	4
1941	..	..	..	19,200	3
1942	..	..	..	3,600	1
1943	..	..	..	14,760	2
1945	..	..	..	17,480	4

Early in 1946, the grass was released and a publication entitled " A very promising drought-resistant grass for South India " was made in Madras Agricultural Journal. Since then seeds have been supplied to departmental officers and ryots at a rate of 100-200 lb. annually.

During 1953-55, the grass was under trial at the salvage farm in Kambakkam Reserve Forest (Chingleput district) in an area of about 1.90 acres. It was pronounced to be very successful exhibiting remarkable drought-resistant qualities. The total yield under dry conditions (rainfed) during the years at Kambakkam is given below :—

Year.				Yield.		Number of cuttings.
				TONS.	LBS.	
1953-54	..	..	..	28	731	2
1954	..	..	..	14	537	2

(June-December)

Since 1952 there has been a growing demand for the seeds of this grass and sale of seeds has been made to several departmental officers and private parties. During exhibitions at Madras and at Coimbatore, sample packets were supplied to interested members of the public for trial purposes and for popularizing the grass. The species is at present grown on the road sides on the Agricultural College estate.

Qualities.—The grass is specially selected for dry regions and provides green fodder when all the other species dry away. The grass is well relished by cattle except when it is too mature when the culms become stout and unpalatable. The seeds germinate easily and raising the grass is easy. The seeds are broadcast at the rate of 4-6 lb. per acre just after the receipt of monsoons in a well-ploughed field. The grass gets established well in about 15 days and is fit for harvest after two months.

Further possibilities.—The grass is intended mainly for dry regions and waste lands. Growing of the species in waste lands will certainly minimize fodder scarcity. The district staff of the department may be entrusted with the work of popularizing the species and to bring as much area as possible under this grass. The seeds will be supplied by me to the parties.

Studies on the longevity of weed seeds.—The work was initiated during early 1954 and most of the germination tests were conducted during the year under report. The study was undertaken with a view to study the dormancy and longevity of the chosen weed seeds. *Trianthema portulacastrum*

showed maximum germination of 68 and 69 per cent after 11 and 12 months of storage. *Aristolochia bracteata* gave no germination for 14 months in the long period of dormancy. *Abutilon indicum* and *Digera aruensis* gave negligible germination and seeds were dormant for 12 months. *Tribulus terrestris* behaved in a peculiar way by showing complete dormancy in laboratory tests, for 14 months and giving low percentages of germination under potted conditions filled with garden land soil. *Acanthospermum hispidum* showed a wide range of variability in germination but showed that the seeds have no dormancy period and started germinating immediately after harvest. *Flaveria australasica* also indicated no period of dormancy and seeds gave a germination of 87 per cent after seven months' storage.

8. BOTANIC GARDENS AND PARKS.

Botanic Gardens, Coimbatore.—This popular resort for the public and educative centre for the student population of the Coimbatore town and the surrounding places was maintained throughout the year in an excellent condition. Special attention was paid to numerous flower beds which were always kept filled with flowers of various sorts. The bed to the right of the main entrance was planted with different varieties of ornamental palms. Old hedges were reinforced with fresh plantings in the gaps. Special efforts were made to eradicate Korai weeds completely from flower beds.

Nursery.—The propagation of plants was undertaken on as large a scale as the small nursery would permit. A total of 3,500 seedlings were sold to the public. Much attention is being paid to the collection of seeds of various trees growing in the garden, in addition to the collection from the flower plants. Nearly 50 lb. of seeds were sold.

New introductions.—The following are the new additions to the garden during this year :—

- | | |
|----------------------------------|---------------------------------------|
| (1) <i>Coleas</i> varieties—16. | (11) <i>Thumbergia grandiflora</i> . |
| (2) <i>Hibiscus</i> varieties—8. | (12) <i>Eugenia</i> . |
| (3) <i>Carnations</i> —4. | (13) <i>Michelia champaka</i> . |
| (4) <i>Caladiums</i> —4. | (14) <i>Gananga odorata</i> . |
| (5) <i>Solanum wendlandii</i> . | (15) <i>Crossandra</i> varieties—2. |
| (6) <i>Bignonia magifica</i> . | (16) <i>Clerodendron innerma</i> . |
| (7) <i>Bignonia robusta</i> . | (17) <i>Nyctanthes arbortristis</i> . |
| (8) <i>Allamanda</i> . | (18) <i>Azolla pinnata</i> . |
| (9) <i>Ixora</i> . | (19) <i>Pistia</i> . |
| (10) <i>Passiflora</i> . | (20) <i>Lemna</i> . |

Botanic Gardens, Ootacamund.—The collection of data on growth features and flowering periods for all the varieties of trees and shrubs was continued to confirm and standardize the data collected during the previous years. The trial on the determination of a planting season of exotic types of *Antirrhinum*s and *Larkspur* such as would enable seed collection were foiled due to very heavy downpours. So also the seed multiplication studies on selected annuals were foiled due to the downpour. Both the above could not be continued during the rest of the year for want of reliable seeds.

The plant introductions during the year comprised of studies on 31 species of *Eucalyptus* from Australia, 8 strains of ornamental castors, 25 varieties of *Gladiolus*, 23 varieties of *Dahlias*, 9 varieties of *Chrysanthemums*, 1 variety of *Ryacinth*, 2 varieties of *Funkia*, 16 varieties of *Begonias*, 1 variety of *Paeony*, 8 grasses, 2 varieties of *Jasminum*, 1 variety of *Centranthus*, 10 Legumes including clovers, 7 varieties of *Daffodils*, 2 varieties of *Tulips*, 2 species of *Liliums*, 3 species of *Berberies*, *Pinus Caribaea*, *Zizyphus spina*, *Araucaria araucana*, *Thevetia*, *Anerifolia*, 4 unidentified succulents, yellow arum lily, 8 varieties of *Nymphaeas*, *Azolla pinnata*, *Calopogonium*, *Centrosema* and 5 strains of pyrethrum.

The work of making out a complete list of every plant introduction at the Government Botanic Gardens, Ootacamund, is under way.

Besides the designs tried in the various parts of the garden, the components used, the effect produced, etc., have been prepared for the two seasons.

The survey and collection of information on *Arboreal* plants was begun. This would give the basis for further studies and introductions besides a knowledge about the performances of the allies of the cultivated trees in their natural locations.

Budding trials on briar roses with the variety *President Marcia* with and without wood were commenced so as to evolve the optimum month for the operation and the technique to be employed at Ootacamund. In order to evolve the pruning practices to be adopted, rose, plants of the different groups have been planted and are under study. It is too early to have on hand results on these two items.

Sim's Park, Coonoor.—Horticultural records on annual flower plants with reference to their height, colour, effect and blooming period were maintained and valuable information for future designs, patterns, etc., was collected. Data on the height, girth, spread/period of blooming, month of seeding, etc., were gathered during the period for various trees and shrubs which enable the suggestion of these according to the space available for planting.

The designs along with the plant materials employed in each terrace were recorded in permanent books so as to recommend the appropriate designs, patterns and plant materials to the public.

Among the successful introductions during the period were 19 species of *Eucalyptus*, 8 strains of ornamental variety of castor plants *Crotolaria anagyroides* and the rose cuttings received from the Agricultural Demonstrator, Tanjore. The pepper vine rooted cuttings received from the Pepper Specialist, Taliparamba, have failed to establish. The seeds of *Acacia* species have failed to germinate.

9. PLANT PHYSIOLOGY.

Trace element studies.—Field experiments and pot culture trials were carried out on four paddy strains, viz., Adt. 3, Adt. 25, Co. 1 and TKM. 6 at Coimbatore and at the Agricultural Research Station, Aduthurai, to see the comparative effects of applying trace element salts to paddy as soil dressings and sprays. Five different treatments, namely, no treatment (control), trace element salts added to soil, trace elements as sprays, urea as spray and urea plus trace elements as spray were superposed on three fertility levels, i.e., no manure of any kind, green leaf alone and green leaf plus artificials to supply nitrogen and phosphorus. The data indicate that the beneficial effects

of supplying trace element salts are manifested only when the field is manured adequately. Between soil dressings and foliar sprays, the former appear to be influenced to any appreciable degree by differences of variety and season of location.

The effect of zinc supplied in the form of soil dressings as well as spray treatments alone and in combination with urea and other trace elements was studied on ragi Co. 2 both in pots and in the field to see how far the yields could be increased as claimed by workers in Mysore. In pot cultures spraying with urea and all trace elements seemed to increase the yield of earheads whereas in the field spraying the soil with and presoaking the seeds in zinc sulphate solution over a basal dressing of farmyard manure favoured the yield of earheads.

Studies on seed viability and dormancy.—Studies were conducted on paddy (GEB. 24) cholam (Co. 12) and ragi (Co. 2) to find out whether the percentage of staining with 2, 3, 5 triphenyl tetrazolium chloride increases with temperatures as was noted previously in cotton 216 F. It was found that a higher temperature (35 C) did have the effect of increasing the percentage of staining as compared to room temperature (26 C to 27 C).

A few oil seeds, namely, groundnut, sunflower, safflower, linseed and nigar were also tested for the existence of any dormancy.

Presoaking studies.—Studies were continued in an Indian Council of Agricultural Research aided scheme to investigate the possibilities of presoaking seeds in nutrient salt solutions as a method of increasing the crop yields.

A. Paddy.—Two experiments one in the green house and the other in field were carried out on paddy using the strain GEB. 24, to test the effect of various presoaking treatment on paddy growth and yield. The field experiment was conducted at the wet lands Central Farm, Coimbatore. GEB. 24 seeds were tested with K3P04 (M/2) alone and in combination with trace element salts as well as urea 0.25 per cent. Increases in grain yield were recorded ranging from 4 to 6 per cent but the differences were not statistically significant.

Field trials have been started during the year under report to test the effects of presoaking treatments on paddy at different Agricultural Stations, viz., Agricultural Research Station, Aduthurai (Adt. 3), Rice Research Station, Tirurkuppam (TKM. 6) and Agricultural Research Station, Pattambi (PTB. 2). The details of treatments are : (1) Control, (2) K2HP04 M/2, (3) K2HP04 Molar/4—Mn. 5 ppm, (4) K2HP04 Molar/4—Fe, Mn, Cu 5 ppm, (5) K2HP04—Fe, 8 lb./acre, Mn 4 lb./acre, Cu and Zn 4 lb. per acre each.

B. Sorghum.—Two experiments were started in sorghum in the green house and another in the field to test the effect of presoaking the seeds in different concentrations in comparison with sowing the seeds in soils sprayed with trace elements salts and spray treatments with the same trace element salts. The crop was harvested on 30th June 1955. The data are being analysed.

C. Ragi.—An experiment in the green house in sand culture on ragi Co. 1 was carried out during the year in order to test how far nutrient deficiencies could be overcome by the technique of presoaking. Ragi Co. 1 was treated with K3P04 solution in a seed to solution ratio of 3 : 1 for 16 hours, and sown in glazed pots, each containing 8 Kgm. of washed sand.

The trace elements tried are as below :—

- (1) Presoaked seed in complete nutrient solution.
- (2) Do. P deficient do.
- (3) Do. K do. do.
- (4) Unsoaked seed in complete nutrient solution.
- (5) Do. P deficient do.
- (6) Do. K do. do.

The data indicate that in the case of plants grown in potash-deficient medium presoaking has given higher yields of 28.7 per cent and 24.2 per cent grain and straw respectively over the corresponding unsoaked potash-deficient medium. When grown in a phosphate-deficient medium the plants were extremely poor in growth and failed to produce earheads.

D. Physiological studies on presoaking.—Laboratory experiments have been started to determine the physiological basis of the responses of different seeds to different concentrations as well as to different combination of salts.

Weed control studies.—Studies were continued in an Indian Council of Agricultural Research aided scheme to devise suitable methods of eradicating or controlling some of the most troublesome weeds in South India. The main weeds taken up for study were *Cyperus rotundus*, *Cynodon dactylon*, *Trianthema portulacastrum* and *Acanthospermum hispidum* at Coimbatore and Palur and *Spergula arvensis* and *Oxalis latifolia* on the Nilgiris. A number of weedicide chemicals were tried in different dosages including various formulations of 2, 4-D, MCPA, 2, 4, 5-T, IPC DNOC and NIX both singly and in combination.

Complete eradication of *Cynodon* and *Cyperus* remains still a difficult problem as the various formulations tried so far were able to kill off only the aerial portions and the unaffected underground parts such as stolons and tubers send forth fresh growths after sometime, which ranges between one to three months.

Two new chemical herbicides, viz., Extar A. (Dinitro-ortho-cresol) and Triherbide NIX (Sodium Isopropyl Xanthate) were tried on a number of seeds for studying their phytocidal action. These show quick scorching effect on most of the dicot weeds as *Leucas urticaefolia*, *Acanthospermum hispidum* and *Gynandropsis pentaphylla*.

Trees like *Morinda tinctoria*, *Millingtonia hortensis* and *Capparis zeylanica* were completely scorched up by spray application of 2, 4, 5-T, ester at 5 lb. per acre and Isopropyl ester of 2, 4-D and Brush-killer (esters of 2, 4-D and 2, 4, 5-T) at 10 lb. per acre in the course of a fortnight.

Herbicidal trials were started in the Agricultural Research Station, Nanjanad, for the control of *Spergula arvensis* and *Oxalis latifolia*. Triherbide NIX at 20 lb. in 100 gallons of water per acre has been found to give the best scorching of both *Spurry* and *Oxalis* in 24 hours, closely followed by Extar 'A'. Further observations are being recorded.

Storage of fruits and vegetables with hormones and chemicals.—Studies were commenced with one variety of mango (Nadusalai) by applying Dr. Sharma's wax and fungicidal composition to find out the storage response of fruits by the application of hormones.

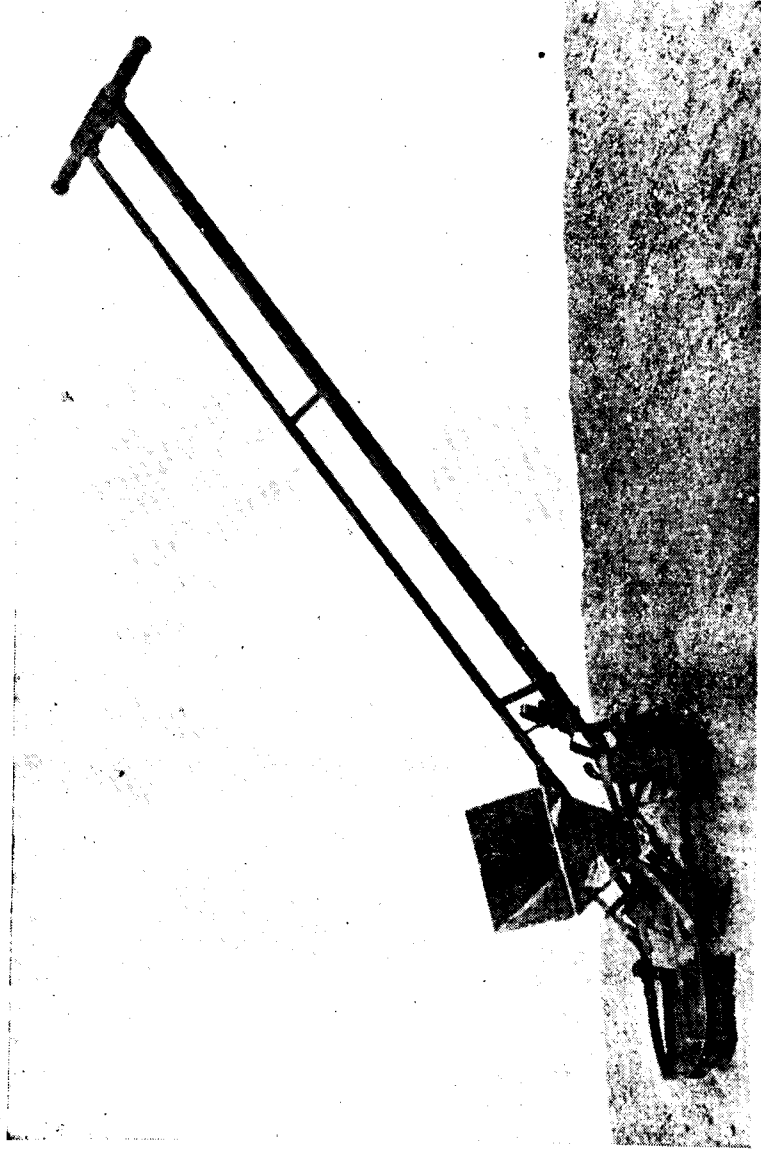


COIR FILTER POINT.

This is inserted into the water bearing strata and connected to the suction side of a pump. It acts as a strainer for filtering the water entering the suction pipe.

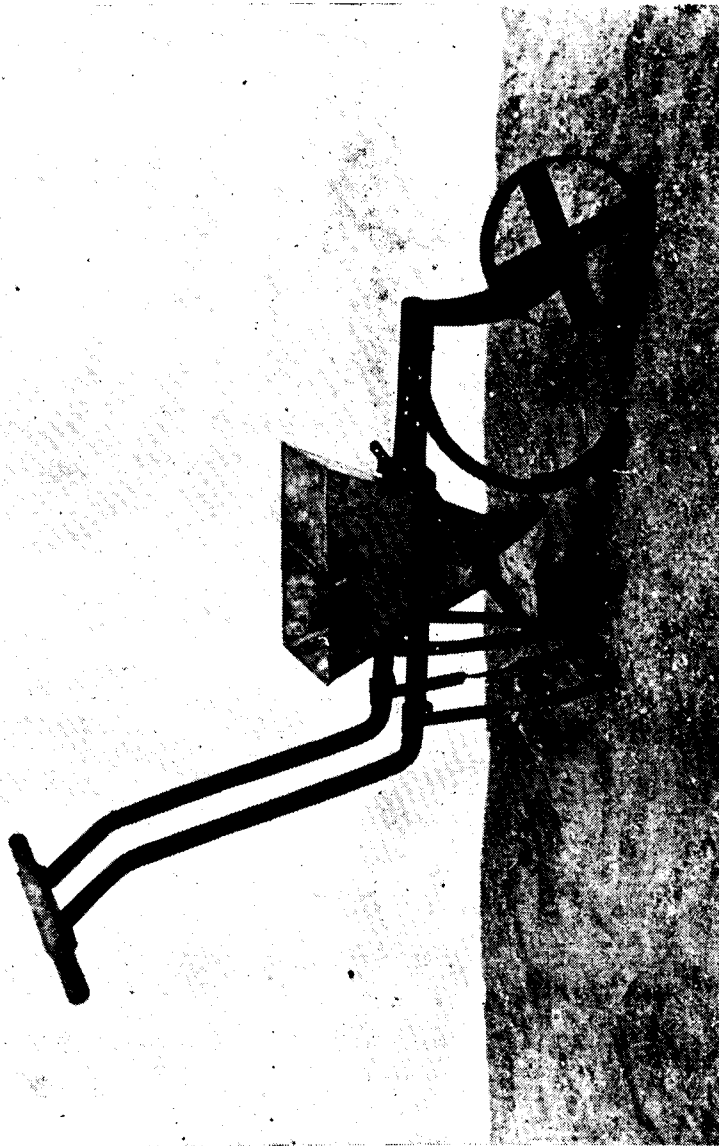
It consists of 4 or 6 Nos. of 1' X 1 1/4" M.S. flats rivitted to 1" width bands of required diameter. The bottom end is closed with a perforated sheet to protect the mesh. The other is rivitted to nipple to receive the suction side of the pump. The coir rope is wound around the flats in two layers to form the straining medium.

It costs about Rs. 21.



JAPANESE ROTARY WEEDER WITH FERTILIZER ATTACHMENT.

The fertilizer attachment consists of a rectangular tank for fertilizer with two holes at the bottom with tubes protruding down. While operating the weeder forward and backward the fertilizer falls through the holes gets stirred well. Hence both manuring and inter-cultivation can be done in a single operation.



FERTILIZER PLACEMENT UNIT.

This equipment is used for placing fertilizer in the furrows for the cultivation of row crops. It consists of a furrow opener, a hopper for fertilizer and a small bund former. It was found that the spreading was not uniform and could not be controlled. It was discharging the fertilizer in a single spot when the unit stops and also during idle runs along the head lines. Now it is being modified to rectify the above defects.

The general conclusion drawn from the experiments conducted so far is that no great difference is noticeable between treated and untreated fruits in any of the features relating to storage life. There was also no difference perceptible between treated and untreated fruits in appearance, taste or flavour.

10. CYTO-GENETICS.

Millets—Pennisetum.—The autotetraploid cumbu plants continued to show the perennial habits, drought and rust resistance. To improve the fertility, a series of crosses between autotetraploids were undertaken. Crosses between autotetraploids and allotetraploids also were done. A second set of sowing was not done in the case of the autotetraploid plants.

In cumbu species the inheritance of rust resistance presents a fascinating problem. In the diploid, the rust susceptibility behaves as dominant while in the interspecific crosses and their progeny rust resistance is dominant. Crosses were done between the P allotetraploid and 814/3 cumbu with rust resistance and Merkerii $\times$ 814/3 so that the study of their progeny might throw some light on this apparently contradictory behaviour in regard to rust resistance.

The progeny of the chromosome deficient Napier Grass $\times$ 2n cumbu produced, in meiosis, chromosome number approaching $2n=45$. Many of the plants were found to have fertile anthers unlike the chromosome deficient Napier Grass. It is quite probable that the deficient plants gave rise to unreduced gametes and these were fertilized by the pollen from the hexaploids which were grown nearby to give rise to plants with $2n=45$. These plants with fertile anthers were therefore rejected.

Comparison of Karyotypes of the allotetraploids as to the number of long, medium long and short chromosomes showed that those derived from similar crosses had similar Karyotypes while the F₂ was different. The F₂ forms quadrivalents while the others form trivalents.

Sorghum.—The F₂ progeny of the triploid *S. halepense* $\times$ *S. Durra* were examined. On the whole ten plants were triploids, two diploid and the remaining ones tetraploids. The meiosis was quite regular in most of the tetraploids forming twenty bivalents at diakinesis. In a few 1 or 2 quadrivalents were formed. One or two laggards were found in two tetraploid plants. Majority of triploids formed only 15 bivalents. Two plants were found to have trivalents also. All the 40 chromosomed plants having regular meiosis were rejected. The triploids and the tetraploids having irregular meiosis were preserved for further studies. Among the triploids was included one plant, profusely tillering, which might prove to be of value as a fodder plant.

Seeds of the back cross plant of the asynaptic sorghum progeny were larger than those of the wild sorghum almost approaching Irungu types but with periamanjal blood in them. The plants were perennial, gigantic and produced flowers and seeds out of season unlike Periamanjal cholam. The later flowering panicles of asynaptic sorghum were pollinated with pollen from 49 chromosomed maize.

The cross *Sorghum halepense* (20) $\times$ *S. Roxburghii* (20) gave a possible F₁. The panicle and leaves of the hybrid were like those of the wild parent while anther and stigma resembled the cultivated one. The seeds were larger than those of *S. halepense* brown in colour and umbonate, i.e., more like the cultivated one. It exhibited semisterility and slight shattering of grains.

Maize.—Tetraploid maize seeds were obtained from abroad and the plants raised. The emergence of tassel and silk did not synchronise in the tetraploid so that there was paucity of pollen. Seed setting was found to be poor due to this.

Setaria.—The plants of *S. Autumnalis* possessed panicles resembling the cultivated tenai. Some of the wild setaria plants raised were found to grow up to 5 feet in height well tillered and might prove to be of value as fodder. Bulk seeds Japanese tenai strains original economic selections have been collected for conducting trials in sub-stations. Five tenai varieties from Japan were found resistant to tenai rust.

Paddy.—The progeny of three autotetraploids and twelve other tetraploids involving crosses between different races of cultivated rice as also between species was raised and studied. All were found to be semi-sterile and awned. The tetraploids SR 26 B $\times$ Brazil and Co. 13 $\times$ Chinese had higher fertility than others. In all tetraploids, single plant selections towards higher facility were done. Fresh crosses were attempted between *O. sativa* $\times$ *O. perennis*, *O. perennis* $\times$ *O. sativa*, *O. sativa* $\times$ *O. australiensis*, *O. australiensis* $\times$ *O. sativa*. A few seeds were obtained in these.

Fruits and Horticultural Plants.—The hybrid between Sirumalai and *M. Banksii* was found to have $2n=44$ chromosomes, Laden $\times$ *M. acuminata*, $2n=44$. The parent, Lades were found to have $2n=33$. The investigation showed that both Sirumalai and Laden were triploids and produce unreduced gametes so that when crossed with diploid species with $2n=22$ having reduced gametes give rise to F1 plants with $2n=44$. The investigation in the species of *Vitaceae* were continued.

11. AGRONOMY.

It is one year since the three agronomic experiments were laid out as follows :—

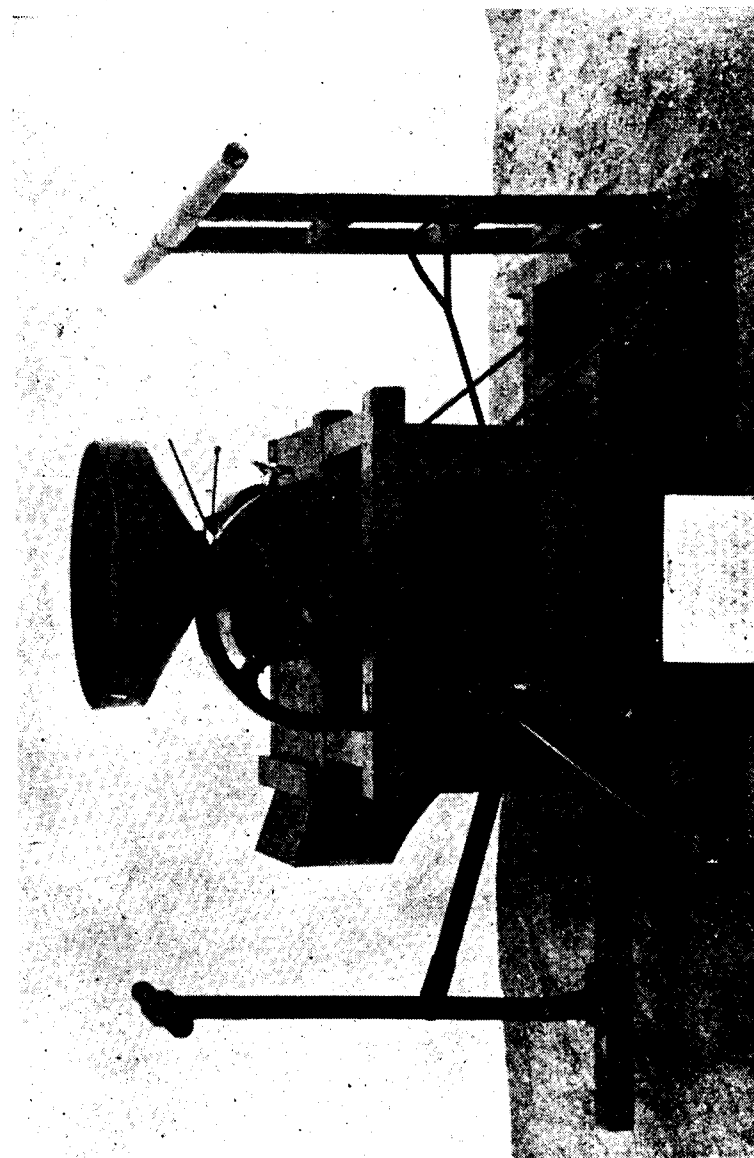
- (1) Combined effect of tillage manures and irrigation on garden land crops in Field No. 44.
- (2) Combined effect of tillage and manures at different levels on paddy in block No. C.
- (3) Rotation experiment in garden land in Field No. 52.

The three-year-programme of work was carried out and the following results were obtained from the experiments :—

(i) *Field No. 44*.—The integrated effect of the three agronomic factors, viz., tillage, manuring and irrigation on ragi crop production resulted in significance for irrigation levels only but not for tillage and manure.

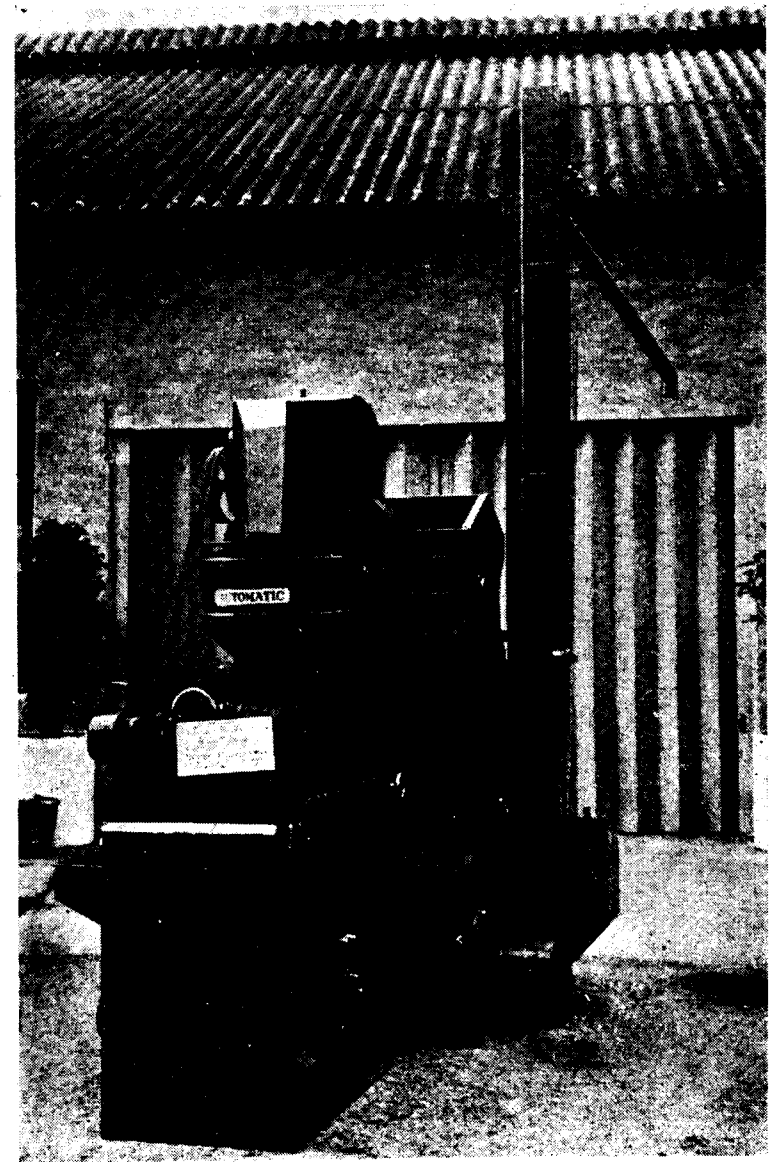
(ii) In Block C as far as the grain yields are concerned the results were not significant while the straw yields for the manurial treatment were significant. There was no significant difference in yields between deep and shallow tillage.

(iii) *Field No. 52*.—As a full rotation has to run for two years, it is too early to comment on the results.



CE. Co. Co. RICE HULLER—TYPE B (WITH WINNOWER).

This machine employs a set of two rotary rubber rollers and the grains while passing in between is hulled and then winnowed by a blower. This can easily be operated by two men. The percentages of unshelled grain was only 9 per cent and breakages was nil. The output of this equipment is 150 lb. per hour. The cost of this unit is Rs. 200.

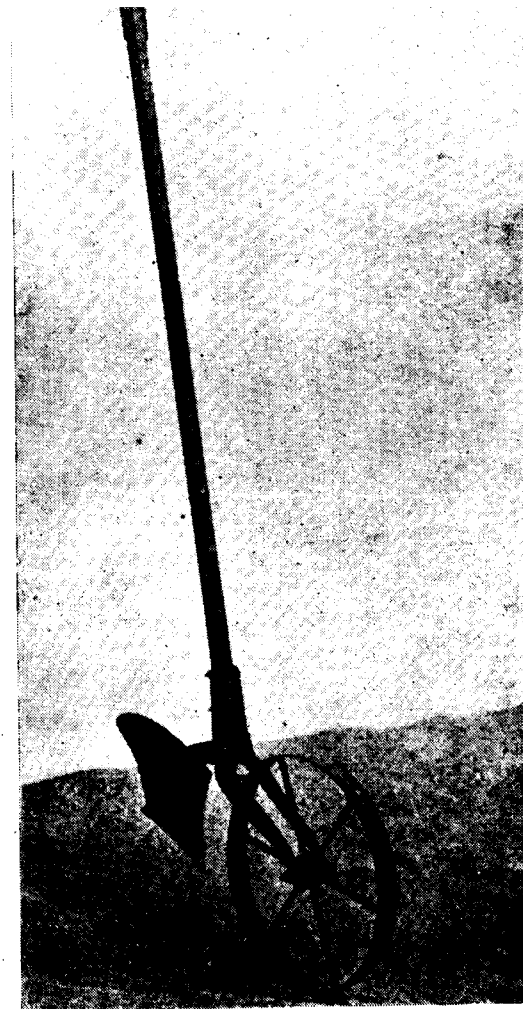


CE. CO. CO. POWER OPERATED RICE HULLER.

Paddy with more than 13 per cent of moisture is unfit for hulling with this machine. It requires a 3 H.P. motor for driving it.

The output is about 2½ bags per hour and the unshelled paddy is only 8 per cent. The breakages was nil.

The cost of this unit is Rs. 3,335.

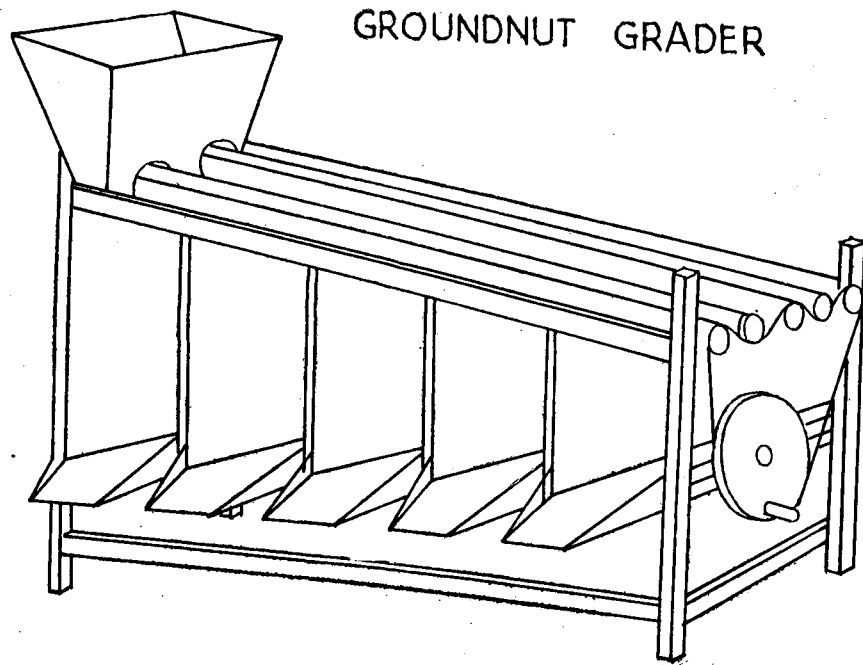


FIRE PLY PLOUGH.

This type of plough can easily be operated by a single man. It is best suited for garden lands and house-hold gardens when the area is very small and also on hill slopes.

The cost of this implement is Rs. 20.

GROUNDNUT GRADER



The grader consists of 4 Nos. of 2" size rollers $4\frac{1}{2}$ feet long mounted on top of wooden frame with suitable bearings. The rollers being rotated by means of wheel which is connected to the rollers by a thin cord. The rollers operate in sets of two, the rotation of the rollers being opposite and outward directions to prevent the crushing of groundnuts. The rollers have a slight inclination from top to bottom, the width between the rollers widening gradually from top to bottom. The gap between the rollers could be adjusted to suit the different grades of rates required.

The groundnuts to be graded are placed in a receptacle provided at the top and of the rollers and fed into the gaps gradually while the rollers are being rotated. The rotary movements helps the groundnuts to slide along the gaps of rollers and as the gap is varying, pods are graded according to sizes and fall into the compartments provided below.

The output of the grader is one bag of 83 lb. per hour and the cost of manufacture is approximately Rs. 60. By using the grader, the grading can be done at one-fourth the cost of hand-picking method.

12. AGRICULTURAL ENGINEERING (RESEARCH).

1. *Research.*—The following is a very brief report of the work done and the results achieved under each item of research during the period :—

(1) (i) *Mechanization of paddy cultivation.*—A power driven threshing machine with winnowing attachment was designed and manufactured. The machine was tested and it gave an output of one bag of threshed paddy per hour. The threshing and winnowing was so complete that further cattle threshing was not required. But in an hour's operation the pieces of chaff get entangled between the front roller and the conveyor belting making it tight and stiff.

To eliminate this difficulty, modifications and further trials are being continued.

(ii) *Japanese Rotary weeder with fertilizer attachment.*—The fertilizer attachment consists of a rectangular tank for fertilizer with two holes at the bottom with tubes protruding down. While operating the weeder forward and backward the fertilizer fall through the holes, gets stored well. Hence both manuring and inter-cultivation can be done in a single operation. (Vide Photo No. II.)

(2) *Studies on Tube Wells.*—The wire mesh filter point which is now in vogue costs about Rs. 110. Moreover, these can be erected only in places where the sub-strata is of course sand. Hence 'coir filter point' was designed and tested. The cost of this filter point comes to about Rs. 21 only.

Just like other filter points, this is also let inside the casing pipe and the casing pipe is withdrawn. This proved successful even in places where the strata is fine sand. With this type of 4 inches filter point the discharge obtained is about 10,000 gallons per hour. This has already become popular among the ryots. (Vide Photo No. III.)

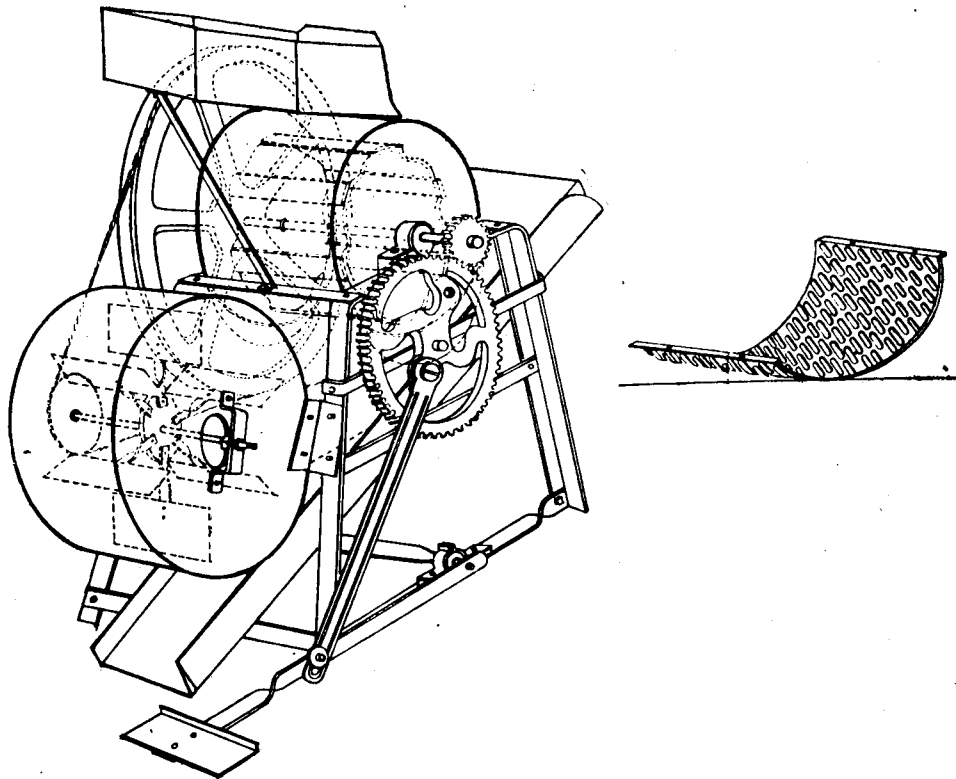
(3) *Devising manually operated and animal drawn machinery for pumping, threshing, intercultivating and fertilizer placement.*—(i) *Bullock drawn pump.*—A bullock operated pump employing two plunger type pump units worked by a pair of bullocks working round in a circle was designed and manufactured. This gave an output of 2,700 gallons per hour with a draught of 190 lb. The strain on the animals was much and the discharge was not good.

Then the two plungers were reduced to one and the bullocks were made to work forward and reverse just like an ordinary country mhothe. With this modification, the discharge rose to 4,000 gallons per hour and the maximum draught is only 170 lb. Modification to introduce one direction (forward) movement of animals and increasing the output is under contemplation.

(ii) *Fertilizer placement unit.*—The hand operated fertilizer placement unit was tested in the fields of Central Farm, for cotton crop. It was found that the placing was not uniform and there is strain on the operators. Next another unit mounted on wheels with furrow opener was tried. With this equipment it was found the spreading was not uniform and not possible to control. It was discharging the fertilizer in a single spot when the unit stops and also during idle runs along the head lands. (Vide Photo No. I.)

Hence a mechanically controlled fertilizer placing equipment which discharges only when it is in motion is being designed for further trials.

(4) *Levelling instrument.*—Two levelling instruments were manufactured in Research Engineer's Workshops and tried by the Assistant Agricultural Engineer, Soil Conservation Scheme, Ootacamund. The performance



GROUNDNUT DECORTICATOR.

The decorticator consists of a cast iron rotor housed with suitable bearing on an angle iron frame. The rotor is faced with serrated rubber shots to a thickness of $\frac{1}{4}$ ". The concave grate is made of $\frac{1}{8}$ " M.S. sheet punched with oblong holes. Three sizes of grates are provided, so that any of them could be used to suit the groundnuts to be decorticated. The groundnut placed on the hopper at the top falls to the concave where it is decorticated by the action of rotor beating against it. The decorticated nuts fall below into the receptacle provided below by gravity while the haulms are blown off at the other end by the action of the separator fan provided. The unit is pedal operated.

The cost of manufacture is 175. The output is 75 lb. of kernels per hour. The leakages are 8 to 10 per cent.

was not satisfactory and he has suggested some modification. They will be tried again after effecting these modifications.

(5) *Fire Fly Plough*.—The firefly ploughs were manufactured and sent to several departmental officers. The plough is useful for garden lands and household garden when the area is very small. (Vide Photo No. III.)

(6) *Peebble Picker*.—Two pebble rakes were designed and manufactured in Research Engineer's Workshops and sent to the Agricultural Research Station, Satyamangalam, for trials. The gap between the prongs were $1\frac{1}{2}$ inches and $1\frac{1}{4}$ inches and since the gap was more, the pebbles made good their escapes in between the prongs when the unit was operated. The gap between the rakes was reduced to 1 inch and it proved successful.

(7) Three rice hullers, two hand operated and one power operated, have been received for trials. They have been imported from Japan to be used in Community Project areas.

(i) *Ce. Co. Co. Hand operated rice huller type A*.—The machine is similar to the one manufactured by Messrs. P.S.G. & Sons, Coimbatore. The machine can be operated by two men without much difficulty provided the speed is limited to 40 RPM of the driving wheel. At this speed however the percentage of the unshelled grain is as high as $33\frac{1}{3}$ per cent. The percentage of broken grain at this speed is negligible and an output of 300 lb. per hour is obtained.

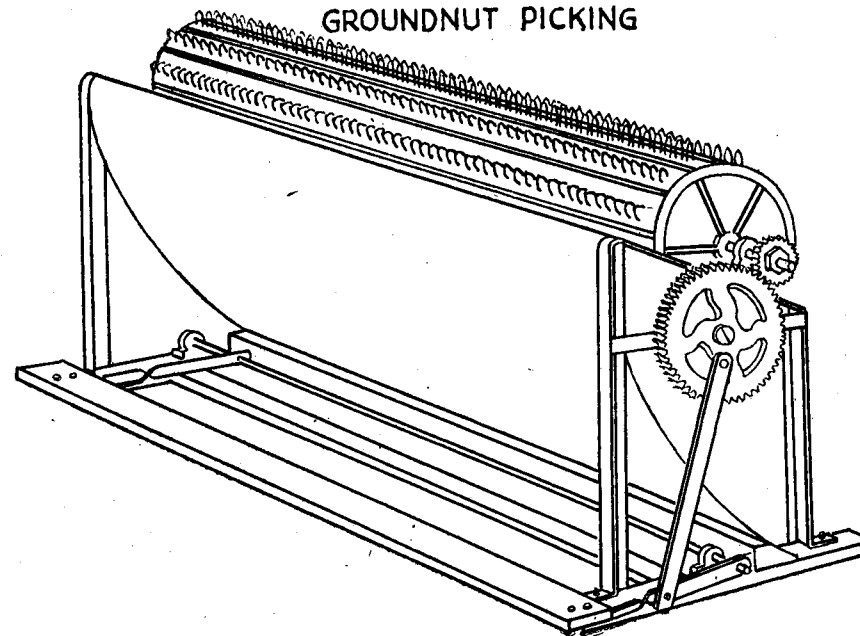
If the machine is operated at 60 RPM of the driving wheels, the percentage of unshelled grain is reduced to 17 per cent, but the percentage of broken grain is correspondingly increased. Further, it is found that at this higher speed, two men were unable to operate the machine continuously for more than 15 minutes. To keep down the percentage of both unshelled and broken grain, it appears to be necessary to sieve the output from the first hulling to separate the unshelled grain which should be put through the machine a second time. It may be worthwhile to convert this machine for power operation in which case it should be possible to work the machine off at $\frac{1}{2}$ h.p. motor.

(ii) *Ce.Co.Co. rice huller type B. with winnower*.—The machine employs a set of two rotary rubber rolls, in passing between which the paddy is hulled. The machine incorporates a winnowing attachment which is not effected to any noticeable extent as the speed at which it is driven is far too low to create a draught. The machine can easily be operated by two men. When operated at 90 RPM of the driving wheel, the percentage of unshelled grain was only 9 per cent, one noticeable feature of this huller is that the shelled grain was not broken at all. An output of 150 lb. is obtained. The performance of this machine can be improved with certain modifications. (Vide Photo No. I.)

(iii) *Ce.Co.Co. Power Operated Rice Huller No. 6*.—Trials are conducted at Gobi with CO. 25 par boiled paddy and samba variety raw paddy. Paddy with more than 13 per cent moisture is unfit for hulling as it results in incomplete separation of the hulls. The sieve provided are not suitable for our paddy varieties. Another defect now noted was that the black rubber rollers impart dark colour to the hulled paddy which is therefore disliked. Provision of white rubber roller is necessary to remedy the defect. (Vide Photo No. II.)

The time required for hulling a bag cannot be assessed with any degree of certainty due to the frequent stoppages for adjustments. Samples of hulled rice show that the hulling is very satisfactory, there is no breakage

JAPANESE TYPE THRESHER FOR
GROUNDNUT PICKING



This unit consists of a 4' long rotor made up of wooden planks and mounted an angle iron frame with suitable bearings. On this rotor, $3/16$ " G.I. wire hooks to a projection of 2" over the planks were impeded in a regular interval. A concave is covered over one side of the rotor to direct the pods to one side. This concave is made up of 22 gauge G.I. sheet. The drive was obtained to the rotor through two gears attached to one side of a rotor and a crank arrangement attached to the pedal below. The sheaves must be arranged or heaped regularly so that the pods are all facing to one side. As the operation feeds by brushing against the fast moving the pods get entangled in between the hooks and get picked. The bunch type shelves were held by hand catching the upper part of the sheaves. Two men are necessary for the whole operation, one man to arrange the sheaves and to supply to the operator. The operator brushed the sheave bunches on to the rotor and throws away the straw.

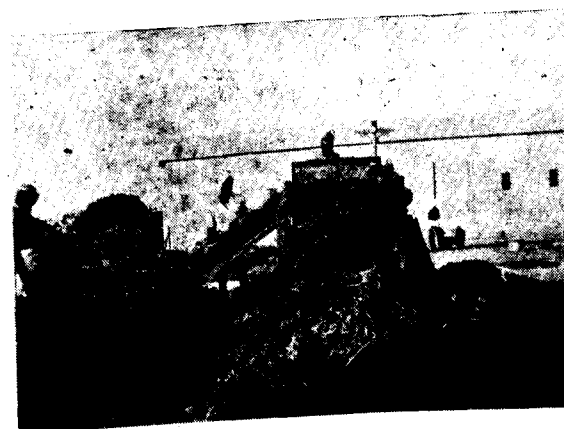
The cost of the thrasher is about Rs. 150.



PEANUT PICKER (MINOR) IN OPERATION
(Side View).



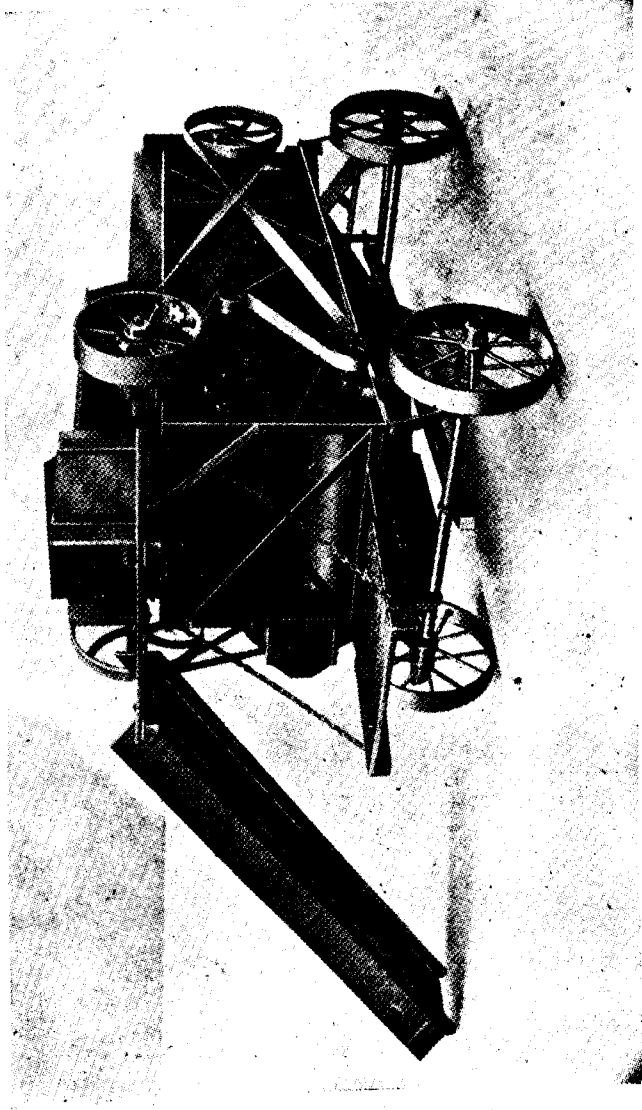
PEANUT PICKER (MINOR) IN OPERATION
(Side View).



PEANUT PICKER (MINOR) IN OPERATION
(Rear View).

PEANUT PICKER (MINOR).

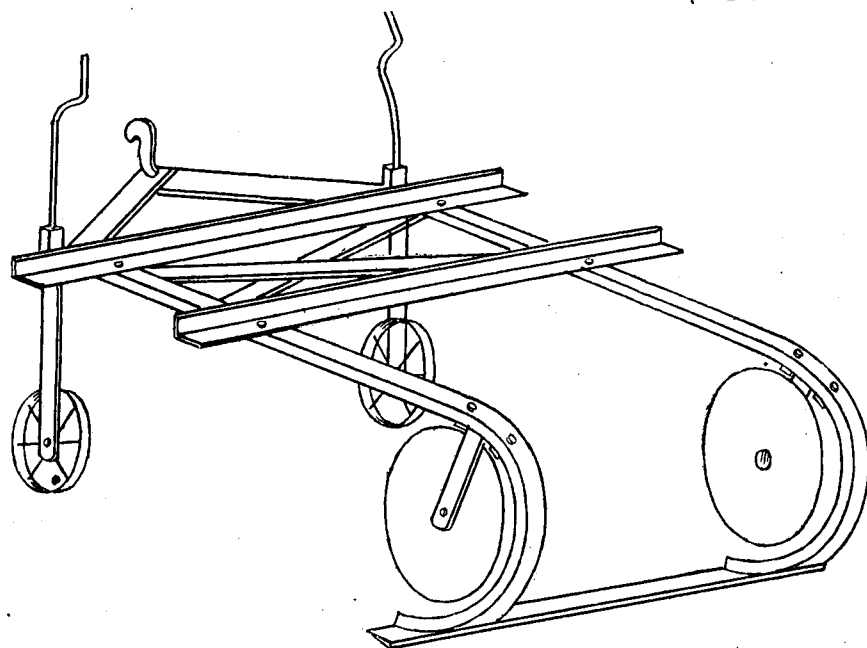
The picker is a power operated machine. The dried vines are fed into the opening facing the operator. The pegs of the concave hold the plants, while the rotor pegs beat and thrash them, while passing in between the stationary peg, thus separating the pods from the vines. After such separation the pods drop at the bottom sheave and after passing through the blower chamber, are collected in bags. The well chopped plants pass separately through the shaking rake and are ejected out. The speed of the machine is 400 R.P.M. The capacity is up to 60 bags working 10 hours a day. The cost of the machine is about Rs. 330.



PEANUT PICKER (MINOR) ON STEEL WHEELS FOR PICKING, CLEANING AND BAGGING GROUNDNUT SPEEDILY,
ECONOMICALLY AND EFFICIENTLY.

<i>Dimensions, weights, output, etc.</i>		MINOR.
Overall length (arranged for work)	..	11' 0"
Overall width (without feeding trough)	..	4' 6"
Width inside frame	..	24"
Power required to drive, b.h.p.	..	5
Speed of drum, r.p.m.	..	350
Speed of crankshaft, r.p.m.	..	200
Capacity per day of 10 working hours, bags of 100 lb. each	..	Up to 80
Weight with recleaner and bagger	..	1,500 lb.
Diameter of main pulley (unless otherwise specified)	..	24"

TRACTOR-DRAWN GUNTAKA HARVESTER



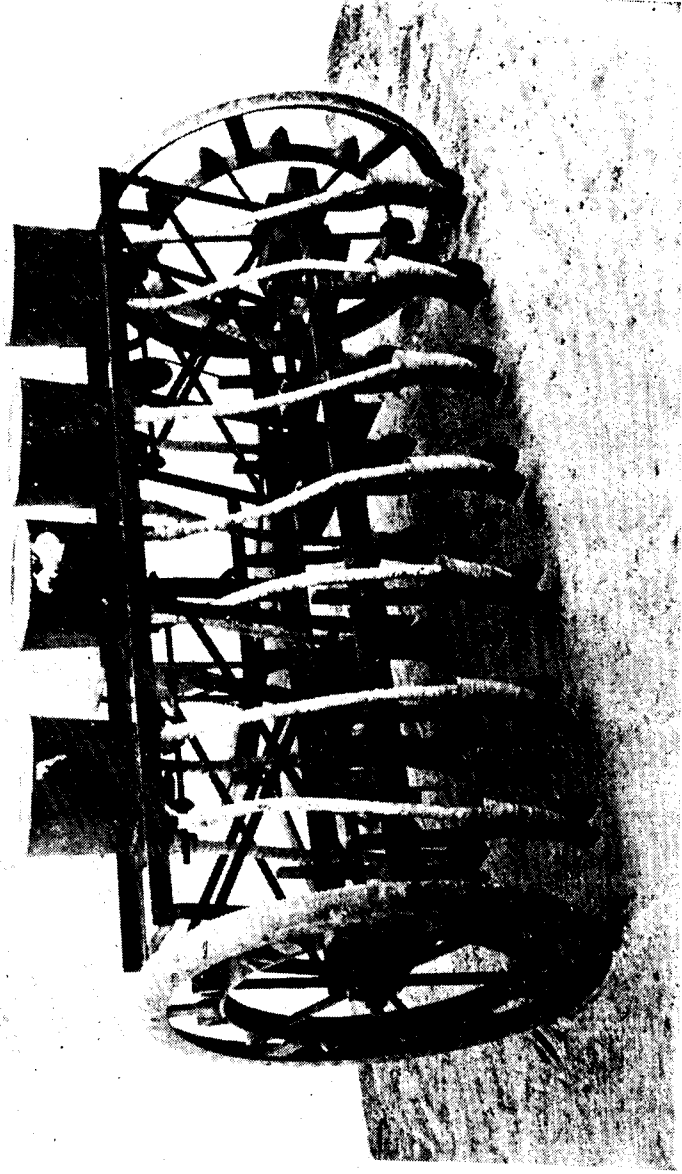
GROUNDNUT DIGGER (GUNTAKA HARVESTER) WITH COULTER ARRANGEMENT.

This consists of a simple trailed type angle iron tool bar with two forks. The blade is fixed at the end of the fork.

The tool bar members are fabricated out of sturdy square bars of $1\frac{1}{2}'' \times 1\frac{1}{2}''$ section to prevent from twisting out of shape. A slight curvature of $1\frac{1}{2}''$ in 6' has been given to the blade to facilitate easy penetration of the blade. In ordinary sandy loam soil blade angle of about 25 degree has been found to give good results. Where the soil is moist a lesser blade angle of about 20 degree suffice since otherwise the implement has a tendency to go deep.

A coulter attachment is incorporated near the fork to prevent the accumulation of vines at the forks.

Provision has been made to adjust the depth of cutting.



Tractor-drawn seed drill for groundout,



JOHN DEERE PEANUT HARVESTER IN OPERATION (WITH JOHN DEERE SIDE DELIVERY RAKE).

JOHN DEERE PEANUT HARVESTER.

John Deere Peanut Harvester has two straight blades of 4½" for length, attached to the front side frame of the tractor in a V shaped position. The up and down more nuts of the blade are controlled by drastically from the seat of the driver. It is used for harvesting row crops and digs to a depth of about 3". The cost of the implement is Rs. 1,151.

and about 8 per cent of unshelled paddy is found in the resulting produce. The quality of the rice is the same as that obtained from hand-pounded paddy. By remedying the above defects, the huller will prove efficient.

Workshops.—In addition to the manufacture of models implements and machinery for agricultural purposes, the Workshops also undertook the repairs and conditioning of pumps, agricultural implements and machineries and laboratory equipments belonging to the various sections in the Agricultural College and Research Institute and to the several Agricultural Research Stations. The manufacture of parts required for overhauling the oil engines and pumpset, lorries and boring sets in the section were also undertaken. Repair works to the value of Rs. 14,484-6-0 was done during this period.

Estimates and drawings.—Estimates, drawings and blue prints required for the various items of research were prepared.

IMPLEMENTS FOR CULTIVATION AND HARVEST OF GROUNDNUTS—RESEARCH.

Development of hand or pedal operated groundnut decorticators for seed purposes and experiments connected with the same.—Trials were conducted with the pedal operated decorticator with different sets of rotor shoes, cast iron and wooden. The damaged seeds are in the region of 20 per cent the damages calculated on the basis of quality of seeds required for seed purposes.

Trials have been carried out with the decorticator by replacing the cast iron shoes of the rotor with rubber shoes of medium hardness with horizontal serrations. The grates were filed smooth to minimise damages. The percentage of broken pods have been reduced from 20 to 10. Trials with varying thickness of rubber shoes and with different types of grates are under progress. (Vide Photo No. I.)

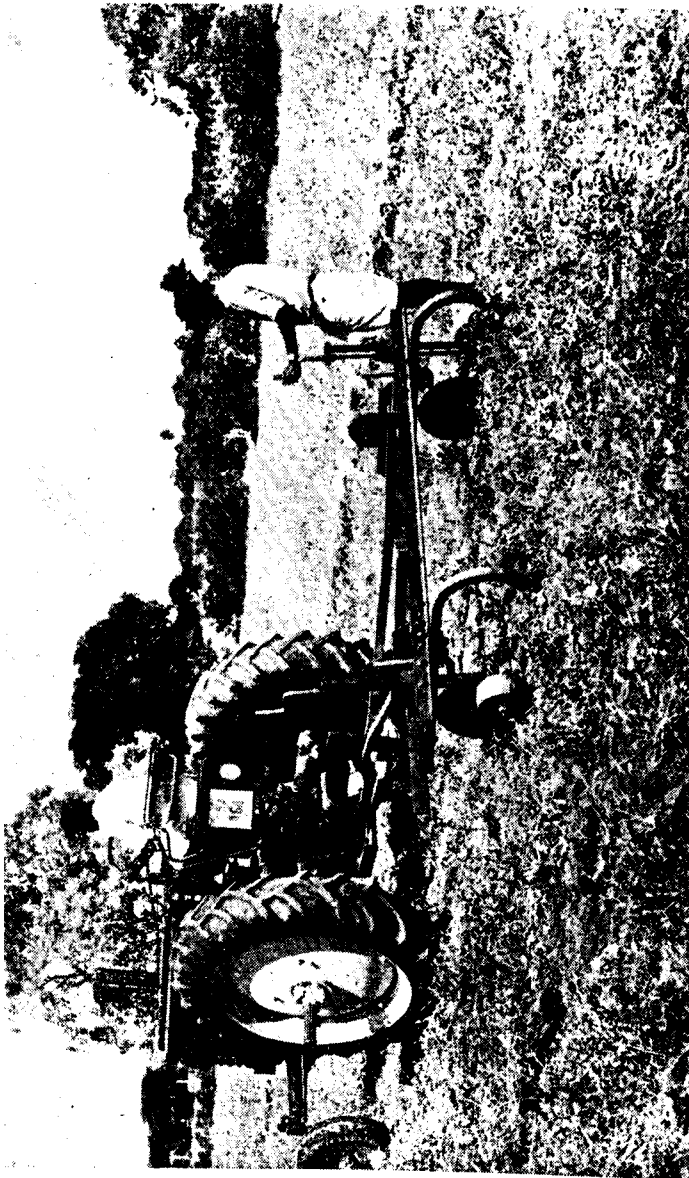
Designs and fabrication of grading machines to grade groundnut pods or kernels.—The design and the fabrication of the roller type grader was taken up and completed. (Vide Photo No. II.)

The grader consists of 4 Nos. of 2 inches size rollers, 4½ feet long mounted on top of a wooden frame with suitable bearings, the roller being rotated by means of a wheel which is connected to the rollers by a thin card. The rollers operate in sets of two, the rotation of the rollers being in opposite and outward directions to prevent the crushing of groundnuts. The rollers have a slight inclination from top to bottom, the width between the rollers widening gradually from top to bottom. The gap between the rollers could be adjusted to suit the different grades of nuts required.

The groundnuts to be graded are placed in a receptacle provided at the top end of the rollers and fed into the gaps gradually while the rollers are being rotated. The rotary movement helps the groundnuts to slide along the gaps of rollers and as the gap is varying, pods are graded according to sizes and fall into the compartments provided below.

The output of the grader is one bag of 83 lb. per hour and the cost of manufacture is approximately Rs. 60. By using the grader, the grading can be done at one-fourth the cost of handpicking method.

At present no grading is done to the pods before they are offered for sale. The pods if graded before offered for sale will fetch a higher price. Moreover the grading of the groundnuts before they are fed into the seed drill hoppers or decorticators minimizes breakage of seeds.



GUNTAKA HARVESTER IN OPERATION (WITH COULTERS).

BRIEF DESCRIPTION OF THE IMPLEMENTS—GROUNDNUT HARVESTER WITH COULTER ATTACHMENTS.
Harvester consists mainly of frame two forks and a 6 feet cutting blade. It is drawn by a tractor and the blade digs to a depth of about 3" into the soil the crops are lifted. It works very well on sandy soil and on land less infested with weeds. The implements covers harvesting of the crop to the extent of 12 to 15 acres in 8 hours per day. The cost of the implement is about Rs. 170.

Automatic seed drill attachment to the country plough and for bullock power.—Preliminary field trials were carried out with the new gorru. There was much breakage of seeds due to the smallness of seed plate holes. The holes were enlarged and the implement was tested again. The arrangement of fixing the bottom plate was not rigid enough to withstand the shock due to rotation of the seed plate. The rotation of the seed plate was not smooth and the flow of seeds not uniform. The unit is being redesigned.

Trials with peanut picker (minor) to increase seed production and minimize damage to pods.—It was experienced during the trials conducted previously that with the existing set or rotor and concave, unless the vines are in a fairly dried condition, considerable percentage of the pods were left along with the vines. Hence the modifications listed below were carried out in order to increase the efficiency of picking even if the vines are not completely dry.

The existing concave was removed and a new type of concave was fitted. This concave has in it, stationary pegs inclined at a slight angle. Three numbers of peg bands were designed to be fitted and housed in the body of the rotor. The pegs in these bands are the flat type, with round nose. The concave pegs are embedded to stand in between the rotating path of the beater pegs in the rotor, thereby forming a cross comb while in action.

Large scale trials are to be undertaken. (Vide photos.)

Development of a pedal operated groundnut picker on the model of Japanese thresher (vide photo).—The pedal operated Japanese type paddy thresher was tried for picking the bunch type variety of groundnut and was found useful. The sheaves must be arranged or heaped regularly so that the pods are all facing to one side. As the operator feeds by brushing against the fast moving rotor, the pods get entangled in between the hooks and get picked. The rate of picking also is high. It was observed that the unit worked more satisfactorily in the case of well-dried vines than it wet vines. The damages to the separated pod are negligible. However too much drying of vines though easy for picking should be avoided to minimize the splitting of pods during the process.

A number of three scale trials with different varieties of groundnut strains has to be carried out to study the economic advantage of the unit.

Three rotor units of the Japanese type thresher were combined suitably as one unit with belt pulley attachment so that the unit is fit for power operation. Provision has also been made to dismantle one of the sets of rotors and to use it as a pedal operated one.

A pedal operated groundnut picker on the model of the Ransome's Peanut Picker (Minor) was also designed and manufactured. This implement is in the trial and development stage.

Trials with available machinery for drilling and harvesting of groundnuts.—Trials were conducted with the bullock drawn seed drill of the Indian Agricultural Research Institute type and it was observed that the beds are not drilled uniformly with the result on germination there were many gaps in the rows throughout the entire area sown. The seed rate also was low as 72 lb. acre. A different set of seed plate of the type that has been successfully used in the tractor drawn seed drill has been manufactured.

The cost of manufacture of this implement is about Rs. 200. With this implement 3-4 acres can be sown in 8 hours.

The Guntaka harvester with coulter arrangement was worked for harvesting of groundnut crop in $1\frac{1}{2}$ acres. The time taken was one hour. The soil was in good condition with just enough moisture for the removal of the plants and the working of the implement was satisfactory. The cost of manufacture of this implement is about Rs. 170. Twelve to fifteen acres can be harvested in 8 hours with this implement. (Vide Photo No. II.)

The John Deere Peanut harvester (hydraulically operated) was tried in a field of Agricultural Research Station, Tindivanam, having $1\frac{1}{2}$ foot row crop. The blades cut to a depth of about 3 inches and the depth of digging was not sufficient to lift the crops completely out without damage to the pods. Due to unfavourable ground conditions the depth of cutting could not be effectively adjusted. (Vide Photo No. I.)

Designs and fabrication of bullock-drawn rake.—In harvesting operations of groundnut as soon as the plants are dug out of ground, necessity of some device to collect the vines in rows for easy gathering was felt. Foreign-made side delivery rakes serve the purpose well. Apart from collecting vines in rows the rake fingers help to bring the buried pods to the surface rendering it easier for collection.

A delivery rake suitable to be drawn by a pair of bullocks was designed and fabricated. This consists of a sweep rake constructed of $\frac{1}{4}$ inch steel wires wound round a mild steel bar and fixed to it by bolts and nuts to prevent rotations. The rake bar is fixed to the rear of the wooden frame in which the driver's seat is incorporated. A draft pole is attached to the front of the frame. The rake can be lifted out of the ground or lowered by the driver by tipping a hand lever or pulling it back and engaging it in a groove. The cost of the manufacture of the implement is Rs. 200.

Preliminary trials were taken up with the implement in the fields of the Agricultural Research Station, Tindivanam. The land was once ploughed with iron plough (Cooper 26) and caster stubble straw and uprooted weeds were left in the fields. Originally a spring was incorporated in the lever connecting the rake fingers so as to enable the operator to lift the rake out of ground by tipping his hand lever. Since this did not give a position pressure for the rake to penetrate the land, the spring position was reversed so as to give a positive pressure on the land.

The rake penetrates to a depth of about 2 inches and collects from the soil the straws and plants left on the surface. As soon as the quantity of weeds and straw collected in front of the rake become sufficiently large, the operator pushes the hand lever from his seat and lifts the rake off the ground thus leaving the heap in one place. Later these heaps are easily collected.

The following improvements were made to the tractor-drawn seed drill :—

(1) Cover plates were welded to the tyre points in order to prevent soil entering the seed tubes and choking of the free flow of the seeds. These cover plates not only prevent the soil from entering the seed tubes but also facilitates the seeds to fall at the level of the tyre bottom and enable the seeds to get buried at uniform depth.

(2) In order that the seed rates may be varied as may be required while working the implements in different tracts and with different types of seed, screening plates have been provided. These are slightly conical-shaped zinc sheets that can easily be fitted up to the top of the seed plates. These

plates cover a definite number of seed groves thereby reducing the seed rate proportionately.

(3) The gear shafts and bearing blocks and level gear were also machined and bolted to fit the new wheel shaft of larger diameter. The increase in size of the shaft was found necessary to prevent bending.

The cost of manufacture of this implement is about Rs. 450. With this implement, an extent of 12 acres can be sown in 8 hours.

The unit was tried at the lands of a leading ryot in Kayapakkam village in Madurantakam taluk and an extent of about 30 acres was sown with groundnuts with this implement. The ryots who witnessed were impressed with the performance of the unit and the land owner expressed a desire to fabricate one seed drill of the same pattern and requested the help of the department in its manufacture.

(A photograph showing the general view of the implement is attached.)

Drying chamber for groundnuts.—Quotations were called for from foreign firms for the supply of a groundnut drying chamber and were examined. There does not seem to be any drying chamber specially designed for groundnuts. Modifications are suggested by makers of grain drying chambers to suit the groundnuts and the cost of such device is prohibitive.

Self-propelled combine (Peanut Special).—Quotations were called for from manufacturers of combines and only one company was able to quote for the supply of a peanut combine. Further details of the unit were called for and the same is awaited from the company.

Trials with the seed drills evolved and development of them.—The following improvements were carried out to the Research Engineer's Tractor-drawn seed drill:—

(a) The tyres were welded with side covers to prevent soil entering the seed guide tubes.

(b) The existing seed tubes were replaced with flexible tubes.

(c) The belt drive for the seed boxes have been replaced with chain and spricket drive with suitable alterations in the clutch. The belt system was originally meant for use for bullock operation and during trials the belt often had a tendency to give way. Hence the replacement. Trials are in progress.

13. AGRO INDUSTRIES—BEE-KEEPING.

About 5,780 bee colonies, including new introductions were kept functioning during the year and about fourteen tons of honey are estimated to have been obtained from them.

Ergot production.—The production of ergot was continued during the year and it was confined to the Ergot Farm. A total quantity of 125 lb. of ergot was produced and 9,243 lb. of rye grains were obtained. Ten varieties of rye seeds got from the Botanist, Indian Agricultural Research Organization, New Delhi and a small quantity of English winter rye obtained through Dr. Batts of Cambridge University have been grown to maintain their purity and observe their suitability for ergot production. Australian black winter rye was quite suitable for ergot production. The "Canadian Old Spring" was not satisfactory. Canadian petkur though good for ergot production was highly susceptible to *Helminthosporium*.

Fruit preservation work.—The fruit preservation unit at Ambalavayal continued to work satisfactorily. A total quantity of 27,873 ounces of squash and 538½ lb. of jam was produced and disposed of during the year.

Studies on the preservation of fruits and fruit products at Coimbatore.—This scheme was started on 25th May 1955 with the object of demonstrating scientific methods of preserving fruits and fruit products for adoption as a cottage industry. The study was confined to mangoes. Mango products like squash, jam, jelly, preserve sweet mango chutney, mango butter, mango cheese, and bottled mangoes have been prepared and stored for preservation studies at a later stage. Attempts are being made to arrive at more effective methods of preserving this fruit, its juice and also the products prepared according to standard recipes followed at Kodur and elsewhere.

14. AGRICULTURAL RESEARCH STATIONS.

The Rice Research Station, Tirurkuppam.

I. Results achieved in research during 1954-55—Pure line selection.—Twenty-five selections in Mottakar, 54 in Sonappalai, eight in Vadan samba and 92 in Kappa samba were carried over for further trials. Five cultures in Sornavari, 14 in Chinna samba, five in Kittan samba, six in Kappakar, 19 in Mottakar, four in Sathikam and seven in Kesari were found promising and carried forward for further trial against their respective standards.

Hybridization.—Two cultures of crosses between kar duration strains and samba strains were under yield trials. Culture 6810 was on a par with TKM. 6 and significantly superior to TKM. 3. Among the secondary selections from the same set of crosses nine were found to be earlier and higher yielding than T.K.M. 6. Two short duration blast-resistant cultures 6517 and 6522 were under yield trial against Co. 13 standard. The cultures were tried in the district also. Performance of 6517 was found to be better than that of 6522. Twenty-four cultures of Co. 26 × Co. 19 were under yield trial against Co. 19 standard. Five cultures of Co. 10 × Burma types were under yield trials against Co. 10 and Co. 18 standards. Four cultures were found to be on a par with Co. 10. Though they are on a par with Co. 10 their stiff straw and non-lodging habit are points in their favour. Three hundred and ninety progenies of crosses between Japonica × Indica were studied and 900 single plant selections were taken from 18 promising progenies for further study.

Manurial experiments.—In the co-ordinated set of manurial experiment on rice it was seen that sunnhemp gave significantly higher yield than sesbania and daincha; sesbania gave significantly higher yield than daincha. Green manures from plots receiving phosphate and no phosphate were on a par.

General.—A total quantity of 35,783 lb. of seeds of improved strains of paddy, 2,237 lb. of vegetable and other seeds, 12,433 cuttings and seedlings were distributed from the station during the year. Six strains released from the station and strains released from other research stations, found suitable for this tract were multiplied and distributed.

Actual progress during the year.—Improvement of varieties by pure line selection was continued in the main varieties of the tract for all the three seasons. Two cultures of crosses between kar duration strains and samba strains, two cultures of Co. 13 × Co. 4, 24 cultures of Co. 26 × Co. 19, five of Co. 10 × Burma types and nine of GEB. 24 × T. 260 were under yield trials.

Three hundred and eighteen progenies of TKM. 2 × BAM. 3, TKM. 2 × MTU. 4, ten of TKM. 2 wild paddy, 222 of Coimbatore strains × wild paddies, 49 natural crosses in wild rices from Cuttack, 49 of Maruteru strains × wild paddies, 182 of Co. 10 × Burma types and 390 of Japonica × Indica were under observation and study.

Co-ordinated set of manurial experiment on rice to find out the effect of the application of phosphate direct to paddy crop and through the green manure crop preceding paddy with sunhemp, daincha and sesbania was conducted. Japanese method of rice cultivation as practised in Korakendra was compared with farm method of rice cultivation. MCU. 1 cotton was tried as a mixed crop with rainfed paddy.

Results of research.—Five cultures in Sornavari, five in Seevan samba, 14 in Chinna samba, five in Kittan samba, six in Sirumani, six in Kappakar, 19 in Mottakar, four in Sathikam and seven in Kesari were found promising and carried over for further trials.

Two cultures of crosses between kar duration strains and samba strains, nine cultures of the same set of crosses from secondary selections, two of Co. 13 × Co. 4, 24, of Co. 26 × Co. 19, four of Co. 10 × Burma types and nine of GEB. 24 × T. 260 and 900 further selections from progenies of Japonica × Indica were carried over for further study and observation.

Economic gain to ryots.—In Sornavari cultures two best cultures have been earmarked for trial in the district. By evolving a higher yielding strain than TKM. 3, the cultivator can expect at least two bags of paddy more per acre (i.e.) about Rs. 30 more per acre. This will benefit more than 30,000 acres in Chingleput district. Among Chinese types, Ch. 2, which is about two weeks earlier than TKM. 3 can be grown where water-supply is not sufficient for a crop like TKM. 3. Cultures of Co. 13 × Co. 4 are under trial in the district. Evolution of short duration blast-resistant strain will minimise the heavy loss due to blast.

II. *Programme of work for 1955-56—Pure line selection.*—(i) Multiplication of strains popular in Chingleput and North Arcot districts and the strains evolved at the Rice Research Station, Tirurkuppam, will be continued.

(ii) *Improvement of rainfed varieties.*—Twenty-five promising selections in Mottakar and 54 in Sonappalai will be under preliminary yield trials against their respective standards.

(iii) *Semi-dry varieties.*—Eight selections in Vadan samba and 92 in Kappa samba will be under preliminary yield trials against their respective standards.

(iv) *Wet area.*—Five cultures in Sornavari, 14 in Chinna samba, five in Kittan samba, six in Kappakar, 19 in Mottakar, four in Sathikam and seven in Kesari will be under yield trials against their standards.

Hybridization.—(i) Two cultures of crosses between kar duration strains and samba strains, nine cultures of the same set of crosses from secondary selections, two blast-resistant cultures of Co. 13 × Co. 4, 24 of Co. 25 × Co. 19, four of Co. 10 × Burma types and 11 of G.E.B. 24 × T. 260 will be under yield trials.

(ii) Study of 900 single plant selections of Japonica × Indica together with 17 bulks of ADT. 12 × Japanese varieties and back cross progenies of ADT. 12, GEB. 24 with the Indica parents.

Study of cross progenies of TKM. 2 × BAM. 3; TKM. 2 × MTU. 4. ADT. 22 × BAM. 3; Co. 4 × Vadan samba; Co. 10 × T. 892; Co. 17 × SR. 26 B; TKM. 3 × ASD. 5.

- (iii) Co-ordinated set of manurial experiment on rice;
- (iv) Japanese method of rice cultivation;
- (v) Fish manure experiment;
- (vi) Ridging rice crop experiment;
- (vii) Intercultivation experiment on paddy;
- (viii) Growing green manures, fodder crops, fruit plants and vegetables.

Sugarcane Research Station, Gudiyattam.

I. *Results achieved in research during 1954-55—A. Sugarcane.*—A total of 71 Coimbatore varieties were under study for selection of variety superior to the existing standard varieties for this tract. Eight varieties, namely, Co. 859, Co. 910, Co. 956, Co. 939, Co. 980, Co. 998, Co. 974, and Co. 997 fit for early season crushing and seven varieties, namely, Co. 723, Co. 853, Co. 856, Co. 901, Co. 961, Co. 975 and Co. 981, for late season crushing were selected and promoted to further yield trials before passing on to the ryots.

Co. 726, Co. 732, Co. 792 and Co. 913 recorded high yield combined with quality in the preliminary yield trials and these varieties have been promoted to the final yield trial stage. Similarly for the late season crushing Co. 678, Co. 683, Co. 750, Co. 782, Co. 785 and Co. 810 have been selected and promoted to the final yield trial stage.

Time of planting and harvesting experiment.—The results of this experiment indicated that planting sugarcane early in the month of January was the best in respect of yield, quality and sugar per acre. Planting late in the season was found to be bad both in respect of yield and quality of the cane harvested.

Rayungans trial.—Rayungans were found to yield better at wider spacings and setts at closer spacings. The trials did not indicate the utility of the rayungans as seed material for wider adoption. The disadvantage is increased by low establishment in the field under lift irrigation and the severe summer months.

Chilean nitrate trial.—The use of Chilean nitrate as a nitrogenous manure to sugarcane crop was tested in this experiment and the trials indicated that the Chilean nitrate yielded better than normal manuring with cake and ammonium sulphate.

Pit method of planting sugarcane.—The practice of planting cane in pits as against normal planting in trenches did not show any advantage in increasing the yield. But there was the disadvantage of high initial cost in digging the pits.

Improved Poona furnace.—The improved Poona furnace for jaggery boiling was conducted during the year and trial boilings conducted to assess its advantage over the present furnace in vogue in this tract. The ryots of the tract having been accustomed to use 4½ feet to 5 feet diameter pans; Poona furnace is at present found to be too big for the area. In Pugalur tract where big pans are already in use this type of furnace may be useful with the elimination of certain small defects. It has been proposed to conduct further trials with this furnace during the coming season.

Other crops—Paddy.—17.19 acres of paddy were grown during the year with samba, kar and navari strains. The samba strains grown were mainly ASD. 5, MTU. 19, GEB. 24 largely and small areas were grown under BAM. 3, Co. 25, and SR. 26B. An average yield of 2,495 lb. per acre was recorded in the samba season. ADT. 20, ADT. 9, Co. 13 and TKM. 6 were the short duration strains grown and an average yield of 1,913 lb. per acre was obtained for the short duration strains.

Ragi.—Co. 2 ragi was grown in an area of 1.39 acres and an acre yield of 780 lb. was obtained.

Green manure crop.—8.61 acres were grown under sunnhemp and sesbania and an acre yield of 9,258 lb. of green leaves was recorded during the year.

Miscellaneous—Fruit plants.—Two hundred and thirty-three plants in all mainly of Malta lemon lavers, mango grafts, papaya seedlings and acid lime seedlings were distributed during the year.

Seed distribution.—Sixty-four thousand four hundred and seventy-three pounds of sugarcane seed materials and 28,015 lb. of paddy seeds were made available for distribution.

Practical results.—A total of 71 new Coimbatore varieties were tested for selecting more suitable varieties than the existing standard varieties. Eight varieties fit for early season crushing and seven varieties fit for late season crushing have been selected and promoted to further yield trials before passing on to the ryots.

The time of planting and harvesting experiments indicated that planting early in the month of January is the best both in respect of yield, quality and sugar per acre. Planting late in May resulted in poor yield and also quality.

The use of rayungans as seed material did not indicate the utility of the method for wider adoption by ryots.

The use of Chilean nitrate as a nitrogenous manure proved to be better than the normal manuring with oil cake and ammonium sulphate.

The system of planting cane in pits as against the normal method in trenches did not result in increasing the yield. But had the disadvantage of initial high cost in digging the pits.

II. *Programme of work for 1955-56.*—The following trials and observations will be laid out during the season :—

(1) Study of new varieties from Coimbatore under normal method of manuring and irrigation.

(2) Preliminary yield trial of early varieties.

(3) Preliminary yield trial of late varieties.

(4) Main yield trial of early varieties.

(5) Main yield trial of late varieties.

(6) Maturity observation plots with early varieties.

(7) Time of planting and ratooning on maturity in sugarcane.

(8) Study of suitability of rayungans as seed material.

(9) Form of manure in relation to quality of gur.

Paddy.—GEB. 24 and MTU. 19 will be grown in the samba season and ADT. 9, TKM. 6 and Co. 13 will be grown in the kar and navarai season.

General.—TMV. 3 groundnuts and horsegram will be grown in an area of 0.50 cents. Vegetables like tomato, brinjals, lablab and snake gourds will be grown in an area of 0.25 cents.

Work on grafting and layering of fruit plants will be continued for large-scale distribution to ryots.

Agricultural Research Station, Palur.

I. *Results achieved in research—Paddy.*—Paddy was grown on a total area of 24.77 acres in four seasons, viz., kuruvai or kar, long duration samba, second crop samba (thaladi) and navarai. Eleven sornavarai cultures received from Tirurkuppam were compared with Sw. 7 and TKM. 3 in randomised replicated plots and the results showed that all the eleven cultures were on a par with SW. 7 while only one culture recorded significantly increase yield over TKM. 3.

Seven sets of F. 3 progenies totalling 100 plants of the Japonica × Indica (ADT. 12) crosses were studied for economic character in the kuruvai season of 1954-55 and 392 promising single-plant selections were carried forward for further study and purification.

GEB. 24 cross progeny cultures 1246 and 4388 from Maruteru were compared against GEB. 24 for a second time during 1954-55 samba season and it was found that the cultures gave increased yield of 42 per cent and 37.5 per cent over GEB. 24. The duration of the cultures was two days longer than GEB. 24 standard. During the thaladi season the hybrid culture 5108 a cross between Kavinganpoothala and ASD. 5 was compared against ASD. 5 and Co. 2. Gurmatia × Lunchai × Burma cross strains from Madhya Pradesh was compared against ASD. 5 and Co. 2 in the thaladi season.

Twenty-nine pure breeding cultures from 10 sets of crosses of Japonica × Indica (GEB. 24) were under comparative yield trials against GEB. 24, in the samba season in two series. Ten of the cultures have yielded 10 to 42 per cent more grain than GEB. 24. From a study of the 138 selections for economic characters, 91 promising single-plant selections have been carried forward for further purification and study. During the samba of 1954-55, 34 cultures from 5 sets of crosses made for evolution of alkali-resistant strains were laid out in 2 series of yield trials against SR. 26B as standard in a typical alkaline land in a ryot's field in Maruvoy in Cuddalore taluk. It was found that 10 cultures from four sets of crosses have yielded larger grain than the saline-resistant standard SR. 26B. Two hundred single-plant selections from Thillainayagam, a local variety grown in typical alkali areas of Vriddhachalam taluk were grown in study plots comparing against SR. 26B and 175 single-plant selections have been carried forward for further selection. Six cultures of the cross PLR. 1 × Co. 19 made for improving the quality of PLR. 1 were under comparative yield trial and it was found that all the six cultures proved better than PLR. 1, yielding 30 to 70 per cent more grain yield than PLR. 1. Fourteen bulk selections of the crosses PLR. 1 × Co. 4 and Co. 26 × Co. 19 were grown in two series of yield trials comparing against Co. 25 and PLR. 1 and all the fourteen cultures have yielded better than Co. 25 and PLR. 1 and the range of increase in yield over PLR. 1 being 7 per cent to 128 per cent. Of the 54 selections under study plots, 36 promising selections and 5 pure breeding cultures have been carried forward for further purification and study.

In the manurial experiments, (i) application of P_2O_5 to paddy through green manures and (ii) to find out the manurial value of organic manure and inorganic fertilizers and finding out the necessity for liming paddy soils, and (iii) to assess the relative merits of Japanese method of paddy cultivation with the farm method, the phosphate applied either direct or through green manure has not made any definite contribution towards increasing the yield of paddy and the 'Z' test was not satisfied either for the five main treatments or for the three sub-treatments or their inter-action. In the permanent manurial experiment five major treatments and eight sub-treatments, the 'Z' that was not satisfied either for the five main treatments, or for the eight sub-treatments or their inter-action. During the kuruvai season with Co. 13 and TKM. 3 the Japanese method did not show its superiority over the farm method. But in the samba season with Co. 25 and Co. 19 it was found that in the case of grain the Japanese method recorded significantly larger yield than the farm method but the difference in yield between the varieties Co. 25 and Co. 19 was not significant. Also the 'Z' test was not satisfied for the inter-action between the varieties and the method.

Millets.—Seventeen pure breeding culture selected from local ragi were under comparative yield trials in December to March season and 10 cultures have proved better than P. 1 standard. These cultures were again put under yield trial in May to September season in 1955. A manurial experiment with P. 1 ragi was conducted to find out the relative merits of ammonium sulphate and chilean nitrate when applied alone and in combination with lime, compost and super phosphate. During the 1954-55 December to March season it was found that the 'Z' test was satisfied and the treatment with 60 lb. N as ammonium sulphate in combination with other manures had secured the best yield while Chilean nitrate at 60 lb. N in combination with other manures came next.

In the mixed cropping experiment with ragi, cotton and groundnut conducted during 1953-54 season, again indicates the superiority of mixed crops over a pure crop of ragi and the importance of groundnut in the mixture for getting better monetary value. It was found that the mixed crop of ragi plus groundnut has given the best yield significantly above all the rest while ragi pure crop was the poorest. The pure crop of groundnut and the mixed crop of ragi plus cotton plus groundnut come next while cotton pure and ragi plus cotton mixed crops are poor.

Miscellaneous.—The breeding of long staple cotton financed by the Indian Central Cotton Committee was continued on the station during the year, under the control of the Assistant Cotton Specialist, Srivilliputhur. Studies on the performance of eight different varieties of sweet potato were continued. Production of seedlings and grafts of different plants and multiplication of vegetable seeds were in progress.

Poultry.—Throughout the period the Rhode Island Red breed was maintained. The opening balance at the beginning of the year was 5 cocks, 1 hen and 3 pullets. Eighty chicks were obtained from the broods kept on the station. Three pullets, 1 cockerel and 18 chicks died during the year. Three cocks were sent to Poultry Development Officer, Madras, and 3 pullets obtained back in exchange and the number of birds remaining at the end of the year was 67 made up of 2 cocks, 1 hen, 27 cockerels, 20 pullets and 17 chicks. The year started with a balance of one egg; 466 eggs were obtained from the hens and pullets. Two hundred and fifty-seven eggs were kept for hatch, 39 eggs were sold for hatch, 167 sold for table leaving a balance of 4 eggs at the end of the year.

Seed distribution.—The following quantities of seeds and plants were made available for distribution to ryots :—

	LB.
Paddy	23,244
Ragi	674
Cumbu	28
Varagu	24
Redgram	50
Prosopis pods	999
Gingelly seed	242
Groundnut pod	643
Green manure seeds	213
Vegetable seeds	46
	NUMBER.
Mango grafts	422
Lemon layers	313
Cuttings of economic value	33,646
Grass slips	22,100
	SETTS.
Tapioea selts	75,600

Practical results.—(1) *Paddy*—(a) *Kar season.*—Eleven sornavari cultures from Tirurkuppam were compared against TKM. 3 and SW. 7 and the results showed that all the eleven cultures were on a par with SW. 7 and one culture was superior to TKM. 3. Strain TKM. 3 was found suitable for the Kar season of the tract and it yielded on an average 2,850 lb. grain per acre while the sornavari strain of the station yielded only 1,790 lb. on average. If over the entire Kuruvai area of about 90,000 acres this strain is used and taking the increase in yield at 10 per cent over the local strain, the increased production will be 7,230 tons which will result in an increased profit of Rs. 16,19,500.

(b) *Samba season.*—Blast resistant sirumani strain has recorded the highest yield of 2,530 lb. grain per acre. The percentage increase in yield of this strain over PLR. 1 the local strain is 16 per cent. If Co.25 is grown in the entire samba area of the district, namely, 3.3 lakhs of acres, the increased production will be 47,000 tons valued at Rs. 1,11,00,000.

(c) *Thaladi season.*—In the thaladi season ASD. 5 Karthiga samba has recorded the highest yield of 2,375 lb. grain per acre and this is an increase of 33 per cent over the strain Co.2. If this replaces Co.2 in all the thaladi area of 90,000 acres, the increased production will be 6,400 tons valued at Rs. 15,00,000.

(d) *Navarai season.*—In the Navarai season SW.1251 and TKM.6 have recorded high acre yield of 2,790 lb. and if these strains are grown in the Navarai area of 9,000 acres of the district and taking the increased yield at 10 per cent over the varieties grown the increased production will be 800 tons valued at Rs. 1,75,000.

(2) *Millets.*—One thousand pound of P. 1 ragi strain and 640 lb. of P. 1 varagu strain were multiplied on the station for distribution to primary seed farms. Seventeen selections from local ragi were under comparative yield trial with local ragi and P. 1 strain and it was found that all the cultures yielded better than the local and 10 cultures better than P. 1 strain. The increase was from 7 to 13 per cent more than P. 1. By the use of the strain over the entire ragi growing area of the district and taking the

increase at 10 per cent over the local yield 8,800 tons of grain will be produced additionally with an estimated value of Rs. 7,92,000. A manurial experiment with P. 1 ragi strain was conducted to find the relative merits of ammonium sulphate and chilean nitrate at 40 lb. N and 60 lb. N levels by themselves and in combination with 3 tons of compost, 450 lb. lime and 30 lb. P_2O_5 as super phosphate. It was found that ammonium sulphate at 60 lb. N. over a basal dressing gave the best yield followed by chilean nitrate at 60 lb. N over a basal dressing of other manures. It was also found that the artificials applied in combination with other manures resulted in greater yield than when they were applied by themselves. The plots receiving no nitrogen either in the form of ammonium sulphate or chilean nitrate gave the poorest yield. In the mixed cropping trials with ragi, cotton and groundnut, it was seen that the growing of mixed crops of ragi plus groundnut and ragi plus groundnut plus cotton resulted in greater monetary returns. The results also showed that growing ragi with cotton or groundnut or with both did not lower the yield of ragi. If in all the 75,000 acres under ragi mixed crops of ragi plus cotton plus groundnut or ragi plus groundnut are taken at the increased return of Rs. 100 per acre the increased profit will be Rs. 75,00,000.

(3) *Miscellaneous*.—Varietal studies on tapioca varieties showed that valenca was the best suited for the tract and it yielded 14,884 lb. of tuber per acre. If this variety with good tuber quality and high yield replaces the local variety over the area of 5,000 acres and taking the increase in yield to be 10 per cent higher than the local the estimated increase in production will be 2,232 tons valued at Rs. 1,56,240. The varietal studies with foreign varieties of sweet potato showed that BW 304 was the best yielder with 12,770 lb. tuber per acre. If this improved variety replaces the local variety grown for the 2,500 acres under this crop the increased yield will be 1,120 tons valued at Rs. 78,400.

II. *Programme of work for 1955-56*.—The following experiments will be studied during the year 1955-56 :—

Sugarcane.—(1) Main yield trial of early varieties.

- (2) Maturity observation studies on the above varieties.
- (3) Preliminary yield trial of early varieties.
- (4) Varietal trial for adsali.
- (5) Adsalai manuring.
- (6) Water in relation to form of nitrogen.
- (7) Permanent manurial experiment—garden land condition.
- (8) Permanent manurial experiment—wet land conditions.
- (9) Monthly planting and harvesting experiment.

Other crops—Palur—Paddy—Varietal.—To isolate strains suitable to the area in which the station is located and superior to those grown by the cultivators.

Kar season.—To select a strain superior to SW. 1251 a Sornavari strain of the station eleven sornavari cultures from Tirurkuppam are compared with SW. 1251 and TKM. 3. Determining the suitability of strains of other stations for the locality. Finding out the suitability of Chinese type for the locality and season.

Samba season.—To select a strain superior to PLR. 1 the samba strain of the station similar duration strains of other stations are tried. Find out the suitability of ADT. 26 and culture 6538 (GEB. 24 × Co. 4) for the season and locality.

Thaladi season.—To select a strain superior to Co. 2, strains ASD 5 and culture 5108 are compared against Co. 2.

Navarai season.—To select the best strains suitable for the navarai season, the strains SW. 1251, TKM. 6, Co. 18, and ADT. 18 are compared against short durations strains of other strains. Trial of Mottakar and bellakar cultures in the season for isolating the best strain suitable for the season.

Hybridization—Economic.—(i) To isolate and select economically useful plants for the locality earlier than GEB. 24.

Selecting promising cultures for the ten groups of Japonica × Indica (GEB. 24) progenies after trial under comparative yield tests and in study pests.

(ii) To select a suitable strain for the GEB. 24 cross progenis 1246 and 4388, and yielding higher than GEB. 24.

(iii) The trial of Gurmatia × Luchai × Burma cross strain from Madya Pradesh and evaluating its yielding capacity and suitability to the tract and season.

(iv) Study of seven sets of hybrid progenis of Japonica × Indica (ADT. 12) and the back crosses for the kuruvai season.

(v) To evolve alkali resistant strains suitable to the tract.

(a) Pure line selection—study of the cultures and purification of cultures made for the variety Thillainayagan.

(b) Study of the progenis for five sets of crosses with the alkali resistant strain, Thallathokavadhu and other high yielding strain in typically alkaline areas.

(vi) The study of the hybrid progenies of PLR. 1 × Co. 19 and selecting strains with better quality rice than PLR. 1.

(vii) The study of the progenis of crosses of PLR. 1 × Co. 4 and Co. 26 × C. 19 to evolve blast resistant strains suitable for further locality.

Manurial.—(i) To find the difference in yield, if any, between direct application of P_2O_5 to paddy and indirect application through green manure an experiment with five green manure varieties and 3 P. 205 treatments will be conducted.

(ii) To find out the direct manurial value of organic manures and inorganic fertilizers and to find out the necessity of liming paddy soils, an experiment in split plot design with 5 main treatments and eight sub-treatments is to be conducted.

(iii) To find out the efficacy of the Japanese method of cultivation and the farm method, experiments in split plot design is to be conducted both in kuruvai and samba season with two strains.

Ragi.—To select high yielding strains of ragi suitable for growing in the districts of South Arcot, Chingleput and Tanjore.

To select the best culture from the seventeen cultures taken from local ragi and comparing them against PLR. 1 ragi.

To find out the relative merits of ammonium sulphate and chilean nitrate when applied alone and in combination with a basal dressing of compost, phosphoric acid and lime.

To show the advantages of growing a mixed crop of ragi and groundnut or ragi, groundnut and cotton overgrowing, than as pure crops.

Sweet potato.—To test the suitability of varieties of sweet potato obtained from abroad for local conditions.

Regional Millets Station, Tiruppattur (North Arcot).

I. Results of research achieved in 1954-55.—A culture AS. 8006 of Talaivirichan with white pearly grains has been released as a new strain TPT. 1. This is capable of spreading in an area of 5,100 acres in Salem and North Arcot districts, giving an additional production of 230 tons of grain, valued at Rs. 51,000. Another culture TS. 29 of the same variety isolated at the station having white chalky grains has given 38 to 50 per cent increased yield of grain over the local varieties in Chengam and Cheyyar taluks of North Arcot district. This has again been issued for trial in the Tiruppattur tract. In cumbu, a culture TC. 97 evolved at the station after completing trials at the station has been issued for trials in North Arcot and Salem districts. Twelve selections of irrigated ragi and 10 of samai have reached the preliminary yield trial stage. Two cultures of redgram, one of horsegram and five of lab lab have recorded increased yields over their respective standards. A manurial trial on rainfed cholam and cumbu and a mixed cropping experiment with cholam and pulses have recently been initiated. A total quantity of 2,186 lb. of seeds of improved strains of millets and pulses was distributed from the station.

II. Programme of work for 1955-56—Tiruppattur—(1) *Millets.*—(a) Evolution of high yielding strains of the following crops by selections:—Talaivirichan cholam, irrigated vellai cholam, cumbu, irrigated ragi and samai.

(b) *Agronomic experiments.*—(i) Manurial experiments on rainfed cholam and cumbu (ii) mixed cropping experiments with dry land millets and pulses.

(2) *Pulses.*—Evolution of high yielding strains of redgram, horsegram and field lab lab.

Agricultural Research Station, Tindivanam.

I. Results achieved in research during 1954-55—Research—A. Groundnut.—Two bunch strains from Bombay, two dormant bunch selections and a white seeded bunch variety from Australia were compared with TMV. 2 strain. Excepting the strain K. 3 from Bombay which recorded very low yields, the others were on par with the local strain. Twenty spreading selections and two strains from Pakistan, viz., Pondicherry and Big Japan, were compared with the local groundnut and the strains TMV. 1 and TMV. 3. Seven selections and one strain from Pakistan recorded significantly increased yields over the local. Five bunch selections were compared with the strain TMV. 2. The yield differences were not significant. Three selections from progenies of crosses, three selections from varieties and seven selections from progenies of crosses were compared in preliminary yield trials. Out of them nine selections recorded significantly higher yields than the local. Nine bunch and nineteen spreading selections were multiplied. Sixty-seven bunch and 56 spreading selections were tested under replicated row test and 13 bunch and 11 spreading selections were found promising. Out of 285 bunch and 115 spreading selections, 44 bunch and 52 spreading selections out-yielded their adjoining controls. One hundred and fifteen bunch and 105 spreading selections were made from the varieties and progenies of crosses. Twenty-seven new crosses were attempted and the progenies

of earlier crosses were raised and studied in detail. In the rotation experiment, the differences in yield of groundnut following groundnut and groundnut following cereals were not significant. Cereals following groundnut fared better than cereals following cereals. In the cultural and manurial experiments no conclusive results were obtained. In the mixed cropping experiment, the performance of the cotton strains was poor. The adoption of wider spacing between rows and closer spacing in the row resulted in increased yields and also permitted inter-cultivation with bullock drawn implements which resulted in considerable saving in expenditure. The spacing 24 inches by 3 inches recorded significantly higher yields than the spacing 9 inches by 8 inches. The legume rotation experiment designed by the Agronomist, Agricultural Research Station, Satyamangalam, was conducted with twelve crops.

B. Gingelly—1954 summer.—Two selections were compared with local TMV. 1 and TMV. 3 strain under comparative yield trials. Yield differences were not statistically significant. Nine selections from progenies of crosses and varieties were tested in replicated row tests and no conclusive results were obtained. Seventy-five single plant selections showing desirable economic characters were made. Three crosses were attempted and progenies of earlier crosses were raised and studied. In the manurial experiment with ammonium sulphate and chilean nitrate, the yield differences were not statistically significant. In the cultural experiment also the yield differences were not statistically significant between the different tillage treatments.

1954-55 Cold weather.—A white seeded strain from Pakistan was tested under comparative yield trials along with TMV. 2 strain. The differences in yield were not statistically significant. Out of 394 single plant selections tested under row tests, 138 out-yielded their adjoining controls. Two hundred single plants were selected from local groundnut field. Two new crosses were effected during the season to evolve economic forms.

C. Castor.—Three strains from Uttar Pradesh, Madhya Pradesh and Bombay were compared with the strains TMV. 1 and TMV. 2 under comparative yield trials. The strains from other States were inferior to the local strains. In the preliminary yield trials with eleven selections from progenies of crosses and varieties, the yield differences were not significant. Two selections out of twenty selections put under replicated row tests were found promising. Out of 64 selections tested for purity and yield, 24 were found to be pure and to possess high yielding ability. Twenty-seven new selections were made from them. Four new crosses were attempted and the progenies of earlier crosses were raised and studied. A new variety C. 3 from Punjab (Pakistan) was not found to be promising. In the manurial experiment the application of mixture NP and NPK resulted in higher yields than no manure. Nitrogenous manures were also found to induce early flowering. In the district trials TMV. 1 castor was found suited to Ramanathapuram district.

Miscellaneous.—The area sown to fodder crops and paddy was increased with a view to achieve self-sufficiency in the fodder requirements of the station. The production of compost and farm yard manure was higher this year than in last year. Two hundred and thirty nine tons of compost and 118 tons of cattle manure were produced as against 229 tons and 116 tons last year. Gliricidia and sesbania were raised on an extensive scale on the station and large number of seedlings were distributed to the ryots. Tractor

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stationed for the scheme for mechanical cultivation of groundnuts was hired out to ryots in the taluk.

Seed distribution.—The following seed materials were distributed during the year :—

Groundnut pods	3,038 lb.
Groundnut kernels	322 "
Gingelly	1,500 "
Castor	644 "
BAM. 3 paddy seeds	11,485 "
MTU. 19 paddy seeds	270 "
AKP. 1 ragi seeds	8½ "
Vegetable seeds	77½ "
Thin Napier seed	10 "
Prosopis Juliflora seeds	471 "
Jamberi seedlings	25 Nos.
Jack seedlings	19 "
Gajanimma seedlings	10 "
Vegetable seedlings	1,480 "
Moringa cuttings	10 "
Gliricidia seeds	9 lb.
Gliricidia cuttings	18,575 Nos.

Schemes.—The following schemes were in operation at the station :—

- (1) Zonal Nucleus Seed Farm Scheme.
- (2) Scheme for the mechanical cultivation of groundnut.

A scheme for the intensive breeding of groundnut was started from 30th June 1955.

Benefit of research to the ryots.—During this year useful results were obtained regarding spacing for groundnut and manuring to castor. Promising selections of groundnut and castor were tested in the different districts and their performance was satisfactory. But as the results are still in trial stage, it is not possible to compute exactly the benefit of the economic gain that would result by the adoption of the above results of research.

II. Programme of work for 1955-56—A. Groundnut (rainfed season).—

(1) Comparative yield trials of three bunch and two spreading strains from other States.

(2) Comparative yield trials of twenty spreading selections.

(3) Preliminary yield trials of seven bunch and twelve spreading selections.

(4) Seed multiplication of eighteen bunch and twenty-two spreading selections.

(5) Replicated row tests of sixteen bunch and thirty-nine spreading selections.

(6) Row tests of four hundred and thirty bunch and spreading selections.

(7) Study of one hundred and twenty-four new varieties and types.

(8) Hybridisation.

(9) Manurial experiment.

(10) Cultural experiment.

(11) Rotation experiment.

(12) Groundnut cotton mixed cropping experiment.

(13) Maintenance of varieties and types.

(14) Rainfall and yield correlation experiment.

(15) Trial of labour saving implements (Dhanthies).

(16) District trials.

(17) Spacing trials.

B. Castor.—(1) Comparative yield trials of three selections from progenies of crosses.

(2) Preliminary yield trials. Series I of five selections from progenies of crosses and varieties.

Series II of four selections from progenies of crosses.

(3) Replicated row tests of twenty-two selections from progenies of crosses and varieties.

(4) Purity studies forty selections.

(5) Hybridisation.

(6) Maintenance of inbred types : 140 numbers.

(7) Maintenance of purity and vigour of strains TMV.2 and TMV.3.

(8) Seed multiplication of strains and types.

(9) District trials.

C. Gingelly.—(i) 1955-56 cold weather season.—(1) Comparative yield trials of two selections.

(2) Preliminary yield trial of two selections.

(3) Replicated row tests of 138 selections.

(4) Row tests—250 selections.

(5) Seed multiplication of varieties and selections.

(6) Hybridisation.

(ii) 1956—Summer season.—(1) Preliminary yield trials of seven selections.

(2) Replicated row tests of thirteen selections.

(3) Row tests—75 selections.

(4) Manurial trials.

(5) Cultural trials.

(6) Seed multiplication of varieties and types.

(7) Hybridisation.

Agricultural Research Station, Aduthurai.

I. Results achieved in research during 1954-55—Crops—Paddy.—(i) *Multiplication and distribution of nucleus seed of paddy strains.*—A total quantity of 1,44,083 lb. of nucleus seeds of different strains was produced out of which 1,27,252 lb. were distributed to the district staff for running primary seed farms.

(ii) *Breeding.*—(a) *Improvement by introduction.*—Ten short duration Chinese varieties compared for yield against Aduthurai strains did not yield more than the station strains but they were found to be slightly non-lodging in habit.

(b) *Improvement by pure line selection.*—Forty-one selections made from Mattaikuruvai, a short duration red riced variety grown in the coastal taluks of Tanjore district and eleven selections made from Tiruthurai-poondi kar, a variety grown under water logged conditions in low lying areas in Tiruthurai-poondi taluk were compared for yield against their respective local varieties in the kuruvai season and based on the yields recorded, 16

cultures of the former and seven cultures of the latter were selected from Kattuvanam, a long duration flood resistant variety grown in Mannargudy taluk and three cultures in each of Kattaivellai, Kodaivellai and Kaivari-samba grown under rainfed conditions in Arantangi taluk were also compared for yield against their respective local varieties in samba season. None of the cultures of the rainfed varieties yielded significantly better than the standard while in Kattuvanam five cultures gave more yield than the ryots' unselected bulk.

(c) *Improvement by hybridisation.*—Progenies of crosses in different generations, intended for the evolution of (1) dormant strains, for kuruvai season, (2) strains with stiff straw and non-lodging habit and (3) strains with fine grain and non-shattering habit, were grown and studied. From the various progenies studied a total number of 673 single plant selections were made for further study. Besides, progenies of crosses between Japonica $\times$ Indica races, were also grown and studied and a total number of 610 single plants were selected for further study.

(iii) *Crop weather studies—Experiment.*—The experiment under the All-India Co-ordinated Crop Weather Scheme was continued both in kuruvai and samba season as in previous years. The prescribed meteorological and microclimatic observations as well as observations on crop growth, panicle emergence, etc., were recorded and data compiled and sent to the Director of Agricultural Meteorology, Poona.

(iv) *Manurial experiments.*—The manurial experiments conducted on paddy during the period under report and the results obtained from them are as follows:—

(a) *Nutrient requirement of paddy.*—In this experiment, it was found that an application of 60 lb. N per acre in the shape of ammonium sulphate together with 45 lb. P_2O_5 per acre in the shape of superphosphate resulted in the highest yield of grains.

(b) *Permanent manurial experiment.*—From the results of this experiment both in kuruvai and thaladi seasons, it was observed that for the same level of nitrogen (60 lb. N per acre) ammonium sulphate application resulted in the highest yield of grain closely followed by green manure application. There was not appreciable response for the other nutrients, P_2O_5 , K_2O and lime when applied alone and in combination over the nitrogen applied during kuruvai season while in thaladi, the addition of phosphoric acid over nitrogen resulted in higher yield.

(c) *Trial of sesbania green versus sesbania dry.*—In this experiment, both in kuruvai and thaladi seasons, it was noticed that application of green sesbania at 5,000 lb. per acre gave 16 per cent more yield than no manure, while the application of dry sesbania, equivalent to 5,000 lb. green matter per acre gave 8 per cent more yield than no manure. Even sesbania applied in dry form gave as much as 8 per cent more yield than no manure.

(d) *Sea weed compost experiment.*—In this experiment, the sea weed compost received from Fisheries department was tried as a manure for paddy along with farm waste compost, farm yard manure, green manure and ammonium sulphate on equal nitrogen basis of 30 lb. N per acre. The results both in kuruvai and thaladi seasons showed that the sea weed compost is not useful for application as manure for paddy crop since its application did not result in any increased yield over no manure.

(v) *Cultural experiments—(a) 'Udu' trial.*—From the results of this trial, which was conducted to find out the optimum ratio of kuruvai to

ottadan seed mixture to be used for udu cultivation, it was concluded that a proportion of 3 : 1 of kuruvai to ottadan is the best for udu cultivation.

(b) *Japanese method versus farm method of cultivation.*—To test the merits of Japanese method of paddy cultivation as practised at Kora Gramodyog Kendra, Bombay, compared with the farm method of cultivation, this experiment was repeated in kuruvai, samba and thaladi seasons during the period under report. There was no appreciable increase in yield of grain by the adoption of Japanese method of cultivation. On the other hand, the expenditure was more for Japanese method of cultivation and the net profit obtained was only half of that obtained by adoption of farm method of cultivation.

Other crops—(i) Cotton.—During the period under report, a scheme for breeding an early variety of cotton suitable for cultivation in rice fallows of Madras State partly financed by the Indian Central Cotton Committee, was sanctioned by Madras Government. An area of 5.61 acres of the rice fallows was utilised for the breeding and agronomic trials under the scheme. Besides, a seed nucleus plot of 0.89 acres for production of selfed seeds of P216F. was maintained. In addition 7.30 acres were sown with P216F as bulk crop. The crop was affected to some extent in the early stages of growth by the heavy rainfall amounting to about 10 inches received in March-April but recovered thereafter. Picking of kapas was commenced, in the first week of June. Till the end of the period under report, a total quantity of 2,470 lb. of kapas from the bulk area and 135 lb. of selfed kapas from the seed nucleus plot was obtained. A few more pickings have to be taken before the crop is removed from the ground and the land made available for paddy cultivation.

(ii) *Pulses.*—Wet land blackgram and greengram were grown on an area of 2.50 acres and 0.50 acres respectively as an after paddy crop in rice fallows for production of grain. Seven hundred and twenty-nine pounds of blackgram and 108 lb. of greengram seed were obtained during the year.

Two varieties of green gram Krishna Mung II and Moong T.1 received from Madhya Bharat and Uttar Pradesh respectively were grown along with local variety in observation plots in wet lands as after paddy crop to find out the suitability of the North Indian types for cultivation in Tanjore district. The North Indian types were found to be a week shorter in duration than the local variety but they did not out yield the local variety. They yielded only about one-third of that of local variety and thus they were found to be unsuitable for cultivation in Tanjore district.

(iii) *Fruits and vegetables.*—An area of 1.40 acres was utilised for growing indigenous vegetables like bhendai, brinjals, lab-lab amaranthus, gourds of different types, chillies, tomatoes, etc., and seeds collected for sale and distribution. Besides, the vacant spaces in the Rest House compound was utilised for the production of rooted cuttings of Malta lemon and seedlings of other fruit plants. In addition, grafting of mango varieties was also undertaken and 300 grafts were produced for sale. During the year, the following quantities of fruits, vegetables, vegetable seeds and seedlings and fruit plants were either sold or transferred to the district staff:—

Fruits—1,351 lb.
Fruit plants—1,794 numbers.
Vegetable seeds—314 lb. 5 oz.
Green vegetables—1,528 lb.
Vegetable seedlings—132,925 numbers.

(iv) *Green manures*.—During the year, the planting of *Indigofera teysmanni* seedlings along channel bunds and in odd places in the office high piece was intensified and 1,495 seedlings were planted. Planting of *Gliricidia maculata* cuttings and seedlings in available area was also done. *Sesbania speciosa* was raised as a border crop along the field margins of transplanted fields and also as a pure crop in rice fallows in summer. During the year, 3,366 lb. of *sesbania* seeds were collected from the border crop. From the pure crop sown in the rice fallows during the previous year, a total quantity of 91,141 lb. of green matter was obtained and utilised for manuring the fields. By lopping the *Gliricidia* plants, 86,896 lb. of green matter was obtained and utilised for manuring. From the plants that are left unlopped along the road margins 67 lb. of *Gliricidia* seeds were collected. In addition to *sesbania* and *gliricidia* a total quantity of 60,217 lb. of cotton plants and 13,950 lb. of leaf from miscellaneous trees were also utilised for manuring the fields. From the seven plants of *Indigofera teysmanni* in the Rest House compound 14 lb. 12 oz. of seed were collected.

(v) *Fodder crops*.—Three thousand guinea grass slips were planted during the year on an area of 20 cents in D block near the well. From the newly planted crop 2,715 lb. of grass was cut and fed to cattle. Green grass totalling 83,115 lb. was cut from field bunds and fed to cattle. From the guinea and napier grasses planted along channel bunds 6,000 slips of the former and 200 of latter were collected and sold to the public.

(vi) *Coconuts*.—From 148 trees that are bearing 9,054 nuts were harvested and disposed off. In connection with Grow More Coconut Campaign, 112 seedlings were obtained from Pattukkottai nursery and planted on June 14th during the "Farmers' Day".

(vii) *Arecanuts*.—The few arecanut plants already planted in the Rest House compound grew satisfactorily during the year. Besides, 200 arecanuts seedlings obtained from Taliparamba in June 1955 were also planted during the Farmers' Day in connection with the Grow More Arecanut Campaign which was inaugurated by the Agricultural Minister, Madras State.

Filter points.—During the year, three wire mesh filter points that are in existence were pulled out and instead of them coir filter points of cheaper cost were installed. These coir filter points are attracting the attention of the numerous visitors that come to this station. They serve remarkably well as additional sources of irrigation during summer months for raising cotton and other crops in rice fallows and also for raising kuruvai nurseries in advance of the receipt of canal water.

II. *Programme of work for 1955-56*—(1) *Multiplication and distribution of nucleus seeds of paddy strains*.—To supply the nucleus seeds for primary seed farms. Aduthurai strains as well as Co. 25 and a few other special varieties will be multiplied.

(2) *Evolution of strains*—(i) *By pure line selection*.—The yield trials of cultures of Mattaikuruvai. Tiruthuraiyadi kar, Kattuvanam, Kodaivellai Kattavellai and Kaivari samba will be continued.

(ii) *By hybridisation*.—The various selections made from the different cross progenies will be grown and studied.

(3) *Improvement by introduction*.—The inter-varietal trial with outstation strains and Chinese varieties along with Aduthurai station strains will be continued.

(4) *Manurial experiments*.—The following manurial experiments will be carried out during the year :—

- (i) Varietal response to manuring.
- (ii) Reinforced compost experiment.
- (iii) Permanent manurial experiment.
- (iv) Experiment with *sesbania* in different forms.

(5) *Cultural experiments*.—(i) Japanese versus farm method of cultivation.

(ii) Trials with different proportions of kuruvai to o'tadan seed mixture for 'Udu' cultivation.

(iii) Pre-stocking seed experiment Plant Physiologists' experiment.

(6) *Other experiments*—(i) Co-ordinated Crop Weather Scheme.

(ii) Trace element experiment.

(7) *Other crops*.—(i) Cotton in rice fallows.

(ii) Pulses in rice fallows.

(iii) Green manure crop in rice fallows.

(iv) Production of vegetable seeds, fruit plants and grams.

Central Banana Research Station, Aduthurai.

I. *Results achieved in research during 1954-55*—1. *Varietal collections*.—The total number of varieties maintained to date is 171. The varieties, Onakkan Mannan, Manga Kaya, Sodari, Gali Bale, Deeva Bale, from West Coast and Alshi, Kari Bale, Dodda Bale, Bargi Bale from Bombay were added to the collection. A survey of banana growing areas in the districts of Ramanathapuram, Tirunelveli, North Malabar, South Kanara, Nilgiris, Coimbatore and parts of Salem, Chingleput and Madurai districts was undertaken. Detailed morphological descriptions of fifty-five varieties were completed during the period under report and five more varieties were added to the list of synonyms. A trial was initiated to test the performance of different varieties under swampy conditions. Among these, Batheesa types, Lambi, Kachkol and Supari turned out to be promising so far.

The following wild banana species were collected during the year :—

- (1) Wild banana from Assam.
- (2) Wild banana from Anamalais.
- (3) Kallu bale (*Musa balbisiana*).
- (4) Kattu Vazhai from Wynaad.

The banana varieties which have performed well at the station and which have given bunch weight of 20 lb. and more under both perennial and wet land conditions are listed below :—

Desert varieties.—Walha, Kullam, Poovan, Rasthali, Ayiranka, Rasthali, Suganthi, GrosMichel, Kodappanilla Kunnan, Kapur, Mannan, Lady's finger, Nendra Padathi, Cheena bale, Raja vazhai, Boothi bale, Peyan, Enna banian, Krishna vazhai, Sirumalai, Virupakshi, Vennettin kunnan, Mayil vazhai, Safet velchi, Padathi, Melbhog, Vella Kadali, Puttu vazhai, Peykunan, Motta Poovan, Vennettin Mannan, Monthan Poovan, Thenkunnan, Ney Poovan, Pacha Nadan, Ney yannan, Nendran, Nanguneri Peyan and Pey Ladan.

Culinary varieties.—Monthan, Ponthan, Malai monthan, Sambrani monthan, Kallu monthan, Pidi monthan, Bontha, Kuri Bontha, Nalla Bontha, Pacha Bontha Batheesa, Booditha Bontha Batheesa, Aduku Monthan, Ash Montha, Kanch Kela, Bainsa, Madhuranga Bale, Nella Bontha, Batheesa, Thella Bontha, Supari, Lambi, Kachkol, Nendran and Batheesa green.

2. *Hybridisation.*—The following wild species were utilized for crossing with the cultivated varieties :—

(1) *Musa balbisiana* and its clones, Elavazhai, Neer Bale, Kadu bale and sawai.

(2) *Musa acuminata*.

(3) *Musa banksii*.

(4) *Musa Chiliacarpa*.

(5) *Musa coccinea*.

(6) Wild banana from Anamalais.

Two hundred and thirty-four inflorescences of 57 cultivated varieties were crossed. Among these only twenty-two parental combinations have set seeds of which the following have germinated and are under study :—

(1) Thote × *Musa balbisiana*.

(2) Thote × *Musa balbisiana*—clone Elavazhai.

(3) Pey kunnan × *Musa coccinea*.

The seedlings and Venneettin Kunnan × *Musa balbisiana* and Raja Vazhai × *Musa balbisiana* clone Elavazhai obtained last year are still in the preflowering stage and are under study.

3. *Mutants and selections.*—One selection of Poovan chosen for high grade of bunch did not keep up the parental characteristics, confirming the similar results in the case of Monthan and Rasthali. The ashy coated nature on the fruits was found to be an inherited character in the clonal progenies in the variety Nanguneri Peyan. Other selections made during the period are as follows :—

(i) Two monthan selections for persistent male flower.

(ii) One Mauritius for its semi-tall stature.

(iii) One Gali bale for superior fruit quality.

(iv) One gali bale for male bud branching character.

(v) One Motta Poovan for its reversion to Poovan.

(vi) One Rasthali for its multiple inflorescence.

4. *Propagation and plantation practices*—(1) *Method of propagation.*—This trial was started in June 1954 to find out whether the whole rhizome and bits of rhizomes can provide quantitatively more conveniently available material for propagation. The two varieties used were Monthan and Poovan with six replications. The harvest is under progress and 88 Monthan and eight bunches of Poovan out of a total of 144 in each have come to harvest so far.

(2) *Season of planting trial.*—The object of this observational trial is to find out the optimum season or month of planting under Aduthurai conditions and the planting of twenty-five suckers every calendar month for the past two years under Monthan and Poovan varieties were completed by March 1955. The harvests are under progress and June planting proves to be promising so far.

(3) *Performance study of suckers produced during different stages of growth of parent plants.*

The aim of this trial is to ascertain the best stage at which banana suckers should be allowed to be produced during different stages of growth

of the parent plants for propagation. The trial is a randomised and replicated trial with the Poovan variety comprising the following three treatments replicated six times :—

(i) Suckers selected during the early stages of the parent plant (up to four months);

(ii) Suckers selected during the middle stage of the parent plant (from fifth month to the time of flowering); and

(iii) Suckers produced during the late stage of the parent plant (at the time of flowering and within a month after flowering). Uniform aged suckers of equal size have been planted for the three treatments on 12th April 1955, 12th December 1954 and 12th August 1954 respectively. From these plantings uniform aged suckers will be selected and planted out for trial.

Plantation practices—(1) *Ratooning trial.*—The trial was initiated to judge the utility of taking one to three ratoon crops after a plant crop of bananas. The treatments were (i) one ratoon crop, (ii) two ratoon crops and (iii) three ratoon crops with two varieties, Monthan and Poovan replicated six times. The plant crop harvest has been completed in May 1955 and the first ratoon crop has been allowed to grow.

(2) *Mattocking trial.*—This trial was relaid in August 1953 to study the influence of the extent of mattocking on the growth and performances of the suckers that follow on. Three treatments adopted were (a) control—parent pseudostem left untouched, (b) parent pseudostem cut back to half the length after harvest, (c) parent pseudostem cut to ground level after harvest. The harvest of the first generation was completed in January 1955 and the mattocking treatments were applied soon after harvest and the flowering in the followers have just commenced.

(3) *Time of application of fertilisers-cum-spacing trial :—*

This trial with Poovan variety was commenced to arrive at best periods of application of fertilisers for bananas and to determine the optimum spacing under wet land conditions. The trial was laid out in November 1954 with split plot design adopting two spacings 7 feet either way and 8 feet either way and manurial doses as ten treatments. The trial is under progress.

(4) *Improvement of perennial banana area*—(a) *Desuckering trial.*—This trial was relaid in January 1953 with the object to devise optimum desuckering practice in perennial banana plantations. There were four treatments, namely, (i) all daughter suckers permitted to grow, (ii) removal of all except the first daughter sucker, (iii) removal of all except the first and the third daughter sucker and (iv) removal of all suckers except the one that emerges after the parent plant has flowered. The analysis of the harvest data of the first generation reveals that there are no significant differences among the desuckering practices adopted at various intervals. However desuckering done at any time was significantly superior to no desuckering. The trial is being continued.

(b) *Spacing trial.*—This observational trial was started in December 1952 to determine the optimum spacing for bananas in the perennial plantations with the following treatments : (i) 9 feet by 9 feet, (ii) 10 feet by 10 feet, (iii) 11 feet by 11 feet and (iv) 12 feet by 12 feet between clumps. Progressive yield data collected from the two generations indicate that the treatment 11 feet by 11 feet has recorded maximum mean bunch weight and in respect of total yields from plots of equal area, treatment 9 feet by 9 feet the closest

spacing has led. These results throw light of the fact that in commercial plantations, closer spacing has to be reckoned as a factor for getting maximum returns than getting heavier bunches in lesser numbers obtained in broader spacings.

(c) *Manurial trial in the perennial area.*—This trial with the Poovan variety was started with the object to determine value of different manurial practices under the perennial conditions by application of cattle manure, ammonium sulphate, groundnut cake either alone or as a mixture of any two and to examine how far the application of phosphoric acid and potash or potash alone would contribute the yield was relaid adopting a 26 confounded factorial design in January 1953, and manures were applied in two doses every year. One harvest of all the 576 plants has been completed and treatment combination to give $\frac{1}{4}$ lb. nitrogen as farm yard manure, $\frac{1}{4}$ lb. of nitrogen as ammonium sulphate, $\frac{1}{4}$ lb. phosphoric acid as super phosphate and $\frac{1}{4}$ lb. potash as sulphate of potash is leading the rest in mean bunch weight. The trial is in progress with the second generation crop.

(d) *Soil culture trial.*—This trial to determine the frequency of soil digging in perennial banana plantations was relaid in January 1953 with a randomized block design replicated six times with the following treatments (a) digging once every month, (b) digging once in two months, (c) digging once in three months and (d) digging once in four months. The analysis of the yield data of the first generation reveals that there are no significant differences among the various treatments. The trial is being continued in the second generation.

Other crops.—In all 7,735 banana suckers from 108 high yielding and promising varieties were sold to the public during the period under report.

II. *Programme of work for 1955-56*—(1) *Varietal collection.*—Morphological descriptions of banana varieties that were not described already will be continued and synonyms will be recorded. Survey tours of banana growing areas of different districts that were not already surveyed will be taken up and mutants will be spotted and unrepresented varieties and species collected.

(2) *Hybridisation.*—Crossing of cultivated varieties of bananas with the wild species will be continued with a view to build up disease-resistant dwarf and more desirable types of commercial banana varieties. In addition, the seed set and germination capacity of seeds got by hybridization of all the important varieties will also be studied. Further detailed study of the hybrid progenies already obtained will be made.

(3) *Mutants and selections.*—Progeny tests of six selections made during the year 1954-55 will be continued. The selection of possible mutants in outside plantations and in the station and conducting of clonal progeny tests will be continued.

(4) *Propagation and plantation practices*—(a) *Propagation studies*—(1) *Method of propagation.*—This trial to find out in whole rhizomes and bits of rhizomes can provide quantitatively more conveniently available material for planting purposes will be completed in the year 1955-56 and the results will be statistically analysed.

(2) *Season of planting trial.*—This observational trial to assess the relative merits of the various months of the year for planting purposes is in progress from March 1953 onwards. The plants planted for 24 months will be harvested and results recorded. The trial will be freshly started in a statistical layout after the approval of the extension proposals of the scheme.

(3) *Performance study of banana suckers produced during different stages of growth of parent plants*—(i) *Ratooning trial.*—The ratoon crops will be allowed to grow as per programme and yield data will be recorded in this trial to assess the utility of taking one to three ratoon crops, after a plant crop of bananas in the wet land system of cultivation.

(ii) *Mattocking trial.*—The ratoon crop on which the influence of the extent of mattocking of the respective parent plants is to be studied has just commenced flowering. The harvest data will be collected and statistically analysed.

(iii) *Rotation experiment.*—This trial to devise the best rotation of crops for banana will be initiated during November 1955 with five treatments and five replications following the layout approved by the Indian Council of Agricultural Research.

(iv) *Time of application of fertilisers.*—The trial to arrive at the best periods of application of fertilisers for bananas and to determine the optimum spacing under wet land system of cultivation is in progress. The harvests will be completed during the year 1955-56 and statistically analysed.

(v) *Improvement of perennial area.*

(vi) *Desuckering trial.*—This trial to devise the optimum desuckering practice in perennial banana plantations is in progress from January 1953 onwards will be continued by giving fortnightly desuckering operations and by recording suckers produced, suckers desuckered and number of bunches harvested with their respective weights.

(b) *Spacing trial.*—This observational trial to determine the optimum spacing in the perennial banana areas which was continued after cyclone with the best available follower of each clump will be continued and yield data will be recorded.

(c) *Manurial trial.*—This trial to find out the value of different manurial practices in perennial banana areas which was initiated in January 1953 will be continued. Two applications of manures and fertilisers as per programme will be done and yield recorded.

(d) *Soil culture trial.*—This trial which was relaid in January 1953 with the object of determining the optimum frequency of soil digging in perennial banana plantations will be continued. Digging will be given to plots as per programme yields recorded.

Agricultural Research Station, Pattukottai.

I. *Results achieved in Research during 1954-55*—Crop 1. *Paddy.*—A total of 2.21 acres of Kuruvai nurseries were raised. The nursery area was manured with a basal dressing of 20 tons of farm-yard manure and a top dressing of ammonium sulphate at 100 lb. per acre. Transplanted fields received a basal dressing of 10,000 lb. of green leaves and 100 lb. of super phosphate and a top dressing of ammonium sulphate at 150 lb. per acre. The area under ADT. 3 and ADT. 20 and the average acre yields recorded are as follows:—

Strains.	Total area.	Average acre yield in
	ACRE.	LB.
ADT. 3	3.32	1,438
ADT. 20	9.40	1,681

In the Samba season, sowings in the nursery were started on 5th August 1954 and completed on 1st September 1954. The transplanting was

commenced on 12th September 1954 and completed on 2nd October 1954. The Samba nurseries received a basal dressing of 10,000 lb. of green leaves and a top dressing of 100 lb. of ammonium sulphate per acre. The transplanted fields received a basal dressing of 10,000 lb. of green leaves and 100 lb. of super phosphate and a top dressing of 150 lb. of ammonium sulphate. The various strains and varieties grown in the Samba season, the area grown and the average acre yield each recorded are given below :—

Strain.	Total area.	Average acre yield in
	ACRE.	LB.
ADT. 8	0.75	2,124
BAM. 3	0.60	1,513
Co. 25	1.66	2,421
SR. 26 B	0.30	1,943
ADT. 25	0.50	2,488
Basumathi	0.25	1,260
AEB. 148	0.36	222
White puttu	0.15	2,413

During the *Thaladi* season, planting was commenced on 1st October 1954 and completed by 27th November 1954. The transplanted fields received 6,000 lb. of green leaves and 100 lb. of super phosphate as basal dressing and 150 lb. of ammonium sulphate as top dressing. The strains or varieties grown the area put under each and the average acre yield recorded by each are as follows :—

Strain or variety.	Area.	Average acre yield in
	ACRE.	LB.
ADT. 8	6.40	1,434
Co. 25	3.30	1,281
ADT. 25	5.07	1,425
BAM. 3	0.59	1,071
ASD. 4	0.45	422
ASD. 10	0.12	700
ASD. 5	0.50	1,026
Co. 2	0.50	896
White puttu	0.05	500

Manurial experiments—(1) *Experiment to fix the optimum dose of different kinds of manures to obtain maximum yield of paddy.*—This experiment was continued in the *Kuruvai* and *Samba* seasons with the following treatments :—

- (i) Green leaves 2,000 lb. per acre;
- (ii) Green leaves 5,000 lb. super phosphate 150 lb. and ammonium sulphate 150 lb. per acre;
- (iii) Green leaves 10,000 lb. and super phosphate 300 lb. per acre;
- (iv) Green leaves 10,000 lb. super phosphate 300 lb. and ammonium sulphate 100 lb. per acre;
- (v) Green leaves 10,000 lb. super phosphate 300 lb. and 1,000 lb. of lime per acre; and
- (vi) Green leaves 10,000 lb. super phosphate 300 lb. lime 1,000 lb. and ammonium sulphate 100 lb. per acre.

From the results collected no valid conclusions could be drawn as the differences due to treatmental effects were not statistically significant.

In the *Thaladi* season, the experiment with the following treatments was conducted :—

- (i) No manure.
- (ii) Green leaves 3,000 lb. super phosphate 300 lb. and ammonium sulphate 300 lb. per acre.
- (iii) Green leaves 10,000 lb. and super phosphate 300 lb. per acre.
- (iv) Green leaves 10,000 lb. super phosphate 300 lb. and ammonium sulphate 100 lb. per acre.
- (v) Green leaves 1,000 lb. super phosphate 300 lb. and lime 1,000 lb. per acre.
- (vi) Green leaves 10,000 lb. superphosphate 300 lb. lime 1,000 lb. and ammonium sulphate 100 lb. per acre.

From the results obtained it was seen that treatment 6 was on a par with treatments 2 and 4 and significantly better than the other treatments.

Japanese method v. Farm Method of Paddy cultivation.—“ Japanese method ” of paddy cultivation (as practised at Kora Gramodyag Kendra, Bombay) was compared with the “ Farm method ” in the split plot design of layout with the strains as the main treatments and the two methods as the sub-treatments in the *Kuruvai* and *Samba* seasons. In the *Kuruvai* season, ADT. 3 and ADT. 20 were used, while in the *Samba* season Co. 19 and Co. 25 were used. During the *Kuruvai* season, due to the incidence of blast no reliable results could be got. In the *Samba* season, from the results gathered, it was seen that the treatmental differences between the two methods were statistically significant, the difference being in favour of the “ Japanese method ”. But the extra yield got from the “ Japanese method ” was not enough to compensate for the extra expense incurred by way of additional manures applied and cultural operations.

2. *Other crops—Ragi.*—Ragi, Co. 3, was raised in summer season in 40 cents and the crop gave an acre yield of 762½ lb. of grain.

Groundnut.—Groundnut, TMV. 2 was raised in 4.85 acres in rice fallows. The crop was sown between 18th January and 16th March 1955. The harvest of the crop was done between 26th April and 6th July 1955. An average acre yield of 925 lb. of pods was obtained.

Groundnut, TMV. 2 sown in the dry lands (in 150 acres) in July-August gave an acre yield of 637 lb.

Gingelly.—Gingelly TMV. 1 sown after groundnut in the dry lands (1.20 acre) in the month of January gave an acre yield of 127 lb.

Coconuts.—Thirteen fresh coconut seedlings were planted during the year. From the old trees, 450 nuts were harvested.

Cotton.—(In rice fallows) P. 216. F. Cotton was raised in rice fallows in an area of 1.25 acres. Sowing was done in January and February, picking was commenced on 13-5-1955 and the crop is still in the field.

Green manure.—The quantity of green manure produced during the year was sufficient for the paddy crop raised in the station. *Sesbania*, sun-hemp, glyricidia and indigofera formed the source of green manure for the station. *Sesbania* grown as a pure crop after paddy gave up to 22,000 lb. per acre. *Sesbania* plants planted along the field bunds gave up to 3,000 lb. per acre. A total quantity of 129½ tons of green manure was produced during

the year; 21,106 feet of glyricidia cuttings were planted on field bunds or distributed and 500 seedlings of *Indigofera teysmanii* were planted. Five hundred and ninety-eight pounds of *Sesbania* seeds, 51 pounds of *Glyricidia* seeds and 17 lb. of *Indigofera* seeds were collected.

Calopogonium.—This was sown over an area of 13 cents in the orchards area and 54 lb. of seeds were collected.

Vegetables.—The following vegetables were grown for seed production:—

Crop.	Area.	Seed collected.	
		LB.	OZ.
Bendai	87.25	58	13½
Brinjal	4.50	..	11
Bitter gourd ..	0.32	6	12½
Amaranthus ..	1.00	..	6
Snake gourd ..	32.00	3	10½
Tomato	4.00	..	3
Ribbed gourd ..	2.00	1	6½

Sathur chillies.—Sathur chillies were sown on 22nd November 1954 and the seedlings were planted on 17th January 1955 in 3.76 cents. The crop gave 96½ lb. of pods, which works out to 2,560 lb. (net weight) of fruit pods per acre.

Fruit plants.—The orchard occupying an area of 1.80 acres was maintained as usual and the performance of Nepali lemons and acid limes is good. Seedlings and rooted cuttings of fruit plants are being supplied to the public. Two thousand four hundred and twenty-four fruit plants were made available for distribution to ryots.

Seeds and plants distribution.—Seventy-six thousand two hundred and forty-one pounds of paddy seeds and large numbers of seeds and seedlings of vegetables were sold to ryots.

II. Programme of work for 1955-56.—Work on paddy improvement will be intensified. Work on the following will be undertaken on paddy:—

- Seed multiplication.
- Pure line selection.
- Hybridisation.
- Manurial trials.
- Cultural experiments.

Other crops—Groundnut.—Groundnut TMV. 2 will be raised as a dry crop as well as an irrigated crop in rice fallows after paddy crop.

Gingelly.—TMV. 1 will be raised as rainfed crop in the dry land after the groundnut crop.

Orchard area.—Large scale multiplication of fruit plants will be done.

Agricultural Research Station, Koilpatti.

I. Result achieved through research in 1954-55—*Cotton*.—For the third year in succession the three long linted cultures, viz., 6181, 6188 and 6874, continued to be better than the local Karunganni (K. 2). Of these three cultures 6189-9 has been tentatively selected as an interim strain between K. 2 and K. 5 to replace K. 2 and K. 5 in view of the yield quality and adaptability.

1. *Millet breeding*.—The main work under millets breeding was confined to (1) cumbu (rainfed), (2) irungu cholam (rainfed), (3) ragi (irrigated) and (4) vellai cholam (irrigated).

(1) *Cumbu (rainfed)*.—Three thousand nine hundred and seventy-four pounds of seed of the superior strain of cumbu K. 1 which was released during 1945-46 and which gives up to 10 per cent more than the local, were distributed for running seed farms in the division.

Hybridisation work is being carried out in cumbu from 1951 and out of nine combination obtained which outyielded cumbu K. 1 one which was more superior was earmarked for further testing before recommending to the ryots.

(2) *Irungu cholam (rainfed)*.—To introduce a fodder-cum-grain type of cholam, in this tract, the local irungu cholam was crossed with Periamanjai cholam of Coimbatore and by further selection a cross A.S. 7081 was obtained and in the final tests of its performance during the year, this strain gave 36 per cent and 21 per cent more of grain and straw yield over irungu K. 1. It is proposed to release this culture as a strain in the coming season.

(3) *Ragi (irrigated)*.—A total quantity of 1,636 lb. of seed of the improved strains K. 1 ragi released from this station earlier, were distributed from the station during the year. To avoid the defect of lodging exhibited by ragi K. 1 a selection K.R. 4 possessing non-lodging properties was evolved as then was tested during the year finally, before release as a strain.

Crosses were made between K. 1 and K.R. 4 ragi to combine the desirable green pigment of K. 1 in K.R. 4 (which has a purple pigment) and four types were found to give better yield than K. 1 with non-lodging properties.

(4) *Vellai cholam (irrigated)*.—A total of 9,231 lb. of seeds of the improved strain of cholam K. 2 were distributed. Work is in progress to evolve a better yielding strain than K. 2.

2. *Agronomic studies*.—From the Agronomic experiments conducted in the station it is found that (1) for black soils of the tract, deep ploughing is not necessary and that working a Guntaka to a depth of 4 inches and keeping it free of weeds will suffice. (2) To avoid the cholam effect which gives poor yield when cotton is grown after cholam, the application of 150 lb. of super phosphate per acre to the cholam crop and 100 lb. of ammonium sulphate to the cotton crop is essential, which is easy to adopt; and (3) that cotton yields are affected least by growing it as mixture with the following:—

- (1) Cotton plus coriander.
- (2) Cotton plus groundnut.
- (3) Cotton plus horsegram.

II. Programme of work for 1955-56—(I) *Millet breeding*—(1) *Cumbu*.—Eight hybrids are found to give better grain yields than cumbu K. 1 in the initial trials. The same will be confirmed by repeating the trial in regular plots.

(2) *Irungu*.—Six bold sized grain selections from cholam K. 3 have been isolated. These will be sown in replicated plots and compared with the standard.

(3) *Ragi*.—Two economic extracted types (the progenies of crosses made between ragi K. 1 and ragi K. 2) would be compared in regular replicated plots against both the parents ragi K. 1 and ragi K. 2.

(4) *Vellai cholam*.—New collections (to select promising selections of vellai cholam giving better grain yield than cholam K. 2) would be sown and selections made.

(II) *Agronomic studies*.—(1) The economics of growing groundnut selections as a mixture with cotton is programmed to be studied during the year.

(2) The role of legumes in crop rotation in rainfed areas for increasing soil fertility is in the second year of study.

(III) *Miscellaneous studies*.—Cultivation of new introductions like garlic, mustard, varieties of brinjal from New Delhi and trial with chillies from New Delhi would be taken up.

Agricultural Research Station, Ambasamudram.

1. *Results achieved through research in 1954-55—Seed multiplication*.—In both the Kar and Pishanam seasons a total area of 21.16 acres was put under improved strains of paddy for seed multiplication and distribution to primary seed farms and 65,516 lb. of seed were distributed.

Research—Kar crop—(1) *Single plant selection of Naikuruvai and Seenganni*.—From single plant selection 15 and 17 promising ones in Maikuruvai and Seenganni respectively registering in higher yield than the control were carried forward for further work.

(2) *Study of comparative yield trials of ASD. 1 × ASD. 3*.—Of the eight progenies tested three were found to be on a par with ASD. 1 and these have been carried over for the final yield trials.

(3) *Study on the Japonica × Indica varieties*.—The twenty-one progenies supplied by the Paddy Specialist, Coimbatore, were found to be segregating for duration, size of grain, pigmentation, etc. The seeds have been selected for further plant breeding.

(4) *Artificial crossing*.—Of the fresh crosses that were effected between ASD.1 × Japanese varieties and ASD.1 × Chinese varieties for inducing non-shattering and non-lodging habits, respectively in ASD. 1 four were successful. Further work is to be taken up.

Studies on the Japanese versus Farm Method of rice cultivation.—Even though the possibilities of increasing rice production have been definitely indicated in the Japanese method of rice cultivation it was found that the cost at which such increase was effected is prohibitive. No perceptible difference could be observed due to interculture.

Pishanam (second-crop season)—(1) *Single plant selections of Sembuli and Varigarudan Samba*.—Of the single plant selections 65 sembuli selections and 63 Varigarudan Samba selections were found to be promising and selected for further work.

(2) *Natural cross-progeny of GEB. 24 × Kavunginpothala*.—The natural cross-progeny 5108 has showed good performance in the district trials at Tirunelveli, registering 6 to 27 per cent increased yield over ASD. 5. It is scheduled to be released as a strain.

(3) *Studies on the comparative yields of Arikiravi selections and the extract progenies of Co. 14 × Co. 8* were carried out and promising selections are to be studied further in district trials.

An Agronomic investigation of the Japanese versus Farm method of cultivation showed that the profit obtained by the Farm method was more by Rs. 68 per acre in spite of the better yield obtained under the Japanese method. This is due to the high cost of cultivation under the Japanese method.

Miscellaneous.—It was observed from trials conducted that A.H. 3490 groundnut which is a short duration strain can be successfully grown in rice fallows during summer for enhancing the income of cultivators.

Green manures.—Sesbania was grown as a pure crop over an area of 6.34 acres, the average yield of green matter obtained from a four-month crop being 31,523 lb. A total quantity of 1,210½ lb. of Sesbania seeds was collected.

The following seeds were distributed :—

	LB.
Paddy	61,834
Sesbania	675
Vegetable seeds	19½
Prosopis seeds	17½
Seedling distributed—	
Vegetable seedlings	2,055
Prosopis seedlings	600
Sesbania seedlings	2,10,450
Vagai seedlings	250
Neem seedlings	200
Tamarind seedlings	400
Ipomea cuttings	1,420
Guinea grass slips	21,100
Napier grass slips	5,150

II. *Programme of work for 1955-56*.—Pure line selection work will be continued for replacing with improved strains five more local varieties of paddy from Tirunelveli and Ramanathapuram districts, viz., Maikuruvai, Seenganni, Sembuli, Varigarudan, Samba and Arikiravi. In the field of hybridisation, by effecting fresh crosses with Chinese and Japanese parental types, synthesis of new strains with non-lodging straw and non-shattering grain characteristic besides the prolific yielding capacity of ASD. 1 will be done and studied. While the hybrid progenies 5108 will be multiplied and distributed to the public, the rest of the hybrid extracts as 5474 and 8769 among the Co. 4 × Co. 8 cultures will be tried in the district against ASD. 6 in ryots' fields. The progenies of the crosses between PLRI × Co. 19 and Japonica × Indica varieties will be studied and suitable plants with desirable agronomic trials selected for further work.

Cultural trial on the comparison of the local practices with the improved farm practices and the manurial trial on the Japanese versus Farm method of cultivation will be conducted.

A.H. 3490 groundnut will be tried as a third crop in the off-season after the second crop paddy.

Agricultural Research Station, Paramakudi.

I. *Results achieved through Research in 1954-55*.—In the efforts to evolve saline resistant strains 2 cultures (No. 10022 and S.R. 26B) and 13 selections of the cross progenies between Bali and Aduthurai selections were under trial and 200 single plant selections of Kuliadichan, and 153 selections were studied. In the studies to evolve drought resistant strains 8 cultures of GEB. 24 × T. 260 against BAM. 3, 227 progenies of F. 7 generation of TKM against MTU. 4 and 31 selections from the cross of Co. 1 and Co. 2 against wild paddy types were studied.

Seeds distributed.—During the year under review the following quantity of seeds were distributed :—

(1) Paddy	3,860 lb.
(2) Millets	2,412 „
(3) Sesbania	991 „
(4) Vegetables	96 „

II. *Programme of work for 1955-56*—(i) *Introduction and trial.*—(a) Nine drought resistance strains will be put under yield trial.

(b) The saline resistant cultures, 10022, 10034, and S.R. 26. B will be under observation.

(ii) *Pure line selection.*—One hundred and seven single plant selections from Kuliadichan and 81 SPS. from Pulidipiratti will be raised for further selection. Sixteen cultures of the tank-fed varieties of Ramnad will be under yield trial.

(iii) *Hybridization in Paddy*—(a) Ninety-six progenies of crosses between wild paddies and departmental strains and 50 progenies of crosses between departmental strains made for drought resistance will be under study for further selection, eight drought resistant cultures received from TKM will be under yield trial.

(b) Sixty cultures and 16 of bulks of alkaline resistant progenies of crosses between long and short duration strains of Aduthurai and saline resistant types such as S.R. 26B. Bali—TT vadlu, etc., will be under observation.

(iv) *Trial of other crops—Suitable for rice fallows.*—Cotton (P. 216 F and MCU. 1) Groundnut (TMV. 2) and Gingelly (TMV. 3) will be raised after harvest of paddy in March.

(v) *Trial of alternate crops (in paddy lands).*—Crops such as Ragi (Co. 2), Cholam (Co. 9) and Cumbu (Co. 4) will be raised in small areas under restricted supply of water on the north-east monsoon season.

(vi) *Introduction and trial in dry lands.*—Cotton (P. 216 F, MU. 1 and MU. 2) will be raised under irrigated conditions.

Ragi strains (Co. 1, Co. 2, Co. 3, Co. 5, etc.), will be under trial in the hot weather period.

Groundnut strains will be under yield trial in the south-west monsoon period.

Seed Multiplication—Varagu, Cumbu, and horsegram strains will be under observation.

Regional Millet Station, Ariyalur (Trichurappalli district).

I. *Results of Research achieved in 1954-55.*—In Makkattai Cholam, the major dry land variety in South Arcot and Tiruchirappalli districts three cultures were superior to the local in yield trials. In Vellai Makkattai two cultures A.S. 7537 and A. Ch. 183 have been issued for trials in the districts as they were superior to the local in three years of yield trials conducted at the station. Two cultures in each of Kaka Irungu, Sev Irungu and dry land Sen Cholam superior to their respective standards have been advanced to yield trials. In Cumbu five cultures were under trial in early season and all the five were significantly superior to the local. One of these A.C. 50 which gave good performance in the previous years was issued for trial in the districts. In Varagu, a new culture A.V. 155 isolated at the station confirmed its

superiority over Co. 1 and hence was issued for trials in Tiruchirappalli and South Arcot districts. A total quantity of 272 lb. of seeds of improved strains was distributed from the station.

II. *Programme of work for 1955-56—Ariyalur.*—(i) Evolution of high yielding strains of the local varieties of cholam (Makkattai cholams, Talai-virichan, Irungu and dry land Sen cholam), cumbu (Arisi or early season and Paladam or Pani cumbu—late season), varagu, redgram and blackgram.

(ii) Multiplication and distribution of high yielding strains of millets and pulses.

Central Farm.

I. *Results achieved in 1954-55—Area of the farm.*—The centralization resulted in the addition of a few more acres to the Central Farm and with effect from 15th April 1955 the Paddy Breeding Station, the Orchard, the new area, and all the fields which were up till now being cultivated by the various specialists in both eastern and western blocks came under the direct administrative control of the Superintendent, Central Farm.

The total cultivated area in Central Farm now is 226.36 acres.

The farm afford all facilities to the various Crops Specialists and Heads of sections for the conduct of their important experiments in Central Farm lands.

Paddy.—During the year under report a total area of 47.15 acres of paddy was raised. Out of this bulk crop constituted an area of 21.56 acres in the first crop and 9.63 acres in the second crop thus making a total of 31.14 acres. An area of 16.01 acres (13.91 acres in the first crop and 2.10 acres in the second crop) were under experiments conducted by the Agro-nomist, Government Agricultural Chemist, Government Mycologist, Government Entomologist, the Plant Physiologist and the Agricultural Meteorologist. The acreage yield per acre of the bulk crop worked out to 2,867 lb. in the first crop and 2,349 lb. in the second crop. The intermittent rains received during the harvesting period resulted in the lodging of the main crop and the consequent shedding of the grains and but for this set back the yield would have been still higher. The strain that gave the highest yield of 4,250 lb. per acre was Co. 19. The culture 6,538 which was tried for the first time gave an acre yield of 3,522 lb. per acre.

Sugarcane.—The crop in 'J' block under Government Entomologist, borer trials and the bulk crop of 0.30 acre in M block planted during the previous years as well as the ratoon crops in K and M blocks were harvested during the year. The blockwise yields are furnished below :—

Block.		Area.	Yield.				Field.	Remarks.
			Total for the block.		Yield per acre.			
			TONS.	LB.	TONS.	LB.		
J. Block	..	2-15	38	832	17-8	..	Government Entomologist trial.	
K. Block	..	2-00	39	1,404	19-8	..	Ratoon crop.	
M. Block	..	0-80	16	492	20-3	..	Bulk (30 cents ratoon and 50 cents new planting).	
M. Block	..	1-90	Government Entomologists experiments planted in May 1955.				..	
M. Block	..	0-30	Bulk ratooned in April 1955.				..	

Bananas.—The varietal collections in an area of 2 acres in M block was discarded and the cultivations was confined to only 6 varieties, viz., Monthan, Poovan, Navi-Poovan, Rasthali, Nadan and Gros Michael. An area of 0.60 acre was freshly planted during the year with the above 6 varieties. The 0.80 acre of Bananas under the Banana wilt experiments planted during the previous summer has only just commenced yielding.

Cotton.—The crop was dibbled in an area of 4 acres in E and G blocks as a bulk crop in rice fallows the variety being P. 216 F. The experiment on cotton in rice fallows was laid out in J block over an area of 1.80 acres by the Assistant Cotton Specialist. The crop commenced yielding towards the close of the year under report. The stand of the crop is quite good and a fairly good yield is expected.

An area of 10 cents in O block was planted with MOCO cotton during April 1955.

Groundnut.—An area of 0.60 acre in M block was grown with TMV 2 groundnut. The seeds were dibbled behind the country plough towards the end of March 1955. The stand of the crop is quite satisfactory and an average yield is expected.

Green manure.—A total area of 17.50 acres was under green manure. The estimated yield of green stuff obtained in wet lands ranged from 10 to 60 thousands. During the year 1,450 lb. Sesbania seeds were collected from the plants planted along the sides of bunds which has now become a routine practice in paddy lands.

Garden lands.—The main crops grown in garden lands are ragi, cholam, cotton and green-fodders.

Ragi.—The total area under ragi during the year was 29.62 acres. The varieties grown were Co. 1, Co. 2, Co. 3, Co. 5, and 4601.

Cholam.—The cropping programme of the irrigated Chitrai cholam was drawn up in consultation with the Millet Specialist. A total area of 23.61 acres was under irrigated cholam during the year. Among the different strains grown Co. 16 gave a maximum yield of 1,810 lb. closely followed by Co. 18 with 1,690.5 lb. per acre and Co. 15 with 1,648 lb. per acre.

Cotton MCU 1.—The area under this crop was increased from 32.45 acres during 1953-54 to 49.33 acres.

Fodder crops—Maize.—A total area of 10.40 acres was under maize. The yield of green-fodder obtained varied from 5,755 lb. to 37,375 lb. per acre. During the year the area under maize fodder was increased with a view to give a continuous supply of good fodder to the many milch cows and with this in view maize was sown in small area of 20 to 25 cents at regular intervals.

Perennial grasses.—A total area of 7.81 acres were under perennial irrigated grasses mainly guinea grass during the year. An average acre yield of 35,744 lb. of green-fodder was obtained from field 53.

Lucerne.—The lucerne in 0.62 acre in F. No. 77 gave an acre yield of 32,000 lb. of green fodder and 30 lb. of seeds.

Dry lands.—The important crops on dry lands were cholam, cotton and bengalgram.

Farmers' day.—The Farmers' day was celebrated on 19th August 1954. The Hon'ble Minister for Agriculture presided over the function. The Crop Specialists spoke on their latest achievements. The function was well attended and numerous leading ryots of the district were present on the occasion.

Estate planting.—Beautification of the estate was taken up strenuously. During the year a beautiful lawn was prepared in front of the Freeman building wherein crotons and other ornamental shrubs and flowering plants were newly laid out. Traffic circles were constructed at various points in the estate during the period under review.

The ornamental plants, hedges and lawns throughout the estate were kept trim and green by systematic pruning and watering.

II. Programme of work for 1955-56.—The Crop Specialists and other Research Officers will continue to receive all facilities for conducting field experiment.

All strains of crops which are in demand will be multiplied for seed production to the maximum extent possible.

Agricultural Research Station, Satyamangalam.

I. Results achieved in research in 1954-55—Field experiments and investigations.—The field experiments consisted in the main in finding out suitable methods of improving the fertility status and physical texture of the soils by the application of green-leaf manure, cattle manure and compost in different doses and by growing a number of legumes and ploughing *in situ* to find out the best one to produce high tonnage and increased yields in cotton and millets. Of the four doses tried, i.e., 0 lb., 2,500 lb., 5,000 lb. and 7,500 lb. of green-leaf, cattle manure and compost on cotton and cumbu it was found that there was not much difference in the three manures but the heavier doses of 7,500 lb. and 5,000 lb. were responding better than the lighter doses. In the trials with the different legumes at different levels on cotton and ragi significant increase in yield was noticed in cotton at 7,500 lb. level while in ragi there was no response. In another experiment to study the effects of growing different varieties of legumes with and without P_2O_5 as basal dose and ploughing them *in situ* on the succeeding crops of cotton and millets (cumbu and ragi) greater response with the basal dose of P_2O_5 was noticed on millets but not cotton. In the irrigation experiment with 1 inch in 5 days and 2 inches in 10 days on cotton in one season from September to March and cumbu, cholam, ragi and groundnut in two seasons from September to December and December to March greater response was obtained from 1 inch in 5 days on cotton crop and the other crops grown in the second season while in the first season there was no significant difference between the two treatments.

Farmers' day.—The Farmers' day was celebrated on the station on 20th December 1954. About 150 farmers from Satyamangalam, Gobichettipalayam and Avanashi attended the function besides all the Crop Specialists from Coimbatore, Deputy Director of Agriculture, Coimbatore, District Agricultural Officer, Coimbatore, and the Agricultural Demonstrators.

II. Programme of work for the year 1955-56.—As per G.O. Ms. No. 3713, Agriculture, dated 31st December 1954 sanction was accorded for the opening of an Agricultural Research Station at Bhavanisagar and also the conversion of the present Agricultural Research Station at Satyamangalam into a demonstration farm and as such all the experiments conducted at the Agricultural Research Station, Satyamangalam have been shifted to Bhavanisagar.

The station at Satyamangalam will serve as a demonstration farm growing bulk crops of improved strains of cotton, millets, pulses and oil-seeds adopting the best cultural and manurial treatments found suitable to

the tract so that maximum returns are realised to show to the cultivator the advantage of adopting the recommendations of the department for the project area.

The station also will demonstrate the following items of work for the advantage of the cultivator :—

- (1) Growing of a live fence of *Prosopis Juliflora* to prevent cattle and human trespass.
- (2) Growing of *Gliricidia maculata* and *Indigofera Tesmanii* on a very large scale on field bunds and waste places, to augment the organic manure supply for the station.
- (3) Preparation of farm yard manure and compost.
- (4) Growing fruit plants and vegetables to increase the revenue of the station.
- (5) Growing of perennial grasses for fodder supply to the work animals.
- (6) Timely control of pests and diseases.
- (7) Intensive cropping with the three crops in a year by growing a green manure or pulse crop in the off-season to increase the revenue of the station.

Agricultural Research Station, Bhavanisagar.

I. *Work done during 1954-55 (1st March to 30th June 1955).*—Sanction was accorded for the opening of the Agricultural Research Station, Bhavanisagar, in G.O. Ms. No. 3713, Agriculture, dated 31st December 1954. The station was started on 9th February 1955 and regular work commenced from 1st March 1955. The area of 414.42 acres taken over from Public Works Department is being reclaimed.

A programme of work has been drawn up and approved by Research Council.

II. *Programme of work for 1955-56*—(I) *Agronomical—Field experiments.*—Improvement of the project lands and evolving proper farming practices, methods of manuring and study and selection of crop varieties suitable to the tract on the lines stated at the Agricultural Research Station, Satyamangalam.

(1) Rotation experiments with cotton, millets, groundnut, tobacco, and leguminous green manure crops to determine the most profitable and suitable two year rotation for the project condition.

(2) Methods of soil amendment—Comparative value of green manure, cattle manure and compost for soil amelioration.

(3) Variety of legumes suitable to the tract. To select the most quick growing and hardy legume that can give not only high tonnage but also induce high yields in the succeeding crops.

(4) Duty of water experiment to determine the frequency and best method of utilising the irrigation water without waste for the different crops in rotation.

(5) Varietal trials with ragi, cumbu, cholam, groundnut and gingelly to fix the most suitable and high yielding varieties.

(6) Time of sowing experiment with millets, groundnut and cotton to determine the optimum period of sowing for the different crops during the project season for getting high yields.

(7) Spacing trials with groundnut and gingelly to determine the optimum spacing to economize seed-rate and get good yields.

(8) Mixed cropping trial to find out the most suitable mixture of crops for good monetary return compared to pure crops.

(9) Plot and bed size for irrigation: To find out the optimum size of beds for efficient irrigation without allowing for wastage of water.

(10) Comparative study of the crop yields of millets and groundnuts to study the economics under irrigated and dry conditions.

(11) Trials with fodder grasses, fruits, vegetables and other horticultural crops to find out the most high yielding type for the project area.

(12) Improvement of Cambodia cotton under Winter Cambodia Scheme to evolve suitable strains combining quality and yield for the project area.

(13) Trials of different varieties of Cholam, Cumbu, Groundnut, Ragi, Tenai and Masipattam cotton under garden land conditions for the benefit of the garden land ryots in the ayacut area.

(II) *Chemical investigations*—(a) Study of the progressive changes in the soil properties with irrigation, change in the crop rotation and application of organic manures.

(b) Working out a suitable manurial schedule for the project lands.

(III) *Seed multiplication.*—(a) Multiplication of varieties of groundnut, pulses and millets for the dryland areas on nearly 150 acres.

(b) Multiplication of irrigated crop varieties like cotton, cholam, ragi, etc., on nearly 175 acres available under irrigation to meet the demands of seed for the area and to serve as primary seed farm.

Government Botanic Gardens, Ootacamund, and Sim's Park, Coonoor.

I. *Results achieved in research in 1954-55.*—Floricultural records gathered on the shrubs enabled their classification into three groups, viz., those flowering from December to March, April to July and August to November. Double transplantation of annuals gave indications of greater establishment of seedlings. The new introductions during the year comprised of in addition to several ornamental crops, twenty species of *Eucalyptus* from Australia.

II. *Annual programme of work for 1955-56.*—Growth, flowering and performance studies of shrubs and trees, acclimatisation and seed multiplication of annuals introduction of new kinds and varieties germination and propagation studies, studies to determine budding and pruning practices in roses, potting and transplanting methods in orchards and annuals will be pursued.

Agricultural Research Station, Nanjanad.

I. *Results achieved in 1954-55.*—Disease free seeds of the popular potato variety, Great scot were multiplied and a record quantity of 115,444 lb. transferred to seed farms, after meeting the requirements of the station for 1955-56 in full.

A manurial trial on the best combination of the fertilizer ingredients for supply of nitrogen for optimum potato yields (started in 1952 and concluded in 1954) was uniformly in favour of a combination of ammonium sulphate and groundnut cake. This is a great value directly for the manufacturers of potato manure mixtures and of incalculable benefit indirectly to growers. The recommendation is being adopted by the Nilgiri Co-operative Marketing Society for their mixture which in addition to being cheap, is reported to be increasingly used by the growers.

It was found that rye could be raised as a useful green manure crop for potatoes and may serve as a stock feed also during dry periods of lean grazing.

Attempts to render dormant seeds fit for sprouting by new chemicals like thiourea and sodium nitrate showed promise, if confirmed the findings may serve to mitigate the difficulties of seed shortage generally experienced by the growers for the second crop, since freshly-lifted tubers can be treated for sprouting and immediate use.

An extent of about 60 acres was contour terraced to check losses of soil and water by erosion.

Area under economic plants like blue gums was extended by planting of 33,800 seedlings.

Farmers' Day was celebrated and the station partook in the various exhibitions in the State.

II. Programme of work for 1955-56.—The following are among the important items included in the programme :—

Potato.—(1) Large scale multiplication of certified Great Scot seed received from the United Kingdom in 1954.

(2) Yield trials of promising Dutch potato varieties against Great Scot.

(3) Studies on (a) magnesium fertilization of potatoes and (b) influence of minor elements on potato yields.

Other crops.—New introductions of plants of economic importance will be undertaken.

Pomological station, Coonoor.

I. Results achieved in research during 1954-55.—Four new apple varieties came to bearing during the year for the first time and their quality was under assessment. The rootstocks, Merton 779 and 778 accounted for greater tree vigour and yield for Rome Beauty, apple scion. The efficacy of Sandolin 'A' in hastening blossoming and fostering increased yields in apples was confirmed. Increasing stock-scion incompatibility was observed in plum varieties, Czar and Gaviota on plum seedling rootstocks. The results of spraying trials with Sandolin 'A', on four plum varieties indicated that increased yields can be secured by the treatment. In a trial with rootstocks of varying ages on two peach varieties the scions on eight-month old rootstocks continued to record greater vigour and yields.

New introductions during the year included an extra sized garlic from Missouri and almond grafts from Chaubattia.

II. Annual Programme of work for 1955-56.—Further work to extend the trials on hand and towards enriching the existing collections with new and improved varieties and types will be undertaken. The trials to increase crop yields through improved cultural practices top working choice but shy bearing plum varieties isolation of high yielding strains and individual trees of merit and through the use of hardy and disease resistant rootstocks will all be continued on approved lines.

Kallar and Burliar Fruit Stations (The Nilgiris).

I. Results achieved in research in 1954-55.—In the rootstock trial for the mandarin orange at Kallar, Jamberi continued to impart greater vigour to the scions. Rudrakshi for jack and bull's heart for annonas were adjudged to be the most promising rootstocks on considerations of tree yield and vigour. Propagation trials with clove and nutmeg indicated that inarching on own seedling rootstocks as well as on allied species was the most feasible method. The hybrid progenies of citrus, annonas and banana emerging out of planned hybridization work were under study.

II. Annual Programme of work for 1955-56.—Improved work on fruits and other horticultural crops peculiar to the humid tropics such as mangosteen, mandarin orange, jack, annonas, durain, avocado, clove, nutmeg and cacao will be continued. The progeny trials with mangosteen, mandarin orange and jack rootstock trials with mandarin, orange, jack-annonas, clove and nutmeg will be pursued. Hybridization work to evolve new and promising types of citrus, pineapple, banana, annonas, etc., will be continued on planned lines. Efforts will be made for the enrichment of the collection through the new introduction location of bud sports, etc.

The scheme for research on clove and nutmeg and cacao (jointly financed by Indian Council of Agricultural Research) will be put under operation.

Agricultural Research Station, Pattambi.

I. Results achieved in research during 1954-55—Planting.—An area of 78.15 acres was transplanted under first crop paddy including 7.05 acres under experiments comprising of 927 units. An area of 50.97 acres was under second crop paddy including 7.50 acres of experimental area comprising of 320 units. Third crop was grown to an extent of 1.63 acres. The total quantity of paddy seed produced from the three crops was 238,160 lb.

Coconut nursery scheme.—The comprehensive coconut nursery scheme which was working at the station with the object of producing large number of good quality coconut seedlings was closed down during the year 1954 and opened at the new station at Tikkodi. However production of a limited number of seedlings for distribution to the ryots of small holdings in the locality with an yearly target of 5,250 seedlings as a trial is being continued.

Pure line selection.—Culture 6027 in Arikkura which is to be released shortly as a strain was multiplied. The strain when released will benefit an area of 10,000 acres.

Seven promising cultures in Velutharikayama were under yield trial in the first crop season. The work was started in 1949-50 and will benefit an area of 30,000 acres. Four cultures in Valiachampan during the first crop season were under comparative yield trial. The work was started in 1948-49 and will benefit an area of 20,000 acres. Four cultures in Vellakoli in the second crop season were under comparative yield trial. The work was started in the year 1947-48 and it will benefit 20,000 acres.

Selection work was started in the first crop varieties of Vadakkan Canpanore, Vadakkan Tellicherri and Allikannan in the year 1953-54 and continued this year also. The material has since been transferred for continuation of the work at Taliparamba. In the second crop varieties of Annachampan and Mundagakutty the work was started in 1953-54 and will benefit about 2,000 acres.

Hybridization.—Four different progenies of inter-strain crosses in the first crop season were under study. Progenies from one interstrain cross in the second crop season was planted under comparative yield trial. The work on the cross between 1,653—Castero dourado—a dormant variety × PTB 10 was started in 1951-52. The F₂ progenies were studied and 50 plants carried forward for further study. Cross progenies of PTB 2 and MTU 3 effected in the year 1953-54 to evolve a non-lodging PTB 2 type were studied and the seeds from F₁ progenies were carried forward for further studies. F₂ progenies of Krasanodar a drought resistant Russian type × Kattamodan first started in 1951-52 were under study and 12 promising plants were carried forward. Progenies of cross between PTB 7 × PTB 22 started in 1941-42 to evolve a cosmopolitan strain suitable both for the single crop and double crop lands

were planted under yield trial in the first crop season and three cultures were carried forward. A strain evolved with the cross will cover an area of 5,000 acres. Yield trials were continued with the cross progenies of Co. 3 x PTB 19 to evolve a strain which will not deteriorate in storage. These were tested periodically for their viability in storage. The work was started in the year 1944-45 and will benefit about 20,000 acres.

Manurial experiments—Chilean nitrate experiment.—The experiment was initiated first in 1952-53 and was conducted this year also to compare the efficacy of chilean nitrate with ammonium sulphate. The results showed that nitrogen at 60 lb. over basal dressing in the form of ammonium sulphate and chilean nitrate were on par and superior to all other treatments. Ammonium sulphate at 40 lb. nitrogen over basal dressing was equal to basal dressing alone. Chilean nitrate to supply 40 lb. nitrogen over basal dressing was on par with ammonium sulphate alone (without basal dressing) at 60 lb. nitrogen per acre.

Compost experiment.—The experiment was started in 1954-55 second crop season to test the relative merits of compost prepared from the leaves of deep, medium and shallow rooted plants, viz., jack, gliricidia and sesbania. The results showed that glyricidia compost to supply 30 lb. nitrogen per acre is on par with sesbania as green leave to supply 30 lb. nitrogen and both these treatments superior to composts of sesbania and jack leaves.

Varietal manurial interaction.—The experiment was started in the first crop season of 1954-55 to find out the differential performance of strains under different acid when applied as ammonium sulphate and super phosphate over basal dressing of green leaves. The results revealed that the effects of manurial differences on the two strains under trial viz., PTB 12 and PTB 20 do not exist. However the results indicate that high dose of nitrogen in the form of ammonium sulphate contributes to high yields of grain irrespective of the dose of super applied.

Miscellaneous experiments—Japanese method v. Farm method of paddy cultivation.—The experiment to compare the merits of cultivation in both the systems was started in the first crop season of 1953-54. The result of the first crop season in 1953-54 showed the yield obtained is higher in the Japanese method than in the farm method and that PTB 2 in the Japanese method gave an extra net income of Rs. 69-7-0 per acre over the farm method. However PTB 9 was better in case of farm method than the Japanese method and an extra income of Rs. 20-6-0 over the Japanese method was obtained due to higher cost of cultivation in the Japanese method. The second crop of 1954-55 was harvested and the results showed that the Japanese method with PTB 18 was superior to the farm method in respect of the yield followed by Japanese method with PTB 20. The farm method PTB 20 gave the lowest yield. Regarding the economics of the cultivation farm method gave more profit of Rs. 25-8-6 and Rs. 13-0-9 under PTB 18 and PTB 20, respectively, per acre than the Japanese method due to the additional expenditure incurred for the Japanese method.

Modan rotational trial.—A rotation with six crops in Modan land was started in 1954-55. The experiment will be conducted for a continuous period of four years and further observations will be made for another four years. The first year of the trial was in progress with crops, like paddy, gingelly, tapioca, chillies and groundnut.

Cotton.—The scheme for the trial of Sea-Island cotton commenced function in this station under the guidance of the Cotton Specialist in 1949 with the object of exploring the possibilities of cultivating Sea-Island cotton in the West Coast. It was established that Sea-Island cotton can be grown

successfully under rainfed conditions at Pattambi and the variety Monteserrat possessed fibre qualities equal to other Egyptians used for making sewing threads. Agronomical experiment revealed that pre-monsoon raised seedlings gave better yield than seed sown crop and basal application of 3 tons of cattle manure 30 lb. of phosphoric acid and 50 lb. of K_2O in combination with a top-dressing with 40 lb. nitrogen per acre gave remunerative yields.

Seed distribution.—The following seeds and plants were distributed :—

I. Paddy seed	..	..	..	..	..	83,912 Lb.
II. Fruit Plants—						
Singapore jack seedlings	..	..	..	..	..	2,027 Nos.
Local jack seedlings	..	..	..	..	..	753 "
Citron Hawaii seedlings	..	..	..	..	..	98 "
Nepali lemon rooted cuttings	..	..	..	..	..	88 "
Seville lemon rooted cuttings	..	..	..	..	..	107 "
Malta lemon rooted cuttings	..	..	..	..	..	1,096 "
Acid lime seedlings	..	..	..	..	..	185 "
Badam seedlings	..	..	..	..	..	7 "
Custard apple seedlings	..	..	..	..	..	10 "
Surinam cherry seedlings	..	..	..	..	..	33 "
Mango grafts	..	..	..	..	..	269 "
Chilli seedlings	..	..	..	..	..	2,474 "
Brinjal seedlings	..	..	..	..	..	875 "
Muringa cuttings	..	..	..	..	..	12 "
Guava layers	..	..	..	..	..	57 "
Rose apple layers	..	..	..	..	..	17 "
Papaya seedlings	..	..	..	..	..	53 "
Gliricidia seedlings	..	..	..	..	..	1,400 "
Gliricidia cuttings	..	..	..	..	..	2,200 "
Coconut seedlings	..	..	..	..	..	3,921 "
Pineapple suckers	..	..	..	..	..	4 "
III. Vegetable seeds—						
Cowpea seed	..	..	..	..	..	8 lb.
Bhendai seed	..	..	..	..	..	18 "
IV. Miscellaneous—						
Kapok seed	..	..	..	..	..	32½ Lb.
Chilli seed	..	..	..	..	..	32 "
Tapioca setts	..	..	..	..	..	5,115 setts.
Tapioca (ornamental)	..	..	..	..	..	200 "
African oil palm seed	..	..	..	..	..	1 Lb.
Indigofera tyermanii seed	..	..	..	..	..	18 "
V. Grass slips—						
Guinea grass	..	..	..	..	..	500 Nos.
Napier	..	..	..	..	..	845 "
Thin napier grass	..	..	..	..	..	225 "
Lemon grass	..	..	..	..	..	25 "
Buffalo grass	..	..	..	..	..	25 "

II. *Programme of work for 1955-56*—(I) *Pure Line selection*.—(i) Maintenance of purity of 32 strains released from the station and multiplication of nucleus seed for primary seed farms.

(ii) Yield trial of four cultures of valiachampan, seven cultures of velutharikayama and four cultures in Vellakoli.

(iii) Study of single plants from Allikannan, Annachampan and Mundagakutty.

(iv) Release of Arikiri culture 6027 as strain.

(II) *Hybridization*.—(i) Yield trial of 3 progenies of the cross PTB 7 × PTB 22 for selecting a hardy cosmopolitan strain suitable both for the I and II crop seasons.

(ii) Yield trial of seven progenies of cross PTB 2 × MTU 3 for selecting a high yielding and non-lodging PTB 2 type.

(iii) Yield trial of 12 progenies of cross Krasnodar × Kattamodan for evolving drought resistant strain.

(iv) Study of progenies of cross Co. 3 × PTB 19 for selecting a non-deteriorating Co. 3 type.

(v) Study of 50 progenies of castero Dourado 1653 × PTB 10 for selecting a PTB 10 type of plant with seed dormancy.

(III) *Manurial experiments*.—(i) Chilean nitrate vs. Ammonium sulphate—experiment—The experiment will be continued.

(ii) Compost manurial experiment to test the merits of compost prepared from leaves of deep medium and shallow rooted plants.

(iii) Varietal manurial interaction to find out the differential performance of strains under different levels of nitrogen and P_2O_5 .

(iv) Reinforced compost experiment with rock phosphate and super phosphate.

(IV) *Cultural experiments*.—(i) Japanese method of paddy cultivation v. Farm method.

(ii) Trial of double row rice weeder to assess the economic and other advantages of working this implement over local practice of hand-weeding.

(iii) Rotational trials in Modan land to find out the best rotation.

(iv) Inter-cultivation by rotary weeder v. Hand rake under heavy and normal manuring.

(v) *Other crops*.—(1) Trial of Sea-Island cotton in collaboration with cotton specialist.

(2) Maintenance of a small coconut nursery for supplying over 5,000 seedlings to the farmers of South Malabar.

(3) Production of fruit plants and vegetable seeds for distribution to ryots.

(vi) *Miscellaneous*.—(1) Trials for estimating the extent of cross pollination in rice strains.

(2) Inoculation trials with *sesbania speciosa* to observe the formation of nodules under different conditions of manuring in collaboration with the Government Agricultural Chemist.

(3) Presoaking seeds in nutrient solutions and spraying of trace element salts on the crop for increasing crop yield in collaboration with Plant Physiologist.

(4) Paddy stemborer control trials in collaboration with the Government Entomologist.

(5) Collection of meteorological data under the co-ordinate crop weather scheme.

Agricultural Research Station, Taliparamba.

I. *Items of Research undertaken and results*—(a) *Paddy*.—(1) *Comparative yield trial of paddy strains*.—From the comparative yield trial of

different strains of paddy carried out during the year, the previous finding that PTB. 9 is the most suitable strain for the first crop season in this locality was confirmed, as this strain recorded an yield of 6.3 per cent over PTB. 8, 8.01 per cent over PTB. 13, 31.8 per cent over MTU. 3 and 32.5 per cent over MTU. 4.

(2) *Trial to find out the effect of application of Ammonium Sulphate continuously for a number of years on the yield of paddy*.—An experiment to find out, if application of ammonium sulphate continuously for a number of years would depress the yield of paddy in later years if no ammonium sulphate application is given to the crop was initiated with three treatments, namely, (1) no manure, (2) green leaves at 5,000 lb. per acre and (3) green leaves at 5,000 lb. per acre with ammonium sulphate at 150 lb. per acre. From the trial, it has been found that application of 5,000 lb. of green leaves with 150 lb. of ammonium sulphate per acre has resulted in significantly increased yield of 30.1 per cent over no manure and 16.5 per cent over green leaf only at 5,000 lb. per acre, in the first year of the trial.

(3) *Trial on intensive manuring*.—To find out, how much the yield of paddy can be economically increased by heavy application of fertilizers, an observational trial was carried out. The two treatments in the trial consisted of (i) application of green leaves at 6,000 lb. per acre with compost at 10 cart-loads, super phosphate at 175 lb. and ammonium sulphate at 350 lb. per acre, and (ii) green leaves at 4,000 lb. per acre with super phosphate at 112 lb. and ammonium sulphate at 100 lb. per acre. The plots given heavy application of fertilizers recorded an acre yield of 2,771 lb. of paddy, as against 2,434 lb. per acre from the plots which received the lesser dosage of manures. Though heavy application of fertilizers resulted in increased yield, the net profit per acre was less by Rs. 40 compared to that from ordinary manuring.

(4) *Raising irrigated paddy crop*.—For the second time, an irrigated crop of paddy (PTB. 10) was raised in an area of 1.83 acres from January to May and an yield of 2,000 lb. per acre was obtained from the crop. Thus, it is found that an irrigated crop of short duration paddy (PTB. 10) can profitably be raised from January to May by means of lift irrigation, if the price of paddy does not go below the present level.

(b) *Chillies*.—Seven types of chillies from Lam Farm, Guntur, were grown and seeds collected to lay out a regular trial of the comparative performance of these types with the variety South Malabar.

(c) *Groundnut*.—A short duration type of groundnut, TMV. 2 was grown in a 10 cent plot, in paddy land after harvest of the paddy crop in November, 1954. Due to severe drought from November to April 1955, the crop was almost a complete failure.

(d) *Fruits*.—(1) *Pine apple*.—(i) *Trial on the effect of Alphanephthalene acetic acid in staggering the bearing of pineapple*.—A fresh trial on an extended scale for confirming the results obtained from the preliminary trial, which showed that application of alphanephthalene acetic acid influences the bearing season of pineapple, was initiated.

(ii) *Trial on ice water and calcium carbide application to the core of the pineapple plant for hastening flowering*.—An observational trial to find out, if application of ice water and granulated calcium carbide to the growing point of pineapple plants eight months after planting, will hasten the

flowering of the plants was carried out. From the trial, it was found that 45 per cent of the ice water calcium carbide treated plants came to flower 35 to 53 days after the application, whereas none of the plants in the control (untreated) came into flower even till 12 months after planting. A comprehensive trial on ice water calcium carbide application to determine the optimum age of the plants for hastening fruiting by this treatment was laid out.

(iii) *Propagation of pine apple plants from stem slices*.—A trial to find out if the growth of pine apple plants raised from stem slices can be forced up by application of fertilizer and by irrigation during the summer months was carried out. It was found that by application of $\frac{1}{4}$ oz. of ammonium sulphate and $\frac{1}{4}$ oz. of super phosphate per plant at monthly intervals one month after planting and irrigation, plants from stem slices can be forced into growth, so that they will be ready for planting in the field within a period of about six months of raising the plants from stem slices.

(iv) *Pineapple varietal trial*.—Plants of uniform age of the varieties Kew, Mauritius, Charlotte Rothschild, West Indian and local were planted in an observational trial to compare the performance of the different varieties.

(2) *Sapota—Rootstock trial*.—From the data and observations recorded in respect of the sapota trees on different root stocks, it is found that *Mimusops Hexandra* rootstocks has continued to exhibit superiority over the other two rootstocks *Madhuca Longifolia* and *sapota* seedling.

(3) *Jack*—(i) *Hybridisation*.—Hybrid seedlings raised from seeds resulting from soft and hard flaked types were planted for study of these seed progenies.

(ii) *Survey of outstanding jack trees and establishing a collection of progenies of different types*.—From seeds obtained from Burma, Malaya, Ceylon, Indonesia and Bengal, seedlings were raised for establishing a collection of trees of these types. Clonal progenies of four outstanding trees in the Agricultural Research Station, Taliparamba, and one tree in Kurumathur, a locality near to Agricultural Research Station, Taliparamba, were raised.

(4) *Mango*—(i) *Hybridisation*.—Mango hybridisation on a large scale was carried out, and 3,066 controlled pollinations involving 32 parental combinations effected, from which 261 fruits involving 28 parental combinations developed. Two hundred and fifty-one fruits involving 28 parental combinations matured and became available for harvest. The stones of these fruits were sown, and 103 seedlings involving 22 parental combinations have been raised.

(ii) *Polyembryonic rootstock trial*.—From the germination of the stones and the growth performance of the seedlings of four polyembryonic varieties, *Chandrakkaran*, *Bapakkai*, *Olour* and *Kurukkan* and the monoembryonic variety, *Puliyan*, it has been found that the varieties *Chandrakkaran* and *Bapakkai* by virtue of good germination and rapidity of the growth of the seedlings are superior to the two polyembryonic varieties, *Kurukkan* and *Olour* and the monoembryonic variety, *Puliyan*, for root stock purpose.

(e) *New introductions of fruits and other crops*.—Clonal progenies of off-season bearing trees of the varieties, *Olour*, *Bengalora* and *Neelum* from Eruvadi in Tirunelveli district were obtained and planted. A new leafy vegetable 'Chekur Manis' (*Sararopus* and *rogynus*) was introduced for multiplication of the planting material for distribution.

Bulk crops—(1) *Pepper*.—Due to adverse seasonal conditions during the summer of 1954, the pepper crop during the year was very poor, and against an yield of 3,903 lb. obtained in the previous, only an yield of 1,042 lb. was obtained during the year under report. Peppervines were planted to 1,200 vacant standards during the year.

(2) *Arecanut*.—A total number 119,750 nuts were harvested during this year, as against 116,289 nuts harvested in the previous year.

(3) *Coconuts*.—The trees in the station were manured with green leaves at the rate of 100 lb. ammonium sulphate at the rate of 2 lb. superphosphate at the rate of one pound and muriate of potash at the rate of one pound per tree. The yield of nuts during the year was 4,560, as against 3,921 in the previous year.

(4) *Cashew*.—The crop of cashew was comparatively poor during the year. From a total population of nearly 1,000 trees in the station, 2,573 lb. of cashewnuts were obtained as against 3,193 lb. obtained in the previous year.

(5) *Vegetables*.—An area of 1.10 acre was grown to rainy season and summer season vegetables, and 370 lb. of vegetable seed were collected during the year.

(6) *Green manure*.—A total number of 5,410 cuttings and seedlings of *Gliricidia* was planted in suitable places in the station. About 40,000 *Gliricidia* seedlings planted in the previous year have established without many casualties. Increasing the population of *Indigofera Teysmanii* plants in the station was in progress and nearly 11,000 seedlings were planted in suitable sites.

(7) *Cover crop*.—The cover crop of *Calopogonium* was extended to a further area of about 25 acres during the year. A quantity of 1,771 lb. of *Calopogonium* seed was collected during the year for distribution.

Seeds and plants, etc., distributed—

	LB.		NUMBERS.
Paddy seeds	7,268	Roseapple seedlings	53
Calopogonium seeds	1,469	Pappaya seedlings '	44
Vegetable seeds	495 $\frac{1}{2}$	Pepper cuttings	17,724
	NUMBERS.	Mangosteen seedlings	114
Arecanut seeds	713	Banana suckers	105
Mango grafts	3,876	Pineapple suckers	335
Sapota grafts	463	Mango seedlings	80
Jack grafts	17	Chilly seedlings	18,700
Malta lemon rooted cuttings ..	4,209	Brinjal seedlings	987
Jack seedlings	840	Miscellaneous seedlings	508
Guava layers	159	Arecanut seedlings	1,916

A short note on the results achieved in research.—The strain of paddy PTB.9 has been found to be the most suitable for the first-crop season, for this locality, among the various strains put under trial. Very heavy application of manures and fertilizers to paddy crop is not profitable, as the increased yield is not commensurate with the cost of the increased quantity of manures and fertilizers and their application. Application of 150 lb. of ammonium sulphate per acre in addition to 5,000 lb. of green leaves per acre

has been found to result in 16.5 per cent increased yield over only green leaf application at 5,000 lb. per acre.

Application of ice water and calcium carbide to the growing point of pineapple plants has been found to hasten the flowering of the plants. It has been found that pineapple plants of suitable size for planting can be made available within a period of about six months of raising the plants from stem slices by application of $\frac{1}{4}$ oz. ammonium sulphate and $\frac{1}{4}$ lb. of super-phosphate per plant at monthly intervals and irrigating or pot-watering the plants during the dry season. From stem slices put for sprouting in September and the sprouts planted in nursery beds in November and given manurial application and watering as mentioned above, well-grown plants suitable for planting in the field have been obtained by May.

That *Mimusops hexandra* is a superior rootstock for sapota than either *Madhuca longifolia* or sapota seedling has been confirmed.

A collection *hexandra* is a superior rootstock for sapota than earlier *Madhuca longifolia* or sapota seedling has been confirmed.

A collection of seedling of types of jack from Malaya, Ceylon, Burma, Indonesia and Bengal and Clonal progenies of five outstanding trees from this locality has been established. Five outstanding jack trees were located.

One hundred and three hybrid seedlings of mango involving 22 parental combinations were raised from controlled pollination. In respect of the germination of the stones and the growth of the seedlings, the two polyembryonic varieties Bappakai and Chandrakkaran, have been found to be superior to the two polyembryonic varieties Olour and Kurukkan and the monoembryonic type 'Puliyani'.

II. Programme of work for 1955-56—(I) *Paddy*—(1) *Varietal trial*.—A few strains from Mangalore, Ambasamudram and Aduthurai will be grown in observational plots to study the suitability of these varieties for this locality and for later comparative yield trials.

(2) Pure line selection work in Allikannan and Vadakkan to evolve high-yielding strains of these varieties.

(3) Manurial trial to find out the effect of continuous application of ammonium sulphate for a number of years on the yield of paddy, if ammonium sulphate application is not given in later years.

(II) *Chillies*.—Comparative yield trial of different types of chillies to select the best types for popularisation.

(III) *Groundnut*.—Trial of short duration type of groundnut to assess the feasibility of growing groundnut, in single-crop wet lands after the harvest of the paddy crop.

(IV) *Fruits*—(1) *Pineapple*.—(a) Trial on the effect of alphanapthalene acetic acid for staggering the bearing season of pineapple.

(b) Trial of ice water-calcium carbide treatment for hastening the flowering of pineapple.

(c) Pineapple varietal trial.

(d) Trial on forcing the growth of pineapple plant raised from stem slices and the performance of such forced plants in the field.

(2) *Sapota (Rootstock trial)*.—The trial will be continued and data on growth and performance recorded.

(3) *Jack*—(a) *Rootstock trial*.—The rootstock trial of jack with two rootstocks, *Artocarpus hirsuta* and jack will be started.

(b) *Hybridisation*.—The growth performance of the hybrid seedlings planted will be recorded.

(4) *Mango*—(1) *Hybridisation*.—The hybrid seedlings raised will be planted out and their performance recorded. Further hybridisation will be carried out.

(2) *Polyembryonic—Rootstock trial*.—Grafts of Baneshan and Bennet Alphonso on the polyembryonic rootstocks, Chandrakkaran and Bappakai and the monoembryonic type Puliyani will be raised and the rootstock trial will be planted out.

Pepper Research Station, Panniyur.

I. Results achieved in research in 1954-55.—Hybrid seedlings in 23 parental combinations were raised. These showed that hybridisation offered a means of developing new types with desirable economic trials. Spraying the flowers with water was found to lead to increased berrysetting if the weather at flowering is dry. Kalluvally variety was determined to be the best polliniser for other varieties. Dense shade was found to lead to increased 'Pollu' incidence. Similarly, wilt disease was found to be promoted in exposed situations. Trials to standardise vegetative propagation methods resulted in the finding that side grafting was easy on pepper as well as on betelvine.

II. Annual programme of work for 1955-56.—Survey and collection of pepper varieties, hybridisation, manurial and cultural trials, studies on the incidence of pollu, wilt and spike shedding, vegetative propagation studies and rootstock trials will be continued.

Agricultural Research Station, Ambalapalayal.

I. Results of research achieved during the year 1954-55—(i) *Paddy*.—In a trial to determine the varieties suitable for the second-crop season, it was found that TKM.5 recorded the best yield of 1,571 lb. The duration of this variety was 143 days and was therefore fairly suitable for the second crop.

With a view to obtain a second crop of paddy from the first-crop stubbles, without having recourse to nursery operations, the ratooning of the first crop was attempted in five paddy varieties. Two of these varieties, viz., Jeerakasale and Ninidhan responded to the treatment yielding 1,307 lb. and 303 lb. of grain per acre, respectively. This process appears to be worth adoption with the varieties such as Jeerakasala, which responds to the ratooning treatment, as it dispenses with the major nursery operations such as sowing and transplanting.

Horticultural crops.—The varietal studies have brought out that sapota and sathugudi orange could be cultivated not only successfully but with definite profit. The quality of the latter fruit, however, was not as good as that of the fruits obtained from the plains.

Preliminary trials have also indicated that the passion fruit varieties, viz., yellow and purple, as well as the avocado could be successfully grown.

Miscellaneous crops—Oysternut.—This new oil seed crop exhibited a very vigorous growth and yielded outsized fruits within about 30 months of planting. The fruits contained numerous disc-shaped nuts rich in oil and very palatable for consumption out of hand.

Cinnamon.—This spice crop has given promise of successful cultivation in Wynaad conditions. From the peeling tests of the bark, it was observed that a marketable produce of good fragrance could be obtained from the shoots of the past season's growth.

Eucalyptus citriodora.—This crop which yields a valuable essential oil has proved itself suitable for cultivation in Wynaad. The distillation of the leaves recorded 0.8 per cent of oil recovery. The oil is used in soap manufacture and cosmetics and is highly valued.

Practical utility and the economic gains to the cultivator.—The station has released two improved strains of paddy viz., WND.1 and WND.2 which record 10 to 15 per cent increased yields over the local bulk varieties. These strains are gaining ground in the colony area and have covered approximately 100 acres.

The growers are taking to new crops like Malta Lemon, passion fruit, *Eucalyptus citriodora* and sathugudi orange. An economic assessment derived from these crops can be made only after they attain the bearing age.

A total quantity of 17 tons of improved paddy seeds and over 28,000 plants of tested merit were distributed to the growers from the station.

II. Programme of work for 1955-56—Paddy.—(a) Trial of different strains, types and varieties to select the most outstanding ones for multiplication and popularisation in Wynaad.

(b) Evolving a high yielding strain of Jeerakasala by selection.

(c) Multiplication of seeds of improved strains and varieties.

(d) Trial of short duration varieties to select a high yielding variety for the second-crop season.

(e) Ratooning trial with the varieties, Ninidhan, Jeerakasala, etc.

Millets.—Trial of ragi strains to determine the suitable ragi strain for popularisation in Wynaad.

Fruits.—(a) Cultural and manurial trial on mandarin orange to determine the optimum practice in relation to growth, productivity, fruit quality and prevention of decline.

(b) Mandarin orange rootstock trial to determine the best rootstock for mandarin orange.

(c) Cultural and manurial trial on pineapple to determine the optimum cultural and manurial practice for high yield.

(d) Trial on the effect of desuckering and removal of slips till the plant crop is harvested in the fruit size.

(e) Trial on the effect of phyto-hormone in extending the bearing season of pineapple.

(f) Trial on the different kinds of planting material, namely, suckers slips from the fruit stalk and from the base of the fruit.

(g) Trial of different kinds and varieties of fruits to select those suited for extensive cultivation in Wynaad.

Agricultural Research Station, Pilicode.

I. Results achieved in research during 1954-55.—Application of manure broadcast and ploughed in was found to be the best practice. Wood ash may be substituted by muriate of potash on equal K_2O basis for manuring coconut

gardens. Ploughing coconut gardens three times in the year gives higher yields than digging once. *Calopogonium Mucunoides* was found to be the best green manure cum cover crop.

A total of 998 inflorescences of the tall variety were cross pollinated with pollen from the dwarf and 3,478 hybrid seednuts of last year's pollination were harvested for raising seedlings. Among the 140 F₂ (natural) seedlings of the tall × dwarf, planted in 1951 and 1952 for testing their suitability for further propagation, it was found that all the seedlings are quite vigorous and one seedling flowered four years after planting. Among the exotic varieties under study, Laccadive ordinary and Laccadive small are outstanding. Andaman ordinary and Java are also high yielding types. Cochin China and Phillipines are outstanding in the quality of tender nuts.

II. Programme of work for 1955-56—Manurial experiments.—Method of application of manures experiment will be continued.

Comparison of potassic fertilizers experiment will be continued.

Ploughing versus digging experiment will be continued.

Depth of cultivation experiment will be continued.

Groundnut will be raised as subsidiary crop.

Pepper vines will be maintained and progress watched.

Coconut breeding.

Agricultural Research Station, Nileshwar II.

I. Results achieved in research during 1954-55.—The F₁ progenies of the tall × dwarf continued to be the most outstanding. Among the intra-varietal crosses, progenies of the cross involving 'thick meat' and 'big nut size' in the male and female parents respectively and of the cross involving 'high setting' in the female parent and 'high female flower production' in the male parent are promising. Progenies of high yielders and those obtained by cross pollination continued to be more vigorous than progenies of lower yielders and those obtained by selfing. The natural progenies of Cochin China, Laccadive small, Laccadive ordinary and Andaman ordinary are promising. Among the progenies of crosses between exotic varieties, those of Strait Settlements × Andaman dwarf, Laccadive × Chowghat dwarf and Andaman × Laccadive pink are promising. The six-year old progenies of tall × Gangabondam and Laccadive ordinary × Gangabondam continued to be vigorous. Four hybrids of the latter cross have flowered.

Groundnut proved to be the most remunerative among the different subsidiary crops grown under the coconut, recording an acre yield of 2,233 lb. of dry pods.

Calopogonium Mucunoides which was found to be the best green manure cum cover crop for the coconut was raised on large scale and a total of 920 lb. of seeds collected for sowing on the station and for distribution.

II. Programme of work for 1955-56.—Raising of groundnut as subsidiary crop will be done.

Pepper vines will be maintained and progress watched.

Coconut breeding.

Agricultural Research Station, Nileshwar III.

I. *Results achieved in research during 1954-55.*—The growth and flowering of seedlings planted in 3 feet and 6 feet deep pits showed decided advantage in favour of 3 feet deep planting.

Calopogonium mucunoides was found to be the best green manure cum cover crop and the area under the crop was further extended.

The following numbers of selected coconut seedlings were supplied from the station :—

Ordinary tall	.. .. .	41,676 (including nursery scheme)
Tall × dwarf	.. .. .	1,478
Dwarf	.. .. .	500
Exotic varieties	.. .. .	267
Total	.. .. .	43,921 numbers.

II. *Programme of work for 1955-56.*—Depth of planting experiment
Trials to increase humus content of soil.
Application of cattle manure to cashewnut.
Coconut breeding.

Paddy Breeding Station, Mangalore.

I. *Results achieved in research during 1954-55.*—A. *Paddy*—(i) *Pureline selection.*—Three strains in the popular first crop varieties—MGL.3 (Halluga), MGL.4 (Kanwa) and MGL.5 (Mascathy) were released during the year. Culture 2482 of Athikraya, a second crop variety, has been proposed for release as strain MGL.6. Bilikayama culture 1558 which was found promising in the district is proposed to be tried again to confirm previous year's findings. Halluga cultures were under preliminary yield trials and Mascathy cultures were under observation. Fresh selections were made in three first crop varieties—Kanwa, Doddari and Parambanavara and one second crop variety Athikraya.

(ii) *Improvement by introduction.*—The study of pureline cultures was continued with an addition of 28 strains and pureline cultures received from other stations. In the trials of the early varieties during first crop season three strains PTB.22, PTB.23, and PTB.28 were found promising. Of the different varieties compared for yield during the second crop season culture SR26B was found to be promising.

(iii) *Improvement by hybridisation.*—During the first crop season the F3 progenies of two crosses MGL.1 × MTU.3 and PTB.11 × MTU.4 to evolve non-lodging types resembling MGL.1 and PTL.11 respectively and F3 progenies of cross Kasipichodi × PTB.9 to evolve an early non-shedding variety were studied and 67, 66 and 190 progenies respectively from each cross were selected for further study, while during the second crop season the F3 progenies of PTB.20 × Co.3 and Co.3 × 8448 to evolve a non-deteriorating type resembling Co.3 were examined and 63 progenies of the former cross and 73 of the latter were selected for further study. The two hybrid cultures of Kavinginpoothala 8360 and 8448 which were under trial both at the station and district were found to retain their viability under ryot's method of storage and were multiplied in the station for further trial. Of the seven economic progenies of

the cross Co.3 × PTP.19 tried at the station cultures 8900/1, 8900/2 and 8900/3 recorded higher yields than Co.3 with non-deteriorating character. Culture 8900/2 is proposed to be tried in the district also.

(iv) *Manurial trials.*—Three manurial trials were laid out during the year under report.

In the experiment on the study of deleterious effects (if any) of the continuous application of ammonium sulphate indications were in favour of green leaf alone at 2,500 lb. which increases paddy yields and the addition of ammonium sulphate showed no additional response. The experiment to study the effect of growing high yield in strains continuously under conditions of ryots manuring and farm-manuring showed that farm-manuring was significantly better than ryot's manuring and that strains respond better under farm manuring conditions than under ryot's manuring conditions. The experiment laid out to compare the relative merits of ammonium sulphate and chilean nitrate showed that chilean nitrate was efficacious under the first crop conditions while ammonium sulphate was better for the second crop confirming the previous findings.

(v) *Cultural trials.*—An experiment was laid out during the year to compare the relative merits of Japanese system and farm system of cultivation. The Japanese system was found to be significantly better than the farm system of cultivation. In the experiment to find out the merits of interculture and spacing under Japanese system of manuring and farm system of manuring it was found that there was no significant difference between the different treatments. An observational trial to find out the varietal resistance of different strains to silver shoot when sown at different times and planted under different soil conditions was laid out for the first time during the monsoon season of 1955 and the crop is in the field.

B. *Other crops*—(i) *Ginger.*—One cultural experiment to find out the influence of spacing on yield and two manurial experiments one to find on yield and another to find out the influence of nitrogen and influence of organic and inorganic nitrogen on yield of ginger were laid out for the first time during the monsoon season of 1955 and the crop is in the field.

C. *Green manures*—(i) *Sesbania speciosa.*—Planting of sesbania seedlings along the periphery of the paddy fields during first crop season for green manure production and during second crop season for seed production was done. A total quantity of 143 lb. of seed was collected from plants planted along field bunds. Seedlings numbering 191,000 were supplied to the district staff. Sesbania sown as pure crop over an area of 1.5 acres gave an acre yield of 27,000 lb. of green matter.

(ii) *Gliricidia maculata.*—The plants along the channel bunds, boundaries and field bunds were cut and they yielded 23 tons of green matter during the year. A total quantity of 22 lb. of seed was collected during the period. A total number of 51,000 seedlings and 4,100 cuttings were either sold or transferred during the period.

(iii) *Indigofera teysmanii.*—Five pounds of seed obtained by transfer were sown for raising seedlings. A total number of 7,700 seedlings were planted on the station while 8,000 seedlings were sold. The old plants are now in flowers and pods.

(iv) *Tropical green manures.*—The study of the different annuals and perennials that had been sown during the previous year was continued. Out

of these 18 varieties were sown in double crop land to study their performance and capacity to withstand water stagnation. It was found that varieties *Cassia alata*, *Cassia leschenaultiana*, *Phaseolus semierectus*, *Tephrosia candida*, *Tephrosia noctiflora* and wild cassia were able to withstand water stagnation.

D. *Miscellaneous crops*—(i) *Pulses*.—Blackgram was grown over an area of 0.78 acre during the year after the harvest of paddy in single crop area and over an area of 0.55 acre after the harvest of second crop in the double crop area. Horsegram was grown over a total area of 1.82 acres after the harvest of first crop paddy. Greengram and greengram black were grown over an area of 1.17 acres.

(ii) *Bananas*.—Suckers numbering 219 from ten different varieties maintained were planted over an area of 24 cents. The plants were irrigated in summer and are growing well. Fifty-two suckers of different varieties and 550 lb. of fruit were sold during the period.

(iii) *Vegetables*.—Vegetables like bendai, cowpea, *Amaranthus*, ash gourd, ribbed gourd, bitter gourd, pumpkin, bottle gourd and cucumber were grown over an area of 63.5 cents during the year. A total quantity of 68 lb. of seeds of different vegetables and 3,988 lb. of vegetables were sold.

(iv) *Fodder grass*.—Five varieties of grasses, viz., cumbu napier hybrid grass, Guinea grass, Thin Napier grass, Elephant grass and buffalo year buffalo grass recorded the maximum acre yield of 32,800 lb. followed by Guinea grass with 30,470 lb. per acre. A total number of 175,350 slips of different grass varieties were distributed during the year.

(v) *Cover crops*—(a) *Tropical Kudzu*.—The vines in A, L and M blocks are coming up well. The vines in A block were cut and from one bund 160 lb. of green matter could be got. Four pounds of seed was collected during the period.

(b) *Calapogonium Muconides*.—Seeds of this cover crop sown along the slopes of bunds in blocks, J, K, L and M and Kumeri area of B block cover crop. During the year 3,200 seedlings were sold and 24 lb. of seed was collected.

(c) *Centrosema pubescens*.—This cover crop introduced in 1952 is coming up well under the shade.

E. *Seed distribution*.—A total quantity of 32,801 lb. of first and second crop seed paddy was distributed in the districts during the year. Besides paddy seed 68 lb. of vegetable seeds, 38 lb. of green manure seeds and 45 lb. of pulses were also distributed. There was good demand for seedlings and cuttings and 1,800 bundles of paddy seedlings, 300 seedlings and 256 rooted cuttings of Malta lemon, 240,850 seedlings and cuttings of vegetables, green manure plants and 175,350 grass slips were supplied to the public.

Actual progress of work during 1954-55.—The breeding of high yielding strains in the major paddy varieties of the tract by pure line selection and hybridization was continued. Two pureline cultures and two hybrid cultures were under trial both in the district and at the station. Single plants were isolated in three first crop varieties—Kanwa, Doddarai and Parambanavara and one second crop variety Athikraya. Hybrid progenies to evolve non-deteriorating type of MGL.1 and PTB.11 for the first crop season and a non-deteriorating type of Co.3 for the second crop season were under study.

Study of pureline cultures was continued and inter-varietal trials of promising cultures were laid out. Three manurial experiments were laid out to find out (1) deleterious effects (if any) of the continuous application of ammonium sulphate, (2) the effect of high yielding strains on soil fertility and (3) the relative merits of chilean nitrate and ammonium sulphate. Two cultural experiments were laid out to find out (1) the merits of Japanese method and farm method of cultivation, (2) the merits of interculture and spacing under Japanese system of manuring and farm system of manuring. A preliminary study of tropical green manure was taken up during the year.

Results of research.—Halluga culture, 1828, Kanwa culture 1958 and Mascathi culture 3159 were released as strains MGL. 3, MGL. 4 and MGL. 5 respectively. Culture 2482 of Athikraya, a second crop variety has been proposed for release as strain MGL. 6. Three strains PTB. 22, PTB. 23 and PTB. 28 were found to be promising as early varieties suitable for first crop season while culture SR. 26-B was found to be promising during the second crop season. Two hybrid progenies of Kavinginpoothala were found to retain their viability under ryot's method of storage. The results of manurial and cultural experiments showed that (1) strains respond better under farm method of manuring than under ryot's method of manuring, (2) chilean nitrate was efficacious under first crop conditions while ammonium sulphate was better for the second crop, (3) Japanese method is significantly better than farm method of cultivation and (4) inter-cultivation was found to have no perceptible effect in increasing yield of paddy.

Economic gain to the ryots.—With an area of about 142,000 acres under different strains of paddy both released as well as introduced from the station, the economic gain may be estimated at about Rs. 21 lakhs at Rs. 15 per acre.

II. *Programme of work for 1955-56*—A. *Paddy*—1. *Improvement of local varieties*.—(i) Laying out trials of one Bilikayama culture (1558) and two non-deteriorating cultures (8360 and 8900/2) at the station and in the district.

(ii) Laying out second year yield trials of promising Halluga cultures and preliminary yield trials of Mascathi cultures.

(iii) Laying out of observation plots of Kanwa, Parambanavara and Doddarai.

(iv) Multiplication of culture 2482 proposed for release as strain MGL. 6.

2. *Improvement by introduction*.—The study of pure lines will be continued. Inter-varietal trials of promising cultures and strains will be laid out in all the three seasons:

3. *Improvement by hybridization*.—(i) Study of F-4 progenies of the following crosses:—

MGL. 1 × MTU. 3	..	..	} First crop.
PTB. 11 × MTU. 4	..	..	
Kasipichodi × PTB. 9	..	..	
PTB. 20 × Co. 3	..	..	} Second crop.
Co. 3 × 8448	..	..	

(ii) Laying out the yield trials of economic hybrid progenies possessing non-deteriorating characters at the station.

4. *Manurial trials*.—The following manurial trials would be laid out :—

(i) To study the deleterious effects (if any) of continuous application of ammonium sulphate.

(ii) To study the effect of growing high yielding strains continuously under the conditions of ryots' manuring and farm.

5. *Cultural trials*.—(i) Japanese method of cultivation and farm method of cultivation.

(ii) To study the role of interculture and spacing under Japanese and farm system of manuring.

6. *Miscellaneous studies*.—Silver shoot studies during first crop season :—

(i) Varietal resistance under different time of sowings.

(ii) Varietal difference under different soil conditions.

B. *Ginger*—(1) *Manurial*—(i) Influence of nitrogen and P_2O_5 on yield

(ii) Influence of organic and inorganic nitrogen on yield.

(2) *Cultural*.—Influence of spacing on yield.

Cashew Research Station, Mangalore.

Results achieved in research in 1954-55.—Eighteen more individual tree selections were isolated as a result of a survey of cashew growing areas in Travancore-Cochin and Andhra States thus bringing the total under study to 105. Air layering of one year old and current season's shoots with the aid of Alkathene wrapper proved to be a promising method of vegetative propagation. Several rooting media such as coir fibre, sand and wood shavings were to be useful substitutes to moss in air layering. Other methods that gave promise were inarching and cutting nurse method of grafting. Topping the seedlings at the time of lifting was found to facilitate their successful transplanting. Controlled pollination and spraying the inflorescences with water led to increased fruit set. It was found that under natural conditions only three per cent of the flowers set fruits.

Annual programme of work for 1955-56.—Survey and establishment of comprehensive collection of types, maintenance of progeny plots, standardization of vegetative propagational methods and multiplication of clonal progenies of promising types, blossom biological studies, trials to determine the optimum manurial and irrigation practices, etc., will be pursued.

XI. CROP SAMPLING.

This is the fifth report since the implementation of the five-year co-ordinated scheme of crop cutting experiments and statistical assessment of the results due to Grow More Food aids. The report covers the period from 1st July 1954 to 30th June 1955 of the fasli year 1364.

During this year the conduct of crop cutting experiments was continued as in the previous years on the principal food crops, viz., paddy, cholam,umbu and ragi and the experiments for the statistical assessment of the results due to Grow More Food aids were confined to the three principal heads, viz., improved paddy seed, green manure and ammonium sulphate.

2. *Staff and administration*.—The technical control of the crop sampling work continued to vest with the Director of Statistics, assisted by one Assistant Statistical Officer (Crop Sampling) and one Special District Agricultural Officer (Crop Sampling) at headquarters and four Special District Agricultural Officers at four centres, namely, Vellore, Tanjore, Madurai and Kozhikode.

The headquarters of the Special District Agricultural Officer (Crop Sampling), Salem, has been shifted to Vellore with effect from 21st September 1954.

The headquarters of the Special District Agricultural Officers (Crop Sampling) was changed over to Kozhikode from Shoranur with effect from 11th April 1955.

As in the previous year crop cutting experiments on paddy and the statistical assessment of Grow More Food aids results were attended to by the Agricultural Demonstrators while the Revenue Inspectors were in charge of experiments on millets. In general, the experiments during the fasli under review were conducted more satisfactorily than in the previous fasli. This position may obviously be due to the experience gained by the Agricultural Demonstrators and Revenue Inspectors during the past four faslis.

3. *Work done*.—Despite the dislocation of work due to the post of the Special District Agricultural Officer (Crop Sampling), Madras, remaining unfilled for a fortnight and the additional charge arrangements every effort was taken to ensure the successful conduct of the crop cutting experiments.

The number of days toured, villages visited, the number of experiments inspected at several stages both by the Special District Agricultural Officers (Crop Sampling) at headquarters and at the mufassal centres, are furnished in Appendix. During this year the Special District Agricultural Officers in the districts, on an average toured 273 days, visited 212 villages and inspected 417 experiments, as against 174 days on tour, 105 villages visited and 130 experiments inspected, during the previous fasli. The Special District Agricultural Officer (Crop Sampling) at headquarters toured for 217 days visited 156 villages and inspected about 21 experiments during the period.

Regular course of random sampling technique both in theory and practical were conducted by the Special District Agricultural Officers to a number of batches of the Revenue Subordinates along with their survey training. Instruction classes were also conducted for the benefit of the Agricultural Demonstrators.

4. *Survey under several categories of experiments*—(a) *Enquiry into operational holdings*.—An enquiry into the economic holding of some of the ryots in whose fields the crop cutting experiments were already conducted was taken up to investigate whether the acre yield has any relation to the size of the holdings. The results of this enquiry has not yet been finalised, as this was taken up at the fag end of the fasli year. The experiments targetted and conducted so far are furnished in Appendix.

(b) *Crop sample survey on sugarcane*.—The crop sample survey on sugarcane was conducted in Gudiyatham taluk in North Arcot district and in Coimbatore taluk in Coimbatore district with a view to gain some experience of the condition peculiar to this State. The survey was proposed to be conducted in 13 villages in Gudiyatham taluk and in 14 villages in Coimbatore taluk. It was, not however, possible to conduct the experiments in all the villages proposed as the crop had already been harvested in some of the villages. Only six villages in Gudiyatham taluk and two villages in Coimbatore taluk were surveyed.

batore taluk could be covered by the survey. The Sugarcane development staff in this State attended to the field work and their work was supervised by the Special District Agricultural Officers (Crop Sampling) who are in charge of crop sampling survey on paddy and millets. The tabulation and analysis was attended to by the existing staff of this department.

(c) *Crop cutting experiments for assessing the effect of soil conservation measures on the yields of crops.*—During the year 1954-55, a pilot survey of crop cutting experiments was conducted in Mulanur village of Dharapuram taluk in Coimbatore district and Ketti Valley of Coonoor taluk in Nilgiris district where two types of soil conservation (bundling and terracing respectively) measures were in progress. The object of the survey was to assess the effect of these soil conservation measures on the yields of crops. As no separate field staff was sanctioned for this survey only a limited number (10 pairs) of experiments could be conducted at each centre with the help of the regular Agricultural Demonstrators. The experiments at Ketty Valley were conducted on the potato crop while those at Mulanur were conducted on the cumbu crop. Though the results are not statistically significant, the individual plots in terraced or bunded area showed increased yield over the plots, in non-terraced or non-bunded area. The results of experiments conducted are shown in Appendix.

(d) *Pilot scheme for estimating area and yield of pepper crop.*—A pilot survey was carried out in Malabar and South Kanara districts with a view to examine the feasibility of adopting sampling methods for estimating the pepper crop and also to collect information on the detailed classification of pepper standards by varieties, age, bearing capacity and such other important characters. The survey was initiated at a time when the harvest of the crop had commenced. Out of the 100 villages selected on the random sampling principle experiments on harvest were conducted in 73 villages. Experiments on harvest could not be conducted in 27 villages as the crop had already been harvested. The work relating to enumeration of pepper acreage and pepper standards and their classification with reference to the support, age of vines, etc., and collection of ancillary data relating to the crop was completed in 92 villages out of 100 selected.

The Special District Agricultural Officer, Kozhikode, was in charge of the survey. He was assisted by one field officer, two supervisors, ten field investigators and one junior computer. One Statistical Assistant attended to the work at the headquarters.

5. *Progress of general crop cutting experiments.*—The progress of experiments during the 1364 fasli, in respect of paddy, Grow More Food aids experiments and millets are given in Appendices.

From Appendix, it is seen that out of 1,240 experiments planned under I, II and III period paddy 1,177 experiments have been completed, constituting 95 per cent to the total planned. The highest number of experiments was conducted in Kozhikode and Tanjore and next in order comes Madurai and Vellore. The highest and lower number of experiments completed and that could be considered for analysis with reference to the total number of experiments planned in the several regions are examined below :—

Experiments.	Highest.	Lowest.	Remarks.
Paddy I ..	100 per cent in Vellore and Madurai.	95 per cent in Tanjore.	Experiments were conducted on paddy III period only in Tanjore
Paddy II ..	98 per cent in Tanjore.	93 per cent in Madurai.	
Paddy III ..	100 per cent in Tanjore.	58 per cent in Vellore.	

From Appendix, it is seen that out of 250 experiments planned under Grow More Food Aids, 230 experiments were completed, constituting 92 per cent to the total planned. The highest number of experiments under this aid was conducted in Tanjore region and lowest in Vellore region.

Experiments.	Highest.	Lowest.	Remarks.
Grow More Food Aids.	....	....	....
Improved Seed ..	100 per cent in Madurai.	76 per cent in Vellore.	....
Green Manure ..	100 per cent in Kozhikode.	71 per cent in Vellore.	....
Ammonium Sulphate.	98 per cent in Tanjore.	91 per cent in Madurai.	....

From Appendix, it is seen that out of 2,280 experiments planned under millets, 1,348 experiments have been completed, constituting 59 per cent to the total planned. The highest number of experiments under this survey was conducted in Vellore region and lowest in Kozhikode region.

Taking all categories of experiments under paddy, grow more food aids and millets, the progress was as given below :—

	Planned.	Completed and considered for analysis.	Percentage.
I. Paddy—			
Vellore	270	242	90
Tanjore	380	370	97
Madurai	280	262	94
Kozhikode	310	303	98
	<u>1,240</u>	<u>1,177</u>	<u>95</u>
II. Grow More Food Aids—			
Vellore	46	36	78
Tanjore	109	106	97
Madurai	54	50	94
Kozhikode	41	38	93
	<u>250</u>	<u>230</u>	<u>92</u>
III. Paddy and Grow More Food Aids together—			
Vellore	316	278	88
Tanjore	489	476	97
Madurai	334	312	93
Kozhikode	351	341	97
	<u>1,490</u>	<u>1,407</u>	<u>94</u>
IV. Millets—			
Vellore	720	368	51
Tanjore	550	394	72
Madurai	620	312	50
Kozhikode	390	274	70
	<u>2,280</u>	<u>1,348</u>	<u>59</u>

Items III and IV above give a comparative picture of the experiments planned and completed by the Agricultural Demonstrators and Revenue Inspectors in each region as 94 per cent and 59 per cent respectively. It would be seen that the percentage of experiments completed to the number planned in paddy and Grow More Food Aids, was highest both in the regions of Tanjore and Kozhikode being 97 per cent while it was lowest in Vellore region being 88 per cent. In regard to millets Tanjore region had the highest results (72 per cent) and Madurai region the lowest (50 per cent). Though the achievement of the Revenue Inspectors was slightly better than during the last year inasmuch as 59 per cent of the experiments were considered for analysis, as against 49 per cent during the previous fasli, the progress was better but not quite satisfactory.

6. *Results of experiments conducted.*—The results of the crop cutting experiments conducted during 1954-55 in the Residuary Madras State are summarized below :—

Category I—Paddy.—As in the previous year the crop cutting experiments on paddy were conducted during the three periods covering the crop harvested, from July to October, November to March and April to June respectively. The total number of experiments planned on paddy first crop was 272 out of which only 269 experiments were considered for analysis. Nine hundred and ten experiments were planned on the second crop paddy but only the results of 866 experiments were analysed. The number of experiments planned for the third period crop was 58, the number considered for analysis was only 42. Thus in all the three periods taken together, the number of experiments considered for analysis was 1,177 as against 1,240 planned in 620 villages at the rate of two experiments per village. The percentage of the number of experiments considered for analysis to the number of experiments planned works out to 95 per cent. During the last fasli 1,476 experiments were planned, 1,353 experiments were considered for analysis and the percentage of the latter to the former in respect of paddy crop combined for all the three periods was 91.7 per cent. The results of the statistical analysis for the first, second and third period crops are given in Appendices. The average yield of rice for the State as a whole in respect of first, second and third crops works out to 1,114.59 lb. per acre, 1,144.15 lb. per acre and 1,130.99 lb. per acre, respectively. The respective percentage of standard error was 2.52, 1.85 and 6.16 per cent. The corresponding figures of average yield during the previous year are 992.81 lb. per acre, 1,008.18 lb. per acre and 1,206.54 lb. per acre, the respective percentage of standard error being 4.59, 2.16 and 8.14.

Category II—Assessment of additional production due to Grow More Food Aids.—As in the previous year the crop cutting experiments during 1364 fasli with Grow More Food Aids were confined only to the main period crop and the second aid (i.e.), green manure was limited to sesbania only. The 250 experiments planned with the three aids were distributed as shown below: Improved seed 70, sesbania 90 and ammonium sulphate 90 and the number of experiments under each of the three aids completed satisfactorily and considered for analysis was 63, 82 and 85 respectively. These totals up to 230 or 92 per cent of the experiments planned. The statistical analysis of the results relating to these experiments is summarized in Appendix. It will be seen from the Appendix that the rate of response (i.e.),

the additional yields of rice in pound per acre due to the application of the three aids were as follows :—

Aids.	Increase in lb. per acre of rice.
Improved Seed	243
Sesbania	290
Ammonium Sulphate	262

Category III—Millets.—During the year under review 2,280 experiments on millets were planned and 1,348 were completed successfully (i.e., about 59.12 per cent). The corresponding figures for the previous year were 3,266, 1,602 and 49.1 per cent respectively. The particulars of the number of experiments planned and the number of experiments completed and considered for analysis under each category of the millets are given below :—

Category of experiments.	Number of experiments.		Percentage of the number completed and taken for analysis to the total planned.
	Planned.	Considered for analysis.	
Irrigated Cumbu	120	88	73.33
Unirrigated cumbu	740	418	56.49
Irrigated Ragi—			
I Crop	266	200	75.19
II Crop	124	78	62.90
Unirrigated Ragi	290	126	43.45
Irrigated Chulam	194	102	52.58
Unirrigated Chulam	546	336	61.54
Total	2,280	1,348	59.12

The results of the analysis for each category of experiments under millets are given in appendices. The average yield, the percentage standard error and the estimated production for the State in respect of experiments under each millet crop are shown below :—

I. *Irrigated cumbu.*—The estimated average yield per acre worked out to 636.0 lb. per acre for the State and the percentage standard error worked out to 9.0. The estimated production for the State was 85,700 tons.

II. *Unirrigated cumbu.*—The estimated average yield for the State was 323.88 lb. per acre and the percentage sampling error of the estimate was 4.83. The estimated total production for the State worked out to 201,300 tons.

III. *Irrigated ragi (first crop).*—The estimated average yield and the percentage sampling error for the State worked out to 1,219.81 lb. per acre and 3.99 respectively. The estimated total production was 194,400 tons for the State.

IV. *Irrigated ragi (second crop).*—The estimated average yield for the State was 1,275.69 lb. per acre, the percentage sampling error was 16.58. The estimated total production worked out to 95,200 tons for the State.

V. *Unirrigated ragi.*—The average yield for the State was estimated at 712.00 lb. per acre and the percentage standard error was 7.23. The estimated production worked out to 152,700 tons.

VI. *Irrigated cholam*.—The average yield for the State was estimated at 1,051.74 lb. per acre and the percentage standard error was 8.86. The estimated production worked out to 199,800 tons.

VII. *Unirrigated cholam*.—The average yield for the State was estimated at 488.05 lb. per acre and the percentage standard error was 5.51. The estimated production worked out to 332,800 tons.

The estimated average yield, sampling error and total production of rice for the entire paddy crop and the results of the crop cutting experiments on cumbu, ragi and cholam (irrigated and unirrigated) for the year 1954-55 are furnished in the Appendices.

XII. WYNAAD COLONIZATION SCHEME.

Research—1. *Progress of work during the year*.—(i) Trials of different types, varieties and strains of paddy to select the outstanding ones, for popularization in the tract.

(ii) Evolving high yielding strains of Jeerakasala paddy by selection.

(iii) Multiplying high yielding strains and cultures of local paddy varieties for large scale distribution.

(iv) Trial of Chinese type of paddy during the first and second crop season to assess their suitability for introduction in the tract.

(v) Purification work in the strains WND. 1 and WND. 2.

(vi) Trial on cultural practices on mandarin oranges to determine the optimum cultural practices in relation to growth, productivity, fruit quality and prevention of decline.

(vii) Rootstock trial of mandarin orange to determine the best rootstock in relation to growth, productivity fruit quality and prevention of decline.

(viii) Varietal collection of introduced fruits, spices and beverage crops and their experimental cultivation.

(ix) Trials to find out the effect of nitrogen and phosphatic acid in the yield of ginger.

(x) Mulching trial on ginger.

(xi) Observation trial of cholam and ragi strains.

(xii) Canning of fruits and preparing squashes from surplus fruits.

2. *Livestock improvement*—*Cattle*.—A pure Sindhi bull purchased from Karachi and stationed on the farm since 1947 has been doing useful service. To prevent inbreeding, it is proposed to replace it by a new bull.

3. *Poultry*.—The egg laying performance of birds of white Leghorn and Rhode Island Red Breeds were found to be satisfactory. But inherently they were more susceptible to diseases than the local birds.

4. *Propaganda*.—(1) Soil conservation and preventing soil erosion by Contour bunding, contour planting and planting of perennial crops like coffee, orange and pepper.

(2) Rendering advice on the proper cultivation and maintenance of plantation crops of coffee, orange and pepper.

(3) Japanese method of cultivation of paddy.

(4) Cultivation of paddy by transplanting paddy seedlings raised in nurseries instead of broadcast sowing.

(5) Raising second crop of paddy in the first crop lands where adequate water is available.

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(6) Using green leaf manures and fertilizers for paddy crop.

(7) Raising green manure crops in the paddy fields and ploughing in site.

(8) Using improved paddy strains in preference to unselected local bulk seed.

(9) Control of pests and diseases.

(10) Adoption of suitable crop rotation.

(11) Preservation of cattle manure and preparing composts.

(12) Subsidiary occupation such as poultry farming, dairying, etc.

(13) Distribution of seeds and plants of all economic crops suitable for the tracts.

(14) High yielding cultures of local paddy varieties, Velunpales, Chettuvaiyan, Kothandan and Maranellu have been distributed on a large scale. MTU. 19 was found superior to local varieties on account of its lodging and heavy yielding characters. Where water-supply is adequate, Palthundi Punja, and PTB. 10 have been determined as suitable varieties for growing in the second crop season.

5. *Help rendered to colonists*.—AD. 4 bull grader caterpillar tractor worked for 830 hours on 136 days in Colonists plots. 26.30 acres were levelled, 98.50 acres were ploughed and 26.00 acres were harrowed. Seven hundred and eighty tons of compost were prepared. One thousand nine hundred and twenty pounds of Sunnhemp seeds were distributed for raising in the paddy lands as green manure crop. Over 12,000 coffee seedlings and 1,500 pepper rooted cuttings of a productive variety, Kalluvalli were distributed to the colonists. About 25,835 fruit plants and seedlings were distributed.

XIII. PROPAGANDA, DEMONSTRATION AND PUBLICITY (EXTENSION WORK).

Propaganda.—The Agricultural Extension staff concentrated their efforts on propaganda on the several schemes of the intensive food production plan, cotton extension and sugarcane development included in the Five-Year Plan. Special emphasis was laid on modified Japanese method of paddy cultivation, raising sesbania speciosa in paddy fields along bunds and as pure crop, sinking filter point tube wells, intensive manuring of paddy with fertilizers, cultivation of cotton in rice fallows, crop competitions in paddy, millets, potato and sugarcane, organizing village seed farms, formation of agricultural associations in villages, adoption of improved methods in sugarcane and cotton. The extension staff toured the villages frequently held meetings of ryots and constantly conducted demonstrations with improved implements, exhibits and posters.

2. *Demonstration plots*.—In all 20,587 propaganda meetings were held and 18,106 demonstration and trial plots were laid out in ryots' fields to bring home to the cultivators the use of improved seeds, manures and better cultural practices.

Besides 15,059 plots were arranged under the Modified Japanese Method of cultivation. The target of one demonstration plot for each village required by Government is being carried out.

3. *Agricultural Association*.—Agricultural associations were continued to be organized. So far 16,317 Agricultural Associations were formed against a

total of 21,000 villages in the State. New associations were formed in villages without them and membership and functioning were sought to be improved. All agricultural improvements were put across through the members of these associations. Modified Japanese method of paddy cultivation, Sesbania as the pure crop and border crop in paddy fields, village seed farms, composting waste vegetable matter, tree planting, Grow More Food Journals were some of the items popularised through these associations.

4. *Publicity*.—The annual Villagers' Calendar and Guide for the year 1955 was published in the three regional languages. Besides 31 articles were sent for publication in the Agricultural News Letter on important subjects.

A total number of 1,15,675 copies of leaflets and pamphlets was distributed to the ryots by the department during the year under report.

* 5. *Grow More Food Journal*.—With the object of disseminating knowledge of scientific agriculture among the agriculturists and thus giving an impetus to the Grow More Food campaign, the Department was directed to publish a monthly journal in the vernacular. The first issue of Tamil Journal agricultural associations, reading rooms, etc.

Very soon the journal won the appreciation of the ryots and the public and gained a wide popularity with ever increasing demand for the copies. In order to mobilize an extensive supply of copies to those in real need of them, a nominal annual subscription of annas twelve was fixed. Simultaneously a special number of the Tamil New Year was also published in April 1948.

Popularity and utility this journal had, had created the public enthusiasm to have similar journals in Kannada and Malayalam also, the first issues in these languages coming out in September 1949.

Subsequently the clamour for more copies and the keen interest which the journal created in the cultivating public caused a gradual rise in the rate of annual subscription from annas 12 to the present rate of Rs. 2-4-0 in stages.

Now the journals in Tamil, Malayalam and Kannada are published with better get up and the present rate of annual subscription is Rs. 2-4-0.

Strength of subscribers at the end of the year.

Mezhichelvam	...	...	27,280
Naveenakarshakan	...	...	2,970
Krishikarabandhu	...	...	1,630

Radio for publicity was also pressed into Service and the following talks on subjects of Topical interest were given from the All-India Radio Stations in the State :—

Radio talks.—The following talks on subject of topical interest were given from the All-India Radio Stations in the State :—

Date of broadcast.	Subject of talk.	Language and station where broadcast.
20th November 1954	'Seed Farm for paddy' by Sri Mohamed Ali, B.Sc. (Ag.), Deputy Director of Agriculture, Tanjore.	Tamil, Tiruchirappalli.
8th December 1954	'Soil conservation' by Sri B. M. Lakshminpathy Mudaliar, Deputy Director of Agriculture (Engineering), Headquarters.	Tamil, Madras

* A total number of 1,15,675 copies of leaflets and pamphlets was distributed to the ryots by the department during the year under report.

Date of broadcast.	Subject of talk.	Language and station where broadcast.
5th January 1955	'National Extension Work in Tanjore' by Sri Mohamed Ali, B.Sc. (Ag.), Deputy Director of Agriculture, Tanjore.	Tamil, Tiruchirappalli.
7th May 1955	'Manurial problem in Madras and its solution' by Sri S. N. Venkataramanan, B.A., B.Sc. (Ag.), Headquarters Deputy Director of Agriculture (Inspection).	Tamil, Tiruchirappalli.
8th July 1955	'Vanamahotsava' by Journal Assistant (Kannada), Director of Agriculture's Office.	Kannada, Madras.
11th July 1955	'Vanamahotsava' by Journal Assistant (Malayalam), Director of Agriculture's Office.	Malayalam, Madras.
14th August 1955	'Grow More Vegetables' by Journal Assistant (Tamil), Director of Agriculture's Office.	Tamil, Madras.

6. *Agricultural Information Committee*.—In G.O. No. 3186, Agriculture dated 2nd July 1953, Government ordered that an Agricultural Information Committee at Headquarters be formed with the Director of Agriculture as Chairman and the Director of Animal Husbandry, the Director of Publicity, and the Station Director, All-India Radio and an Agriculturist, Sri C. G. Guruswami Naidu, as members. The object of the Committee is among other things to organize and formulate information and publicity for such items as Japanese method of cultivation and collection, preparation and distribution of literature for Agricultural extension work and conducting campaigns.

The Committee held two meetings.

The Government also ordered that a counter should be opened at the Agricultural Seeds Depot in Mount Road, Madras City, for giving information on agricultural matters and to popularize agricultural publications. This was opened on 17th March 1954, and 2,892 publications were sold to the public.

The Government of Madras also accepted the offer of the Indian Council of Agricultural Research of a Multilitho equipment for expanding printing facilities. The machine has been received and is with Controller of Stationery and Printing.

7. *Exhibition*.—As an aid to propaganda, exhibitions were organized in connexion with all important fairs, festivals and during social, religious or political conferences. On such occasions besides putting up exhibits and posters, demonstrations, with improved implements and magic lantern shows were arranged. In all 192 exhibitions, big and small, were organized.

Exhibition at the Agricultural College and Research Institute, Coimbatore.—A separate hall was allotted for Central Exhibition at the Agricultural College, Coimbatore, and all activities of the Specialists were arranged in the hall after providing for necessary fittings in the shape of electricity and chart space.

College Museum.—The College Museum continued to be a centre of attraction to visitors who numbered 31,573 during the year as against 28,072 of last year.

College Day and Conference.—The Thirty-seventh College Day and Conference was celebrated from 18th and 21st August 1954 under the presidency of Sri M. Bhaktavatsalam, Hon'ble Minister for Agriculture, Madras. Sri N. L. Dutt, Director of Central Sugarcane Institute, Coimbatore, delivered the inaugural address.

Scientific Workers' Conference.—The Scientific Workers' Conference and Departmental Officers' Conference were presided over by the Director of Agriculture, Madras. During the year 32 papers were received of which 14 were presented at the conference and the rest read at the Study group meetings.

Centenary of the Madras State Herbarium.—The Centenary of the Madras State Herbarium was celebrated on 20th August 1954. Dr. A. Lakshmanaswami Mudaliar, B.A., M.D., LL.D., D.Sc., D.C.I., F.R., C.O.G., F.A.C.S., M.L.C., Vice-Chancellor of Madras University, presided over the function.

8. *Crops*—(a) *Paddy.*—Paddy strains evolved from the Agricultural Research and Breeding Stations give at least 10 per cent increased yields over locally cultivated varieties. So multiplication and distribution of paddy strains formed the main item of work of the extension staff. The special seed development staff continue to look after the primary seed farms and helped to check the purity and viability of seeds produced in secondary seed farms. The following are the particulars of primary and secondary seed farms organized and seeds procured from them :—

	Acreage.	Quantity of seeds procured.
		TONS.
Primary and Secondary seed farms ..	10,427	972

A total quantity of 1,955 tons of improved paddy seeds was distributed during the period under report. The area so far covered by improved grains of paddy was 2.98 million acres as compared to 2.57 million acres in 1953-54.

(b) *Millets.*—Improved millets seeds were multiplied and procured from the seed farms for distribution.

	Acreage.	Quantity of seeds procured.
		TONS.
Primary and Secondary seed farms ..	3,046	34

A total quantity of 36 tons of improved millets seeds were distributed during the period reported on.

(c) *Pulses.*—The following are the particulars of pulses seed farms organized and seeds procured :—

	Acreage.	Quantity of seeds procured.
		LB.
Primary and Secondary seed farms ..	38	680

A total quantity of 860 lb. of improved pulses seeds were distributed.

(d) *Village seed farms* were run in 8,078 villages for paddy and 3,261 villages for millets. Eight thousand seven hundred and seventy-nine tons of paddy and 264 tons of millets were exchanged among ryots.

(e) *Cotton—Seed multiplication work—Co.2 Seed Farms.*—During the year an area of 380.2 acres has been arranged under Cambodia-2 cotton in Tiruppur centre. Two hundred and fifty-two bags of sowing seeds were obtained.

MU1 Seed farms.—The seed farm areas for the MU1 cotton were arranged both at Coimbatore and Tiruppur. The area was distributed as follows :—

	ACS.
Coimbatore	4,000
Tiruppur	1,450.5
	5,450.5

During the year, a total quantity of 638,658 lb. of MUI sowing seeds were procured and distributed as follows :—

	LB.
(a) Cotton extension schemes	527,700
(b) Seed farm sowings at Tiruppur	38,800
(c) Seed farm sowings at Coimbatore	72,158
	638,658

The following quantities of sowing seeds were obtained up to 30th June 1955 :—

	BAGS.
At Tiruppur	2,059
At Coimbatore	3,006
	5,065

K.5 Seed farm.—The seed farm areas have been arranged in Palladam and Udumalpet taluks. A total quantity of 590,056 lb. of K.5 seeds were obtained and distributed as follows :—

	LB.
(a) Cotton extension scheme	458,500
(b) Seed farm issue	133,481
(c) Free transfers	75
	590,056

The following are the details of seed farms arranged :—

	ACRES.
Palladam	3,500
Udumalpet	2,000
Sulur	500
	6,000

The ginning of kapas is in progress and so far 882 bags at Udumalpet and 715 bags at Palladam have been got ready.

K.2 Seed farms.—A total area of 30,436 acres were sown under seed farm conditions. A quantity of 4,893 bags (each 100 lb. net) of K.2 cotton seeds were distributed to all the seed farm ryots, while a quantity of 2,386 bags were distributed to district officers and the rest for cash sales, by Assistant Cotton Specialist, K.2, Co.4 Combined Scheme, Koilpatti, from a total quantity of 9,509 bags of K.2 seeds procured from 1953-54 crop.

A quantity of 14,147 bags of 112 lb. each of good seeds has been obtained up to 30th June 1955.

Madras Cambodia Uganda zone—(A) 1954 summer (1953-54).—A quantity of 5,036 bags each of 100 lb. of MCU.1 and 3,143 bags each of 100 lb. of MUC.2 cotton seeds were procured from the 1954 summer crop raised at Srivilliputhur and Rajapalayam under seed farm areas. In addition to this a quantity of 800 lb. of MCU.1 from the Agricultural Research Station, Koilpatti and 912 lb. of MCU.2 cottons seeds from the Assistant Cotton Specialist, Long Staple Cotton Scheme, Srivilliputtur, were also received. Seven thousand nine hundred and ninety-five bags were transferred to the districts under the Cotton Extension Plan, 82 bags were sold for cash and 1,182 bags were supplied to the Srivilliputtur Co-operative Marketing Society for running seeds farms.

(B) 1955 summer (1954-55).—The multiplication and distribution of MCU.2 cotton has been entrusted to the Srivilliputtur Uganda Cotton Growers' Marketing Society, Limited, as per G.O. Ms. No. 267, Industries, Labour and Co-operation, dated 29th January 1955. The work was carried on with the assistance and technical advice of the departmental staff.

The society distributed a quantity of 102,191 lb. of MCU.2 cotton seeds under the advice and control of the departmental staff under seed farm conditions for 3,667 acres.

A total quantity of about 35,273 maunds of seeds of improved strains of cotton was distributed during the year 1954-55.

The area covered by improved strains of cotton in this State in 1954-55 is about 5.23 lakhs acres or about 60 per cent of the total cotton area.

(f) *Oil seeds*.—The following quantities and improved seeds and seedlings were distributed :—

Groundnut—

Pods	122,417 lb.
Kernels	478 "
Gingelly seeds	2,514 "
Caster seeds	2,996 "
Coconut seedlings	94,023 Nos.

(g) *Fruits*.—Choice grafts, budded plants, layers seedlings and cuttings of fruit plants were raised in large numbers in Government fruit nurseries and fruit centres and made available to the public. Special drive for distribution was organized whenever stocks accumulated in nurseries. The following are the particulars of fruit and vegetable plants and seeds distributed :—

Centre	Number of plants.	Quantity of seeds.
1 Pamological Station, Coonoor .. .. .	.. .. .	LB
2 Kallar and Burlar Fruit Stations	37,258	88
3 College orchards, Coimbatore	18,575	61
4 Fruit Centre, Wynad	15,564	278
5 Fruit Centre, Taliparamba	25,827	10
6 Cashew Research Station, Mangalore	48,211	..
7 Model Orchard-cum-Nursery, Periakulam	1,429	146
8 Model Orchard-cum-Nursery, Mangalore	226	181
9 Model Orchard-cum-Nursery, Thimmapuram	2,413	2,828
10 Pepper Research Station, Taliparamba	3,985	499
11 Tular Crop Scheme, Coimbatore	21,419	68
12 Tular Crop Scheme, Mangalore	..	2,135
13 Government Botanical Garden, Ootacamund	..	3,282
14 Sim's Park, Coonoor	119,494	44
	66,989	99
	361,340	9,686

Over 360,000 fruit and other plants raised from tested parents and adopted to the different regions have been distributed. These are expected to bring 1,800 acres under improved plant material which can form secondary centres for further dissemination of desirable types in due course.

(h) *Vegetables*.—The production of vegetables was encouraged by distribution of vegetable seeds produced in Agricultural Research Stations and from reputed vegetable seedsmen. The special staff to encourage city production of vegetables continue to function in the Madras City. The following items of work were turned out by the staff :—

Vegetable seeds sold	836 lb.
Vegetable seedlings	44,750 Nos.
Insecticides sold—T. 3	1,642 lb.
Coconut and fruit plants sold	1,820 Nos.
Avenue and shade plants distributed	9,893 "
Number of bungalow compound inspected	3,070 "
Area of vegetable gardens tacked	184 acres.
Demonstration of lay out cultural, varietal, manurial, etc.	1,019 Nos.
Pests and diseases control demonstration	677 "

In the district 3,574 lb. of vegetables seeds and 309,851 vegetables seedlings were sold to the public.

(i) *Sugarcane extension work*.—The development staff were engaged in rendering technical advice on the improved method of cane cultivation and assisting cane-growers in securing implements, manures, etc. In respect of important items demonstration plots were laid to show the value of improved techniques. The achievements recorded in respect of important items, are summarized below :—

1 Area work with improved implements	14,150.99 acres.
2 Ridged with ridge plough	8,892.51 "
3 Area worked with departmental tractors—	
(i) Ploughing	764.00 "
(ii) Trenching	144.00 "
4 Area under green manure	3,971.41 "
5 Area under green-leaf manuring	9,473.70 "
6 Area manured with optimum quantity of concentrate.	19,402.84 "
7 Area worked with bullock drawn implements for inter-cultivation.	5,118.13 "
8 Area propped	6,400.34 "
9 Demonstration of preparation of good gur	3,450 Nos.
10 Construction of improved furnace	1,042 "
11 Composting cane trash	1,069 "
12 Eradication of pests and diseases	26,388.30 acres.

In the Kulitalai zone, the pest Act was enforced for the third season in succession.

In Nellikuppam zone, Co.658 and in Kulitalai zone Co.467 are under extended trial.

In Kuli-alai zone, Co.419 is still the best variety. Co.449 which was recently introduced is best.

The development staff functioned mainly as advisory body. In Pugalur sugar factory area, pest Act was enforced to control smuts and borers. Selection of seeds from disease-free area was emphasized and ryots were helped in securing good seed. Several development items were carried to the field of the cultivators and 876 demonstration plots were laid in ryots holdings. On account of intensive development the Pugalur Sugar Factory recorded sugarcane recovery of 10.52 per cent as against 9.11 per cent of last season. In the yield competition a record yields of 129.03 tons of cane was recorded by Sri T. Kanda Reddiar of Radhapuram with Co.419 variety.

The area covered by improved strain of sugarcane in 1954-55 is 114,000 acres and about 95 per cent of the area under the crop in the State.

(j) *Manures*—

	Numbers.
1 Manure pits newly opened	33,808
2 Manure pits renovated	43,274
3 Byre system for conservation of urine	3,357
4 Dry earth system	16,837
5 Loose box system	1,309

(k) *Composts*.—As sufficient cattle manure is not available propaganda for conversion of all waste vegetable matter available in villages into useful composts through the simple process of composting in pits was done and in all 135,976 tons of rural composts are estimated to have been prepared in all the districts by the extension staff.

Propaganda for the use of urban composts prepared and sold by municipalities and panchayats was done and the prejudice against the use of these is breaking down gradually. A quantity of 208,430 tons of compost was distributed from municipalities and panchayats.

(l) *Green manures*.—To supplement cattle manure and composts a manure or crops intense propaganda for cultivation of green manure crops was done. Sesbania as a border crop and pure crop for paddy was attempted on a large scale. Over 1,370,000 acres of paddy land was brought under this plant as against 905,000 acres last year border crop over 22,000 acres were sown to pure crop. Other green manure crops as daincha, sunhemp, koringi and indigo were encouraged wherever found suitable.

Planting of perennial green manure yielding plants as Gliricidia, Pungam, Ipomea Carnea, Malaipoovarasu, in all waste place was encouraged and large quantities of seed material required were made available.

(m) *Extension of useful plants*.—Besides nearly 42 million plants of Gliricidia established in wet and garden lands and Indigofera Teysmanii several useful plants are being expanded by distribution to ryots. Seeds of Calapagonium were collected and distributed in districts to serve as a useful cover crop.

In order to expand the cultivation of pepper on a wide scale, propaganda was done to have it grown and trailed in coconut and arecanut gardens in Malabar and South Kanara districts. A number of ryots have been to this practice. *Prosopis Juliflora* has been extended on a large scale as a fence crop and as border crop on road and rail margins to serve for fuel soil conservation and as useful hedge plants. Fifteen thousand seven hundred and ninety-eight miles along road sides and railway lines were

covered, besides being raised in 26,804 acres as fencing for fields or in paddocks, etc.

(n) *Fodder crops*.—Propaganda was done for cultivation of fodder crops to supplement natural grazing available for cattle. Seeds of fodder crops as cholam, pillipesara, etc., and slips of guinea grass and Napier grass were made available to interested ryots. About 9 tons of fodder seeds and 583,825 slips of grasses were distributed.

(o) *Crop competition*.—The crop competitions have become very popular with the agriculturists.

Crop yield competition fortnight.—The crop yield competition fortnight was celebrated in all districts from 1st June to 14th June 1954. Prizes to winners of crop yield competitions were distributed by high officials and personages. Meetings were held and the object of the competitions were explained to the ryots. Intensive propaganda was done to enlist a large number of competitors. During the fortnight 1,897 competitors were enlisted.

(p) *Crop competition—Review of progress*.—During the year 1954-55 crop competitions were held in all the districts in the Madras Residuary State.

The competition covered all varieties of paddy grown under any system of cultivation and prizes were awarded from the firka level onwards in ordinary areas and from village level in Community Project and National Extension Scheme areas.

The crop competition was also organized in respect of the crops cholam, cumbu and potato in the following districts:—

Cholam and cumbu—Coimbatore district.

Potatoes—The Nilgiris.

Government have revised the award of prizes at the firka, taluk, district and State levels as follows in their G.O. Ms. No. 75, Agriculture (Food Production), dated the 12th March 1954:—

1 State prize	A gold medal worth Rs. 300 (real gold) plus certificate.
2 Regional prizes	(i) Real gold medal worth Rs. 100. (ii) Cash of Rs. 100. (iii) Certificate.
3 District prizes	(i) Real silver medal worth Rs. 50. (ii) Certificate.
4 Taluk prizes	(i) Real silver medal worth Rs. 30. (ii) Certificate.
5 Firka prizes	(i) Rs. 20 in cash. (ii) Certificate.
6 Village prizes	(i) Rs. 10 in cash. (ii) Rs. 5 in cash.

The prizes are being awarded to the prize winners at different levels.

The total number of competitors who entered for the competition during the year and the area brought under competition in the Madras Residuary State are given below :—

Name of the crop.	Number of competitors enlisted	Number of plots entered for the competition.
(1)	(2)	(3)
Paddy	10,256	10,693
Potatoes	307	307
Cholam	748	776
Cumbu	198	198
Total	11,509	11,974

(q) *More milk day*.—14th April (Tamil New Year's Day) was celebrated as More Milk Day in order to focus the attention of the public on the need for protection of cows and production of more milk to meet the growing requirements of the people. On that day surplus milk at Agricultural Research Stations were distributed freely to poor children wherever available.

(r) *Agricultural Week*.—The Agricultural Week was celebrated during Pongal and mass contacts with agriculturists were made and the improved techniques advocated by the department were explained.

Farmers.—Forums have also been formed including progressive agriculturists as members.

(s) *Compendium*.—A compendium on improved methods of agriculture was prepared and submitted to Government for publication as required.

(t) *Continuation and weekly forecasts of pests and diseases*.—The weekly forecasts on pest and diseases of crops were continued and this proved very beneficial to the ryots as they were enabled to take prompt preventive and remedial measures.

(u) *Loans*.—The following amounts were issued as loans for purchase of seeds and manure, implements and chemical fertilizers under the intensive manuring scheme.

	RUPEES IN LAKHS.
For seeds and manures	13.44
For implements	0.29
For chemical manures	42.35

XIV. HILL TRIBES UPLIFT SCHEME.

Toda Welfare Scheme.—In their Order Ms. No. 825, Food and Agriculture, dated 2nd May 1950, Government sanctioned the Scheme for the creation of an agricultural bias among the Todas in the Nilgiris district and for teaching them improved methods of cultivation. The scheme was continued from time to time and the last sanction for the continuance of the scheme for a period of 8 months from 1st May 1955 was accorded in G.O. Ms. No. 1138, Agriculture, dated 22nd April 1955. The Government of India also sanctioned a half grant of Rs. 6,476 towards their share on the net expenditure

on account of the scheme. During the year for the second crop 1954, nineteen Todas were advanced with 37½ bags of potato seeds, 66 bags of manure mixtures at a cost of Rs. 3,654 and the cost of the same will be recovered in full at the time of harvest. Apart from the potato cultivation the Todas were helped in raising vegetables and cereal crops to an extent of 22.00 acres which had helped them a long way in meeting their daily requirements of food. For the irrigated crop of 1955, a total quantity of 50 bags of potato seeds and 90 bags of manure mixtures costing Rs. 4,719-5-6 has been advanced to 14 Todas and this has been sown.

For the main-crop 1955, a total quantity of about 825 bags of seed potatoes and 8½0 bags of manures costing Rs. 49,000 will be issued to about 100 Todas.

XV. VANAMAHOTSAVA.

Vanamahotsava or National Tree Planting Week was celebrated along with the Compost Week in all the districts during the first week of July 1954. The vanamahotsava period was extended up to 31st October 1954. Required seeds and seedlings of useful plants and trees were distributed to the ryots in co-operation with the other officials and non-officials. Seeds and seedlings distributed during the Tree Planting Week are as follows :—

Fruit tree seedlings—262,313 Numbers.

Cuttings of economic importance—249,433 Numbers.

Other seedlings of economic importance—1,100,863 Numbers.

Seeds—5,029 lb.

XVI. AGRICULTURAL MARKETING.

Market surveys.—Work regarding market surveys continued side by side with development programme. Supplementary information was furnished to the Agricultural Marketing Adviser to the Government of India on the following :—

(a) Information on the acreage production and other details of different varieties of paddy grown in Madras State.

(b) Data on the production, movements, assembling, distribution, market charges, etc., in different pulses grown in Madras State.

(c) Information on the analysis of Tur dhall and suggestions for fixing standard grade specifications.

(d) Details of area, production and marketing of peas, French beans and tomatoes.

(e) The area, production and supply, etc., of citrus fruits for purposes of a scheme to start fruit preservation industries.

(f) Information relating to area and production, etc., of different varieties of fruits, seasons of marketing exportable surplus and other details.

(g) Information relating to production of chicory in Madras State together with a note on the cultivation of chicory.

(h) The information regarding the production, imports, exports and utilization of myrobalams in the State together with suggestions for drawing up grade specifications under Agmark.

(i) Particulars on the marketing of asafoetida hing in a few important assembling marketing centres in the State.

(j) Details of the supply, possibilities of goose feather together with a list of addresses of merchants in the line.

Grading of commodities—Ghee.—Four grading stations for ghee functioned during the period—two at Tirupur and one each at Coimbatore and Madurai serving six authorized packers in the State. The one at Coimbatore did not function during the year except for short periods at the beginning and end of the year for want of a qualified chemist. The grading work of Amarchand Gulabchand & Co., Tirupur, was also affected very much due to repeated misgradings of melts and consequent imposition of restrictions. The total quantity of ghee graded during the period was 6,014 maunds valued at Rs. 9,01,854 as against 9,372 maunds valued Rs. 15,68,944 in the previous year. Due to various reasons mentioned above the output of Agmark ghee went down compared to the progress made in the previous year. Propaganda was continued for inducing traders in the producing areas to take up ghee grading. As a result of the attempts made one Sri Venkateswara Laboratories at Kattour have applied for the issue of a certificate of authorization to grade ghee under Agmark standards. Preliminary work has also been done to start grading stations at Kangayam and Avanashi during the period which may bear results in the next year. A conference of the ghee merchants of the State convened by Government was held at the Rajaji Hall during February 1955 when several matters relating to defective conditions existing in ghee trade were discussed at length and in this way a fillip to popularizing Agmark ghee in the market was achieved. An association was also started at State level to look into the interests of the trade and to take early steps for the improvement of quality offered to consumers by greater production and popularization of Agmark ghee.

Eggs.—Out of eleven authorized packers only nine were actually engaged in grading of eggs during the year. A total of 236,184 eggs valued at Rs. 28,090 were graded as against 765,020 eggs valued at Rs. 97,687 in the previous year. The turnover of graded eggs went down considerably due to the Government Hospitals in the City switching on to the purchase of upgraded eggs. As against this discrimination against Agmark eggs by the Chief Government institutions, the India Coffee House took to the purchase of graded eggs. One authorized packer in Madras City has not renewed his authorization for grading and the newly enlisted packer at Tanjore did not perform any grading during the year.

Fruits.—There was only one packer at Vellore authorized to pack Bangalora and Neelam mangoes but he did not grade any fruits on the plea that there was no demand for graded mangoes at the consuming centres. Efforts were made to build a consumer demand in Bombay, the main distributing centre by contacting the fruit marketing society, there, and send consignment of graded mangoes especially Bangalora from Vellore. The exploratory efforts may bear results in the next season in 1956. Efforts are also being made to popularise Agmark graded mangoes in a few centres within the State.

Potatoes.—Out of five authorized packers the one at Mettupalayam alone graded a quantity of 4,787 maunds of potato valued at Rs. 64,634 as against 2,860 maunds valued at Rs. 48,972 in the previous year. A greater difficulty in attaining a much better progress in potato grading is the lack of a suitable hand operated grading machine as grading by manual labour is both costly and not impressive to the traders. Some preliminary work to get a suitable appliance standardised was put in and has to be pursued further.

Rice.—Nineteen millers in the State held certificate of authorizations during the period under report in three districts. Most of them did not take

up grading work due to lack of demand for graded rice in the market and more largely due to a dominant predilection to pass off dump and substandard rice. Three packers, two of them at Tanjore and one at Polur were able to account for a total of 2,850 maunds of Agmark rice valued at Rs. 55,435 as against 744 maunds valued at Rs. 12,700 in the previous year. Two packers at Tiruvannamalai surrendered their authorizations during the year while nine of them in Tanjore were eliminated and their certificates cancelled as they did not prove to be enthusiastic about grading. Fresh authorizations were however issued to three persons at Kumbakonam, Nagappattinam and Tiruchirappalli. Wide propaganda is being carried on to popularize Agmark rice at these centres and in the Madras City through the T.U.C.S., Ltd. A contractor for supply of provisions to ships to Nagapattinam was persuaded to tender Agmark rice and ghee. Packers were afforded ample opportunities to quote their competitive rates for tenders for supply of Agmark graded rice to the various Government and private institutions, advertising for supply of rice for their requirements. Attempts are also being made to offer Agmark rice in smaller packings by resort to repacking wherever necessary to build up a consumer demand.

Jaggery.—Two persons were authorised to grade jaggery at Kodumudi. This work was however given up due to the very extensive use of 'Hydros' in the manufacture of jaggery which is not permitted under Agmark specifications.

Tobacco.—Eleven persons were authorised to grade tobacco in Madras State. The work on tobacco grading is exclusively administrated by the Directorate of Marketing and Inspection Government of India, with the special staff under its direct control.

Wool and bristles.—Compulsory grading of wool and bristles entering the export trade came to be enforced this year and three applications from persons desiring to take up the grading of wool were forwarded to the Agricultural Marketing Adviser to the Government of India who had also granted the certificates of authorization. Similarly two traders in the city dealing in bristles were also authorized to grade. The grading of these commodities is also under the direct administrative control of the Directorate of Marketing and Inspection, New Delhi.

Edible oil.—The T.U.C.S., Triplicane, have been approached to set up a grading station for grading of gingelly oil produced by them in their oil mills and the matter is under active consideration. An application for grading of gingelly oil by a person at Tiruchirappalli has been obtained and is being considered while the Tiruchirappalli Urban Co-operative Society have passed a resolution to set up a grading laboratory shortly with the help of a subsidy from Government. It is hoped that some tangible progress will be registered in the course of next year to have graded Agmark gingelly oil put into the hands of the consumers from these centres.

Other items of grading activities that were tackled are mentioned below. Tentative grade specifications for the grading of tur dhal were drawn up and sent to the Agricultural Marketing Adviser to the Government of India for consideration and approval.

The compulsory grading under Agmark of lemon grass oil, sandalwood oil, pepper, ginger, cardamom and cashewnut that are exported out of India is likely to be enforced shortly and arrangements for setting up of a central laboratory at Cochin for the purpose by the Directorate of Marketing and Inspection, New Delhi, are under way.

Regulated markets.—Regulation of markets has been attempted in respect of six crops, viz., cotton, tobacco, groundnut, gingelly, coconut and arecanut which are declared as commercial crops under the Madras Commercial Crops Markets Act of 1933. There are seven market committees which have set up thirteen regulated markets in the State. Control over the administration of Market Committees remained vested with the Director of Agriculture, Madras, assisted by the State Marketing Officer as in previous years. The details of the coverage under the Act are furnished in the table below :—

Name of the crop.	Total area in the State (000 acres).	Area benefitted by the Act (000 acres).	Percentage of area benefitted.	Districts covered.
(1)	(2)	(3)	(4)	(5)
Cotton	881	690	78.4	Coimbatore, Tirunelveli, Ramanathapuram, South Arcot.
Tobacco	54	33	61.5	Coimbatore.
Groundnut	1,938	1,188	61	South Arcot, North Arcot, Coimbatore, Ramanathapuram.
Gingelly	438	42	9.5	South Arcot.
Coconut	559	455	81.5	Malabar, South Kanara.
Arecanut	114	111	97.3	Malabar, South Kanara.

The progress of work in the regulation of markets for commercial crops continued to be complicated and taxing due to the very many legal issues stifling the enforcement of the Act especially in the Committee's of Ramanathapuram, Tirunelveli, Coimbatore and South Kanara.

The Coimbatore Market Committee is still confronted with the difficulties in collecting the arrears of levy of fees on cotton transactions from the textile mills in the districts. A number of personal discussions were held with the Chairman and Secretary of Southern India Mill Owners Association by the State Marketing Officer and the Secretary of the Coimbatore Market Committee to induce them to pay up the arrears but these efforts have not so far proved successful. The resistance to the Act in respect of tobacco and groundnut from the trade sector continued to persist. The Minister for Agriculture conceded a personal interview to the tobacco dealers of the district during October 1954 when after thorough discussions, the dealers were advised to conform to the regulations under the Act conceding at the same time a few relaxations to remove hardship. The trade block is still to give practical evidence of a changed outlook. The challenge to the validity of a levy under Section 11 of the Act on groundnut by dealers in Erode which ended in the section being held by the District Magistrate as unenforceable, continued to subsist and the Government appeal to the High Court is yet to be decided. Meantime an amendment of section 11 of the Act is under consideration. This situation has imposed material restrictions over the realization of the revenues by the Coimbatore Market Committee.

The South Kanara Market Committee could not function properly due to the legal problems over the validity of its initial constitution earlier in the year. These legal difficulties were removed in September 1954 by the Madras Commercial Crops Market (Amendment) Act under which the Constitution of the South Kanara Market Committee was revalidated. As the Committee set about enforcing the regulations under the Act two recalcitrant traders of Mangalore have again approached the High Court through writ

petitions seeking to nullify the regulations. The committee is thus once again under restraint through an injunction order of the High Court pending disposal of the writ petition.

The Tirunelveli Market Committee and Ramanathapuram Market Committee could not function as a result of an appeal by one sector in the trade against the judgment of the Madras High Court on the writ petitions disposed of by it to the Supreme Court and the interim injunction order of the High Court restraining these Committees from enforcing the Act in any manner till disposal of the appeal.

As outlined above, four of the seven Market Committees in the State worked under one or other kind of restraint and the efficiency of their work was consequently impaired to varying degrees. Good work was turned out only by South Arcot Market Committee while a fair progress was registered by the Committees of North Arcot and Malabar.

Thirteen regulated markets as previously mentioned were spread out in the districts of South Arcot, North Arcot and Coimbatore. The preliminary arrangements for the opening of a market for arecanut at Kuttipuram in South Malabar by the Malabar Market Committee were finalized and the opening of this regulated market by the Minister for Agriculture was fixed for 8th July 1955.

The eight regulated markets in South Arcot together accounted for a transaction of 846,304 bags (177 lb. each) of groundnut kernels. Arrivals were voluntary into these markets and the transactions were put through under auction by the Market Committee which secured for the sellers the best prices possible. The extra income earned by the sellers in this way for the year 1954, is estimated at Rs. 5.5 lakhs. Among the produce thus sold in the market 98 per cent were marketed direct by the growers themselves without assistance from any market intermediary. More than 74.6 per cent of the produce was taken by oil millers direct from sellers. Similarly these eight markets accounted for transactions in 11,630 bags of gingelly seeds (2 maunds each) out of about 15,000 bags assembled as the market arrivals. In the case of cotton only two markets were prominent. Between them they accounted for the disposal of 203 pethis of cotton kapas (280 lb. each) out of 8,000 pethis assembled at the Centre. These markets in South Arcot stand out as the best among regulated markets in the State and perhaps of the Union as well.

All transactions in cotton at Tiruppur were centred at the regulated market by virtue of a prohibitory order denying licence under section 5 (1) of the Act to places within a radius of five miles of the Committees Markets there. The arrivals and disposals of kapas effected in the Tiruppur market yard amounted to 104,790 pethis of Cambodia and 22,034, pethis of Karunganni (280 lb. each). Besides these, the transactions in lint registered in the trading hall of the Tiruppur regulated market, contracts signed with samples accounted for disposal of 20,830 candies of Cambodia and 2,821 candies of Karunganni cotton. The two other markets of the Committee at Gobichettipalayam and Pollachi did not register any transactions in cotton or other notified commercial crops.

The arrivals of groundnut to the two regulated markets of North Arcot district at Vellore and Tiruvannamalai were poor in spite of strenuous propaganda as the crop itself was poor and the cultivators still having not shaken off their traditional commitments with the local traders. Only 187 bags were sold to Tiruvannamalai while 58 bags were transacted at the Vellore market (bag of 177 lb. kernels).

Subject to the restraints and restraints explained in the foregoing paragraphs the Market Committees have regimented market practices by licensing persons using places for buying and selling and for storage and processing, etc., of the commercial crops, licensing also weighmen and brokers, checking scales and weights correcting defective ones and stamping them or eliminating faulty ones. Allowances as commission and brokerage were also regulated to be within reasonable levels. The statement below gives an indication of licensing and other regulatory activities of the different Market Committees :—

Particulars.	All Market Committees together.	South Arcot Market Committee.	North Arcot Market Committee.	Coimbatore Market Committee.	Malabar Market Committee.	South Kanara Market Committee.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(i) Licences to persons for places used for buying and selling under section 5 (i).	6,220	2,875	2,113	552	476	204
(ii) Licences to persons for places used for storage, processing under section 5 (3).	5,158	2,409	776	688	1,114	171
(iii) Licences to weighmen ..	1,509	776	563	..	129	38
(iv) Licences to brokers ..	50	19	27	..	5	..
(v) Number of lots tested and stamped.	4,745	1,955	5	2,734	51	..

Violations against the regulations under the Act were practically nil in South Arcot. A few that were encountered in North Arcot were got departmentally rectified. Defaults were not pressed into action in the Coimbatore Market Committees areas by reason of an adverse judgment against prosecutions launched in the year before. In Malabar 126 prosecutions were launched mostly for unlicensed trading and evasion of payment of levy fees to the committee of which 92 were compromised, 31 convicted and 3 resulted in acquittal. In South Kanara Market Committee 13 prosecutions were launched for contravention of section 5 of the Act. Out of these nine cases were compromised and the remaining four cases are pending in the Court of the District Magistrate, Mangalore, as the proceedings have been stayed on a writ petition by the traders at the Madras High Court.

During the year, arrangements were finalised for holding a conference of the Chairman of Market Committees which is arranged to be held at Villupuram and inaugurated on 7th August 1955 by the Minister for Agriculture.

The Government have since passed the Madras Act XXVI of 1954 regularising the constitution of the South Kanara Market Committee. Apart from these the following amendments were made to the rules :—

(i) To rule 13 of the Madras Commercial Crops Markets Rules, 1948, a sub-rule was added providing for the details of the basis for disqualification of membership in the Committee (G.O. No. 590, Agriculture, dated 1st March 1955).

(ii) An amendment was made to rule 19 of Madras Commercial Crops Markets Rules, 1948, relating to the travelling allowance of Chairman of Market Committees consequent on the abolition of first class in railways—vide G.O. Ms. No. 3202, Agriculture, dated 29th October 1954.

(iii) Rule 20 was amended substituting the Registrar of Co-operative Societies in the place of Director of Industries and Commerce as one among the officers entitled to attend and address meetings of the Market Committees (G.O. No. 3036, dated 9th October 1954).

(iv) In rule 37, the second paragraph prohibiting persons from buying or selling except after registration of the Committee was deleted (G.O. No. 2414, dated 20th July 1954).

(v) Rule 76 was slightly modified providing for restraint in drawing and utilising interests accrued on the investments made by the Market Committees.

(vi) A new item 4 (a) was added under sub-rule (a) of rule 78 fixing the qualifications and scales of pay for the appointment of engineering supervisors by the Committees (G.O. Ms. No. 911, Agriculture, dated 31st March 1955).

(vii) Government in their G.O. Ms. No. 3131, Agriculture, dated 19th October 1954, approved a set of model by-laws under section 19 to be adopted commonly by all Market Committees. The revision of the Committees by-laws on this basis has been attended to by the South Kanara Market Committee and pending with other committees.

(viii) The Government have defined the relationship between the Market Committees and local bodies in running markets within the notified area under the Madras Commercial Crops Markets Act (G.O. Ms. No. 3089, Agriculture, dated 14th October 1954).

(ix) Rule 4 of the Madras Commercial Crops Market Committee Provident Fund Rules was slightly modified so as to provide for menials paid from contingencies also being admitted to the benefits of the provident fund (G.O. No. 3132, dated 19th October 1954).

Market intelligence.—Many enquiries for market information from growers, co-operative societies and members of the trade were attended to as usual. A directory of merchants as well as producers was maintained up-to-date and addresses were furnished to the parties when required. In this way 65 enquiries were dealt with during the year.

Weekly, fortnightly and monthly prices obtaining in the chief markets for all agricultural commodities were maintained. A monthly periodical report on the stocks and price trends at a few important markets in respect of a few special crops entering the export trade from this State, viz., chillies, onions, groundnuts, jaggery, potatoes and tamarind was being sent to the Director of Statistics from October 1954. Details of stock and prices of paddy, rice, cholam, ragi, cumbu, cotton, chillies, onions, tamarind, etc., were sent every week to the Secretary of the Prices Review Committee set up by Government from May 1955. The South Arcot Market Committee continued to issue the weekly bulletin on the conditions and prices prevailing in all its eight regulated markets. A daily market report was published by the Coimbatore Market Committee for the benefit of growers and traders on the prices of cotton in the Chief Indian and Foreign markets and stocks and transactions and prices in the markets of Coimbatore district. The data on arrivals disposals and prices at important markets in the districts of South Arcot, North Arcot, Tirunelveli, South Kanara and Malabar were also periodically released to the press by the Committees and published in the leading *Dailies* in the State. Weekly prices of milch cattle at Tiruvottiyar and prices of vegetables were furnished every week to the Director of Statistics. A monthly review on cotton situation was submitted by the State

Marketing Officer to Director of Agriculture as required by the Government. Details on the activities of the Market Committees and market conditions of commercial crops as reported by the seven market committees monthly were compiled, edited and sent to the Madras Agricultural Journal for publication as a supplement styled as "The Market Committees Chronicle" beginning from the issue of January 1955. On top of these a regular monthly review of the market conditions for all the important agricultural produce was compiled in a comprehensive manner and submitted to Government by the State Marketing Officer, through the Director of Agriculture, besides circulating it among Agricultural Marketing Adviser to the Government of India, New Delhi and Assistant Marketing Officers at Tiruchirappalli and Coimbatore.

Co-operative Marketing.—The staff in the Marketing at headquarters and at the regional centres contacted important co-operative societies and rendered all possible help in better marketing of agricultural produce. Among such societies that received attention were the Katpadi Co-operative Egg Marketing Society, The Gobichettipalayam Co-operative Sale Society, The Tiruchengode Co-operative Sale Society, Nilgiris Co-operative Marketing Society, Tiruchi Urban Co-operative Society and the Triplicane Urban Co-operative Society. Recommendations were made to the Deputy Registrar of Co-operative Societies, Coimbatore, for the opening of a co-operative marketing society at Veerapandiputhur in Coimbatore taluk. Attempts are under way to initiate processing activities in the Tiruvannamalai Co-operative Sale Society, Tiruchi Urban Co-operative Society and Triplicane Urban Co-operative Society for the preparation and sale of hand pounded rice, edible oils produced by Ghannis or Pinto Chekku and merchandizing of chillies and jaggery. The Tiruchi Urban Co-operative Society, Tiruchirappalli, has been given a certificate of authorization for grading rice and the Triplicane Urban Co-operative Society, Triplicane, has made a good beginning to sell Agmark ghee and rice to its clients. The sale of Agmark ghee by this society is particularly becoming increasingly popular.

Market legislation.—Details of legislation under the Madras Commercial Crops Markets Act have been dealt with under 'regulated markets' in this report. In respect of other Acts relating to Marketing (e.g.), Warehouses Act, Weights and Measures Act, etc., no special progress was made.

Warehousing and storage.—The Co-operative Marketing Societies at Tiruvannamalai, Rasipuram, Attur, Salem, Ootacamund and Gobichettipalayam were contacted with a view to convert some of their godown into licensed warehouses under the Madras Warehouses Act, 1951. Except the Tiruvannamalai Co-operative Sale and Marketing Society all others have turned down the proposals due to various reasons. The chief reason is centred round the ideology of co-operation which is not satisfied by some of the restrictions and limitations provided for in the Acts and Rules thereunder. Even the Tiruvannamalai Co-operative Sale and Marketing Society has decided to convert only one of its godown into a licensed warehouse in the first instance as an exploratory measure. The decision was reached only late in the year and the progress achieved by this Society's warehouses remains to be implemented and watched in the ensuing year.

The establishment of an All-India Warehousing Corporation and State Warehousing Companies as recommended in the Rural Credit Survey Report has been accepted by the conference of State Ministers of Co-operation on 16th April 1955. This scheme is under active consideration of the Government of India for passing necessary legislative measures. The purpose of the

scheme will be to help the cultivation as well as the trade in storing the surplus produce and to assist in its gradual and regulated or deferred disposal at favourable stage. In the actual working of the scheme it appears that the Co-operative department may have the control on this developmental aspects of marketing under the Second Five-Year Plan.

National Five-Year Plan.—Agricultural marketing in the State finds only a small place in the National Plan and as such no direct work for development of marketing under Five-Year Plan was attempted though the subject was mooted for consideration in the Community Project and National Extension Scheme areas. A scheme for development of agricultural marketing during the second Five-Year Plan is now under consideration.

Work done on behalf of other departments and States.—Data on various subjects relating to production, supply, movement, prices and other marketing or economic aspects were supplied to heads of different departments in the State and in other States. This work formed one of the important functions of the marketing section. Seven samples of rice were analysed on behalf of the Board of Revenue (Civil Supplies) and the Kasturba Gandhi Memorial Hospital, Madras, and opinion as to the quality was furnished to them. The production and the marketing data and data on exportable surplus of onions, chillies, jaggery, groundnut, groundnut oil and its cake, jaggery, bran, dhall husks, English vegetables, potato and tamarind were worked out in detail and furnished to the authorities for working out the annual export allocations.

Transport.—Railway data on despatches and arrivals of major commodities were collected as usual and piled for important railway stations at the assembling, distributing and terminal market centres.

The exporters of potatoes at Mettupalayam were assisted in securing adequate wagon allotment during the rush in the peak season of potato despatches by taking up the matter with the railway authorities. On the representation made by the Cashew Manufacture Association, Mangalore, for an increase in the wagon facilities during the season, for the movement of cashewnut, cashew-kernels and cashew shell liquid, assistance was rendered to secure more allotment of wagons than in the previous years by approaching the district railway authorities at Podanur. The position regarding the movement of cashewnut and their products is being carefully watched during the current season to arrive at a more precise estimate of the wagon requirements as stated above to take up the recommendations to the railway authorities with due reference to allotment of five wagons daily conceded by the railways already at the instance of the Indian Council of Agricultural Research.

Assistance was also rendered to the sago merchants at Salem in obtaining adequate supply of wagons for the movement of tapioca products to stations in North India by taking up the matter with the authorities of Southern Railway.

The details on the disparity in freight charges from East Punjab to Tiruchirappalli direct and via Bombay for transport of bengalgram were worked out to have the matter placed for representation to the high power five-member committee recently constituted under the chairmanship of the Deputy Minister for Food and Agriculture, Government of India.

Studies on the normal wagon requirements for movement of foodgrains and pulses were undertaken to remedy the scarcity conditions caused by curtailed movements of wagons from assembling centres both within and outside the State.

Review of prices and market conditions.—There was an allround fall in the prices of all commodities in the year. The declining was more pronounced in

the case of foodgrains and pulses as a result of favourable seasonal conditions with the consequent increase in areas and bumper yields in most of the districts. The prices of export commodities like onions, chillies, groundnut, jaggery, tamarind and pepper registered a sharp decline in the year. Cashew kernels showed good improvement while the market for arecanut was remaining more or less steady. Pepper also indicated some improvement in rates during the closing weeks of June 1955.

The course in prices of important commodities during 1954-55 is briefly given below :—

Rice.—At the commencement of the period under report during July 1954, the prices of paddy and rice stood at Rs. 10-8-0 to Rs. 12-12-0 and Rs. 18 to Rs. 23-12-0, respectively per Indian Standard Maund in the different markets of the State. These rates were more or less maintained steadily till the main harvests of paddy commenced in December 1954 when a steady downward trend was registered which was more pronounced after the peak harvests during January, February 1955 were over. The prices of paddy and rice thus reached very low levels in February 1955 and stood at Rs. 8-5-0 to Rs. 12 and Rs. 15 to Rs. 22 respectively in different markets of the State. During the first week of February 1955 when paddy and rice markets registered steep decline, the timely announcement of the export quota helped largely to restore the fallen rates to the levels that prevailed just at the commencement of the main harvest in early January 1955. The year-ending rates for rice marked it down lower at Rs. 15-20 per Indian Standard Maund at the different markets. The large release of Government stocks at the end of the period reviewed kept down the rising tendency in paddy and rice markets at the end of the year under report. The fall in the price levels of paddy and rice was not however considered uneconomic to call for any special action and this aspect was also being examined in the periodical meetings of the Agricultural Prices Review Committee set up for the purpose. In the wake of the conditions described above there was abundance of supplies of paddy and rice in the State supplemented by sizeable arrivals from Andhra, Orissa, West Bengal and shipments from Burma out of the old commitments.

Millets.—The fall in the prices of millets was as marked as in other foodgrains. The reason attributed is the cumulative effects of ample rainfall, more area brought under the crops and the better yields obtained during the year to which can also be added the sumptuous imports from Rajasthan and other North Indian States. The price of ragi, cholam and cumbu per standard maund opened in July 1954 at Rs. 10, Rs. 8-8-0 and Rs. 9 respectively, against the closing rates of Rs. 6-9-0, Rs. 6-10-0 and Rs. 6-10-0, respectively in June 1955. There has been no dearth of millets in all the districts.

Pulses.—Satisfactory local production and large imports from Madhya Pradesh, Bombay, Madhya Bharat, East Punjab, Hyderabad and Andhra where crops prospects were good had together contributed for the steady recession in prices since July 1954 and more sharply from January 1955 when new crops had moved into the markets. However due to acute wagon shortage and consequent curtailed arrivals into the State during May 1955 the rates had gone up slightly towards the close of the year in June 1955. This spurt in the rates for pulses is considered only as temporary phase and it is not likely to go up any higher. The following are the opening rates in July 1954 the closing rate in May 1955 (indicating the low levels touched during 1954) and those of the closing rates in June 1955, when the spurt in rates as explained above was experienced in the market.

(1)	Per Indian standard maund								
	Opening rate in July 1954.			Closing rate in May 1955.			Closing rate in June 1955.		
	(2)			(3)			(4)		
	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
Bengalgram	12	12	0	9	0	0	11	14	0
Redgram	9	8	0	9	0	0	11	14	0
Blackgram	16	5	0	12	4	0	14	12	0
Greengram	16	12	0	8	8	0	11	0	0

The summer crop of black and greengram sown in the rice fallows in deltaic areas were damaged due to unseasonal heavy summer rains and has partly contributed to the rise in prices of these types of pulses.

Oil seeds—Groundnut.—Prices of groundnut during the year were far from encouraging. The prices of kernels which stood at Rs. 130 to 140 per candy of 581 lb. in July 1954 gradually declined month by month and reached Rs. 90 in June 1955. However at the fag end of June the tone of the market marked an improvement and the prices went up, the cause for spurt being ascribed to keen export activities. The prices at the end of June 1955 ruled at Rs. 105-110. It is probable that this higher level will be maintained within limits of small fluctuations till the arrival of new winter crop in October 1955. The groundnut oil prices also moved down in sympathy with the falling market for kernels. In spite of the export quotas having been accorded liberally for groundnut oil and oil-cake there was no reaction for any rise in the prices of oil due to slackened overseas buying interests. The price of oil which was ruling at Rs. 260-265 per candy of 560 lb. in July 1954 gradually fell down and touched at Rs. 190 in June 1955. It is however noted that there was fair parity in rates of the kernels and oil this year.

Coconut and copra.—There was no wide variation in prices of coconuts in Malabar and South Kanara during the year. The prices of husked nuts in Malabar which ruled at Rs. 115 to Rs. 125 per 1,000 nuts gradually advanced and touched a peak level of Rs. 140-150 during February 1955 when copra production was in full swing. However, with the advent of monsoon in May 1955, the prices began declining and remained steady at Rs. 110-120 per thousand.

It is estimated that nearly 150,000 candies of copra (1 ton = 3.2 candies) were produced during the period under report. Of this 40 per cent formed the edible types which are mainly despatched to North Indian markets. The rest comprised the milling quality. Out of the total, 50 per cent was consumed by power-driven mills, the rest having been taken by country chekkus. It is also reported that 3,000 candies of milling copra were imported from Ceylon during the year. There was no export of copra overseas.

The prices of milling copra per candy of 700 lb. ruled at Rs. 335 to Rs. 370 at the commencement of the year and suddenly shot up to Rs. 380 during August 1954. Since then the rates were steady till January 1955 when the market started declining gradually reaching Rs. 262 per candy in April 1955 and continuing at this rate till the close of the year.

Gingelly.—The market for gingelly seeds and oil was also seen receding in sympathy with the fall in prices of other vegetable oils. The prices began slowly declining since the commencement of the year till the middle of May 1955, when scarcity condition was experienced in the market owing to paucity of arrivals from other States to meet the local deficits. Consequently there was a mild upsurge in the rates in latter part of May and early

weeks of June 1955 but the artificial rise in prices was arrested by the improvement in arrivals during closing weeks of June 1955 when prices became steadier with reversion to the original level that prevailed during the early part of May 1955. With the large-scale arrivals of new crops in Salem and Coimbatore, there is ample evidence to forecast even slight recession in rates. The gingelly seeds which were quoted at Rs. 50 per bag of 2 imperial maunds touched at Rs. 36 to Rs. 37 during May 1955, went up to Rs. 39-12-0 to Rs. 40 towards the closing of June 1955. The rates for gingelly oil which opened at Rs. 50 per Indian Standard Maund in July 1954 went down to Rs. 36-3-0 during May 1955 and spurted up to Rs. 39 in the closing week of June 1955 due to causes already described above.

Areca nut.—In the Mangalore market the record prices of arecanut noted in the commencement of the year in June 1954 declined steadily from September 1954 to February 1955. The prices ruled firm for March 1955 and continued to be satisfactory and closed at higher level in June 1955. The market opened at Rs. 130 to Rs. 152 per bag of 112 lb. New supari (whole sun-dried nut) at the beginning of July 1954 stood firm at Rs. 145 towards the closing week of June 1955 for new supari.

In Malabar arecanut markets the prices of processed arecanuts ruled generally high at Rs. 180 to Rs. 195 per bag of 100 lb. during earlier part of 1954 and rose up to Rs. 200 in the month of December 1954. There was a steady decline from March 1954 with the prices marked down to Rs. 130 during the closing week of June 1955. The prospects are not bright for any improvement in the prices of Malabar processed nuts for some time to come as it is learnt that in the main consuming market at Bangalore traders have large carryover stocks and further large arrivals of new crops are expected shortly in Malabar markets.

Cane jaggery.—The market for cane jaggery which was already in doldrums at the beginning of the year in June 1954 ranging between Rs. 12 to Rs. 18 per Indian Standard Maund, faced a sharp decline with the arrivals of new crop produce in December 1954. In spite of the grant of liberal export quotas initially and even free licensing of exports later in the year there has been no perceptible gaining in the ruling prices of jaggery which is ascribed overseas demand. The closing rates in June 1955 stood at Rs. 6 to Rs. 8 at Vellore and Rs. 6-8-0 to Rs. 10-12-0 at Madurai.

Tamarind.—The market for tamarind which ruled at Rs. 23 to Rs. 41 at the commencement of July 1954 steadily went up to Rs. 39 to Rs. 46 in October 1954 and thereafter started sliding from latter part of November due to very large releases of carryover stocks in the wake of bumper new crop arrivals during the ensuing season. The tamarind crop of 1955 was a bumper assembling and distributing centres which caused a steady and appreciable decline in prices. The closing rates per Indian Standard Maund of 82-2/7 lb. at the end of June 1955 were ranging between Rs. 6-8-0 to Rs. 11 in the markets of North Arcot district, Rs. 9-3-0 to Rs. 13-2-0 at Salem and Rs. 13-8-0 at Madras City.

Cotton.—The cotton markets in the State ruled more or less steady during the year under report with small fluctuations in prices. In the Tirupur market prices of Cambodia lint which stood at Rs. 750 per candy of 784 lb. in July 1954 declined to Rs. 725 by end of June 1955. Karunganni lint on the other hand registered a gain from Rs. 642-8-0 at the commencement of the year to Rs. 705 at the year end. The kapas market for Cambodia recorded

a decline from Rs. 115 to Rs. 125 per pothi of 280 lb. down to Rs. 107 at the close of the year. The kapas of Karunganni which opened at Rs. 90 to Rs. 105 per pothi of 280 lb. closed at the end of June 1955 lower at Rs. 75 to Rs. 80. The price of Uganda cotton lint in Tirunelveli district ruled firm throughout the year and improved from Rs. 1,020 per candy to Rs. 1,150 at the end of June 1955.

Tobacco.—There was a marked improvement in the prices of country tobacco both chewing and cheroot varieties in the different markets. The rise was rather pronounced in the case of chewing varieties especially at Tiruchirappalli where it rose from Rs. 375 to Rs. 592-8-0 per candy of 500 lb. at the close of the year. In other markets of Palladam, Erode and Meenampalayam the increase registered in prices varied from Rs. 350 to Rs. 450, Rs. 200 to Rs. 400 and Rs. 385 to Rs. 450 in the different markets.

Pepper.—Price of pepper ruled steady throughout the year. The price per candy of 700 lb. which was fluctuating in the region of Rs. 1,450 to Rs. 1,500 early in June 1954 shot up to Rs. 1,800 during the same month and declined again to Rs. 1,450 at the month end. Thereafter there was gradual decline and the rates at the year end in June 1955 stood at Rs. 1,275 per candy of 700 lb.

The price conditions on the whole registered a general and gradual downward trend and there are little prospects of any sharp and steep rise in prices as the seasonal conditions continue to be favourable for cropping.

Conferences.—The State Marketing Officer gave evidence before the Forward Markets Commission which visited Madras during July 1954 in connexion with the application of Forward Control (Regulation) Act to Vegetable oils and oil seeds. He also gave evidence before the Rice Milling Committee which visited the State during the year. He organized a conference of ghee interests and authorized packers in the State which was convened at the Rajaji Hall on 25th February 1955 and inaugurated by the Minister for Agriculture. Measures necessary to improve the quality ghee produced in the State and popularization of Agmark ghee with the consumers were considered in general. The association of ghee traders was formed as a sequel to the Conference. He attended the preliminary meetings held at Fort Cochin on 9th April 1955 as the State nominee in connexion with the formation of the Export Promotion Council for cashew and pepper.

Exhibitions.—The marketing section took part in the All-India Khadi Swadeshi and Industrial Exhibition held at Teynampet during January-February 1955 on an expanded scale this year. A working model of a regulated market, besides instructions, posters and charts on marketing aspects and better marketing of commercial crops through regulated markets were put on display in specially arranged stall allotted exclusively to the marketing section. Similar arrangements but on a smaller scale were also made by the section to set up a stall and display the activities of the section in the Art Gallery Exhibition held at Tanjore during April 1955 and the one held during the Southern Regional Cattle Show at Coimbatore with greater accent on grading during June 1955. A small scale exhibition of a few interesting aspects of better marketing with specimen of graded produce was put up at the College Day Exhibition organized on the occasion of the College Day and conference. On the occasion of the Ghee Marketing Conference held at the Rajaji Hall on 25th February 1955 an exhibition of items relating to improved methods of ghee marketing was arranged by the marketing section conjointly with the Co-operative and Animal Husbandry Department as also the Indian Dairy Research Institute Bangalore and the Corporation of Madras.

Research—Quality analysis.—With a view to study the existing factors and their variations in groundnuts in South Arcot district marketed in the different regulated markets of the committee quality analysis was taken in five of the eight regulated markets of South Arcot Market Committee by random sampling method. These five markets accounted for 84.5 per cent of the total produce brought up for sale in South Arcot. Of this 6,408 samples were drawn from 158,484 lots comprising 688,390 bags. The samples were analysed to determine moisture, nooks, splits, damaged kernels, etc., as per the All India Standard Contract terms. The consolidation of the data and detailed study of the several aspects of variations has not yet been attempted for want of competent staff proficient in statistics. The general indications based on the results of the study relating to the last winter crop have been compiled in the form of a brief article and passed on for publication in August 1955. The details of the analysis are shown in the tabular statements annexed. At the Tiruppur Market in Coimbatore Market Committee, 139 samples of Cambodia and 54 samples of Karunganni kapas were tested for determination of quality factors such as colour, staple, length, immature and unopened bolls, moisture, neppiness, foreign matter, general quality type and spinning value, etc. These studies did not however conform to any standardized procedure and were more in the nature of empirical appraisals of a few subjective samples.

Publications.—The marketing section including the staff of the Market Committees contributed articles to a few journals devoted to agriculture, co-operation and marketing.

An illustrated folder in art paper on the regulated markets of South Arcot, their working and beneficial effect was compiled and got printed by the South Arcot Market Committee on the occasion of the All-India Khadi Swadeshi and Industrial Exhibition, Teynampet, Madras, during January–February 1955 and distributed to those interested in groundnut production and trade among the visitors as a measure of publicity.

The activities of Market Committees were published regularly in the Market Committees Chronicle which is a new feature included as a supplement to the Madras Agricultural Journal through the joint contribution from all the Market Committees in the State from January 1955. Material for this publication was compiled and edited by the State Marketing Officer, Madras. Articles of interest on the working of regulated markets are contributed by the market Committee staff and others are also included in the Market Committee Chronicle.

XVII. LEGISLATION AND STATISTICS.

1. **Weekly Cotton Press Returns.**—In accordance with section 5 of the Cotton Ginning and Pressing Factories Act, 1925, the ginning and pressing factories in the State have been submitting weekly returns in the prescribed forms. The weekly statistics are compiled and published in the Fort St. George Gazette. Copies of these weekly statements are also sent to the Economic Advisor, Government of India, New Delhi, Indian Central Cotton Committee, Bombay and the Secretary, East Indian Cotton Association, Ltd., Bombay.

2. **Cotton Transport Act—Annual General Licence.**—Seventy-three licences with 4,036 certified copies were issued to the mills for the transport of ginned cotton for the purpose of manufacture during the year from 1st February 1954 to 31st January 1955 as against the 72 licences with 2,267 certified copies issued during the previous year.

Single licences by sea.—During the year, 172 sea licences were issued for the transport of 75,273 bales of 392 lb. each of ginned cotton and 3 licences for transport of 250 bales of 400 lb. each, 2 licences for transport of 150 bales of 750 lb. each, 2 licences for transport of 150 bales of 500 lb. each and 1 licence for the transport of 1 bale of 430 lb. of ginned cotton.

Single licences by road.—Thirty-five licences were issued during the year for the transport of 487,986 lb. of ginned cotton and 2 licences were issued for the transport of 90,000 lb. of cotton waste and mill-sweepings into the protected areas of Cambodia and Tirunelveli area.

Single licences by rail.—Forty-five single licences were issued during the year for import of 2,261,637 lb. of ginned cotton 10 licences for import of 540,400 lb. of unginned cotton and 85 licences for the import of 1,078,500 lb. of cotton waste and mill sweeping into the protected areas notified under the Cotton Transport Act; to spinning mills and dealers and exporters. One single licence was also issued to import 430 lb. of cotton seeds into Tirunelveli areas for the purpose of cattle food. The details of licences issued for import into the respective protected areas are given below :—

Number of Licences.	Kind of Cotton.	Quantity. LB.	Purpose.
A. Cambodia Area.			
44	Ginned Cotton	2,124,400	Spinning yarn and sales.
10	Unginned cotton	540,400	Ginning and sale.
83	Cotton waste and mill sweepings.	1,068,500	Cleaning, willowing and pressing for export.
B. Tirunelveli Area.			
		LBS.	
5	Ginned Cotton	1,37,237	Spinning yarn and sale.
2	Cotton Waste and mill sweepings.	10,000	Cleaning, willowing and pressing for export.
1	Cotton seeds	430	Cattle food.

3. **Cotton Certification Scheme.**—With the object of getting exemption from price control for superior cottons grown in the States, certification schemes were sanctioned in 1950–51 and continued in 1953–54 also. As the schemes proved popular, they were continued in 1954–55 also as per G.O. Ms. No. 663, Industries, Labour and Co-operation, dated 24th February 1955.

A Certification Officer (of the status of Assistant Cotton Specialist) aided by a Gazetted Assistant, six inspectors, ten fieldmen and ten maistries were in charge of the Scheme.

The Certification Scheme helped growers of superior cotton to get better prices. Besides it kept in check the malpractices of adulteration of inferior with superior cotton and helped to maintain the purity of the latter. The co-operation of the grower, the trader and the gin and the press owners, is quite essential for the success of the Scheme.

4. **The Cotton Control Act.**—The rules under Madras Cotton Control Act, 1952, were issued in G.O. Ms. No. 2429, Food and Agriculture, dated 21st July 1954. The draft notifications under the Act continued to form the subject of correspondence and await approval of the Government.

5. **The Madras Agricultural Pest and Diseases Act.**—The Act was in force during 1954–55 against the following pest and diseases :—

- (1) Sugarcane smut and borers in Karur taluk;
- (2) Hairy caterpillar pest in North Arcot district; and
- (3) Stem weevil and pink ball worm in Madurai and Tiruchirappalli districts.

6. *The Madras Sugar Factories Control Act, 1949.*—The Madras Sugar Factories Control Act, 1949, was in force in the districts of South Arcot, North Arcot, Salem, Coimbatore, Tiruchirappalli, Madurai, Chingleput and Tanjore. The Director of Agriculture continued to function as the Sugarcane Commissioner for the State.

The statistics and the working of sugar factories in the State are furnished separately.

The sugar factories at Pugalur and Pandiarajapuram remained closed during the special season from August 1954 for lack of adequate cane supply, but both the factories reopened for crush early in 1955 main season. On special representation, 150 acres of unregistered cane were crushed by the Pugalur factory at the commencement of the 1955 main season. The factory crushed 750-950 tons of cane per day. Due to this satisfactory position, the minimum target of 110,000 tons of cane for the season was exceeded by 20,000 tons. The factory extended its crush up to 12th May 1955. The overall sugar recovery was 10.52 per cent for the season. The sugar factory management propose to benefit the cane suppliers by a bonus for the higher recovery recorded. The sudden increase in the average sugar recovery in the factory zone, had been largely brought about by the Special Seed Scheme of 1953 season, which carried out intensive propaganda on the proper culture of cane. On account of the closure of the factory for some time, in the prevailing low price for gur and paddy, the ryots felt the need to improve the standard of the cane crop. The chief factors which contributed to the sudden increase in sugar recovery per cent, remained to be scientifically analyzed.

The Pandiarajapuram Sugar Factory reopened for crushing by 6th December 1954. Though the season commenced with a sugar recovery per cent of 10.75 and touched 11.38 in December it fell down to 8.57 by the close of the season.

For enforcement of the Sugar Factory Control Act two Special Agricultural Demonstrators were appointed at Nellikuppam and Pandiarajapuram.

Payment for cane.—Payment for cane in the Nellikuppam zone for 1954-55 season was on Sisma formula.

7. *Sugarcane Advisory Committee.*—The Committee held two meetings during the year under report.

XVIII. SOIL CONSERVATION.

The progress made in the execution of Soil Conservation Scheme during the year 1954-55 is furnished below :—

1. *Nilgiris district—I. Ketty Valley Pilot Scheme.*—With the completion of all the various items of work proposed in the scheme, the survey and plotting work was taken up and completed. All the statement regarding the proportionate area enjoyed by each pattadar were recorded and records of rights and liabilities with the apportionment of amount to be levied to each towards recovery of the cost of soil conservation works were prepared in the prescribed form. This statement was sent to the Collector of Nilgiris district for eliciting the opinion of the Government Pleader with regard to the advisability or otherwise of including certain specified conditions regarding the eligibility of the owner to enjoy the lands subject to certain conditions. This is pending with the Collector of Nilgiris district for necessary action.

II. *Ketty Valley Extension Scheme.*—The Government have sanctioned a scheme of soil conservation over an area of 203.35 acres lying contiguous to the area included in the Pilot Scheme and forming the remaining portion of the selected sub-catchment of Ketty stream in G.O. Ms. No. 4821, Development (Planning and Development), dated 31st October 1953. Immediately, the various preliminaries contemplated in the Madras Land Improvement Scheme (Contour Bunding and Contour Trenching) Act, 1949, were gone through and the letters of consent from the affected pattadars were obtained before starting the works. The works were entrusted to a contractor after inviting tenders and so far 150.34 acres were bench terraced and handed over to ryots for cultivation. Out of the total area of 203.35 acres of bench terracing an area of about 25 acres was executed departmentally. Besides the work mentioned above smoothening the stream course, gully plugging by constructing check dams at intervals, taking diversion channels, digging vertical drains with drop pits for satisfactory drainage in the protected area were also executed and the progress in the various items of work is furnished below :—

- (1) Area bench terraced—150.34 acres.
- (2) Trenching and afforestation—4.00 acres.
- (3) Gully plugging—One number with 12 check dams.
- (4) Stream straightening—7.00 acres.
- (5) Area planted with grass—135.11 acres.

III. *Kammandhu Scheme.*—The people of Kammandhu village having realized the increased yield in the terraced area and the benefits derived from the soil conservation work executed in Ketty pilot and extension area requested the Commissioner for Land Revenue that the soil conservation works should be extended to their area also. Accordingly a proposal was submitted for executing soil conservation works in 201.41 acres in a self-defined sub-catchment opposite to the extension scheme area draining into the Ketty stream. In G.O. Ms. No. 686, Agriculture, dated 9th March 1955, the Government have sanctioned the above scheme. As the scheme was sanctioned just at the very end of the agricultural off-season, no substantial work could be pushed through. The formalities contemplated in the Madras Land Improvement Scheme (Contour Bunding and Contour Trenching) Act, 1949, were observed. The pattadars were served with notices. Consent statements are being received from the pattadars of this area, so that the execution of soil conservation measures could be commenced as soon as the standing main crop of potato is harvested. So far, 532 statements have been recorded.

IV. *Soil Conservation Scheme in the Agricultural Station, Nanjanad.*—A scheme for execution of soil conservation measures by means of tractor bulldozers at the Agricultural Research Station, Nanjanad, Nilgiris, was sanctioned by Government in G.O. Ms. No. 461, Agriculture, dated 17th February 1954. One of the executive staff was deputed to render necessary technical assistance in laying out and marking out the contour lines in the farm and as a guidance for the operating staff. Two D.4 tractors with bulldozer attachments were diverted for this work. These machines were utilized for bench terracing of the farm lands. So far, an area of 64.44 acres has been covered. During the fasli year under report, an area of 54.44 acres has been covered by bench terracing. The rest of the area is covered with main crop of potato and this area will be covered in September 1955, when the crop is harvested.

V. *Soil Conservation Demonstration Centre at Palada.*—Proposals were formulated to set up a demonstration centre in Ootacamund taluk. A self-defined catchment comprising an area of 300 acres was selected in Palada village and the site was got approved by the Nilgiris District Soil Conservation Board. Detailed survey work was also carried out over about 150 acres. At this stage the work was suspended, as the Central Government is going to start a soil conservation research demonstration and training centre at Ootacamund.

VI. *Soil Conservation Scheme for Ergot Farm.*—The Government have approved the suggestion that the Ergot Farm near Muthurai should be provided with necessary soil conservation measures, so that it may serve as a demonstration centre, for the nearby area. Topographic and contour survey of the area have since been completed and the scheme for taking up soil conservation work in 40 acres has been submitted. Subsequently for the additional area proposed to be transferred to the farm, viz., 11.50 acres, proposals were called for. Due to the unsettled future of the farm the scheme is kept in abeyance.

VII. *Soil Conservation Scheme for Dunsandle Sheep Farm.*—The Director of Animal Husbandry, Madras, has since been asked to submit necessary proposals to Government to take up soil conservation measures in an area of 600 acres in Dunsandle Sheep Farm, as this area has been included in the acreage proposed to be tackled during the first year of the Second Five-Year Plan period.

VIII. *Soil Conservation Scheme for the whole of Nilgiris district.*—A detailed and broad proposal for executing soil conservation measures in an area of 60,000 acres in the whole of Nilgiris district was prepared and submitted to Government for approval.

2. *Soil Conservation Takkavi Loan Scheme.*—In G.O. Ms. No. 1, Agriculture, dated 2nd January 1954, Government have sanctioned the scheme for sanctioning takkavi loans to the ryots who cannot afford to execute soil conservation works in their fields at their own cost at the rates of Rs. 300 per acre subject to the maximum of Rs. 1,500 for each individual on the recommendation of the Assistant Agricultural Engineer, Soil Conservation Scheme, Ootacamund. The progress achieved in this direction is furnished below:—

- (1) Total number of applications received—44.
- (2) Total amount of loan sanctioned as on 30th June 1955—Rs. 9,710.
- (3) Area protected with soil conservation measures under this scheme—27.25 acres.

3. *Bhoodan Yagna Samithi lands in Pariyaram and Kandanapalli, Malabar district.*—The Bhoodan lands in Pariyaram and Kandanapalli were inspected by the Assistant Agricultural Engineer, Soil Conservation Scheme, Ootacamund, in June 1955 and suggestions regarding the soil conservation measures to be adopted to prevent and protect the fertile top soil efficiently and effectively were given.

4. *Soil conservation work in Bhavanisagar.*—As per the request of the Principal, Basic Agricultural School, Bhavanisagar, an Assistant was deputed to render necessary technical help to mark contour lines in 30 acres block for executing contour bunds and the area was surveyed and plotted.

So also, one Assistant was deputed to Wynaad Colonization Scheme area for surveying and plotting of the protected area.

5. *Teaching and propaganda.*—During the fasli year under report training in theory and practical aspects of soil conservation was given for a period of 45 days to a Farm Manager, Livestock Farm, Tiruvazhakunnu, Malabar district and Veterinary Assistant Surgeon, in charge of sneep farm, Drumsandle, Nilgiris. Intensive propaganda was made regarding the right lines of maintenance of the soil conservation works executed without obliterating slopes by faulty cultivation practices. Some of the interested ryots came forward to execute soil conservation measures in their field at their own cost either by employing manual labour or by tractor bulldozers and necessary technical help was given by the staff of the scheme. So far an area of 31.00 acres has been covered like this in Nilgiris district besides the area terraced under the soil conservation loan scheme.

During the period under report, many distinguished persons visited the various soil conservation works already executed and in progress.

Students from the Agricultural College, Forest Colleges, Coimbatore and Dehra Dun, Agricultural College, Osmania University, visited the soil conservation works at Ketty Valley and Agricultural Research Station, Nanjanad and they were explained about the local conditions and the nature of soil conservation measures taken according to the prevailing condition and benefits of soil conservation work. The staff at various centres were engaged in propaganda work by explaining to the ryots the advantages of soil conservation work.

The soil conservation model depicting the various soil conservation measures suited to varying conditions was exhibited during the Flower Show at Ootacamund and Fruit Show at Coonoor.

6. *Research.*—The garden chief tractor 5 h.p. with different implements attached was tried in the newly terraced and terraced area once cropped to find out the performance and economics of the prime mover with cultivation implements. This was found to be economical in its satisfactory cultivation and cost of maintenance.

7. *Forest regeneration.*—T.D.9 tractor with Kellifer plough assembly was used for ploughing forest lands in Avalanche area prior to afforestation with blue gum seedlings contour lines at horizontal interval of 11 feet were marked and the ploughing was done along with these lines for a width of 3 feet. An area of 25.00 acres was covered.

8. *Training scheme for ryots.*—To afford training in practical aspects of soil conservation measure to the interested ryots of Nilgiris district a scheme was submitted to Government through Board of Revenue. This scheme envisages the teaching of the elementary principles of Agriculture, Engineering and Forestry with regard to soil conservation with practical training for a period of one month.

Training Scheme for Revenue subordinates.—The proposals submitted to Government to train Revenue subordinates of Coimbatore district in Soil conservation technique, so that they can educate the ryots on the advantages of soil conservation measures, are still pending sanction of Government.

9. *Other schemes.*—Surveys were conducted in the following places to carry out soil conservation measures:—

- (1) Badly eroded area of Uthangarai and Harur taluks of Salem district.
- (2) Poultry farm at Memdiyuri near Cannanore.
- (3) Badly eroded areas belonging to the Bhoodan Yagna Samithi at Pariyaram in North Malabar district.

10. *Coimbatore district—Mulanur Scheme.*—The Soil Conservation Scheme which was started as a famine relief measure in Mulanur, Dharapuram taluk, in 1952 was continued during the year under report. All the pending items of work were attended to by the staff sanctioned for this schemment. Details of progress achieved are given below :—

(1) *Contour bunded—*

Up to the previous year (i.e.), up to 30th June 1954—6,708 acres.

During the year—84.50 acres.

Progressive total—6,792.50 acres.

(2) *Sectioning of contour bunds—*

Up to the previous year—23,330,299 running feet.

During the year—Nil.

Progressive total—23,330,299 running feet.

(3) *Number of waste weirs constructed—*

Up to the previous year—272 numbers.

During the year—576 numbers.

Progressive total—848 numbers.

(4) *Number of check dams constructed in gullies—*

Up to the previous year—20 check dams in 5 gullies.

During the year—73 check dams in 34 gullies.

Progressive total—93 check dams in 39 gullies.

(5) *Turfing of bunds—*

Up to the previous year—228,641 running feet.

During the year—Nil.

Progressive total—228,641 running feet.

(6) *Seeds of economic value sown to serve as wind belt—*

Up to the previous year—315,446 running feet.

During the year—80,554 running feet.

Progressive total—396,000 running feet.

(7) *Surveying and plotting—*

Up to the previous year—5,180.84 acres.

During the year—2,537.38 acres.

Progressive total—7,718.22 acres.

(8) *Total number of mazdoors engaged—*

	Men.	Women.	Children.
During the year	10,496	3,739	322

(9) *Amount spent—*

During the year—Rs. 67,536-7-0.

11. *Kangayam and Vellakoil Scheme.*—The scheme for carrying out soil conservation measures in an area of 6,000 acres—3,000 acres in each of the two firkas, viz., *Kangayam* and *Vellakoil* in Dharapuram taluk of Coimbatore district was sanctioned by Government in G.O. Ms. No. 1732, Agriculture, dated 24th May 1954. The scheme came into operation from 1st July 1954 and is in progress. The progress of work to the end of 30th June 1955 is shown below :—

	ACRES.
(a) Area surveyed	2,651.61
(b) Plotting longitudinal section and cross section lines.	2,626.59
(c) Collection of list of pattadars, survey numbers and extent of lands, etc.	6,827.04

12. *Kothamangalam Fuel Series Scheme.*—In G.O. Ms. No. 1903, Agriculture, dated 1st June 1954, the Government have sanctioned a scheme to tackle 4,046 acres in Kothamangalam Fuel Series by direct contouring. The above scheme came into operation on 12th November 1954.

The following preliminary arrangements have so far been done in regard to this scheme. Village map has been prepared and details regarding roads, streams, village sites, hillocks, mile stones, etc., with survey numbers have been noted. Applications from pattadars have been registered. General reconnoitering of the area to be bunded has been done. Catchment had been fixed up to take up execution of work :—

Contouring was done in 6,000 acres.

13. *Exhibition.*—The following exhibits on soil conservation were arranged in the All-India Exhibition held at Madras from December 1954 to February 1955 :—

(1) Lay out of plots with different soil conservation measures.

(2) Artificial rainfall simulator for visual demonstration of soil and water losses under different cultivation practices.

(3) Soil conservation slides with lighting arrangements.

Two assistants were deputed for exhibition duty at Madras, for explaining the exhibits on soil conservation to the visitors.

Surveys were conducted to carry out soil conservation measures in Kolarpatti in Pollachi taluk, Coimbatore district.

14. *State Soil Conservation Board.*—The eighth meeting of the State Soil Conservation Board was held at Ootacamund in May 1955. Draft skeleton plan was prepared for inclusion of soil conservation schemes in the Second Five-Year Plan.

XIX. AGRICULTURAL ENGINEERING.

The Agricultural Engineering Branch was engaged in arranging supply of suitable agricultural implements, oil engine and electric motor pumpsets for irrigation and mechanical cultivation units as tractors with matched implements and bulldozers.

1. *Tractors and land reclamation scheme.*—The demand for tractors and bulldozers in land reclamation work and the cultivation of waste lands in the State is steadily on the increase. While ploughing, harrowing and levelling are the main duties performed with the tractors, there was demand for the puddling operations in wet lands with rotavators especially in Tanjore district.

There is also demand for the use of tractors with implements for ploughing and ridging operations in sugarcane areas.

The ordinary ryot has not been able to meet the cost of such mechanised cultivation due to his insufficient financial resources. With a view to remove this difficulty the Government have now ordered the grant of loans to agriculturists to meet tractor hire charges as in case of supply of seeds, manures, etc. When this facility is fully availed of by the ryots, there will be more scope for mechanised methods of cultivation.

The bulldozers in the department are being worked almost throughout the year, while the demands for tractors are only seasonal. With the help of bulldozers, extensive areas which had not seen the plough for decades have been brought under cultivation. In addition practical experience has

shown that desilting, excavating tanks, levelling flood damaged fields, etc., can all be done more economically and with a great deal of saving in time by the use of bulldozers compared to the heavy costs and time involved in manual labour. The departmental bulldozers are demanded for such purposes also.

Besides, for regeneration of forest areas which were untouched so far, experimental ploughing has given good results and hence more forest regions are now tackled not only for the cultivation purposes but also for large scale wattle plantations. Further vast areas in the Nilgiris slopes are now being made available for potato cultivation. Soil conservation measures and the mechanical contour bunding work done in the Agricultural Research Station, Nanjanad, have induced the ryots to take up similar methods of cultivation in their private mountain areas also.

Some landowners have now purchased their own tractors some direct from the firms, others through the hire purchase system in the department by which tractors are being supplied to them on instalment system. There are nearly 300 tractors owned by private individuals. The departmental fleet consists of 158 tractors of several types ranging from 25 h.p. to 75 h.p. Detailed particulars in regard to these are furnished separately.

In order to eliminate idleness due to repairs and save transport from place to place the departmental units are grouped on a rational basis, grouping as far as possible, the same type in one district or region. But strict enforcement of keeping one type in one district, has not been physically feasible as certain types of tractors are required for use by almost all districts, in view of their capacity for a particular type of work and the preference of the ryots for the same.

Every effort has been made by advance planning and by frequent supervision, to work the units to their best advantage and instructions issued to the Inspecting Assisting Agricultural Engineer to remedy strictly, inordinate delays in repairs or idle retention of units. Proposals have been formulated for grant of loans to deserving operating staff who show good achievements. A statement indicating the area ploughed and the number of hours worked by the bulldozers is given in Appendix. The total area ploughed, levelled and harrowed during the year was 21,812 acres, inclusive of virgin lands which had not seen the plough for several years. With the implementation of the takkavi loan system specified in the previous paragraphs, better results and increased outturn are expected in this direction. The contribution towards additional food production by this scheme is estimated as 2,092 tons. The total receipts for the department by way of hire charges during the period under review was Rs. 9.82 lakhs. Even though steps are being taken to work the scheme as far as possible on a no loss no profit basis by increasing the hire charges gradually, it has not been possible to achieve this aim as according to the opinion of the Economic Adviser to the State, the present hire charges will have to be increased by 63.2 per cent if the units are to be worked on a no loss no profit basis. Such a steep and heavy increase could not be effected since it will tell adversely on the overall demand for the unit, as even now, there is a clamour from the ryots that the hire charges are high especially when the prices of foodgrains are on the downward trend. The Government have, however, made a slight enhancement in the rates of hire charges as per Appendix (?), and any further alteration will have to take into consideration the reaction of the ryots to the increased rates.

Five-Year Plan.—Reclamation of lands by the use of tractors is one of the schemes in the Five-Year Plan. Out of a sum of Rs. 17.12 lakhs provided for the year, the actual expenditure has been Rs. 10.06 lakhs. In view of the orders of Government to suspend the purchase of additional units for the department until the Tractor Enquiry Committee has found ways and means to improve the working condition of tractors, the department has not acquired fresh units.

Purchase of spares for the tractors.—Till recently the spares for tractors were being purchased from the concerned dealers after calling for quotations from them for acceptance. The Government have delegated the Headquarters Deputy Director of Agriculture (Engineering) with powers up to Rs. 3,000 and the district officers including the District Agricultural Officers and Assistant Agricultural Engineers to the extent of Rs. 200 at a time in the matter of purchase of spare parts. Messrs. Larsen and Toubro and Messrs. Voltas, Limited, the present dealers of Messrs. Volkart Bros. have recently entered into a rate contract with the Director-General of Supplies and Disposals for supply of spares for tractors which they represent in this State and as per this the spares for caterpillar and IHG. type of tractors are now purchased only on the rate contract system.

With a view to curtail the expenditure towards purchase of spares, work is undertaken for the manufacture of certain spares, which are at present imported, in the tractor workshop, Coimbatore, itself as recommended by the Tractor Enquiry Committee. Proposals as called for by Government for the purchase of additional machinery for this purpose, are being examined with a view to giving effect to this recommendation. Proposals have also been put up to Government for information of a separate salvage section in order that the condemned spares which are at present disposed off as scrap, may be sorted out for reconditioning as far as possible. Orders of Government on this subject are awaited.

Agricultural Machinery Advisory Committee.—The committee appointed by the Government for advising the department on important mechanization details held two sittings in the year.

Trials.—The suggestion of certain ryots to utilize cheapest types of tractors in the cultivation schemes and ascertain their suitability to local condition is also being tried on an experimental basis.

Two garden type tractors 'Chief' type 5 h.p. units have been procured for the department by the Community Project Administration of the State and trials were conducted with these units at the Agricultural Research Station, Nanjanad, and also in other project areas. These types of tractors are guided by manual labour and the performance had been satisfactory. One-fourth of an acre of land was ploughed in one hour 55 minutes. An equal area could be harrowed in 45 minutes or worked with a cultivator in 40 minutes. Ridging a quarter of an acre takes 22 minutes and bund forming was also done in 22 minutes. The consumption of petrol was two gallons for ploughing and two-thirds gallon for other operations. The estimated cost of cultivation was Rs. 30-3-0 per acre for all the above three operations, as against Rs. 82-8-0 if these operations are done by manual labour for Nilgiris district conditions.

Trials were also conducted with David Brown tractors with rotavators for weeding and cultivation operations in the Ambalavayal farm and results have been satisfactory. For introduction and popularisation of such small size tractors, orders have also been placed for purchasing a Japanese make Fugi tractor of 5 h.p.

It has already been explained in the previous paragraphs that trials were conducted in contour bunding work with D4 caterpillar units in the hill slopes of the Agricultural Research Station, Nanjanad. The results thereof have been so good that it has drawn the attention of the local cultivators to bring all their slope lands under such protected methods of cultivation.

Trials were also conducted with TD9 tractors with clifford cultivators for the generation of selected areas for bringing them under wattle plantations. Similar ploughing and bunding work has also undertaken in the Alamadhi Forest areas in Chingleput district as required by the Forest department.

Sugarcane Development Scheme.—Even though only two units have been procured from the sugarcane funds for sugarcane cultivation in factory zones, the demand for ploughing and ridging operations during the season is not confined to these units alone. In South Arcot district alone about 2,500 acres had been ploughed and smaller acreages were tackled in the districts of Madurai and North Arcot.

The outturn of the two units alone during the season under review was as follows :—

	ACRES.
Total area ploughed	72.75
Total area harrowed	13.82
Total area ridged	54.42
Total area puddled	..
Total area dry ploughing	..
Number of ryots benefitted	27.00

Even though the Government have sanctioned a sum of Rs. 50,000 out of the sugarcane funds to distribute as loans to sugarcane cultivators to meet tractor hire charges, it has not been possible to distribute the loan, pending detailed instructions from Government about the classification on the issue of the loan. It is hoped that when these detailed instructions are complete, the outturn of work in the sugarcane area will also considerably increase.

2. Tractor Workshops, Coimbatore.—The tractor workshops at Coimbatore besides being the Central workshop for all repairs to the sick units in the department also serves as the central stores for all spares for tractors needed in the districts.

The Government with a view to enable the department to manufacture all small types of spare parts in this workshop have called for proposals to equip the same with suitable machinery. As per this, proposals have been received for the installation of a welding plant, power hammer, grinder, etc., and these are being examined.

After a series of trials and initial attempts it is now made practicable to recondition many unserviceable spares which are normally sold away as scrap and as such it has been proposed to Government to open a salvage centre at Coimbatore wherein all condemned spares from districts could be salvaged to the maximum extent possible.

The Assistant Agricultural Engineer, in charge of workshops has since been relieved of district work connected with inspection of tractors, etc., in order to enable him to devote his sole attention to workshops alone.

The spares manufactured in the tractor workshop, are shown in the Appendix.

3. Assistant Agricultural Engineers.—There are at present four regional Assistant Agricultural Engineers in charge of the inspection work of tractors in the districts and their present jurisdiction has been re-defined as follows :—

Assistant Agricultural Engineer (Inspection), Madurai.—District work in Madurai and also inspection work in Tirunelveli and Ramanathapuram districts.

Assistant Agricultural Engineer (Inspection), Tiruchirappalli.—Inspection work in Tiruchirappalli, Tanjore, South Arcot and Salem districts.

Assistant Agricultural Engineer (Central Agricultural Engineering Stores), Saidapet.—District work in Chingleput district and inspection work in North Arcot district.

Assistant Agricultural Engineer (Inspection), Coimbatore.—District work at Coimbatore and inspection work in Nilgiris, Malabar and South Kanara districts.

These officers have regularly toured in their jurisdiction and have carried out a systematic check up of all machineries in their respective districts, during such tours. Instructions have also been given by them to the operating staff in regard to the maintenance and handling of the units under their control.

Machinery purchased during the year for the department was nil.

4. Scheme of hiring of oil engine pumpsets.—The scheme of hiring of departmental oil engine pumpsets was continued during the year under report. The decentralization of oil engine pumpsets by keeping them at taluk headquarters instead of at district headquarters for hiring to ryots has resulted in all round improvement in the utilization of the pumpsets obviating the unnecessary movement of machines over long distances. The difficulty experienced in some of the districts in implementing this arrangement is lack of accommodation for housing the oil engine pumpsets in the Agricultural Demonstrators' depots. Government have, therefore, been addressed for permission to rent suitable small godowns wherever necessary to house the oil engine pumpsets at taluk headquarters and to incur incidental charges for moving the sets in the departmental lorry from one taluk to other depending on the demand and their final orders are awaited.

Government have sanctioned the purchase of oil engines of small h.p. with self-priming pumps. Under the programme for 1954-55, sixteen oil engine pumpsets of 5 h.p. have since been purchased for distribution to South Malabar, North Malabar and South Kanara districts, where there is increasing demand for oil engines of small h.p.

Oil engines were also hired for non-agricultural purposes whenever there was a demand for such purposes without detriment to the use for agricultural purposes and hire charges at double the normal rates were collected. Government also ordered that the oil engine pumpsets should be made available for use in wells in Community Project areas, National Extension Service areas, those dug under the Local Development works and also under the Comprehensive Rural Water-Supply Programmes and hire charges should be collected at the rates applicable to agricultural purposes.

Request for outright sale and on hire purchase for some of the oil engines given on hire were complied with as the Government have permitted the sale of 25 per cent of the hire units to the ryots. In such cases, the ryots were allowed 12½ per cent depreciation and one-third rebate hire charges collected.

The number of sets available for hiring in the State during the period under report was 440 of which 366 are in working order. Government have passed orders for the permanent transfer of 17 oil engines to the Agricultural Research Stations to which they were previously lent. Seven units were also lent on temporary basis.

During the period under report, the following number of oil engines have been sold by the established firms direct to the agriculturists for agricultural pumping operations in the State :—

Name of the firm.	Number of oil engines sold.
Jayems Engineering Company	15
Marshal and Sons, Limited	26
Parry & Co.	53
Crossley Brothers	2
Batlibai & Co.	3
Textool Company	112
Greaves Cotton Company	11

Petrol driven pumpsets.—The hiring of petrol sets to ryots was discontinued this year as all the sets have become unserviceable on account of constant use and almost all of them have serviced their life. Proposals have been submitted to Government for their disposal by selling them in public auction.

5. *River Pumping Scheme.*—The special staff appointed for the river pumping scheme namely the Assistant Agricultural Engineer and Agricultural Engineering Supervisor visited various places in the districts of Chingleput, South Arcot, North Arcot, Tiruchirappalli, Tanjore, Madurai, Ramanathapuram, Malabar and South Kanara districts and investigated the possibility and feasibility of starting as many river pumping schemes as possible. Proposals were submitted to Government for starting river pumping schemes in the following places :—

- (1) Perambakkam, Kadambathur, National Extension Service Block, Chingleput district.
- (2) Vallampadugai, Chidambaram taluk—South Arcot district.
- (3) Puliangudi, Chidambaram taluk—South Arcot district.
- (4) Namasivayapuram, Murugamangalam and Talenjeri in Mayuram taluk, Tanjore district.
- (5) Lakkidi and Pallapuram, Kottapuram and Pulamanthole in South Malabar district.

Government sanctioned the starting of river pumping schemes at Lakkidi and Pallapuram and Pulamanthole in South Malabar district and at Marugamangalam in Mayuram taluk. But the schemes could not be started as at the time of receipt of Government orders the season was over in those three places. Government did not sanction the starting of river pumping schemes at Vallampadugai and Puliangudi in South Arcot district, Perambakkam in Chingleput district and Kottapuram in South Malabar on the score that the ryots would not agree to pay the high water charges at the end of the scheme and that there would be difficulty in the collection of the hire charges. Government have ordered that the demand for oil engines in such cases might be met by hiring the oil engines to the ryots.

The starting of river pumping schemes in the following places was under investigation during the period under report :—

- (1) Certain areas in Tindivanam, Cuddalore and Chidambaram in South Arcot district.
- (2) Soraiyur and Kalasapakkam in North Arcot district.
- (3) Ponmeni and Anupanadi in Madurai district.
- (4) Vadamalapuram and Nenmeni in Ramanathapuram district.
- (5) Kallingapathy, Thulasipati and Kotanathan in Tirunelveli district.
- (6) Ootamali in Salem district.
- (7) Shannamangalam in North Malabar district.
- (8) Shoranur, Olasseriam and Chaitankundu in South Malabar district.

Investigations were made in the following places and it was found not possible to start the scheme as the ryots were not willing to run the scheme :—

- (1) Adavapakkam in Chingleput district.
- (2) Veeramudianathan in Chingleput district.
- (3) Govindaputhur and Sripurandan, Tiruchirappalli district.
- (4) Jagathalla and Cherumallai, Nilgiris district.
- (5) Adur, Illenthilla, Kotta and Uppirangudi, South Kanara district.

The river pumping schemes at Pinayur was discontinued on 31st May 1955 and the units were given on hire basis to the beneficiaries for irrigating the crops.

The implementation of the river pumping schemes could not be achieved to a greater extent as the ryots require subsidy and were not agreeable to pay high water rates in view of the steep fall in price of food commodities and of the changed condition in agricultural economy. Government have since ordered that the proposals sent for starting river pumping schemes and not sanctioned by Government may be reviewed after the revival of the grant of subsidy by the Government of India which is now under correspondence.

6. *Tractor Hire-purchase Scheme.*—The Tractor Hire-purchase Scheme is in operation from the year 1951-52—

1951-52.—In G.O. Ms. No. 191, Agriculture (Food Production), dated 11th May 1951, and G.O. Ms. No. 500, Agriculture (Food Production), dated 14th November 1951, Government sanctioned the purchase and supply of six tractors to agriculturists under the hire-purchase system. Out of this two tractors were supplied to two ryots in this State and the rest to the ryots in Andhra State. These two parties have surrendered the tractors and they have been added on to the departmental fleet maintained under the Hiring Scheme as per G.O. Ms. No. 386, Agriculture (Food Production), dated 31st December 1954.

1952-53.—In G.O. Ms. No. 255, Agriculture (Food Production), dated 11th June 1953, Government sanctioned the purchase of 65 tractors for distribution under hire-purchase system to ryots in the Composite State from the allotment of 1952-53. The distribution of the units were taken up during 1953-54.

Forty-one units were distributed during 1953-54 out of 65 units sanctioned by the Government. Out of these 41 tractors, 10 were distributed in the Residuary State. Out of the balance of 24 units (out of 65) 14 were

allotted to Andhra State and 10 units at a cost of Rs. 2.2 lakhs were allotted to the Residuary State in G.O. No. 50, Agriculture (Food Production), dated 19th February 1954. The 10 units were distributed during 1954-55. The total number distributed in the Residuary State out of 65 units is 20.

1953-54.—In G.O. Ms. No. 126, Agriculture (Food Production), dated 17th April 1954, Government sanctioned the purchase and distribution of 23 tractors under hire-purchase system at an estimated cost of Rs. 4.6 lakhs for 1953-54 scheme. All the 23 units were distributed within December 1954.

1954-55.—In G.O. No. 310, Agriculture (Food Production), dated 9th October 1954, Government sanctioned Rs. 4.6 lakhs for the purchase and distribution of 23 units during 1954-55. The distribution could not be finalised before 31st March 1955 as the approved list of tractors firms and the rates furnished by them had to be got approved by the Agricultural Machinery Advisory Committee and the Government. The distribution was taken up from April 1955. After distributing all the 23 units, it was found that there was a balance of about Rs. 34,000 out of the sanctioned amount of Rs. 4.6 lakhs. Government sanctioned in G.O. Ms. No. 215, Agriculture (Food Production), dated 10th June 1955, the supply of another tractor to the next party in the reserved list selected by the Government. In all the 24 units were distributed before 30th June 1955 within the sanctioned amount of Rs. 4.6 lakhs.

1955-56.—The distribution of 1955-56 allotment has been sanctioned by the Government in their G.O. No. 282, dated 26th July 1955, and distribution is being taken up.

As regards the recovery of instalments, cost memoranda have been communicated for recovery of instalments due this year. Progress reports on the collection of the same is awaited from the district officers.

7. (a) *Purchase and distribution of oil engines and electric motors pumpsets under Hire-Purchase Scheme.*—The Central Agricultural Engineering Stores and Supply Centre for the supply of oil engines and electric motors pumpsets under Hire-purchase Scheme continued to operate during 1954-55. Government were pleased to reallocate the loan of Government of India, i.e., Rs. 26.34 lakhs (being the unspent balance of 1952-53 and 1953-54) for utilization in 1954-55. Accordingly a target of 617 oil engines and 311 electric motors was approved by Government in (1) G.O. Ms. No. 13, Agriculture (Food Production), dated 23rd January 1954, (2) G.O. Ms. No. 71, Agriculture (Food Production), dated 10th March 1955 and (3) G.O. Ms. No. 16, Agriculture (Food Production), dated 21st January 1954.

(b) The distributions of oil engines and pumps (indigenous) makes only were made out of rate contract list issued by the Director-General of Supplies and Disposals, New Delhi. The list of oil engines available under rate contract is given below :—

- (1) Cooper.
- (2) Robust.
- (3) Kirloskar.
- (4) Farida.
- (5) Karma.
- (6) Central.

All these are coupled pumpsets supplied direct from the manufacturing centres like Poona, Bombay, Kirkee and Delhi. Till 28th February 1955 526 permits were issued. Only Cooper, Kirloskar and Central oil engines were preferred by the ryots and the actual supply of sets also took a long

time chiefly due to the long distances from which the sets had to come. Sealed tenders called for in December 1953 for supply of foreign types of oil engines and electric motors were also in operation till November 1954. With these restricted types available both from rate contracts and tender firms selected by the department the following number of units were purchased and distributed to the agriculturists :—

From July to December 1954—Oil engines 124; electric motors 48.

The difficulties experienced under rate contract were placed before Government. The State Government also took up this matter with the Government of India. As a consequence, the Government of India ordered the discontinuance of the rate contract list from March 1955. They further ordered that purchase of indigenous makes of oil engines for the scheme financed by the Government of India should be made from the list of engines approved by the Ministry of Commerce and Industries from time to time. The following is the list of approved types of oil engines received from Government of India :—

Name of oil engine.		Horse-power.
1 Cooper	.. .. .	5 to 23
2 Central	.. .. .	6
3 Kirloskar	.. .. .	5
4 Imani	.. .. .	5 to 13
5 Campbell	.. .. .	15
6 Packo	.. .. .	3.75/4.75
7 Ruston	.. .. .	11 and 14
8 Robust	.. .. .	7
9 D.P.F.	.. .. .	6
10 Textool	.. .. .	5 and 6
11 Karma	.. .. .	6
12 Lion	.. .. .	8 and 50
13 LAE 15 Kirloskar generally called Batliboi	.. .. .	5
14 Indiaman	.. .. .	5

(c) In February and March 1955 sealed tenders were invited for the supply of oil engines (indigenous and foreign types) and electric motors and pumps for distribution to the ryots up to 31st March 1956. Thirty-three firms submitted their sealed tenders for various types of oil engines, motors and pumps. The selection of firms and types of oil engines and electric motors pumpsets to be distributed was placed before the Agricultural Machinery Advisory Committee at the meeting held on 28th March 1955. It was decided that the firms who have quoted the lowest prices for each types of oil engines and electric motors and pumps may be accepted with a specific period for free after sale servicing to the sets to be purchased. Government fixed a two-year free after sale servicing period in the case of all approved tenders and the firms who have not agreed to this period in their tenders were also asked to state whether they are willing to accept the above period. The selection of firms was finalized by the end of May. The period to utilize the loan of Government came to a close on 30th June 1955 and there was only 4 or 5 weeks time to arrange distribution of sets. Against a revised target of 687 oil engines and 100 electric motors the department was in a position to purchase and distribute only 156 oil engines and 69 electric motors under hire-purchase scheme during 1954-55. For 1955-56 Government of India were pleased to allot an initial allotment of Rs. 20 lakhs and if the progress is satisfactory, they also promised to give a further loan of Rs. 17.29 lakhs, as the year 1955-56 is the final year of the Five-Year Plan. It is hoped that the progress in this direction will be satisfactory to achieve the targets,

(d) The number of oil engines and electric motors supplied from the inception of the scheme is given below :—

	Oil engines.		Electric motors.	
	Target.	Number supplied.	Target.	Number supplied.
	(1)	(2)	(3)	(4)
Up to 1951 March	1,000	..	300	..
1951-52	1,250	821	200	181
1952-54	625	462	189	93
1952-54	775	102	365	230
1953-54 and 1954-55 (up to 30th June 1955).	687	156	100	69
		1,541		573

(e) The actual expenditure incurred for the purchase and distribution of pumpsets and receipts by way of collection of instalments from 1st July 1954 to 30th June 1955 are given below :—

Expenditure—

	RS.	A.	P.
Cost of oil engines and electric motors	5,19,887	9	6
Pay and allowances of staff	43,962	0	0
Contingencies and other charges	1,856	3	10
	5,65,705	13	4

Receipts—

By way of recovery of instalments during the period
1st July 1954 to 30th June 1955 5,88,025 15 6

8. *Filter point tube-wells scheme.*—The scheme for the sinking of 600 filter points in the Residuary State for the year 1954-55 was started early in January 1955 and the Government of India sanctioned a loan of Rs. 20 lakhs for this purpose. The target fixed was completed by 30th June 1955 and it was also found feasible to sink more number of filter points than the targeted number as detailed below, within the sanctioned amount.

Serial number and district.	Target.	Number of wells successfully sunk.
(1)	(2)	(3)
1 Chingleput	60	54
2 Vellore	40	60
3 Cuddalore	50	72
4 Tanjore	30	75
5 Pattukkottai	20	30
6 Kumbakonam	100	173
7 Mayuram	120	185
8 Tiruchirappalli	60	74
9 Ramanathapuram	40	72
10 Salem	5	4
11 South Malabar	5	13
12 North Malabar	5	2
13 Tirunelveli	5	7
14 Madurai	50	56
15 Mangalore	10	18
Total	600	895

The area expected to be covered with irrigation water by these filter points will be 8,950 acres and the additional production anticipated from this area will be 4,475 tons. It is proposed to continue the scheme next year on a large scale with 2,000 filter points as a regular feature of the National Five-Year Plan for agricultural development.

There were enquiries from ryots in the districts other than those in which the scheme was worked and the various district officers were asked to render the necessary help to the ryots in the installation of filter points. The officers have also been supplied with the necessary tools and equipment for this purpose and Government have also ordered that a hire charge of Rs. 5 per day may be levied for the departmental boring equipments lent to ryots in connexion with sinking of filter points.

A scheme for the installation of 2,000 filter points at a cost of Rs. 50 lakhs has been sent to Government and orders are expected to be issued shortly. Trials on the newly designed cheap and economical coir filter points were conducted in research stations and these were found satisfactory costing only one-sixth of the ordinary brass filter points.

9. *Motor vehicles.*—The number of motor vehicles with this department in the Residuary State is as follows :—

Jeep trailers—13.	Jeeps—25.
Station wagons—2.	Lorries—32.
Buses—2.	

Eight lorries were received from the Civil Supplies department during the year for the use of filter point scheme in the districts. The tyres and tubes for the motor vehicles were purchased as usual under the rate contract system. Steps were taken to maintain the vehicles in good condition by undertaking repairs then and there as recommended by the Area Transport Officer.

According to the ratio fixed by Government for the division of assets and liabilities there are surplus lorries in the Andhra State. The matter is under consideration of Government regarding the allocation of division of valuable movable stores, like lorries, jeeps, etc., of the different departments in the Composite Madras State among the Andhra, Mysore and Residuary State.

10. *Pipes.*—There was very slow progress in the sale of pipes due to decontrol over the pipes. The Government department at first declined to take their requirements on the plea that rates were charged for the supplies made at the book value and that the above was comparatively very high when compared to the prevailing market rates and that they had not the requisite provision in their budget to meet the increased cost. The Government ordered that the supplies could be made to Government departments also at the prevailing market rates. The Government departments subsequently sent their indents for pipes and their requirements were met with completely. The stock of pipes held on 1st July 1954 was 449,208 feet and 9 inches. The stock of pipes held on 1st July 1955 was 268,315 feet and 2 inches and the quantity supplied to Government Departments during the year was 180,893 feet and 7 inches. Further indents being received are also complied with.

11. *Electric motor pumpsets.*—Getting agricultural service connexion was comparatively easy. There was no case of an electric motor pumpsets not being installed for want of issue of pipes from the department.

12. *M.B. sheds.*—The M.B. sheds belonging to the Ex-Servicemen Co-operative Society, Madurai, were purchased for locating the office of the Assistant Agricultural Engineer (Inspector), Madurai, for the storage of agricultural machineries and implements and are in regular use.

13. (a) *Iron and steel.*—The scheme for the distribution of iron and steel was first introduced as one of the activities of the department in the third quarter of 1944 in furtherance of the Grow More Food Campaign and as part of the Government's plan to make available to the agriculturists their requirements of iron and steel at fair prices on a broad-based distributary set-up.

Government ordered the transfer of the work connected with the distribution of fabricated agricultural implements to the co-operative societies in their G.O. No. 6250, Development, dated 17th December 1948. Government directed the co-operative societies to take over all the stocks of agricultural implements held in the agricultural depots for sale to ryots. Since the response of the co-operative societies in this direction was somewhat slow and unsteady, this department had to continue the sale of implements held in stock. Further acquisition of fabricated agricultural implements by the department was stopped and the fabricators were directed to effect distribution of the fabricated implements through the co-operative societies in their respective districts as also independently by themselves at fixed prices directly to ryots where co-operatives did not come forward to do so.

In G.O. No. 34, Food and Agriculture (Food Production), dated 4th July 1950, Government also transferred the work relating to the distribution of G.C. sheets, cart tyres, barbed wires, etc., for agricultural purposes to the co-operative societies. As such, the acquisition of raw materials by this department for direct sales was also stopped. But the work relating only to the planning for supply of the controlled categories of iron and steel for agricultural purposes is still done by this department in consultation with the Director of Industries and Commerce and the trade interests represented for the various zones on the State Steel Advisory Committee.

Since the response of the co-operative societies in these two directions was very poor, the department had to continue the sale of the departmental stocks and clear them. Government permitted the disposal of these stocks at current market rates in their G.O. No. 100, Food and Agriculture (Food Production), dated 15th March 1951. Subsequently in G.O. No. 560, Food and Agriculture (Food Production), dated 18th December 1951, Government permitted the disposal of the slow moving and unwanted materials at certain reduced rates.

Government ordered the transfer of the work relating to the issue of permits for agricultural purposes to this department from the Director of Controlled Commodities, Madras, with effect from 1st August 1952, and Government in their G.O. Ms. No. 9, Food and Agriculture (Food Production), dated 6th January 1953, re-transferred the work back to the latter.

The failure of seasonal rains in some districts and the consequent distress conditions reduced demands from ryots. To afford relief to the stockists, the Iron and Steel Controller, Calcutta, granted general permission in September 1952, to dispose of, on their own, stocks over 60 days old and not covered by pending permits. In January 1953, the Iron and Steel Controller relaxed control over distribution of light structurals, bars and rods with reference to the stocks of the registered stockists. Control over distribution of heavy sections of structurals was also lifted some time earlier and by this many categories of iron and steel (since decontrolled) were placed on the list of free sales items.

In the third quarter of 1953, Government ordered that the retail distribution of iron and steel for agricultural purposes be taken away from the co-operative societies and entrusted to the registered stockholders of this State who should distribute the stocks in accordance with the prices fixed by the Iron and Steel Controller, Calcutta. The system is in vogue. The departmental activities which originally started with State Trading in iron and steel are now confined to placing of quarterly indents for iron and steel for agricultural purposes in consultation with the State Steel Advisory Board. The details of allotments of iron and steel made towards agricultural purposes for the year 1954-55 are as under :—

	T.	Cwt.	Qr.	lb.
	(1)	(2)	(3)	(4)
Standard steel	1,446	4	1	27
Non-standard steel	952	19	1	8

The quarterly indents for scrap iron and defectives are for allotment to the fabricators of this department through the two departmental controlled stockists at Madras and Tuticorin for manufacture of agricultural implements. A quantity of 952 tons 19 cwt. - qr. 8 lb. of defectives was received and allotted to the fabricators of this department during the period for manufacture of agricultural implements and other suitable accessories.

Government have suggested that with a view to preventing diversion of the agricultural quota of iron and steel by the registered stockholders for non-agricultural purposes, the Director of Industries and Commerce may furnish the Director of Agriculture with a list of registered stockholders of agricultural quota with their addresses for circulation to Agricultural Demonstrators that the Agricultural Demonstrators may be apprised of iron materials under agricultural quota with the stockholders in their respective jurisdiction from time to time and that wide publicity to the existence of stocks may be given by the Agricultural Demonstrators among the ryots—vide Government Memorandum No. 20880-FP. VI (B)/54-1, dated 14th July 1954. The above suggestion was agreed to and Government accepted the above arrangement for a period of six months—vide their Memorandum No. 20880-FP. VI (B)/54-2, dated 6th September 1954. The procedure was again reviewed recently and proposals for continuance of the same for a further period of six months is pending sanction by Government.

The following difficulties were experienced in the working of the scheme for distribution of iron and steel quota for agricultural purposes :—

(1) Some registered stockholders were releasing large quantities of G.C. sheets (e.g., 3 tons and more) to small ryots on the strength of the recommendation of officers like village munsifs, etc., without proper check and verification.

(2) When bona fide agricultural consumers approached the registered stockholders for supply, they were informed that there was no stock in several cases.

(3) Holders of permits from the Director of Industries and Commerce's office also, in several cases returned the permits uncashed for want of stocks with the registered stockholders.

With a view to remove the above difficulties, the Director of Industries and Commerce has fixed the following maximum limits for recommendation by the following officers :—

(1) Village officers—5 cwt.

(2) Revenue Inspectors and Agricultural Demonstrators—10 cwt.

(3) Tahsildars, Rural Welfare Officers in the areas selected by the Rural Welfare Department, Project Executive Officers and Assistant Project Executive Officers in the Community Project area—1 ton.

(4) The District Agricultural Officers—2 tons.

For all demands for more than 2 tons, the applicants are to send their applications supported by plans and estimates through the Director of Agriculture to the Director of Industries and Commerce for consideration.

The registered stockholders have been further informed that in order that holders of permits issued by the Director of Industries and Commerce are not put to disappointment for want of stock, they should reserve 25 per cent of the stock under agricultural quota for release under permits as and when bona fide consumers approach the Director of Industries and Commerce. The above instructions were given effect to from December 1954 and the system is now in vogue.

It was represented to Government that under the existing arrangements, agricultural fabricators are not able to get their full requirements of iron and steel under the agricultural quota from the registered stockholders who exhaust their stocks in several cases before they are approached by the agricultural fabricators and that the registered stockholders should be directed to give first preference to the Agricultural fabricators in the matter of distribution of such of the raw materials as are required by them for the manufacture of agricultural implements. Government have authorized the registered stockholders in this State to supply iron and steel to agricultural fabricators direct on the specific recommendation of the Director of Agriculture or the District Agricultural Officer concerned and have ordered the trying of the above procedure for a period of six months—vide Government Memorandum No. 17441-FP. VI (B)/54-4, dated 28th September 1954. Suitable instructions have been issued to the District Agricultural Officers to follow the above procedure by giving wide publicity through the field staff of the department.

(b) *Agricultural implements*.—Fourteen weeders and one specimen weeder manufactured by Messrs. Gunti & Co., Secunderabad, were received from the Government of India, Ministry of Food and Agriculture (Agriculture), New Delhi, for trial purposes. The above weeders are under trial and action will be taken to popularise their use in this State if the trials conducted with the weeders prove successful.

Burmese suttens.—To give an impetus to the Green Manure Campaign, the District Agricultural Officers and Superintendents of Agricultural Research Stations were requested to submit their requirements of the Burmese suttens together with trawlers-cum-puddlers for popularising in this State. The requirements received from them are under examination.

Government in their Order No. 265, Agriculture, dated 31st January 1955, have requested the Director of Agriculture to prepare and submit the reports on (1) the mechanical cultivation details of the tractors in the State (with details of the performances of different types of tractors and with different types of implements) and in different types of soils in the State, (2) indigenous agricultural implements and machinery in the State and (3) a bulletin on "Farm Structures" in the State—all on the model of the report of the Agricultural Department of Bombay State. In connexion with the preparation of the above reports and bulletins, Government have sanctioned a temporary post of a Special Agricultural Engineering Supervisor in the office of the Director of Agriculture. Preparation of the reports is in progress.

(c) *Advisory Committee on agricultural implements*.—Government in their Order No. 3620, Agriculture, dated 21st December 1954, directed *inter alia* that a State Advisory Committee be constituted to review periodically the progress in the manufacture of improved agricultural implements.

The following are the members of the Committee:—

- (1) Director of Agriculture, Madras—*President*.
- (2) Headquarters Deputy Director of Agriculture (Engineering)—*Member*.
- (3) Assistant Agricultural Engineer (Research), Coimbatore—*Member and Secretary*.
- (4) One representative each of the Co-operative department and Industries department—*Member*.
- (5) Sri R. Varadarajan, owner and Manager, Farm Equipment & Co., Coimbatore—*Non-official Member*.
- (6) Sri V. C. Subbiah Gounder, Secretary, District Agricultural Association, Coimbatore—*Non-official Member*.
- (7) Sri Umapathy Reddiar, Proprietor, Murugan Trading Company, Turaiyur—*Non-official Member*.

The members (both official and non-official) of the State Advisory Committee on Agricultural Implements were requested to propose subjects for inclusion in the agenda so that after receipt of their replies a date may be fixed for the meeting and an agenda drawn up.

The Assistant Agricultural Engineer (Research), Coimbatore, was asked to prepare a note on the present position in regard to the demand and availability of the various types of agricultural implements, etc., and the facilities available with him for carrying out research on improved machinery as this information was required by the Industrial Engineer to be placed before the Committee for discussion at their first meeting. The reply of the Assistant Agricultural Engineer (Research), Coimbatore, is awaited.

(d) *Survey of indigenous implements*.—The scheme for the survey of indigenous implements in common use in Madras State entirely financed by the Indian Council of Agricultural Research and sanctioned in G.O. Ms. No. 2761, Agriculture, dated 3rd September 1954, for a period of nine months from the date of appointment with one Assistant Agricultural Engineer and the staff with headquarters at Coimbatore under the control of Assistant Agricultural Engineer (Research), Coimbatore, started to function from 22nd April 1955 with the appointment of the Assistant Agricultural Engineer, Indigenous Implements Survey.

The scheme is intended to collect basic data of the indigenous implements in common use in the State for carrying out improvements and standardizing the implements. The scheme is to be carried through by all the States in the Union and it would also enable to gather information regarding the types of implements in use in the various States.

The districts covered from 22nd April to 30th June 1955 were, the Nilgiris, Tiruchirappalli, Chingleput and Coimbatore taluk. The implements in use in the Nilgiris were mainly hand tools, as cultivation is only on the slopes. For puddling, a light type of country plough is in use in the districts.

with the more enthusiastic ryots taking to the improved type of indigenous implements, viz., the wet land puddler and Burmese settun.

Chingleput district.—Being mainly a paddy growing area, it was noticed that the ryots were using many more implements in paddy cultivation than in other districts so far surveyed. Many types of bullock drawn cultivators for intercultural work in wet land are also being used in Chingleput district. The implements are toothed harrow, Papadam and Addagorru. Among the seed drills, the Gorru, in common use in this district, is much used for paddy sowing as semi-dry paddy is cultivated to a large extent. The Gorrus are usually four tyred but six and twelve tyred Gorrus are reported to be in use for millet crops.

Hoeing is mainly a manual operation in all the districts and the hoes have been found to differ in size and shape. Harvesting is also done mainly by hand. The sickles used for cutting the earheads of crops like cumbu and cholam are found to be smaller than the sickles for the harvesting of the crop with stalk. These sickles are much heavier and larger in size and the edges are usually serrated. The shape of sickles also vary from district to district.

The following improved indigenous implements are in use in the districts :—

- Wet land puddler.
- Green manure trampler.
- Bund former.
- Buckscraper.
- Guntaka.
- Basin lister.

A few ryots have also gone in for the lighter type of iron ploughs, viz., P.S.G. 16 and 25 and Cooper 25. For sugarcane cultivation, some ryots use the Ridger for forming trenches.

Tiruchirappalli district.—A hand hoe specially designed for Korai weeds is in use in Pudukkottai taluk, besides a forked wooden indigenous implement reported in use for the harvesting of Yam.

XX. SPECIAL PROBLEMS, PROGRAMMES AND WORK DONE IN THE DISTRICTS.

Chingleput district.—During the course of the year, 48 filter points were fitted up which added 480 acres under paddy cultivation. The Modified Japanese method of cultivation was introduced in 521 villages. Sesbania as border crop as well as pure crop covered an area of nearly 40,000 acres. In the Madras City, 836 lb. of vegetable seeds, 44,750 numbers of vegetable seedlings, 1,820 numbers of coconut and fruit plants, 9,893 avenue and shade plants and 10,000 cuttings of Gliricidia plants were distributed to ryots.

North Arcot district.—Raising of sesbania as a pure crop as well as border crop has become popular with the ryots and 37,991 acres were covered. Cotton is a minor crop in the district. However due to the departmental

propaganda, 1578 acres of P-216 F cotton, 1,043 acres of MU. 1 cotton and 50 acres of MU. 2 cotton were grown.

Salem.—Raising of sesbania as pure crop and as border crop is becoming very popular with the ryots. Sesbania was raised in 56,000 acres as border crop and in 300 acres as pure crop. Japanese method of paddy cultivation was adopted over 3,000 acres.

South Arcot district.—Over 275,000 acres of land were brought under line planting of sesbania on field bunds and about 4,800 acres raised as pure crop. Four hundred and fifty-nine thousand and nine hundred and fifty-six cuttings and seedlings of Gliricidia and 4,007 Indigofera teysmanii seedlings were planted. Four hundred and fifty-three maunds of cotton seeds were distributed. Area of cotton as pure crop extended over 2,100 acres and as mixed crop over 1,600 acres. Agricultural associations have been formed in all the villages. There is a concentrated area under sugarcane in this district and the special staff attended to the extension work in this crop.

Tiruchirappalli.—As against a target of 60 filter point of tube wells, 74 were sunk. Agricultural associations have been formed in all the villages. A Special Plant Protection Assistant for betel vines for control of wilt in betel vines was working in the district. One thousand and eighty-nine fruit plants were distributed.

Tanjore.—As against a target of 30 filter points, 75 were sunk. Four thousand eight hundred and seventy-seven fruit plants were distributed. One hundred and fourteen thousand and four hundred and twenty acres of paddy were brought under the modified Japanese method of cultivation. An area of over 160,000 acres was covered by sesbania as border crop and over 4,200 acres as pure crop.

Pattukkottai.—Against a target of 20 numbers of filter point tube wells, 30 numbers were actually sunk. Sesbania was raised on field bunds in an area of over 220,000 acres and as pure crop in an area of over 2,800 acres. One thousand seven hundred and twenty-seven tons of seeds were exchanged by village seed farm scheme.

Mayuram.—One hundred and eighty-five filter point tube wells were sunk. One thousand and thirty-five tons of seeds were exchanged under the scheme of village seed farms. Over 127,500 acres were covered by sesbania as border crop and over 4,300 acres as pure crop. Gliricidia was planted on field bunds to an extent of 3,427 acres. One thousand six hundred and seventy numbers of Indigofera teysmanii seedlings were distributed to ryots. One thousand one hundred and eighty-two pounds of Prosopis seeds were sold. One thousand one hundred and twenty-five fruit plants and coconut seedlings were sold.

Kumbakonam.—One hundred and seventy-three filter points were sunk successfully. One thousand and forty-seven tons of seeds were distributed under the scheme of village seed farms. One hundred and thirty-two maunds of cotton were sold. One thousand four hundred and eight fruit plants and 1,877 coconut seedlings were distributed. Sesbania raised over 130,000 acres of land.

Madurai.—Over 39,000 acres of field bunds were planted with sesbania. Ninety-two thousand and thirty cuttings and 49,064 seedlings of Gliricidia were planted. Sowing of prosopis was taken up along road margins and

railway lines and 1,180 miles covered. Fifty-six filter points were successfully sunk. Seventy-six tons of paddy seeds were exchanged under village seed farm scheme. Forty-three thousand one hundred and thirty fruit plants and 792 coconuts and seedlings were distributed.

Ramanathapuram.—Two thousand one hundred and fifty acres were ploughed by tractors. Sixty-five filter points were successfully sunk. Seven thousand five hundred and twelve maunds of improved cotton seeds were distributed to cover 32,288 acres.

Tirunelveli.—Japanese method of cultivation of paddy was popularized. Sesbania as border crop covered over 32,000 acres. Filter points were sunk as trial and 7 numbers were sunk successfully against a target of 5 numbers.

Coimbatore.—Sesbania seedlings as border crop for green manure occupied 19,784 acres. Glyricidia was planted to cover 5,582 acres. Improved paddy seeds to the extent of 733 bags and millet seeds to the tune of 544 bags to cover 3,665 acres and 8,864 acres, respectively, were distributed. Soil conservation work was attended to and 178 acres were terraced, 901 acres contour bunded, 1,079 acres levelled, 1,281 acres bunded with bund former and 1,107 acres were cultivated along contours.

South Malabar.—Over 84 tons of paddy seeds were distributed to cover 5,880 acres. Sesbania as border crop was grown in 33,186 acres. Soil conservation measures were demonstrated by terracing 1,312 acres, levelling 1,260 acres, contour bunding 323 acres and putting up bunds over 3,340 acres.

North Malabar.—Over 30 tons of paddy seeds to cover 2,100 acres were distributed. Sesbania as border crop was adopted in 28,343 acres. Twenty pounds of vegetable seeds were distributed. Control measures were adopted successfully against the army worm, case worm, grasshoppers, rice bug and fulgorids, infesting the paddy crop.

South Kanara.—Sesbania as border crop was planted in 20,816 acres. Over 135 tons of paddy seeds were distributed to cover 9,450 acres. Proper soil conservation measures were demonstrated by terracing 237 acres, levelling 371 acres and putting up field embankments over 40 acres. Campaign for treatment against arecanut 'Mahali' disease was carried out in 3,183 acres. Jassids, hispa and rice bugs occurring over 1,000 acres were treated with the pesticides and controlled.

The Nilgiris.—Through tractors, 135 acres were ploughed and 91.10 acres were levelled. Necessary help was rendered to Thengumarhada Co-operative Farming Society and an Agricultural Demonstration maistri was there specially to look after all the agricultural improvements up to 1st April 1955, after which the post was abolished. The entire area of 250 acres of paddy has been covered with improved departmental strains. Much expansion under green manures. A quantity of 32 tons of improved disease, free potatoes were distributed under 38.0 acres of seed farm and 1,227 acres of village seed farm for Potato were covered. There are 350 bee colonies functioning in the district and 110 standard hives (Newton type) were introduced. The Scheme for the Welfare of Todas was continued and 82 bags of potatoes and 156 bags of manure mixture were advanced for cultivation purposes for main and irrigated crops of 1954. Out of the advances made in both the season to the tune of Rs. 48,651-1-6, a sum of Rs. 2,209-14-0 is still due from 17 Todas.

XXI. FINANCE.

The receipts and expenditure for the financial year 1954-55 and the corresponding figures for the previous year are given below :—

(1)	1953-54,	1954-55,
	(2)	(3)
	RS. IN LAKHS.	RS. IN LAKHS.
1. Expenditure—" 40. Agriculture "	174.02	127.48
2. Receipts—XXIX.a. Agriculture	102.14	64.16
Loans—		
3. Takkavi loans (according to fasli year)—		
(i) For the purchase of seeds and manures.	14.26	13.44
(ii) For the purchase of agricultural implements.	0.12	0.29
(iii) Intensive Manuring Scheme (for the purchase of chemical fertilizers).	107.0	42.25

1. *Expenditure—40. Agriculture.*—There has been an overall decrease of expenditure amounting to Rs. 46.54 lakhs during the year under report. The decrease is mainly due to (i) postponement of purchase of machinery equipments and tractors and general restriction in the indents for spare parts under 40. f. Engineering, (ii) restricted purchase of seeds under Seed Development Scheme consequent on the introduction of village seeds farms, and (iii) general economy and small savings under other items.

2. *Receipts under XXIX. a. Agriculture.*—The decrease from the previous years' figures is due to the non-collection of recoveries due from the parties during the year under report and due to the selling of the improved seeds at a price lower than the purchase price.

Loans.—An appreciable increase is found in the loans sanctioned for the purchase of agricultural implements.

The entire work of providing agricultural credit under Takkavi loans has since been transferred to the Revenue Department from this Department from April 1955, and in respect of Intensive Manuring Scheme from next year onwards.

XXII. SALIENT FEATURES OF WORK DONE AND OUTSTANDING ACHIEVEMENTS DURING THE YEAR 1954-55.

Season.—Even though the rains were unevenly distributed, the season may be considered to be favourable on the whole.

Intensive Cultivation Schemes (Five-Year Plan).—This is the fourth year of the operation of the Intensive Cultivation Scheme under the First Five-Year Plan. The Agricultural Schemes are estimated to have contributed to an additional production of 190,320 tons of foodgrains. Besides 32,380 tons have also been estimated as having been saved from loss through the timely action taken by the Plant Protection Staff against pests and diseases affecting crops.

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Community Projects.—Besides providing the agricultural staff required for these projects, the department arranged supply of improved seeds, insecticides, oil engines, etc. In G.O. Ms. No. 986, Public (Rural Development Projects), dated 23rd March 1955, Government ordered the conversion of 20 National Extension Service Development Blocks into Community Projects with effect from 1st April 1955.

National Extension Service.—Technical help was given by the officers of the Agricultural Department in National Extension Blocks. In G.O. Ms. No. 2558, Public (Rural Development Projects), dated 21st December 1954, Government ordered that the Agricultural Extension Officers for each National Extension Service Scheme or Agricultural Demonstrator in the Community Project area should be provided with a depot in the blocks and that where there is already an agricultural depot in the area, such depots should be placed in charge of the Extension Officers in the National Extension Service Block or the Agricultural Demonstrator in the Community Project area.

In order to avoid overlapping of the functions of the normal staff of the Agricultural Department and the Special staff of the areas in National Extension Service and Community Project Blocks, Government in G.O. Ms. No. 3330, Agriculture, dated 12th November 1954, issued orders reorganizing and revising the jurisdiction of the Agricultural Demonstrators.

In G.O. Ms. No. 1775, Public (Rural Development Projects), dated 25th September 1954, 10 New Blocks were set up under National Extension Service Scheme. Out of the 38 National Extension Service Blocks so far set up, 20 were converted into Community Project Blocks with effect from 1st April 1955.

Cotton Extension Plan.—A total area of 41,445 acres was achieved against a target of 42,296 acres. The production was estimated at 30,268 bales only, as the seasonal conditions were not quite favourable for cotton as against a target of 43,318 bales.

Research—Agricultural Chemistry.—Chemical analysis of 1,598 samples of soils, plant materials, manures, foods, etc., was done and advice given whenever needed. The results obtained from 3 years' study indicate that in laterite soils, the best crop production is obtained by applying lime at 3,000 lb. and super phosphate to give 60 lb. P2O5 per acre over a basal dressing of 7,500 lb. of green leaf in the first 2 crop seasons. Thereafter the dosage of lime and super phosphate can be reduced to half while the green manure should be continued at the original level. The nutritive quality of paddy is found to increase with increasing dosage of lime.

Legume culture.—During the period under report 32 flasks and 20 tubes of different bacterial cultures of legumes were supplied to parties. Isolation of root nodule organisms of the following legumes and their purification and maintenance were continued:—

Daincha,	Greengram,
Pillipessara,	Horsegram,
Cowpea,	Bengalgram,
Lucerne,	Berseam,
Sesbania,	Groundnut,
Blackgram,	Sunhemp.

Efficiency of pure cultures previously isolated from the above were tested in pot cultures and were found to be quite effective. A copy of the note on the important legume inoculation was sent to each of the Deputy Directors of Agriculture and District Agricultural Officers for giving wide publicity among agriculturists.

Agricultural Entomology.—Weekly pest forecasts were prepared by the Government Entomologist and submitted to the Director of Agriculture. Work on the control of tissue borers, coccids and hairy caterpillars was intensified. The more recent synthetic chemicals, viz., Folidol, Endrin, Diazinon and synthetic chemicals like Systex are being critically tested regarding their usefulness in the control of the abovementioned pests. Studies on the adverse effects of these pesticides were also in progress side by side.

In the experiments conducted for the control of the paddy stem borers, Endrin, Isodrin and Folidol have given best results both with reference to an increase in yield as well as by a gradual reduction in the percentage of infestation. The experiments are being repeated to confirm these findings.

Pests of oil seeds—The red hairy Caterpillar.—Toxaphene dust 20 per cent Folidol and Endrin sprays (one ounce in 12 gallons) have proved highly effective against medium sized caterpillars, which is the most destructive stage of the pest. Higher concentrations of the last two mentioned chemicals cause appreciable kill of even full-grown caterpillar.

Studies on the adverse as well as beneficial effects as a result of repeated applications of the new synthetic chemicals were pursued. D.D.T. applied as dust or spray was found to result in a better growth of groundnut and bhendai.

Agricultural Mycology—Fungicidal trials.—The relative efficacy of five seed dressings in controlling foot rot was tested. Ceresan, Harvesan and Agrosan GN were found effective in controlling the disease.

Sorghum dust.—Fifty-five cultures of sorghum were assessed for their relative reaction to rust cultures. AS 4633, AS 4675, AS 6438, AS 3956, AS 4173, AS 4163 and AS 4190 exhibited freedom from infestation.

Rhizoctonia bataticola was found responsible for causing root rot of pulses. The fungus has been isolated from wilted specimens of greengram, cowpea and pillipessara obtained from different localities.

Promising varieties of greengram, horsegram, blackgram and cowpea are being tested for their resistance to the disease. Wilt of pillipessara caused by *Rhizoctonia* sp. was effectively controlled in the field by drenching the soil with 1 per cent Bordeaux mixture, 0.1 per cent Ceresan (Wet) and cheshunt compound.

In order to find out whether root rot can be controlled by the soil application of the fungicides a field experiment was laid out using 8 fungicides. From the mortality counts it was found that all the treatments recorded less incidence of the disease than the control. Among the treatments, Ceresan (Wet) Bordeaux mixture and Leytosol recorded the least incidence of the disease.

Experiments were conducted at Agricultural Research Station, Adichanrai, to find out whether deterioration of Mandarin orange trees could be improved by manurial application and spraying the foliage with certain chemicals. Five treatments were included, viz., (1) soil application of manures (cattle manure, ammonium sulphate, super phosphate, urea and

Castor.—Two new varieties from the United States of America which were found to possess desirable economic characters like very short duration, good branching and production of fruit clusters in quick succession were utilized in breeding work. Among the three short duration types tested at Coimbatore R.C. 1075 recorded maximum yield. A new inbred type with good branching, closely set fruit clusters and coloured fruits was isolated. In the manurial experiment, the combinations N and P and N, P and K gave significantly higher yields over the rest. The quality of produce from the former treatment was also good.

Coconut.—It was found that manures may be applied to coconut gardens either broadcast and ploughed in or in circular basins around trees. Also, muriate of potash may be substituted for ash. Ploughing coconut gardens thrice during the year recorded increased yields over digging ones. Among the progenies of the various crosses T × D hybrids continued to be most vigorous and outstanding. The F₂ (natural) progenies of these were also vigorous. The production of hybrid seedlings was intensified. Among the exotic varieties under study, Laccadive Ordinary, Laccadive Small, Andaman Ordinary, Cochin China and Philippines are promising. Calopogonium mucunoides was the best green manure-cum-cover crop while groundnut was the best subsidiary crop having recorded an acre yield of 2,233 lb. of dry pods per acre besides giving one ton of fodder.

Minor oilseeds.—Among the sunflower varieties, compared, the "local" and "Many in Axil" recorded the maximum yields. All the exotic varieties were inferior to the local 'N.P. 68' of linseed recorded significant increase in yield over the others. "K.2. Punjab" was the next best variety. "C.T. 66" type of safflower recorded maximum yield for the third year under Koilpatti conditions. Hence this may be popularized among the growers.

Total quantity of improved strains distributed from the Oilseeds Section during 1954-55—

Groundnut pods—122,517 lb.
Groundnut kernels—478 lb.
Gingelly seeds—2,514 lb.
Castor seeds—2,996 lb.
Coconut seedlings—94,023 Nos.

Cotton.—It was found that one culture, in irrigated Cambodia, namely 9030-G-Bulk recorded 18 per cent increased lint yield over MCU-1. In spinning tests it gave 50's counts as against 44's recorded by MCU-1. Steps are being taken to release this culture as a new strain to replace MCU-1. Another culture, viz., 9030-D was also found to be better than MCU-1 in ginning per cent and fibre length in the co-ordinated yield trials. In the compact Family Block and Small Bulk Trial, one culture, viz., 01545-C excelled the control MCU-1 in all the economic attributes. From the bulk yield trials conducted during the year under unirrigated Karunganni Improvement programme, it was found that two cultures, viz., 5341-D and 7416 were superior to K5 in ginning per cent while being equal in yield and halo length. A new item of work taken up during the year was the induction of parthenogenesis in diploid cottons by pollinating them with a hexaploid cotton. The important findings made in these items during the year are as follows:—

In the Progeny Row Trials conducted in the Nadam improvement work, one culture, viz., 7470, was found to be better than the control in halo length and ginning per cent. In the work for the purification of the perennial type, Moco, recommended for cultivation at present, one true breeding line,

viz., P2, was isolated and 39 plants from it raised for study. In studies to get a proper understanding of the inheritance of lint quantity, the lintless types "1027-lintless", "Viramgam-lintless" and 'NHL' were found to produce "normal-linted" F₁'s in crosses with 'short lint', 'sparse lint' and "immature lint" types. In heterosis studies, first year ratoons of a seed sown crop and a crop raised from stem cuttings of the hybrid Co.2 × S.I.V 135 were found to maintain a high level of yield.

Horticulture.—The promising new additions to the horticultural crops during the year included three apple varieties, one type of garlic and several types of pepper and cashew. Among vegetables, eight varieties in brinjal, eight in bhendi, four in sweet potato and two in tapioca stood out as promising. Among root-stocks for the several crops, Mortons 779 and 778 for apples, common peach for plums and peaches, jamberi for mandarin orange, bull's heart for custard apple and *Mimusops Hexandra* for sapota continued to exhibit promise already recorded previously.

In propagation and cultural trials, the following findings were of practical importance:—

In cashew, a successful method of transplanting the seedlings has been devised. Propagation of clones by air-layering cashew shoots in March followed by their separation and planting during early south-west monsoon period has been achieved. In addition inarching and 'Y' cutting nurse-grafts method gave indications of promise. In pine apple, regulation of fruit harvests has gained additional possibility of execution by the application of ice carbide in addition to alpha naphthalene acetic acid already found to be promising. Highly successful results of inarching and side grafting of pepper on wild and cultivated varieties and even of betelvine on wild pepper have been obtained. It was newly found that 'pollu' in pepper can be caused by the maggot of a cecidomyiidae fly. In pepper the period from March to June was found to be the most suitable in Malabar for planting of cuttings in beds for rooting. The papaya type Ranchi obtained cent per cent purity and was advanced to district trials. Optimum manurial, mulching and spacing treatments have been determined for ginger and sweet potato. Growing ginger under mulch gave higher yield than growing them without mulch. Ginger rhizomes smoked and stored in closed pits preserved better than when smoked and left in the open. Bleaching the rhizomes with lime water imparted a good colour to the produce.

The hybridization work in citrus, banana, annonaceous fruits and sapota continued on approved lines and the hybrid seedlings were under study. It has been found possible to propagate durian, clove and nutmeg on allied wild and cultivated species in addition to their own seedlings by inarching. The rootstock potentialities of these several species were under study. The suitability of Hale and Kotagiri plums as pollinizers, the former for top-working and the latter for interplanting, for the shy bearing Shiro and abundance varieties was confirmed. Contrary to expectations, jack grafts on jack seedlings and Rudrakshi rootstocks did not come to bearing even after eight years of orchard life. Sandolin "A" spray has promoted increased yields in three plum varieties in addition to being effective in breaking the dormant period of apple trees and enhancing their yields better than linseed oil spray. Hybridization in mango was taken up for the first time in the residuary State to evolve new types combining the desirable characters found dispersed now in several varieties. At the Botanic Gardens, Ootacamund, double transplanting of annuals was found to be conducive for better establishment of seedlings.

(1) *Varietal collection*.—(a) and (b) *Progress and results in bananas*.—Ten varieties were added to the collection making a total of 171 varieties. Description work was continued and give more varieties were added to the list of synonyms. Thirty-nine desert varieties and twenty-five culinary varieties recorded bunch weight of 20 lb. and above. Batheesa types, Lambi and Supari proved to be promising under swampy conditions. Survey of banana-growing areas was completed in the districts of Ramanathapuram, North Malabar, South Kanara, and parts of Coimbatore, Chingleput, Salem and Madurai districts.

(c) *Economic gain*.—Seven thousand seven hundred and thirty-five banana suckers of superior and heavy-yielding varieties were sold to the public. It was not possible to estimate the percentage of increase in yield per acre, area benefited, total additional production and its monetary value as the area covered is small. So far about 11.37 acres have been covered by banana suckers of improved varieties, supplied from the Station.

Sugarcane.—The revised Sugarcane Research Scheme for the residuary Madras State was sanctioned early in 1955 and the Central Sugarcane Research Station, Palur, started functioning from 15th April 1955, the date on which the Sugarcane Specialist assumed charge.

A total of 71 new Coimbatore varieties were tested for selecting more suitable varieties than the existing standard varieties. Eight varieties fit for early season crushing, namely, Co. 859, Co. 910, Co. 956, Co. 939, Co. 980, Co. 998, Co. 997, and Co. 974 and seven varieties fit for late season crushing, namely, Co. 678, Co. 683, Co. 750, Co. 782, Co. 785, and Co. 810 have been selected and promoted to further yield trials before passing over to the ryots.

The time of planting and harvesting experiments indicated that planting early in the month of January is the best both in respect of yield, quality and sugar per acre. Planting late in May resulted in poor yield and also quality.

Systematic Botany.—(1) In the compilation of floras, Tirunelveli flora was continued. A few more surveys were conducted in Ramanathapuram district.

(2) Twenty species of grasses, 10 species of legumes and 27 species of green manures were tried during the year.

(3) The species of soil binders and cover crops were tried.

(4) Besides Cymbopogen, other essential oil-yielding plants were tried.

(5) The viability tests of grass seeds were continued.

(6) The dormancy and longevity studies in 7 weeds were continued.

1. The Tirunelveli flora was completed and has been found fit for publication by the Botanical Survey of India.

2. *Amphilophis Odorata* and *Eragrostis curvula* var *valida* among grasses, *phasovlus lathyroides* and *Rhynchosia himalensis* among legumes and *cassia less henaultiana* and a few species of *crotalaria* among green manures have done well.

3. *Urochloa mosenbicansis* has been found to be a good soil binder.

4. *Mentha piperita* performed well on the plaints.

5. *Panicum antidotale* gave peak germination of 50 to 60 per cent between 11th and 21st months.

6. *Trianthema portulacastrum* showed dormancy while *Aristolochia bracteata abutilon indicum* and *Digera arvensis* showed dormancy periods.

Plant Physiology—Paddy.—Pre-soaking trials have been laid out in different centres, viz., Aduthurai, Tirurkuppam and Pattambi to verify the results obtained at Coimbatore.

In Sorghum.—Two experiments were carried out to test the effects of pre-soaking versus spray treatments—the results are being analysed.

In Ragi.—An experiment was conducted in pots to see how far pre-soaking of seeds can be helpful in mitigating the bad effects of growing the crops in a medium deficient in nutrients. Studies have also been started to assess the physiological basis of responses to pre-soaking treatments.

In trace element studies about ten experiments were carried out during the year on paddy at Aduthurai and Coimbatore in field and in pots.

Seed Viability Studies.—The effects of higher temperatures than normal on the viability index given by Chemical tests were studied on paddy, sorghum, ragi and cotton.

Weed Control Studies.—A large number of trials and tests were carried out with several weedicide chemicals against both dicot and monocot weeds at several centres, Coimbatore, Nanjanad, Sathyamangalam and Paramakudi.

A new investigation has been started from 1st April 1955 to see how far storage life in fruits could be prolonged by the use of a certain wax and fungicidal composition.

In Ragi, pre-soaking the seeds in potassium phosphate solution increased the grain and straw yield by 28.7 per cent and 24.2 per cent respectively—over the unsoaked controls after both were grown in a potash-deficient medium.

In weed control studies complete eradication is possible with even a single application of weedicide in decotyledonous weeds but in persistent monocot weeds like *Cynodon* and *Cyperus* Single applications can keep the land weed free for only about 10-12 weeks. Further studies are needed with new weedicides to achieve complete eradication of these and similar persistent weeds.

Cytogenetics.—In paddy further tetraploid progenies were raised and selections made for higher fertility.

The F₂ plants were studied from the seeds obtained from the triploid interspecific hybrid between *S. halepense* and Co. 1 grain sorghum.

The F-2, population of sorghum sudanese x Co. 11 and *S. Sudanese* x Co. 3 and *S. Sudanese* x *S. verticelli* floraum were studied for variability. A hybrid was obtained in the cross *S. halepense* (2n=20) x *S. Roxburghi*.

Crosses were done to study the behaviour of rust resistance in Cumbu. The production of unreduced gameets in the chromosome deficient Napier was inferred. The antotetraploids were used for crossing with the allotetraploids.

Seeds of economic imported selections in Tenai were gathered for conducting trials in substations.

Determination of Chromosome numbers in inter-specific hybrids between Sirumalai and *M. Bansii* and *Laden* x *M. Acuminata* was undertaken.

Further selections for higher fertility were made in tetraploid paddy.

Ninety F₂ Plants from the Interspecific hybrids of *S. Halepense* x *Co. 1* were raised. Two of these were diploids, ten triplids and the rest tetraploids. A hybrid was obtained from the cross *S. halepense* (2n=20) x *S. Roxburghii* (2n=20). Analysis of the Kayotypes of the allotetraploids in Cumbu was done. Crosses were done to determine the nature of rust resistance in Cumbu. The progeny of the Chromosome deficient Napier contained plants with 2n=45.

The hybrids *Laden* x *M. acuminata* and *Sirumalai* x *M. Banksii* were both found to have 2n=44 and *Laden* had 2n=33. Evidence of production of unreduced gametes in some triploid Bananas has been inferred.

Agriculture Engineer (Research).—A power driven thrushing machine with winnowing attachment was designed and manufactured.

A cheap coil filter point was designed. This is becoming popular with the ryots. A bullock drawn pump employing 2 plunger type pump units was designed. Modification to this pump to improve the output of water are under contemplation.

A mechanically controlled fertilizer placing equipment which discharges the fertilizer only when the equipment is in motion is being designed for further trials.

In addition to the manufacture of models, implements, and machinery for Agricultural purposes, the Research Engineer's Workshops also undertook the repairs and conditioning of pumps, Agricultural implements and machine and laboratory equipment belonging to the various sections of the Agricultural College and Research Institute and several Agricultural Research Stations.

Agricultural Research Stations.—Due to the drive given for reduction of expenditure and increase of receipts in the Agricultural Research Stations in the State, there was a reduction of expenditure by Rs. 18,223 and increase in receipts by Rs. 15,259 or a net saving of Rs. 33,482.

Crop Cutting Experiments.—The average yield of rice for the State as a whole in respect of first, second and third crops works out to 1,114.59 lb. per acre, 1,144.15 lb. per acre and 1,130.99 lb. per acre respectively.

The rate of response per acre due to the application of the G.M.F. aids was as follows:—

	Aids.	Increase in lb. per acre of rice.
Improved seed	...	243
Sesbania	...	290
Ammonium Sulphate	...	262

Wynaad Colonization Scheme.—The Fruit preservation unit continued to work satisfactorily. A total quantity of 27,873 oz. of squash and 38½ lb. of jam was produced and disposed of during the year.

Agricultural Marketing.—Grading of ghee, eggs, mangoes, potatoes, etc., was continued.

Regulated markets established for cotton, groundnut, gingelly, cashewnut, arecanut and tobacco covered an area of 2,515,000 acres out of 3,984,000 acres of these crops in this State. The progress of work in the regulated markets continued to be complicated and taxing due to the many legal issues standing in the way of enforcement for the Act.

Good work was however turned out by the South Arcot Market Committee while fair progress was registered by the Committees of North Arcot and Malabar.

Instructions were issued to the officers in the Marketing Branch to carry on effective propaganda to acquaint the traders and growers about the benefits of regulated markets and to remove misapprehensions and misconceptions.

There was an allround fall in the prices of all commodities. The decline was more pronounced in the case of foodgrains and pulses.

Soil Conservation.—So far an area of 150.31 acres out of 203.35 acres, of the Ketty Valley Extension Scheme have been bench terraced and handed over to the ryots for cultivation.

In G.O. Ms. No. 686, Agriculture, dated 9th March 1955, the Government have accorded sanction for taking up soil conservation measures in 201.41 acres of Kammandhu village. Consent statements are being taken from the patta-dars, so that the extension of soil conservation measures can be taken up as soon as the standing crops are harvested.

So far an area of 64.44 acres in the Agricultural Research Station, Nanjanad, has been bench terraced.

The soil conservation scheme which was started as a famine relief measure in Mulanur, Dharapuram taluk in 1952 was continued during the year. Details of progress of this Scheme have been furnished separately in the Chapter relating to Soil Conservation.

Agricultural Engineering.—There were 85 tractors with bulldozer equipment and 73 without bulldozer, with the Department and these were hired out to ryots. The total area ploughed, levelled and harrowed during the year was 21,812 acres inclusive of virgin lands which had not seen the plough for several years. The contribution towards additional production is estimated at 2,092 tons.

Thirty-eight tractors with matched implements were supplied to the ryots under hire-purchase system. The estimated additional production under this scheme is 3,800 tons. The Department had 440 oil-engines for hiring out to ryots of which 366 were in working order. One hundred and fifty-six numbers of oil-engines and 60 numbers of electric motors were sold to ryots under the hire-purchase system during the year.

The special staff appointed for River Pumping Scheme, visited various places in the districts of Chingleput, South Arcot, North Arcot, Tiruchirappalli, Tanjore, Madurai, Ramanathapuram, Malabar and South Kanara and investigated the possibility of starting river pumping schemes.

Eight hundred and ninety-five filter point tube-wells were established as against the target of 600, within the sanctioned amount. These are expected to provide irrigation for 8,950 acres and result in additional production of 4,475 tons of foodgrains.

Extension Work.—The Agricultural Extension Staff concentrated their efforts on propaganda on several schemes of intensive food production plan, cotton extension and sugarcane development included in the Five-Year Plan. Special emphasis was laid on the modified Japanese method of rice cultivation, raising *Sesbania speciosa* in field bunds as well as pure crop, sinking of filter point tube wells, etc.

Twenty thousand five hundred and eighty-seven propaganda meetings were held, 18,106 demonstration and trial plots were laid out in ryots' holdings to bring home to them the use of improved seeds, manures, better cultural practices, etc.

Sixteen thousand three hundred and eighteen Agricultural Associations are now functioning including new associations formed during the year.

The following quantities of improved seeds and plants were distributed :--

Paddy seeds	...	...	1,955 tons.
Millet	...	...	36 „
Pulses	...	...	860 lb.
Cotton	...	...	35,273 maunds.
Groundnut Pods	...	...	132,417 lb.
„ Kernels	...	...	478 „
Castor	...	...	2,096 „
Gingelly	...	...	2,514 „
Coconut seedlings	...	...	94,023 numbers.
Fruit Plants	...	...	361,340 „
Vegetable Seeds	...	...	3,574 lb.
Vegetable Seedlings	...	...	309,851 numbers.

Sesbania was raised as a border crop in over 1,370,000 acres of land and as a pure crop in over 22,000 acres.

The Scheme of village seed farms which was recently introduced is becoming very popular among the ryots. Village seed farms were run in 8,078 villages for paddy and 3,261 villages for millets.

General.—The year 1954–55 was also a good year for Food production as 1953–54. The area under sesbania exceeded 13 lakhs of acres as compared to 9 lakhs last year. An increased effort was made for the expansion of improved strains of cereals. The issue of weekly forecasts of pests and diseases has proved very beneficial to the ryots. The scheme of village seed farms with over 11,000 villages has become popular and is likely to have further large extension in the villages. The better method of cultivation was expanded to 4.9 lakhs of acres which is the maximum for all States in India. The filter point scheme is making good strides and it has been possible to exceed the target this year also within the sanctioned allotment. There has been alround progress. With the removal of trading Schemes and distribution of fertilizers from the Agricultural Staff, it is hoped the progress will be kept up. The production of foodgrains has exceeded targets by 9 per cent, and this has been possible by successful extension on a large scale of green and green leaf manuring, improved seeds fertilizers and other items of intensive cultivation which have substantially increased production.

M. S. SIVARAMAN,
Director of Agriculture.

APPENDIX No. 1.

Rainfall in inches in each month and period in 1954-55 as compared with the averages based on the actuals for a series of years ending with 1940.

APPENDIX No. 1—cont.

Rainfall in inches in each month and period in 1954-55 as compared with the average based on the actuals for a series of years ending with 1940—cont.

District.	Winter period.				January to February 1955.				Hot weather period.				March to May 1955.				Grand total.		Number of rainy days.	IN.
	January 1955.		February 1955.		Total.		Percentage departure from the normal.		March 1955.		April 1955.		May 1955.		Total.		Percentage departure from the normal.	(41)		
	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.	Normal.	Actual.				
	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)					(40)
Chingleput ..	1.3	2.9	0.5	0.1	1.8	3.0	2.9	66.7	0.4	..	0.6	1.4	1.4	5.5	2.4	6.9	5.8	137.5	46.8	51.9
South Arcot ..	1.7	1.2	0.6	0.1	2.3	1.3	2.2	43.5	0.5	*	1.1	2.4	1.9	11.3	3.5	13.7	11.1	291.4	46.8	53.5
North Arcot ..	0.9	2.8	0.3	*	1.2	2.8	3.5	133.3	0.4	*	0.9	0.7	2.6	6.2	3.9	6.9	8.1	76.9	37.9	40.7
Salem ..	0.4	0.4	0.3	..	0.7	0.4	1.2	42.9	0.5	0.5	1.7	2.0	4.1	7.3	6.3	9.8	14.5	55.6	32.6	35.3
Coimbatore ..	0.5	0.5	0.4	..	0.9	0.5	1.0	44.4	0.7	0.6	2.1	4.0	3.4	6.0	6.2	10.6	15.1	71.0	27.4	29.0
Tiruchirappalli ..	1.0	0.6	0.4	..	1.4	0.6	1.1	57.1	0.5	0.3	1.7	4.2	3.3	5.4	5.5	9.9	12.4	80.0	34.2	33.4
Tanjore ..	2.2	2.1	0.7	..	2.9	2.3	4.1	20.7	0.7	0.1	1.5	4.3	2.0	6.0	4.2	10.4	10.4	147.6	45.1	53.8
Madurai ..	1.0	1.0	0.6	*	1.6	1.0	1.9	37.5	0.8	0.3	2.4	2.8	2.9	2.8	6.1	6.4	8.3	4.9	32.3	26.5
Ramanathapuram ..	1.5	0.9	0.8	0.1	2.3	1.0	2.2	56.5	0.9	0.3	2.1	6.2	2.0	1.9	5.0	8.4	9.8	68.0	32.3	30.2
Tirunelveli ..	1.8	2.7	1.2	0.1	3.0	2.3	5.2	6.7	1.5	1.0	2.1	4.5	1.4	2.4	5.0	7.9	11.6	58.0	30.4	28.7
Malabar ..	0.3	..	0.3	0.1	0.6	0.1	0.3	88.3	0.8	0.3	3.4	4.5	8.1	24.2	12.3	29.0	21.9	135.8	121.1	138.6
South Kanara ..	0.2	..	0.1	..	0.3	..	0.1	..	0.2	0.3	1.6	1.9	5.9	19.1	7.7	21.3	15.6	176.6	149.4	185.6
The Nilgiris ..	1.3	1.3	1.0	0.2	2.3	1.5	2.5	34.8	1.4	1.2	3.6	5.6	6.0	17.0	11.0	23.8	21.4	116.4	74.4	79.1

* Less than 0.05 cents.

* Less than 0.05 cents.

APPENDIX No. 2.

Statement showing the varieties of seeds and quantities multiplied in the Seed Multiplication Scheme for 1954-55.

Serial number and name of seed.	Quantity of nucleus seed obtained (i.e.) seed from Agricultural Research Stations.		Quantity obtained from seed farms.		Quantity sold.		Remarks.
	T.	LB.	T.	LB.	T.	LB.	
	(2)	(3)	(4)	(5)	(6)	(7)		(8)
1 Paddy seeds	208	1,472	972	251	1954	1,287	
2 Millets	26	361	34	242	36	730	Non-seed farm.
3 Pulses	..	625	..	679	..	866	Seeds were not pro- cured.
<i>Millets—Details—</i>							
Cholam	7	2,040	13	1,390	12	1,744	
Cumbu	6	620	7	1,235	9	1,206	
Ragi	11	1,516	11	1,491	12	1,893	
Tenai	..	665	1	606	1	367	
Total	26	361	34	242	36	730	
<i>Pulses—Details—</i>							
Bengalgram	..	405	..	500	..	621	
Redgram	..	220	..	179	..	245	
Total	..	625	..	679	..	866	

APPENDIX No. 3 (a).

Statement showing production of compost in the different districts of the Madras State during the year 1954-55.

Serial number and name of the district.	1st quarter.	2nd quarter.	3rd quarter.	4th quarter.	Total.
(1)	(2)	(3)	(4)	(5)	(6)
	C. FT.	C. FT.	C. FT.	C. FT.	C. FT.
1 North Arcot ..	148,587	149,370	149,554	163,249	610,660
2 South Arcot ..	123,389	128,373	143,380	128,561	533,703
3 Chingleput ..	128,721	115,212	110,197	115,573	469,703
4 Coimbatore ..	411,221	449,037	439,339	418,558	1,718,155
5 South Kanara ..	22,345	15,771	33,015	31,227	103,358
6 Malabar ..	118,165	105,177	92,381	74,686	390,409
7 Madurai ..	676,341	642,619	796,213	669,181	2,784,354
8 The Nilgiris ..	52,262	41,917	45,457	45,755	185,391
9 Ramanathapuram ..	249,276	207,019	190,611	190,838	837,744
10 Salem ..	302,391	295,461	275,824	163,701	1,037,377
11 Tanjore ..	329,446	325,984	326,226	329,162	1,310,818
12 Tiruchirappalli ..	400,828	351,264	366,044	319,710	1,437,846
13 Tirunelveli ..	150,198	155,466	134,105	139,688	579,457
14 Corporation of Madras.	182,820	128,800	144,700	99,400	555,720
Total in c. ft. ..	3,296,990	3,111,370	3,247,046	2,899,289	12,554,695
Total in tons ..	65,939	62,227	64,911	57,986	251,093

APPENDICES

APPENDIX No. 3 (b).

Statement showing the sales of compost during the year 1954-55 in the different districts of the Madras State.

Serial number and name of the district. (1)	1st quarter. (2)	2nd quarter. (3)	3rd quarter. (4)	4th quarter. (5)	Total. (6)
	C. FT.	C. FT.	C. FT.	C. FT.	C. FT.
North Arcot	128,427	68,540	1,69,568	111,210	477,745
South Arcot	217,144	77,113	44,026	108,093	446,376
Chingleput	67,505	60,160	83,120	190,368	401,753
Coimbatore	630,045	433,845	415,830	261,428	1,741,146
South Kanara	19,450	650	2,975	13,800	36,875
Malabar	63,315	7,690	27,140	68,790	236,935
Madurai	975,395	586,184	179,064	558,085	2,298,728
The Nilgiris	20,890	29,170	80,024	185,060	315,144
Ramanathapuram ..	100,827	342,605	50,754	208,833	703,019
Salem	88,189	379,112	120,421	291,763	870,485
Tanjore	523,627	141,568	100,905	160,604	926,704
Tiruchirappalli ..	463,947	437,931	107,808	161,791	1,171,477
Tirunelveli	397,067	48,242	35,559	31,765	512,633
Corporation of Madras.	83,625	34,525	58,325	173,000	349,475
Total in c. ft. ..	3,782,453	2,638,935	1,475,519	2,524,588	10,421,495
Total in tons ..	75,649	52,779	29,510	50,492	208,430

APPENDIX No. 4.

Statement showing the progress of grading work in the Madras State during 1954-55 (July to June).

Serial number and name of the authorised packer.	Centre.	1951-53		1953-54.	
		Quantity.	Value.	Quantity.	Value.
			RS.		RS.
Eggs (numbers).					
1 M/s. Eggs & Poultry Mart ..	Madras ..	29,217	3,658	606,522	78,442
2 M/s. Ibrahim Bros. ..	Do. ..	8,161	868	12,940	1,325
3 Sri M. Rajoo Chettiar ..	Do. ..	8,198	1,026	2,125	267
4 G. A. Syed Mohamad ..	Do. ..	15,963	1,710	..	..
5 P. P. Samuel ..	Do. ..	..	No grading.	..	..
6 Sri P. K. Venkatarayalu ..	Do. ..	23,311	2,710	..	..
7 Sri P. Parameswara Kurup ..	Do. ..	7,809	854	..	..
8 Sri V. C. Inasu ..	Ootacamund ..	6,681	821	16,011	1,236
9 Egg Co-operative Marketing Society.	Kaapadi ..	134,209	16,168	131,312	16,234
0 Sri T. P. Kalyanasundaram ..	Tanjore ..	..	Not yet commenced grading.	..	..
1 Sri G. Singaravelu Thevar ..	Tiruchirappalli ..	2,632	275	..	..
Total ..		236,184	28,090	763,410	97,504
Ghee (in maunds).					
1 Sri Amarchand Gulabchand ..	Tirupur ..	3,329-26	504,530	5,099-16	834,581
2 M/s. Dhanalakshmi & Co. ..	Do. ..	2,345-27	349,281	3,682-14	635,716
3 Sri A. S. Arunachalam ..	Madurai ..	283-15	39,653	334-5	59,556
4 M/s. Lingam & Co. ..	Coimbatore ..	..	..	34-4	8,107
5 Sri T. M. L. Angappa Chettiar.	Kangayam ..	55-14	8,370	212-16	31,040
6 Sri R. E. Ganapathi Chettiar.	Do. ..	..	No yet commenced grading.	..	..
Total ..		6,014-2	901,854	9,372-15	1,568,944
Potatoes (maunds).					
1 Sri M. Ponnuswamy ..	Mettupalayam ..	4,787	6,4634	2,860	43,972
Rice (maunds).					
1 Sri V. R. Viswanatha Iyer ..	Polur ..	1,250	27,500	..	..
2 Sri M. N. K. Meenakshisundaram	Tiruvarur ..	900	15,335	744	12,700
3 Sri T. S. Ranganatham ..	Kuttalam ..	700	12,600	..	..
Total ..		2,850	55,435	744	12,700

APPENDICES

APPENDIX No. 5.

(a) List of improved strains of paddy available with the department at the beginning of the year and the new strains evolved during the year.

Strains at the beginning of the year—					28
Paddy Breeding Station, Coimbatore	..	..	..	..	32
Agricultural Research Station, Pattambi	..	..	..	..	2
Paddy Breeding Station, Mangalore	..	..	..	..	25
Agricultural Research Station, Aduthural	..	..	..	..	6
Rice Research Station, Tirukkuppam	..	..	..	..	10
Rice Research Station, Ambasamudram	..	..	..	..	3
Agricultural Research Station, Palur	..	..	..	..	2
Wynad Colonisation Scheme, Ambalavayal	..	..	..	..	..
Total ..					108

New strains evolved during the year—

MGL. 3	..	..	..	..	Halluga (white rice)
MGL. 4	..	..	..	..	Kanwa (red rice)
MGL. 5	..	..	..	..	Mascathy (white rice)

The three new strains in the popular first crop varieties of South Kanara were released from the Paddy Breeding Station, Mangalore during the year 1954-55. All of them showed better performance than the respective standards.

(b) List of new strains of millets released during fasli 1364.

Cholam TPT. 1 (S.S. 8006)—A mutant from Co. 2 derived from Pallaki Jola, Kollegal—Average height 5½-6', Panicles open and short to medium central, grains pearly white, fairly bold for Talaivirohan varieties, stalk pithy, duration—135 days. Normal grain yield 800 lb. per acre. Suited to North Arcot and parts of Salem district.

Released in 1955.

Cumbu Co. 5 (P.T. 833): Selected from a variety of Kullam Cumbu, Nilakottai, Madurai. It matures in 80 days. Panicles medium, long spindle, grain ivory gray. Average height 3½-4'. Normal grain yield per acre 800 lb. under rainfed conditions and 2,200 lb. under irrigation. Recommended as a short duration strain for cultivation in dry lands or garden lands. Suitable for Coimbatore, Ramanathapuram, Tiruchirappalli and parts of Chingleput, Salem and Tanjore districts.

Released in 1955.

Samai Co. 1—(P.M. 269) Isolated from a sample of samai from Anantapur. Matures in 100 days. Average height 3-3½', highly tillering and most of the tiller heads mature along with the main head. Panicles somewhat close, medium long and grain olive brown in colour. Normal yield 400 lb. grain and 2,000 lb. of straw per acre. Suitable for Coimbatore, Malabar, Salem, the Nilgiris and parts of Madurai and South Kanara.

Released in 1955.

NOTE.—The strains released yield 12-15 per cent more than the local varieties in the districts where their suitability has been indicated.

List of improved strains available at the beginning of the year.

Crops.	Number of improved strains available. Released from			Total.
	Coimbatore.	Palur.	Kollpatti.	
Cholam	21	..	2	23
Cumbu	6 *	..	1	7
Ragi	7	1	1	9
Tenai	3	..	..	3
Varagu	1	1	..	2
Panivaragu	1	..	..	1
Pulses	3	..	..	3
Total	42	2	4	48

* Includes two hybrids X. 1 and X. 2.

(c) Cotton.

List of improved strains available at the beginning of the year—

(1) Cambodia 2.	(4) P. 216 F.
(2) Madras Cambodia Uganda 1.	(5) Karunganni 2.
(3) Do. 2.	(6) Karunganni 5.

List of New strain of Cotton released during the year .. MCU. 2.

Special feature of the new strain Please see statement below.

Tract recommended In summer Combodia tract.

Centre and year of trial.	Strain number.	Yield/acre.		Percent on MCU. 1.		Ginning percent.	Mean Fibre length (inch).	Mean Fibre weight (X-100 oz/inch).	H. S. W. C. *	Average blow-room loss.	Estimated income per acre. †
		Kapas.	Lint.	Kapas.	Lint.						
A.R.S. Palur (1946-1954).	Recommended strain MCU. 2.	770	263	108	110	34.1	1.06	0.134	48's	..	419
	Existing strain MCU. 1.	714	240	100	100	33.6	0.99	0.153	40's	..	360
A.R.S. Srivilliputhur. (1950-1954).	Recommended strain MCU. 2.	1,069	346	106	107	32.4	1.02	0.120	50's	5.3	552
	Existing strain MCU. 1.	1,011	323	100	100	31.9	1.01	0.123	49's	5.6	484

N.B.—* H.S.W.C.—Highest Standard Warp Counts.

† The estimated income is based on current market price of MCU. 2 lint at Rs. 1,250 per candy of 784 lb. and that of MCU. 1 lint at Rs. 1,175 per candy as given by sworn surveyors estimated on 11 Jan. 1955.

APPENDIX No. 6.

Cotton extension plan—Targets and achievements under area and production in 1953-1954 and 1954-55.

Particulars.	Area in acres.				Production in bales.			
	1953-54.		1954-55.		1953-54.		1954-55.	
	Targets.	Achievements.	Targets.	Achievements.	Targets.	Achievements.	Targets.	Achievements.
Extensive cultivation—								
By reclamation of waste and fallow lands.	5,400	5,354	5,410	4,560	679	339	679	603
By replacement of crops	9,000	10,863	9,000	32,638	6,750	7,226	6,750	22,064
By double cropping	13,700	4,524	13,700	5,774	6,200	1,841	6,200	1,071
Intensive cultivation—								
Inter cropping	233,300	28,569	233,300	28,223	22,640	3,851	22,640	2,673
Distribution of improved seeds ..	192,010	117,183	192,010	115,923	2,449	2,183	2,449	1,586
Application of fertilizers	38,900	11,168	38,000	9,354	4,500	1,995	4,500	1,093
Plant protection measures	12,000	3,694	12,000	15,783	1,000	341	1,000	39
Improved cultivation methods	2,000	6,416	2,000	16,687	100	80	100	239
	42,296	20,532	42,206	41,445	43,318	17,856	43,318	30,268

NOTE.—The total area includes items (1) and (2) in full, a third of item (3) and a tenth of (4) and excludes other items. The total production under the target excludes the item (7). The figures under 'Achievements' under item (6) are incomplete as manures are being distributed by firms.

APPENDIX No. 7.

List of sugar factories in the Madras State which manufactured white sugar from sugarcane during 1954-55 crushing season.

Name of factory.	Location.	District.	Average daily crushing capacity.	Actual crushing period during 1954-55 season.		Total quantity of cane crushed.	Number of licences granted under Section 6 of the Sugarcane Act.	Average sugar recovery percentage.
				From	To			
Nellikuppam.	Nellikuppam ..	South Arcot.	2200	20 Dec. 1954.	23 June 1955.	3,68,989	9	8.78
Madurai ..	Pandiarajapuram.	Madurai ..	300	6 Dec. 1954.	23 July 1955.	43,500	1	9.49
Pugalur ..	Pugalur ..	Trichirappalli.	750	24 Nov. 1954.	12 May 1955.	1,30,424	10	10.521
Mallipatti ..	Mallipatti ..	North Arcot.	75	The factory did not work during the 1954-55 crushing season.				

APPENDIX No. 8.

Statement showing estimates of acreage and yield of food crops in the Madras State in 1954-55.

Crop.	Area (acres).	Yield (tons).	Remarks.
(1)	(2)	(3)	(4)
<i>Cereals.</i>			
Paddy	6,428,000	4,620,900	Figures of yield are in terms of unhusked grain. The estimated loss of weight in husking is 33 percent for paddy, 15 percent for cholam, 20 percent for cumbu and Korra, 10 percent for ragi, 40 percent for varagu and maize, 45 percent for sama i and 20 percent for "other cereals."
Cholam	1,953,000	637,800	
Cumbu	1,686,100	421,800	
Ragi	1,004,500	469 500	
Korra	93,400	29,600	
Varagu	832,500	355,300	
Samai	571,800	103,500	
Maize	15,900	6,900	
Other cereals	197,500	45,800	
Total cereals	12,782,700	6,694,100	
<i>Pulses.</i>			
Greengram	128,000	12,880	Figures of production of pulses are in terms of unhusked pulse. Except horsegram, the estimated loss of weight in husking is 20 percent for pulses.
Redgram	177,100	31,630	
Blackgram	128,500	16,900	
Bengalgram	5,200	1,150	
Horsegram	564,800	48,900	
Other pulses	146,900	12,080	
Total pulses	1,150,500	123,540	
<i>Sugars.</i>			
Sugarcane	110,700	312,310	Production in terms of Gur.
Others	60,300	54,270	
Total Sugars	171,000	366,580	
<i>Condiments and Spices.</i>			
Chillies.. .. .	139,500	73,900	in terms of dry chillies.
Ginger	14,900	5,100	in terms of dry ginger.
Pepper	119,700	8,900	
Others	241,360	89,820	
Total condiments and spices.	515,460	177,720	

APPENDIX No. 8—cont.

Statement showing estimates of acreage and yield of food crop in the Madras State in 1954-55—cont.

Crop. (1)	Area (acres). (2)	Yield (tons). (3)	Remarks. (4)
<i>Fruits and Vegetables including root crops.</i>			
Mangoes	93,470	299,990	
Plantains	126,300	813,810	
Onions	26,600	126,600	
Other fruits and vegetables including root crops ..	430,600	1,208,350	
Total ..	676,970	2,448,750	
Miscellaneous food crops ..	29,680	8,320	
Total food crops	15,326,310	9,819,010	

NOTE.—Figures of area and yield in respect of paddy, cholam, cumbu, ragi, korra, varagu, samai, maize, greengram, blackgram, bengalgram, horsegram, sugarcane, chillies, ginger, pepper and onions are according to final forecast reports for 1954-55. Figures in respect of other crops are only rough estimates.

APPENDIX No. 9.

Estimated area covered by improved strains of crops, 1954-55.

(1)	Total area under the crop. (2)	Area covered by improved strain (both departmental distribution and natural spread). (3)	Percentage of spread. (4)
Paddy	6,428,000	2,979,236	46.3
Cholam	1,953,000	271,460	14.0
Cumbu	1,686,100	368,059	22.0
Ragi	1,004,500	186,850	18.6
Tenai and other millets	1,513,600	43,636	3.0
Redgram	177,100	11,153	6.3
Cotton	871,700	522,644	60
Groundnut	1,625,000	343,000	21.1
Gingelly	458,500	75,000	16.4
Castor	35,800	3,100	8.1
Sugarcane	120,000	114,000	95

APPENDIX No. 9 (a).

Review of Grow More Food Achievements during 1954-55.

During the year 1954-55, a total extent of 17.48 lakhs acres was brought to beneficial use under all the intensive cultivation schemes against a finalised target extent of 25.49 lakhs acres. The additional production of cereals realised, as verified by the Revenue officers, was 1.23 lakhs tons, against a finalised target, of 2.11 lakhs tons, based on the units of works and supplies actually achieved up to the end of March 1955. The gap between the finalised target and the verified figure of additional production is due to the fact that physical verification of achievements by field inspection and enquiry by Revenue officers can cover only a portion of and not the entire additional production resulting from the various Grow More Food aids distributed.

APPENDIX No. (9) (b).

Intensive Cultivation schemes—Progress report for the period from 1st April 1954 to 30th June 1955.

Name of the scheme. (1)	Number of units distributed as reported by collectors from 1st April 1954 to 31st March 1955. (2)	Total acreage to be covered by the quantity to be distributed. (3)	Area achieved or benefited from 1st April 1954 till 30th June 1955 against distribution in column (2). (4)	Additional production aimed at (in tons). (5)	Additional production achieved as verified by the collectors (in tons). (6)
I Distribution of Fertilizers—	ACS.	ACS.	ACS.	TONS.	TONS.
A Ammonium sulphate ..	49,655	1,390,340	10,55,286	99,310	75,788
B Phosphatic manures ..	309	420	4,104	..	436
Total ..	49,964	1,390,760	10,59,390	99,310	76,169
II Distribution of manures—					
A Rural compost	56,824	11,362	17,078	1,418	1,840
B Urban compost	76,701	15,338	23,634	1,915	1,550
C Green manure seeds ..	264	990,000	529,405	88,440	32,000
Total ..	133,789	1,016,700	570,117	91,773	34,890
III Distribution of improved seeds—					
A Paddy seeds	1,457	65,565	75,034	3,558	4,311
B Millet seeds	107	16,050	7,664	1,070	461
Total ..	1,564	81,615	82,698	4,628	4,762
Grand total ..	185,317	2,489,075	1,712,205	195,711	115,821
IV Irrigation schemes—					
1 Pumping installations, oil engine and electric motors.	478	3,333	2,711	1,666	586
2 River pumping scheme ..	6	500	145	669	175
3 Filter point tube wells ..	180	1,800	2,269	900	519
4 Wells subsidy schemes ..	5,397	5,397	5,954	2,696	2,775
5 Repairs to tanks, etc. ..	293	8,073	3,680	3,996	1,313
V Land development schemes—					
1 Soil conservation and contour bunding.	..	..	1,154	..	153
2 Clearance and reclamation of waste lands and old fallows with tractors.	..	40,600	19,754	4,658	1,623
Grand total ..	..	59,703	35,667	14,585	7,143

APPENDIX No. 9 (c).

Intensive Cultivation schemes—Progress report for the period 1st April 1955 to 30th June 1955 (1955-56 schemes) (three months).

Name of the scheme.	Number of units aimed at as per programme for the year.	Number of units achieved.	Total acreage to be covered by the quantity to be distributed.	Acreage actually brought under cultivation.	Additional production to be achieved for the year (in tons).	Additional production achieved as verified by the Collectors in tons.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
I. Distribution of fertilizers—						
A. Ammonium sulphate.	85,000	4,883	2,380,000	28,825	17,000	423
B. Phosphatic manures.	..	98	..	493	..	2
Total ..	85,000	4,926	2,380,000	28,818	17,000	425
II. Distribution of manures—						
A. Rural compost ..	95,000	17,705	18,000	2,485	2,375	72
B. Urban compost ..	303,300	12,082	60,600	8,818	7,535	2
C. Green Manure seeds.	400	25	1,500,000	13,697	134,000	58
Total ..	398,400	29,722	1,579,600	19,950	143,950	132
III. Distribution of Improved Seeds—						
Paddy seeds ..	12,500	90	607,800	3,884	39,660	20
B. Millets seeds ..	700	6	104,300	2,068	5,891	1
Total ..	14,200	96	711,900	5,952	45,551	21
Grand total ..	497,600	34,784	6,471,500	54,720	359,501	578
IV. Irrigation schemes—						
1. Pumping installations, oil engines and electric motors.	1,410	22	10,380	117	5,193	24
2. Tube wells with filter points.	2,000	103	20,000	480	10,000	..
V. Land Development Scheme—						
1. Soil conservation and contour bunding.	..	..	..	433	..	..
2. Clearance and reclamation of waste lands and old fallows with tractors.	..	..	30,500	5,515	3,263	207
Total ..	..	..	60,880	6,545	18,456	231

APPENDIX No. 10 (a).

No. 1.—Abridged statement of loans disbursed during 1954-55 (fashi year).

Serial number and district.	Amount disbursed under	
	Seeds and manures.	Implements.
1 Vellore ..	RS. 95,590	RS. 1,990
2 Guindy ..	1,78,960	980
3 Salem ..	95,754	3,490
4 Cuddalore ..	48,784	..
5 Tanjore ..	82,580	310
6 Tiruchirappalli ..	68,210	2,240
7 Pattukottai ..	1,64,880	4,030
8 Mayuram ..	86,380	5,620
9 Kumbakonam ..	67,150	3,370
10 Madurai ..	68,320	3,040
11 Ramanathapuram ..	1,03,539	370
12 Tirunelveli ..	19,355	1,425
13 Coimbatore ..	73,115	1,200
14 Nilgiris ..	21,180	1,430
15 Shoranur ..	37,985	..
16 Tellicherry ..	90,065	..
17 Mangalore ..	42,190	180
Total ..	13,44,037	6,795

APPENDIX No. 10 (b).

No. 2. Abridged statement of loans sanctioned during 1954-55 (fashi year) under Intensive Manuring Scheme.

	RS.
1 Tanjore ..	8,68,660
2 Coimbatore ..	1,32,435
3 Pattukottai ..	7,86,000
4 Guindy ..	3,02,650
5 Cuddalore ..	3,16,030
6 Tiruchirappalli ..	7,58,179
7 Madurai ..	4,28,100
8 Ramanathapuram ..	26,240
9 Tirunelveli ..	4,51,445
10 Vellore ..	77,970
11 Salem ..	36,250
12 North Malabar ..	4,680
13 South Malabar ..	9,140
14 South Kanara ..	27,797
Total ..	42,25,576

APPENDIX No. 11.

Statement showing the Expenditure and Receipts of the Agricultural Research Stations for the financial years 1953-54 and 1954-55.

Serial number and name of station.	1953-54.		1954-55.	
	Expenditure.	Receipts.	Expenditure.	Receipts.
	RS.	RS.	RS.	RS.
1 Rice Research Station, Tirukuppam.	23,951	8,836	17,847	12,948
2 Agricultural Research Station, Palur.	26,495	31,439	19,295	30,318
3 Agricultural Research Station, Tindivanam.	28,615	25,365	26,599	20,173
4 Agricultural Research Station, Aduthurai.	38,542	57,616	37,666	34,655
5 Agricultural Research Station, Pattukottai.	13,015	10,834	14,120	13,138
6 Rice Research Station, Ambasamudram.	20,412	12,592	14,067	17,242
7 Agricultural Research Station, Koilpatti.	25,160	17,001	26,074	15,222
8 Millet Breeding Station, Ariyalur.	1,560	469	1,963	746
9 Millet Breeding Station, Tirupattur.	2,167	1,444	2,061	1,036
10 Millet Breeding Station, Coimbatore.	17,268	15,694	14,390	10,410
11 Cotton Breeding Station, Coimbatore.	13,202	16,082	11,122	7,055
12 Paddy Breeding Station, Coimbatore.	19,044	5,751	18,320	17,843
13 Central Farm, Coimbatore ..	81,909	87,874	78,963	88,329
14 Agricultural Research Station, Taliparamba.	24,979	21,041	24,379	26,711
15 Agricultural Research Station, Pattam i.	38,079	31,189	39,579	42,114
16 Agricultural Research Station, Nilleshwar (3 Stations).	17,497	17,242	17,296	18,844
17 Paddy Breeding Station, Mangalore.	16,210	15,000	14,728	12,061
18 Sugarcane Research Station, Gudiyatham.	19,816	14,450	17,150	9,819

APPENDIX No. 11—cont.

Statement showing the Expenditure and Receipts of the Agricultural Research Stations for the financial years 1953-54 and 1954-55—cont.

Serial number and name of station.	1953-54.		1954-55.	
	Expenditure.	Receipts.	Expenditure.	Receipts.
19 Agricultural Research Station, Ambalavoyal.	30,033	20,472	33,801	29,053
20 Agricultural Research Station, Nanjanad.	29,421	40,434	33,899	50,236
21 Fruit Station, Kallar ..	11,539	14,226	12,180	14,129
22 Fruit Station, Burliar ..	4,382	4,306	4,061	5,961
23 Ponological Station, Coonoor.	8,715	6,397	9,333	7,628
24 Agricultural Research Station, Satyamangalam.	15,525	2,844	15,524	3,121
25 Arecanut Research Station, Vittal.	11,376	10,308	14,588	8,172
26 Banana Research Station, Aduthurai.	12,010	10,826	14,293	9,870
27 Botanical Gardens, Coimbatore.	6,687	3,649	4,939	4,400
28 Botanical Gardens, Ootacamund.	18,904	9,293	18,953	10,023
29 Sim's Park, Coonoor ..	8,172	5,971	7,911	8,533
30 Agricultural Research Station, Bhavanisagar.*	..	..	1,006	..
31 Cashewnut Station, Kolikar.	3,554	51	4,498	200
32 Agricultural Research Station, Paramakudi.	6,496	99	5,722	4,064
Total ..	5,85,045	5,18,645	5,66,652	5,29,790
Grand total ..	5,95,095	5,18,795	5,76,872	5,34,044

* Opened on 9th February 1955.

APPENDIX No. 12.

Statement showing the work done by the several officers in charge of Crop-cutting experiments, etc., during the fasli year 1364.

Designation of the officer.	Number of days toured.	Number of villages visited.	Number of experiments visited at several stages.
(1)	(2)	(3)	(4)
Headquarters—			
Special District Agricultural Officer (Crop sampling), Madras.	217	156	21
Mofussil centres—			
Special District Agricultural Officer (Crop sampling), Vellore.	265	108	95
Special District Agricultural Officer (Crop sampling), Tanjore.	197	124	157
Special District Agricultural Officer (Crop sampling), Madurai.	226	269	89
Special District Agricultural Officer (Crop sampling), Kozhikode.	253	221	55
Total ..	1,092	848	417
Average ..	278	212	104

* During the month of February 1955, the Special District Agricultural Officer was on casual leave some time and for the remaining period the post was vacant.

APPENDIX No. 13.

Statement showing the progress of paddy experiment—Regionwise.

Region.	Paddy first.			Paddy second.			Paddy third.			Paddy I, II and III Total.		
	P	C	Per cent.	P	C	Per cent.	P	C	Per cent.	P	C	Per cent.
Vellore ..	38	38	100	194	182	94	38	22	58	270	242	90
Tanjore ..	40	38	95	320	312	98	20	20	100	380	370	97
Madurai ..	36	36	100	244	226	93	..	..	..	280	262	94
Kozhikode ..	158	157	99	152	146	96	..	..	..	310	303	98
Total ..	272	269	98.90	910	866	95	58	42	72	1,240	1,177	95

P = Planned.
C = Completed and considered for analysis.
Per cent = Percentage of the number completed and taken for analysis to the total planned.

APPENDIX No. 14.

Grow More Food Aids Experiments—Regionwise.

Region.	Improved seed.			Green manure (sesbania.)			Ammonium sulphate.			Total.		
	P	C	Per cent.	P	C	Per cent.	P	C	Per cent.	P	C	Per cent.
Vellore ..	17	13	76	17	12	71	12	11	92	46	36	78
Tanjore ..	26	25	90	43	42	97	40	39	98	109	106	97
Madurai ..	15	16	100	16	14	87	23	21	91	54	50	94
Kozhikode ..	12	10	83	14	14	100	15	14	93	41	38	93
Total ..	70	63	90	90	82	91	90	85	94	250	230	92

P = Planned.
C = Completed and considered for analysis.
Per cent = Percentage of the number completed and taken for the analysis to the total planned.

APPENDIX No. 15.

Statement showing the progress of experiments regionwise allotted to Revenue Inspectors.

Region.	Unirrigated Ragi.			Unirrigated Cholam.			Irrigated Cho'am.			Irrigated Cumbu.		
	P	C	Per cent.	P	C	Per cent.	P	C	Per cent.	P	C	Per cent.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Vellore ..	160*	56	35	180	132	73	30	16	53	30	20	67
Tanjore ..	30	24	80	150	96	64	30	24	80	20	20	100
Madurai ..	40	12	30	96	36	38	104	46†	44	40	18	45
Kozhikode ..	60	34	57	120	72	60	30	16	53	30	30	100
Total ..	290	126	43	546	336	62	194	102	63	120	88	73

Region.	Unirrigated Cumbu.			Irrigated Ragi first.			Irrigated Ragi second.		
	P	C	Per cent.	P	C	Per cent.	P	C	Per cent.
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
Vellore ..	170	52	31	96	54	56	54	38	70
Tanjore ..	230	160	70	50	44	88	40	26	65
Madurai ..	230	120	52	80	66	83	30	14	47
Kozhikode ..	110	56	51	40	36	90	..	..	..
Total ..	740	418	56	266	200	75	124	78	63

* 92 experiments were lost.
† The remaining experiments were considered to have been lost.

P = Planned.
C = Completed and considered for analysis.
Per cent = Percentage of the number completed and taken for analysis to the total planned.

APPENDIX No. 16.

Statement showing the progress of the enquiry in regard to the size of holdings of cultivators whose fields come under the Crop cutting experiments.

Region.	Number of villages selected for the survey.	Number of fields allotted for the enquiry.	Number of fields for which forms are received up to 30th June 1955.
Special District Agricultural Officers—			
Vellore	96	192	66
Tanjore	81	162	104
Madurai	95	190	114
Kozhikode	78	156	66
Total ..	350	700	350

APPENDIX No. 17.

Yield data of experiments in bunded and terraced area in Mulanur and Ketty Valley.

I. Mulanur Bunded area: Fasli 1364.

Bunded.			Control.		
Serial number.	Yield from plot.	Acre yield.	Serial number.	Yield from plot.	Acre yield.
	LB.	LB.		LB.	LB.
1088	0.4	25.0	467	0.6	37.50
1105	1.3	118.75	3	0.6	37.50
599	0.12	75.0	593	0.3	18.75
2523	0.4	25.0	2122	0.3	18.75
2057	0.3	18.75	2055	0.4	25.0
2145	0.7	43.75	2048	0.6	37.50
1363	0.1	6.25	629	0.4	25.0
1834	0.4	25.0	78B	0.8	50.0
1436	0.8	50.0	1397A	0.8	50.0
99	0.3	18.75	128	0.3	18.75
	4.1			3.3	
Average.		41 lb.			33 lb.

II. Terraced area in Ketty Valley.

Terraced.			Control.		
Serial number.	Yield.	Acre yield.	Serial number.	Yield.	Acre yield.
	LB.	LB.		LB.	LB.
833/2	5.4	5,250	834/5	4.0	4,000
833/1	8.10	8,625	834/9	6.6	6,375
774/2	25.14	25,875	773	13.12	13,750
8/1	19.6	19,375	10	25.2	25,125
814	14.4	14,375	814	12.8	12,500
774/3	15.6	15,375	1137/1	8.2	8,125
775	15.4	15,250	1137/1	2.2	2,125
805/6	3.7	3,437.50	858	4.4	4,250
809	25.6	25,375	809	19.14	19,375
805/6	19.12	19,750	813	4.2	4,125
830	20.10	20,625	830	13.2	13,125
	173.3			113.6	
Average		15,744.3 lb.			10,306.8 lb.

APPENDIX No. 18.

Crop-cutting surveys by the random sampling method.

Table I.

State—Madras. Year—1954-55. Crop—Paddy I period.
Statement showing the estimated average yield, sampling error and total production.

District.	Number of experiments.		Estimated average yield of rice in lb./acre.	Sampling error of the estimated average in lb./acre (rice).	Percentage sampling error.	Area under Paddy I period in '000' acres.	Estimated production of rice in '000' tons.
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Chingleput	12	12	1304.12	136.77	10.49	53	31
2 North Arcot	18	18	1608.26	149.28	9.28	78	56
3 Salem	8	8	1944.76	264.90	13.62	38	33
4 South Arcot	12	12	1125.89	112.56	10.00	59	80
5 Tanjore	20	18	1231.46	155.31	12.54	99	55
6 Tiruchirappalli	8	8	1669.85	90.74	5.43	31	23
7 Madurai	12	12	1476.93	203.05	13.75	30	20
8 Tirunelveli	24	24	1548.71	101.93	6.58	75	52
9 Coimbatore	10	10	1514.29	145.06	9.58	26	18
0 Malabar	76	75	872.60	56.41	6.46	482	188
1 South Kanara	72	72	942.61	49.71	5.27	342	144
Total for the districts covered by the survey).	272	269	1114.59	28.06	2.52	1313	650
Total for the State ..	..	..	..	..	..	1,326	656

NOTE.—Allowance for area occupied by bunds not made.

APPENDIX No. 19.

Crop-cutting experiments by random sampling method.

Table I.

State—Madras. Year—1954-55. Crop—Unirrigated Cholan.
Statement showing the estimated average yield, sampling error and the total production in terms of cleaned and dried grain.

Serial number and districts.	Number of experiments.		Estimated average yield in lb./acre (dried and cleaned grain.)	Sampling error of the estimated average in lb./acre.	Percentage of sampling error.	Area under the crop used for estimating the production (in '00' acres as per final forecast report).	Estimated production in '00' tons (dried and cleaned grain).
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Salem	120	80	482.63	64.56	13.38	1781	384
2 North Arcot	60	52	443.25	53.69	12.11	1112	220
3 South Arcot	60	29	408.25	72.06	17.65	1505	274
4 Tiruchirappalli	100	37	374.91	40.58	10.82	2975	498
5 Madurai	70	32	797.25	138.06	17.32	3089	1,100
6 Tirunelveli	16	4	837.50	547.00	65.31	252	94
7 Coimbatore	120	72	365.88	58.81	16.10	4294	700
8 Ramanathapuram	10	..	..	..	..	..	..
Total for the districts covered by the survey.	546	336	483.05	26.88	5.51	15008	3,270
State ..	..	..	483.05	..	..	15274	3328

NOTE.—No allowance has been made for the area occupied by bunds.

APPENDIX No. 20.

Crop-cutting experiments by the random sampling method.

Table I.

State—Madras. Year—Fasli 1364 (1954-55). Crop—Paddy III period.

Statement showing the estimated average yield, sampling error and total production in terms of rice.

District.	Number of experiments for		Estimated average yield of rice in lb./acre.	Sampling error of the average lb./acre.	Percentage sampling error.	Estimated area during III period '090' acres.	Estimated production in '000' tons.
	Planned.	Considered analysis.					
1 Chingleput	18	10	979.50	160.80	16.41	94	41
2 North Arcot	20	12	1,177.86	113.32	9.62	94	45
3 South Arcot	12	12	1,059.02	103.23	18.72	65	32
4 Tiruchirappalli ..	8	8	1,617.09	46.22	2.86	30	21
Total for the districts covered by the survey.	58	42	1,130.99	69.72	6.16	284	143
State	58	42	1,130.99	69.72	6.16	534	269

NOTE.—No allowance has been made for the area occupied by bunds.

APPENDIX No. 21.

Statement showing the results of analysis of grow more food experiments on paddy conducted during 1954 in Madras State.

Kind of aid.	Number of experiments.		Average estimated yield of rice from		Additional yield in lb./acre.	Sampling error of the additional yield lb./acre.	Percentage sampling error of the additional yield.
	Planned.	Conducted.	Grow More Food plots lb./acre.	Control plots lb./acre.			
1 Improved seed	70	63	1,648.00	1,404.32	243.18	30.47	12.53
2 Green manure	90	82	1,800.03	1,509.99	290.04	54.51	11.90
3 Ammonium sulphate ..	90	85	1,801.75	1,539.89	261.86	32.03	12.23

APPENDIX No. 22.

Crop sampling surveys by random sampling method in Madras State.

Irrigated Cumbu—Fasli 1364 (1954-55).

TABLE I.—Average yield with their sampling errors and estimated production.

Districts.	Number of experiments planned.	Number of experiments considered for analysis.	Estimated area under irrigated 1954-55 in '00' acres.	Average yield in lb./acre (cleaned dry produce).	Sampling error of average yield in lb./acre.	Percentage sampling error.	Total estimated production in '00' tons.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 North Arcot	10	6	142	531.9	149.1	27.0	34
2 Salem	20	14	1,220	569.1	184.3	23.6	310
3 Tiruchirappalli ..	20	20	344	751.4	139.8	17.8	115
4 Coimbatore	30	30	750	681.2	107.6	15.8	229
5 Madurai	10	6	177	859.9	236.7	33.3	68
6 Ramanathapuram ..	30	12	129	505.9	84.4	16.7	29
Total for the districts covered by the survey.	120	88	2,762	636.0	57.1	9.0	784
State	..	..	3,018	636.0	..	..	857

NOTE.—No allowance has been made for the area occupied by bunds.

APPENDIX No. 23.

Crop sampling surveys by random sampling method in Madras State.

Unirrigated Cumbu—Fasli 1364 (1954-55).

TABLE I.—Average yields with their sampling errors and estimated production.

Districts.	Number of experiments planned.	Number of experiments considered for analysis.	Estimated area under unirrigated cumbu during 1954-55 in '00' acres.	Estimated average yield in lb./acre (dried and cleaned produce).	Sampling error of average yield in lb./acre.	Percentage sampling error.	Total estimated production in '00' tons.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 North Arcot	40	18	658	285.19	95.94	33.64	84
2 Salem	130	34	1,590	236.88	47.88	20.21	167
3 South Arcot	100	66	1,350	421.75	34.38	8.30	256
4 Tiruchirappalli ..	130	94	2,476	231.38	14.50	19.23	255
5 Madurai	40	12	573	741.81	336.56	46.37	190
6 Ramanathapuram ..	90	58	1,821	382.33	28.94	7.57	311
7 Tirunelveli	100	50	1,964	474.63	51.38	10.83	416
8 Coimbatore	110	86	3,359	208.56	20.50	9.83	312
Total for the districts covered by the Survey.	740	418	13,772	323.88	15.63	4.83	1,991
State	..	..	13,923	323.88	..	..	2,013

NOTE.—No allowance has been made for the area occupied by bunds.

APPENDIX No. 24.

Crop sampling surveys by random sampling method in Madras State.

Irrigated Ragi I Crop—Fasli 1364 (1954-55).

TABLE I.—Average yields with their sampling errors and the estimated yield.

Districts.	Number of experiments.		Area in 1954-55 figures in '00' acres. (as per final forecast figures).	Estimated yield in lb./acre (cleaned dry produce).	Sampling error of average yield in lb./acre.	Percentage sampling error.	Total estimated production in '00' tons.
	Planned.	Conducted.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Chingleput	40	16	434	783.94	84.50	10.71	153
2 North Arcot	40	28	438	1,145.38	63.75	5.57	250
3 Salem	16	16	489	1,280.24	263.00	20.53	230
4 South Arcot	40	36	557	1,063.44	137.94	12.97	244
5 Tiruchirappalli ..	10	8	132	1,040.31	128.88	12.20	60
6 Coimbatore	40	36	476	1,803.50	151.13	8.37	334
7 Madurai	30	22	365	1,408.69	164.13	11.69	229
8 Ramanathapuram ..	20	16	264	1,190.31	94.94	7.98	140
9 Tirunelveli	30	23	243	1,081.69	160.50	14.84	120
Total for the districts covered by the survey.	266	200	3,433	1,219.81	48.63	3.99	1,980
State	..	..	3,569	..	..	..	1,944

NOTE.—No allowance has been made for the area occupied by bunds.

APPENDIX No. 25.

Crop sampling surveys by random sampling method in Madras State.

Irrigated Ragi II Crop—Fasli 1364 (1954-55).

TABLE I.—Average yields with their sampling errors and the estimated yield.

Districts.	Number of experiments.		Area in 1954-55 in '00 acres (as per final forecast figures.)	Estimated yield in lb./acre (cleaned dry produce).	Sampling error of average yield in lb./acre.	Percentage sampling error.	Total estimated production in '00 tons.
	Planned.	Conducted.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Chingleput	10	6	136	1,284.56	476.38	37.00	78
2 North Arcot	40	28	513	1,201.56	148.10	12.33	275
3 Salem	4	4	153	1,314.06	1,148.44	87.40	90
4 South Arcot	30	22	300	1,091.38	179.50	17.93	134
5 Tiruchirappalli ..	10	4	140	800.00	150.00	18.75	50
6 Ramanathapuram ..	30	14	300	1,857.75	323.19	21.07	256
Total for the districts covered by the survey.	124	78	1,551	1,275.69	211.50	16.58	883
State	..	..	1,671	1,275.69	..	..	952

NOTE.—No allowance has been made for the area occupied by bunds.

APPENDIX No. 26.

Crop-cutting experiments by the random sampling method.

State—Madras. Year—1954-55. Crop—Unirrigated ragi.

TABLE I.—Statement showing the estimated average yield sampling error and the total production in terms of cleaned and dried grain.

Districts.	Number of experiments.		Estimated yield in lb./acre (dried and cleaned grain).	Sampling error of the estimated average in lb./acre.	Percentage sampling error.	Area under the crop used for estimating production (in '00 acres) as per final forecast report.	Estimated production in '00 tons (dried and cleaned grain).
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 North Arcot	20	6	219.81	55.69	25.34	149	15
2 Salem	110	56	889.56	20.61	14.48	2,358	936
3 South Arcot	10	10	537.81	151.00	28.10	123	29
4 Tiruchirappalli ..	20	14	683.19	80.63	11.80	288	88
5 Madurai	10	4	728.13	178.13	24.46	95	31
6 Ramanathapuram ..	30	8	315.06	122.06	38.74	477	67
7 Coimbatore	60	34	562.19	88.63	15.77	853	214
8 Chingleput	30*	..	..	..	..	..	..
Total for the districts covered by the survey.	290	126	712.00	51.44	7.23	4,343	1,380
State	..	..	712.00	..	..	4,805	1,527

N.B.—No allowance has been made for the area occupied by bunds.

* All the experiments, except two, planned in Chingleput district were lost and that two experiments were not taken into consideration for analysis.

APPENDIX No. 27.

Crop-cutting experiments by the random sampling method.

State—Madras. Year—1954-55. Crop—Irrigated cholam.

TABLE I.—Statement showing the estimated average yield, sampling error and the total production in terms of cleaned and dried grain.

Districts.	Number of experiments.		Estimated yield in lb./acre (dried and cleaned grain).	Sampling error of the estimated average in lb./acre.	Percentage sampling error.	Area under the crop used for estimating production (in '00 acres) as per final forecast report.	Estimated production in '00 tons (dried and cleaned grain).
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 North Arcot	10	4	868.75	68.75	7.91	138	54
2 Salem	20	12	1040.31	175.81	16.90	1,069	496
3 Tiruchirappalli ..	30	24	1001.75	174.25	17.39	505	226
4 Madurai	40	24	1212.81	164.12	13.53	611	331
5 Ramanathapuram ..	30	6	823.81	127.00	15.42	327	120
6 Tirunelveli	34	16	1236.75	228.53	17.77	563	326
7 Coimbatore	30	16	95.75	336.44	35.31	956	407
Total for the districts covered by the survey.	194	102	1051.74	93.19	8.86	4,174	1,960
State	..	..	1051.74	..	..	4,256	1,998

N.B.—Allowance has been made for the area occupied by bunds.

APPENDIX No. 28.

Crop-cutting experiments by random sampling method.

State—Madras. Year—1954-55. Crop—Unirrigated cholam.

TABLE I.—Statement showing the estimated average yield, sampling error and the total production in terms of cleaned and dried grain.

Districts.	Number of experiments.		Estimated yield in lb./acre (dried and cleaned grain).	Sampling error of the estimated average in lb./acre.	Percentage of sampling error.	Area under the crop used for estimating the production (in '00 acres) as per final forecast report.	Estimated production in '00 tons (dried and cleaned grain).
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Salem	120	80	432.63	64.56	13.33	1,781	364
2 North Arcot	60	52	443.25	53.69	12.11	1,112	239
3 South Arcot	50	29	403.25	72.06	17.65	1,505	274
4 Tiruchirappalli ..	100	67	374.81	40.56	10.82	2,975	498
5 Madurai	70	32	797.25	138.06	17.32	8,089	1,106
6 Tirunelveli	16	4	837.50	547.00	65.31	252	154
7 Coimbatore	120	72	365.38	58.81	16.10	4,294	700
8 Ramanathapuram ..	10	..	..	..	..	..	..
Total for the districts covered by the survey.	546	336	438.05	26.88	5.51	15,008	3,270
State	..	..	438.05	..	..	15,274	3,328

NOTE.—No allowance has been made for the area occupied by bunds.

APPENDIX No. 29.

Statement showing the estimated average yield, sampling error and total production of rice for the entire paddy crop of the year 1954-55 Season in the Madras State.

Districts.	Area under paddy as per third and final forecast report in '000 acres.	Number of experiments.		Estimated average yield in terms of rice lb./acre.	Percentage sampling error.	Estimated production in terms of rice in '000 tons.
		Planned.	Considered for analysis.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 Chingleput	590	120	102	891.60	5.52	235
2 South Arcot	570	110	106	1272.26	5.52	324
3 North Arcot	500	110	102	1292.61	4.24	289
4 Salem	235	40	38	1440.78	6.57	151
5 Coimbatore	130	40	38	1490.10	6.14	87
6 Tiruchirappalli	510	90	88	1279.91	6.48	291
7 Tanjore	1,355	180	176	1179.41	3.28	713
8 Madurai	330	90	88	1366.19	6.67	201
9 Ramanathapuram	430	100	90	783.45	7.90	150
10 Tirunelveli	340	90	84	1560.19	4.58	237
11 Malabar	860	140	137	897.27	4.50	345
12 South Kanara	570	120	118	905.29	4.06	230
13 The Nilgiris	8	10	10	1313.20	13.57	5
State	6,428	1,240	1,177	1135.20	1.49	2,258

APPENDIX No. 31.

Statement showing the results of crop cutting experiments on ragi (irrigated and un-irrigated) combined for the year 1954-55.

District.	Number of experiments.		average yield in lb./acre.	Standard error of the estimated average yield in lb./acre.	Percentage standard error.	Area under ragi as per final forecast report in '00 acres.	Estimated total production of ragi in '00 tons.
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Chingleput	80	22	712.00	130.39	18.31	850	320
2 North Arcot	100	62	219.81	71.71	32.62	1,150	539
3 Salem	130	64	889.56	74.48	8.37	3,000	1,308
4 South Arcot	80	68	537.31	95.68	17.82	980	428
5 Tanjore*	..	..	712.00	..	..	180	90
6 Tiruchirappalli	40	26	683.19	63.41	9.28	560	199
7 Madurai	40	26	728.13	174.75	24.00	460	260
8 Ramanathapuram	80	38	315.06	113.52	36.03	1,050	464
9 Tirunelveli	30	28	712.00	160.58	22.55	280	136
10 Coimbatore	100	70	562.19	80.08	14.24	1,400	636
11 Malabar*	..	..	712.00	..	..	55	17
12 South Kanara*	..	..	712.00	..	..	50	16
13 The Nilgiris	..	..	712.00	..	..	30	9
State	680	404	712.00	45.02	6.32	10,045	4,422

* Though no experiments were conducted in these districts, since there was some area under the crop, State yield averages were adopted and the production estimated.

APPENDIX No. 30.

Statement showing the results of crop-cutting experiments on Cholam (irrigated and unirrigated) combined for the year 1954-55.

Districts.	Number of experiments.		average yield in lb./acre.	Standard error of the estimated average yield in lb./acre.	Percentage standard error.	Area under Cholam as per final forecast report in '00 acres.	Estimated total production of Cholam in '00 tons.
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Chingleput*	..	..	523.23	..	..	80	19
2 North Arcot	70	56	490.22	48.37	9.87	1,250	273
3 Salem	140	92	691.81	77.29	11.19	2,350	180
4 South Arcot	50	29	422.87	72.06	17.04	1,540	291
5 Tanjore*	..	..	961.54	..	..	50	21
6 Tiruchirappalli	130	91	465.79	42.91	9.21	3,480	724
7 Madurai	110	56	866.87	118.42	13.67	3,700	1,439
8 Ramanathapuram	40	6	707.64	127.00	17.95	500	158
9 Tirunelveli	50	20	1,148.69	230.88	20.10	820	421
10 Coimbatore	150	88	472.34	77.87	16.48	5,250	1,107
11 Malabar*	..	..	610.89	..	..	9	2
12 South Kanara*	..	..	610.89	..	..	..	..
13 The Nilgiris*	..	..	610.89	..	..	1	..
Total for the State	740	438	610.89	29.19	4.78	19,530	5,326

* Though no experiments were conducted in these Districts: since there was some area under the crop, state yield averages were adopted and the production estimated.

APPENDIX No. 32.

Statement showing the results of crop-cutting experiments on cumbu (irrigated and unirrigated) combined for the year 1954-55.

District.	Number of experiments.		average yield in lb./acre.	Standard error of the estimated average yield in lb./acre.	Percentage standard error.	Area under Cumbu as per final forecast report in '00 acres.	Estimated total production of Cumbu in '00 tons.
	Planned.	Considered for analysis.					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 Chingleput*	..	..	379.62	..	..	140	24
2 North Arcot	50	24	328.98	83.21	25.29	800	118
3 Salem	150	48	381.62	64.48	16.90	2,900	477
4 South Arcot	100	66	439.32	34.37	7.82	1,450	294
5 Tanjore*	..	..	417.52	..	..	50	9
6 Tiruchirappalli	150	114	294.82	42.33	14.36	2,320	871
7 Madurai	50	18	769.68	265.88	34.54	750	258
8 Ramanathapuram	120	70	390.55	27.60	7.06	1,950	340
9 Tirunelveli	100	50	477.53	51.38	10.75	2,000	426
10 Coimbatore	140	116	244.15	25.85	10.58	4,100	447
11 Malabar*	..	..	..	..	..	1	..
12 South Kanara	..	..	..	..	..	..	..
13 The Nilgiris	..	..	..	..	..	..	..
State	860	506	365.90	16.40	4.48	16,861	2,754

* Though no experiments were conducted in these districts, since there was some area under the crop, State yield averages were adopted and the production estimated.

APPENDIX No. 33.

Statement showing the distribution of tractors and bull-dozers.

Serial number and name of district.	Number with bull-dozers.	Number without bull-dozers.	Total.
1 North Arcot	4	2	6
2 Chingleput	8	11	19
3 South Arcot	4	9	13
4 Tanjore	11	10	21
5 Tiruchirappalli	5	6	11
6 Madurai	7	6	13
7 Tirunelveli	4	6	10
8 Ramanathapuram	4	4	8
9 Salem	4	4	8
10 Coimbatore	12	6	18
11 Nilgiris	5	1	6
12 North Malabar	3	2	5
13 South Malabar	6	1	7
14 South Kanara	7	2	9
15 Waynad	1	1	2
16 Agricultural Research Station, Tindivanam.	..	2	2
Total ..	85	73	158

APPENDIX No. 34.

Particulars of types of tractors and their horse-power held by the department.

Name and type of tractor.	Horse-power.	Total number of tractors	
		With bull-dozer.	Without bull-dozer.
(1)	(2)	(3)	(4)
Small type—			
1 McCormic Deering W4.	25	..	2
2 Massey Harris 30-K	22	..	8
3 Massey Harris 20-K	18.5	..	11
Medium type—			
1 I.H.C. WD-9	40	..	5
2 Do. TD-9	40	7	2
3 Do. W6	30	..	18
4 Do. T6	30	16	1
5 Fordson Major	30	..	3
6 John Deere AW. and AR.	40	..	12
7 I.H.C. TD-6	34	2	4
8 Caterpillar D4	45	15	..
9 David Brown	25	..	9
Heavy type—			
1 Caterpillar D6	65	25	..
2 Do. D7	75	11	..
3 I.H.C. TD14	65	9	..
Total ..	..	85	73

APPENDIX No. 35.

Statement showing the types and models of tractors with the Agricultural department.

Year.	I.H.C. consisting of T 6, TD 6, TD 9, WD 9, W 4, TD 14, and W 6.	John Deere consisting of AB, and AW models.	Caterpillar D 4, D 6 and D 7.	Massey Harris consisting of 30 K and 20 K.	Fordson Major.	David Brown.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1954-55	64	12	51	19	3	9	158

APPENDIX No. 36.

Statement showing the district-wise outturn of the tractors and bull-dozers.

Serial number and name of district.	Total number of hours bull-dozers worked.	Total outturn (ploughing, levelling and harrowing).
	HRS.	ACS.
1 North Arcot	2,433	1,094
2 Chingleput	7,361	1,945
3 South Arcot	1,886	2,031
4 Tanjore	3,297	3,149
5 Tiruchirappalli	1,822	1,321
6 Madurai	5,717	1,642
7 Tirunelveli	3,019	977
8 Ramanathapuram	1,558	2,668
9 Salem	4,008	750
10 Coimbatore	13,898	4,031
11 Nilgiris	4,923	232
12 North Malabar	1,690	481
13 South Malabar	4,298	391
14 South Kanara	5,591	386
15 Wynad	658	147
16 Agricultural Research Station, Tindivanam	..	617
Total ..	62,159	21,812

APPENDIX No. 37.

Statement showing the progressive increase on the hire charges on tractors and bull-dozers.

Particulars of work.	From 1st April 1946 to 30th June 1950.	From 1st July 1950 to 31st March 1952.	From 1st April 1952.	From 31st December 1954 (vide G.O. Ms. No. 857 Agriculture (P.F.) dated 2nd December 1954).
	Rs. 5 per acre	Rs. 10 per acre	Rs. 12 per acre	Rs. 12 per acre
Ploughing by all types of tractors.	Rs. 5 per acre	Rs. 10 per acre	Rs. 12 per acre	Rs. 12 per acre
Ploughing—Shallow ploughing	Rs. 3 per acre	Rs. 5 per acre	Rs. 7 per acre	Rs. 7 per acre
Levelling with bull-dozer D7	Rs. 9 per hour	Rs. 12 per hour	Rs. 14 per hour	Rs. 17 per hour
Do. D6	Rs. 7 per hour	Rs. 10 per hour	Rs. 12 per hour	Rs. 16 per hour
Do. TD14	Rs. 7 per hour	Rs. 10 per hour	Rs. 12 per hour	Rs. 16 per hour
Do. TD9	Rs. 7 per hour	Rs. 8 per hour	Rs. 10 per hour	Rs. 16 per hour
Do. T6	Rs. 7 per hour	Rs. 8 per hour	Rs. 10 per hour	Rs. 12 per hour
Do. D4	Rs. 7 per hour	Rs. 8 per hour	Rs. 10 per hour	Rs. 12 per hour
Do. D6	Rs. 5 per hour	Rs. 8 per hour	Rs. 10 per hour	Rs. 12 per hour

APPENDIX No. 38.

Statement showing the acreage tackled by the departmental tractors.

1 Target in acres	40,800 acres.
2 Outturn in acres	21,812 „
3 Number of hours worked by the bull-dozer	62,159 hours.
4 Additional food grains in tons	2,092 tons.
5 Number of tractors with bull-dozer and without bull-dozer—	
With bulldozers	85
Without bull-dozer	73
Total	158
6 Number of bull-dozer	85
7 Hire charges collected during the year	Rs. 9.82 lakhs.

APPENDIX No. 39.

Statement showing tractors and implements available with the department.

Particulars.	Year.
	1954-55.
1 Tractors (total)	158 (85 with bull-dozer and 73 without).
2 Bull-dozer attachments	85
3 Mould board ploughs, harrows	89
4 Disc harrows, ploughs, cultivators and tillers	100
5 Disc ploughs	31
6 Rotavators	8

APPENDIX No. 40.

Statement showing jurisdictions of the Assistant Agricultural Engineers.

Name of each Assistant Agricultural Engineer with headquarters.	Name of district or districts in his jurisdiction.
Assistant Agricultural Engineer (Inspection), Madurai.	Madurai, Ramanathapuram, and Tirunelveli.
Assistant Agricultural Engineer (Inspection), Tiruchirappalli.	Tiruchirappalli, Tanjore, South Arcot and Salem.
Assistant Agricultural Engineer, Central Agricultural Engineering Stores, Saidapet.	Chingleput and North Arcot districts.
Assistant Agricultural Engineer (Inspection), Coimbatore.	Coimbatore, Nilgiris, South Malabar, North Malabar and South Kanara.

N.B.—The Assistant Agricultural Engineers, Tractor Workshop and Assistant Agricultural Engineer (Research) have been absolved of inspection duties with a view to devote more attention on workshops.

APPENDIX No. 41.

Statement showing the rates of hire charges collected in other States including Madras State.

Name of State.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Ploughing— shallow or levelling.	Deep ploughing.	Levelling or bunding.	Ploughing cultivated lands.	Levelling.	Discing.	Ploughing barryar land.	Shallow ploughing.	Shrub lands clearing.	Harrowing single.	Harrowing double.
Travancore—Cochin		20 p.a.	30 p.a.	30 p.h.	25 p.a.	27 p.h.	12½ p.a.	35 p.h.	..	..	..	..
Madhya Bharat—Gwalior		..	..	..	..	8 p.h.	..	..	..	..	..	..
Kanpur—Uttar Pradesh		..	..	..	..	..	..	..	..	..	..	..
Sowashtra—Raikot		..	..	..	..	..	..	..	..	..	..	..
Bihar—Patna		..	..	..	..	..	..	..	..	..	..	..
West Bengal—Calcutta		..	..	..	..	..	..	..	..	..	..	..
Madhya Pradesh—Nagpur		..	..	..	..	..	..	..	..	..	..	..
Punjab—Simla		..	..	..	..	..	..	..	..	..	..	..
Hyderabad—Deccan		22 p.a.	..	14 p.h.	..	..	4 p.a.	..	..	..	..	18 p.a.
Mysore—Bangalore		..	..	..	..	..	..	..	..	..	..	..
Assam—Shillong		..	..	..	..	..	..	..	..	..	..	..
Orissa—Cuttack		..	..	..	..	..	12½ p.a.	30 p.a.	..	..	..	..
East Punjab States Union—Nabha		..	..	..	..	..	..	..	..	..	..	..
Vindhya Pradesh—Baya		..	..	..	..	..	..	..	..	..	..	..
Madras State		..	..	..	..	..	..	..	..	..	..	..
		Sugarcane ploughing.	Ploughing.	Ploughing of waste land.	Second ploughing.	Cultivating.	Harrowing.	Sobaga.	Ploughing in black cotton soil.	Ploughing in red soil.	All types of operation.	
		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
Travancore—Cochin		..	..	..	..	..	..	..	..	..	..	..
Madhya Bharat—Gwalior		..	..	..	..	..	..	..	..	..	..	..
Kanpur—Uttar Pradesh		..	..	..	..	..	..	..	..	..	..	..
Sowashtra—Raikot		..	..	..	..	..	..	..	..	..	..	..
Bihar—Patna		..	..	..	..	..	..	..	..	..	..	..
West Bengal—Calcutta		..	..	..	..	..	..	..	..	..	..	..
Madhya Pradesh—Nagpur		..	..	..	..	..	..	..	..	..	..	..
Punjab—Simla		..	..	..	..	..	..	..	..	..	..	..
Hyderabad—Deccan		..	..	..	..	..	..	..	..	..	..	..
Mysore—Bangalore		..	..	..	..	..	..	..	..	..	..	..
Assam—Shillong		..	..	..	..	..	..	..	..	..	..	..
Orissa—Cuttack		..	..	..	..	..	..	..	..	..	..	..
East Punjab States Union—Nabha		..	..	..	..	..	..	..	..	..	..	..
Vindhya Pradesh—Baya		..	..	..	..	..	..	..	..	..	..	..
Madras State		..	..	..	..	..	..	..	..	..	..	..

p.a. = per acre.
p.h. = per hour.

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APPENDIX No. 41.

Madras State—				
Bulldozer	D 7	..	..	Rs. 17 per hour.
Do.	D 6	}	..	Rs. 16 „
Do.	TD 14		..	
Do.	D 4		..	Rs. 13 „
Do.	TD 9		..	
	TD 6, T 6	..	..	Rs. 12 „
Mould board plough, minimum	Rupees			Rs. 3 per acre.
12 per day.				
Disc harrow, minimum	Rs. 6 per day	..		Rs. 1-8-0 per acre.
Tractor Trailer pumpset		..	..	Rs. 8 per day.
Trailers alone	..	..	..	Annas 12 per hour with a minimum of Rs. 6 per day.
Tractor with trailer	..	..	..	Rs. 32 per day with fuel oil, etc., if supplied by the Department and Rs. 20 if fuel oil supplied by the party.

APPENDIX No. 42.

List of spare parts manufactured at Tractor Workshop, Coimbatore.

Serial number and description.	Spare Parts No.	Quantity.	Value.
(1)	(2)	(3)	(4)
			RS. A. P.
1 Studs	2A 5365	4	1 1 0
2 Nuts	..	4	2 4 0
3 Do.	1459 x	2	1 0 0
4 P.C.U. cover plate	..	1	1 0 0
5 Studs (special)	..	2	1 0 0
6 Washers	1A 226	3	1 2 0
7 Cap screws	1A 4864	8	4 14 0
8 Generator cover plate	..	1	1 0 0
9 Flat washer	..	2	1 0 0
10 Tube assembly	1819	1	3 0 0
11 Do.	2F 34	1	3 8 3
12 Washers	1A 5665	12	1 0 0
13 Plug	2B 7409	2	1 1 3
14 Connector	2B 8996	2	1 0 0
15 Main assembly	2F 4191	2	1 0 0
16 Sleeve for starting engine	..	2	1 0 0
17 Tube assembly	..	2	2 8 6
18 Bolts	3/4" x 11/16"	1	1 5 0
19 Master cylinder bye pass stud	..	1	1 0 0
20 Oil cup	..	6	1 5 0
21 Cap screw	1" x 1 1/2"	1	2 3 6
22 Clutch shaft pin	..	1	1 0 0
23 Clutch lifter bush	..	1	1 0 0
24 Plow clutch pin	..	1	1 4 0
25 Tube assembly for fuel filter connectors	..	1	2 4 0
26 Cap	4B 7273	1	2 4 0
27 Screws	..	8	3 9 0
28 Distributor shaft lock	..	1	1 0 0
29 Roller plate	..	8	4 5 0
30 Tappet Adj. spanner	..	1	1 0 0
31 Spanner/Plug	..	6	6 13 0

List of parts manufactured at Tractor Workshop, Coimbatore—cont.

Serial number and description.	Spare parts number.	Quantity.	Value.
(1)	(2)	(3)	(4)
			RS. A. P.
32 Roller plate	.. .. .	4	3 0 0
33 Bulldozer bolts	.. .. .	1	23 10 0
34 Pin ..	2" x 9 1/2"	1	3 15 0
35 Bushing	15721 A	1	11 0 0
36 Bearing stud	.. .. .	8	1 0 0
37 Magneto key	45001 D	1	1 0 0
38 Cap screws, 7 x 2 1/4"	.. .. .	12	6 12 0
39 Nuts	7/8"	12	7 2 0
40 Sleeves	.. .. .	4	1 0 0
41 Bolts	.. .. .	4	2 8 0
42 Do.	.. .. .	1	1 4 0
43 Do.	47465	1	2 0 0
44 Do.	40288	1	1 10 0
45 Nuts	.. .. .	60 Nos.	4 0 0
46 Locks	.. .. .	20 Nos.	8 2 0
47 Bolts	1/2" x 3/4"	2	1 6 0
48 Rivets	.. .. .	1	7 0 0
49 Puller adaptor	.. .. .	2	2 3 0
50 Steering shaft bushes	1B 1585	6	20 11 0
51 Bushes	8B 8313	6	14 7 0
52 Do.	7B 9257	6	5 8 0
53 Pin ..	3F 6523	2	1 7 0
54 Bolts	.. .. .	2	1 0 0
55 Cylinder Head breather connector	38026 MX	4	7 15 0
56 W6 Bolt	.. .. .	1	1 0 0
57 Cap screw	1A 2025	55	23 10 0
58 Handle for hammer	.. .. .	6	3 4 0
59 Bolts	1A 8651	16	27 1 0
60 Dowel pin	497 A	1	1 0 0
61 Lock	1B 945 M	48	4 1 0
62 Brass nipple for Lo furnace	.. .. .	1	1 0 0
63 Screw	6B 808	4	5 14 0
64 Workmen bench	.. .. .	1	35 1 0
65 Retainer washer	5B 6669	4 Sets.	5 14 0
66 Die for grouser plate bolts	.. .. .	1	6 4 0
67 Pin ..	8B 2417 M	1	1 2 0
68 Lock	2A 209 M	1	2 4 0
69 Bolts	7/8" x 4 3/4"	8	12 3 0
70 Pattern for D7 cellar	.. .. .	1	10 14 0
71 Spades	.. .. .	2	1 15 0
72 Cylinder head nuts	1A 5066	12	8 2 0
73 Share paint for tool bar, ..	.. .. .	4	34 1 0
74 Generator bolts	.. .. .	2	2 1 0
75 Cap screws	S 1572	24	22 4 0
76 Generator nut	.. .. .	1	1 1 0
77 Air cleaner screws	149962 A	6	4 10 0
78 Bushing bronze	4F 8412	4	73 10 0
79 Casting power plate	6696 A	1	72 0 0
80 Casting G.M. rods	.. .. .	7	288 0 0
81 Casting C.I. Roller collar	7B 7445	4	73 12 0
82 Locks	3F 9188	52	4 0 0
83 Do.	3F 1,960	50	8 2 0
84 Bolts	15235 A	2	1 6 0
85 Rivets	.. .. .	24	1 11 0
86 Collor bulldozer V Frame	.. .. .	1	6 15 0
87 Bracket and rivet for D7 link assembly	.. .. .	1	2 15 0
88 Bracket for removing plug	.. .. .	1	1 1 0
89 Stop cock for air compressor	.. .. .	1	1 8 0
90 Gunmetal bush	.. .. .	1	2 3 0
91 Elbow	3B 8999	4	28 8 0
92 Water tube assembly	1F 9873	4	12 10 0
93 Fly wheel bolt blocks	1A 2226	50	4 7 0
94 Washers	.. .. .	4	1 4 0
95 Casting C.I. collors	.. .. .	2	2 0 0
96 Diagonal brace bearing dowel pin	3B 2484	2	1 11 0
97 Die set	S 1621	1	16 14 0

APPENDIX No. 42—cont.

List of parts manufactured at Tractor Workshop, Coimbatore—cont.

Serial number and description. (1)	Spare parts number. (2)	Quantity. (3)	Value. (4)
98 Cap screws			RS. A. P.
99 Tool holder for latch bit	S 1589	12	13 13 0
100 Track adj. bolt latch		2	1 0 0
101 Box bit	1F 9487	4	1 15 0
102 Bolts	13/16"	4	4 4 0
103 Lock	V 459	6	12 4 0
104 Chisel	7B 9514	100	3 10 0
105 Shovel	2" wide		
106 Studs		1	2 9 6
107 Spacer, 5/8" × 3/8"	2A 4492	8	3 10 0
108 Box spanner	8B 8679	8	2 8 6
109 Pin	3/4"	4	7 11 0
110 Stud	9B 2283	26	2 7 0
111 Dowel pin	L 1166	6	2 12 0
112 Dowel pin	3B 2484	6	2 8 0
113 Plate with dowel pin	3B 2483	6	2 14 0
114 Washers	1F 8289	8	13 7 0
115 Cotton pins	2B 4853	8	1 14 0
116 Bush	P 5984	12	9 4 0
117 Pattern for collar	1A 1362	2	1 11 0
118 Moulding boxes		1	9 3 0
119 Gin sieve		2	8 3 0
120 Lock plates		1	25 10 0
121 Air cleaner brackets	2A 3327	6	2 15 0
122 Fuel tank caps		2	6 10 0
123 Pattern for casting C.I. Box	4B 1455	18	88 8 0
124 Adapter for D7 Fuel line		1	10 10 0
125 Studs		13	1 4 3
126 Bolts for fuel pump bracket		8	18 8 0
127 Casting C.I. plow parts	2A 4382	6	3 5 0
128 Diagonal brace bolts		3	34 7 0
129 Recoil spring bolt		8	15 3 0
130 Plow guide rod	7B 9726	4	64 1 3
131 Hanger for dis.	50088	1	5 14 0
132 Starter bushes	50038 M21	4	21 15 0
133 Centre Bolt for MSC 9616		1	1 5 0
134 Chisels		3	4 10 0
135 Support Plates		2	2 10 0
136 Bolts, 5/16" × 5"	8B 9520	4	14 4 0
137 Cap screws		2	1 13 6
138 Cap screws	1A 8063	4	2 5 0
139 Bolts, 5/8" × 2 1/2"	L 1178	6	13 5 0
140 King pin bushes	LA 1135	12	25 4 0
141 Bronze bushes		4	3 1 0
142 Shackle nuts		2	1 0 0
143 Shackle nuts		2	3 6 0
144 Clutch dog pin		2	3 6 0
145 Shackle pin	PO 14106	4	3 6 0
146 Clutch slip raller		2	14 6 0
147 Helper spring nuts		4	4 9 0
148 Bolts, 3/4" × 3 1/4" × 1 1/8"	5B 636	8	16 14 6
149 Puller adapters	A 3604	4	9 11 6
150 Nut	070 20M	2	3 7 6
151 Idler bolts	1B 4207	4	3 4 6
152 Idler bolt	6F 7026	4	13 1 6
153 Valve seat cutter	A 3604	12	23 5 0
154 Carburattor jets		1st set	33 6 0
155 Bolts, 1/2" × 1 1/2" spl.		6 Nos.	5 4 0
156 Bolts, 3/8"		2	1 11 0
157 Fuel line		2	2 13 0
158 Lid for man hold		1	2 8 6
159 Laddle and its bracket		1	7 3 0
160 Box spanner		1	3 7 6
161 Cap screws	15/16"	12	24 1 0
162 Guard	L 472	12	39 14 0
163 Master pin plugs	5B 5869	4	6 4 6
		6	5 6 6

APPENDIX No 42—cont.

List of parts manufactured at Tractor Workshop, Coimbatore—cont.

Serial number and description. (1)	Spare parts number. (2)	Quantity. (3)	Value. (4)
			RS. A. P.
164 Special spanner	7/8"	6	4 1 0
165 U clamps for plow		6	12 1 0
166 D6 and T6 sleeve puller		1	57 6 3
167 Clamps for lighting		6	5 7 0
168 3/8" stud		4	1 0 0
169 Master pin plug		6	6 5 0
170 Guards	5B 5865	6	1 15 0
171 Cap screws	1A 2029	50	18 7 0
172 Carburattor jet screws		4	4 1 0
173 Generator bush		1	4 13 8
174 D4 shovel holding bolts		2	2 0 0
175 Drain assembly		1	9 11 0
176 Bulldozer frame bolts		8	19 3 0
177 MH fuel liner		1	17 14 0
178 Dynamo screw		2	1 11 0
179 S. rocket driven pinion nut		1	26 5 0
180 Connector		6	15 5 6
181 Studs	LA 2035	48	34 13 6
182 Bolts, 1 1/2" × 3/8"		24	7 6 6
183 Bolts, 1 1/4" × 3/8"		12	10 7 0
184 Rocker arm grinding attachment		1 set	5 11 6
185 Stud screw for hallet oil engine		6	2 8 6
186 Pins, 3/8" × 4"		4	1 2 0
187 Pins, 2 1/4" × 2" × 4 1/2"		4	15 13 6
188 Cylinder head studs		6	5 13 6
189 Do.		6	5 14 0
190 Connecting rod for accelerator		1	2 4 0
191 Pins, 1/2" × 2" × 3/4"		4	20 15 0
192 Washers, 2 1/2" × 2" × 6 1/2"		10	3 11 0
193 Bolts, 1/2" × 2 1/2"		2	3 12 0
194 Bolts, 3/8" × 3 1/2"		4	4 4 6
195 Fly wheel bolt lock		102	13 8 0
196 Bolt, 3/8" × 1 1/2"		8	3 3 0
197 Stay rods for lorry		2	2 0 0
198 Lock washers	T 290	10	3 2 0
199 Do.	6B 5128	10	2 9 0
200 Share point		4	19 4 0
201 Drill bit for boring glass		1	4 9 6
202 Recoil spring bolt and nut		4	9 3 6
203 Nut for gas valve		1	16 12 6
204 Gudgeon pin bushing		1	2 4 6
205 Water tank trailer plange, 3" × 3 1/2"		1	7 15 0
206 TD 9 Spring bolts		4	9 3 6
207 Bulldozer frame bolts, 1" × 12		8	79 3 0
208 Fuel line		1 No.	17 14 0
209 Dynamo screws		2 Nos.	1 11 0
210 Sprocket drive pinion nut		1 No.	26 5 0
211 Connectors		6	14 5 6
212 Bolts, 3/8" × 1 1/2"		24	7 6 6
213 Studs	Az 2025	48	34 13 6
214 Bolts 11/16" × 2 1/4"		12	10 7 0
215 Foot valve spring		1	7 5 0
216 Forward and reverse gear shaft		1	8 3 0
217 Nut		4	9 3 0
218 Foot board		1 set	10 12 0
219 John Deere brake lever bushing		1 set	4 0 0
220 Brake pedal pins for lorry		1	2 3 0
221 Tilting handle lock pin		1	1 0 0
222 Silencers		1	12 7 0
223 Bearing setting clamp		1	2 10 0
224 Oilpressure guage pipe		1	1 6 6
225 Cotter pins		4	7 0 0
226 Oil Collor pipe		1	2 1 0
227 Steering clutch bushing	1B 6827	8	56 8 6
228 Steering clutch shaft		4	8 4 0
229 D4 gear box level knob		3	4 9 0

APPENDIX No. 42—cont.

List of parts manufactured at Tractor Workshop, Coimbatore—cont.

Serial number and description. (1)	Spare parts number. (2)	Quantity. (3)	Value. (4)
			RS. A. P.
230 TD 9 brake adjustment bolt		6	71 1 0
231 D4 Hydraulic piston bush	4F 8412	4	82 5 6
232 Shackle bushing		2	2 5 0
233 Door latch for lorry		2	2 4 6
234 End blade bolts		3	9 2 0
235 Collor for distributor		1	1 0 0
236 Foot rest plates		1 set	58 6 0
237 Studs $\frac{1}{2}$ " $\times$ $2\frac{1}{2}$ "		12	11 9 0
238 Studs $\frac{3}{8}$ " $\times$ $1\frac{1}{2}$ "		12	12 1 0
239 Studs $\frac{3}{8}$ " $\times$ $1\frac{1}{4}$ "		12	9 0 6
240 U frame bearing bolts		4	18 11 0
241 Clamp for helper spring for jeep		2	7 2 0
242 Screw $\frac{5}{16}$ " $\times$ 1"		12	6 23 6
243 Bolts and nuts for trunion bearings		4	14 13 6
244 Screw $\frac{1}{2}$ " $\times$ 10"		4	4 1 0
245 Bolts $\frac{3}{8}$ " $\times$ 4 per cent		4	2 14 6
246 Pad locks to jeep tool box		2	3 0 6
247 Handle for tilt dozing	R 8213	1	4 9 0
248 Foot valve weight		6	6 0 6
249 Bushing	1F 2409	2	74 6 6
250 Gun metal nut for gate valve		1	1 14 6
251 Bolts	43832 D	12	9 11 0
252 Fuel pump lifter assembly	2A 5578	3	19 3 6
253 Grease cup for tractor trailer		1	2 8 6
254 Key for blackstone oil-engine		1	3 5 0
255 Valve seat cutter		1 set	8 4 0
256 Plate	6B 7473	2 No.	9 2 2
257 Belt fasteners		1 No.	1 2 0
258 Hose clamp		2	1 8 0
259 Bushing	1B 1585	8	24 12 6
260 Bushing	7B 9257	6	5 11 0
261 Bushing	8B 3313	6	1 2 0
262 Bolts		12	14 11 6
263 Bore well pump cover		1	53 8 0
264 Bolts	S 1601	12	16 6 6
265 Bolts	4B 1422	12	5 6 6
266 Water pump bushing		1	9 7 0
267 Water pump bushing		1	2 4 6
268 Medal for valve seat cutter		1	3 0 0
269 Spur gear Milling Cutter		1	13 5 6
270 Puller set (liner) clamp		1	1 0 0
271 Boring bar		1	1 0 0
272 Box $\frac{3}{4}$ spanner bits	17/32"	6	16 13 6
273 Cutter for W.D.-9 valve seat		2	19 8 0
274 Clutch collar with bushes		2	5 11 0
275 Clutch collar with yoke		2	5 1 6
276 Tube assembly	4F 8311	2	1 15 0
277 Key	T 451	4	2 15 0
278 Locks	2F 4154	6	2 8 6
279 Locks	3B 4897	4	1 6 6
280 Connectors	3B 8995	4	7 6 6
281 Collor assembly	3B 696	1	72 10 6
282 Collor shift plate	7B 5997	4	15 1 6
283 Drive gear shaft		1	8 15 6
284 Rivets		20	6 12 0
285 Reamer		5	22 4 6
286 Fuel line for hallet		16	34 0 0
287 Lorry seat making and Fixing		1	6 10 0
288 Box Spanner		20	27 0 0
289 Connector to the Acetylene cylinder		1	2 13 0
290 Casting TD-9 Roller collors		2	21 8 0
291 Clutch links		20	299 6 6
292 Liner washer for clutch facings		12	2 4 0
293 Studs for radiator		2	2 7 0
294 Track roller collar		2	60 10 0
295 Washers		40	5 2 6

APPENDIX No. 42—cont.

List of parts manufactured at Tractor Workshop, Coimbatore—cont.

Serial number and description. (1)	Spare parts number. (2)	Quantity. (3)	Value. (4)
			RS. A. P.
296 Studs		12	7 8 6
297 Radiator supports		2	9 6 0
298 Bracket		1	5 14 0
299 Pump shaft		1	13 9 6
300 Pump shaft bushing		1	35 7 6
301 Seat for jeeps		1	11 8 0
302 Adj. bolts		2	5 1 6
303 Self starter bushing		2	5 13 6
304 Wheel spanners		1	1 0 0
305 Fuel transfer pump shaft		12	27 1 6
306 Eye Bolt		2	10 11 0
307 Silencer		1	1 0 0
308 Pump shaft		12	117 15 0
309 King pin cottor		2	3 6 0
310 Spur gear shaft		*1	26 0 0
311 Cleaning tray		†1	10 0 0
312 Pin		1	5 13 0
313 Patten for bracket		1	18 8 0
314 Hook bolt	B 7363	2	3 1 0
315 Lock washer	6B 5128	30	4 5 0
316 Lock washer	6B 7321	30	3 3 0
317 Lock washer	6B 9260	30	44 9 0
318 Lock washer	6B 8357	30	6 0 6
319 Lock washer	L 935	30	2 2 0
320 Lock washer	1C 155	30	3 9 0
321 Drum bolts		8	4 3 6
322 Lock Washer	6B 8,358	30	1 14 0
323 Bolt		8	9 4 0
324 Petrol tube with filter assembly	6F 2402	2	6 6 0
325 Drum bolts and nuts		4	6 7 0
326 Lub. oil pressure guage	4F 8311	1	3 4 6
327 Bushins	1B 6827	12	124 14 0
328 End Blade (D4)		2	5 8 6
329 Water-pump studs		8	6 10 0
330 Bulldozer U Frame bolts		12	17 6 0
331 Lock washer	2B 3734	12	2 7 0
332 Lock washer	T 35	12	1 15 6
333 Lock washer	2B 8726	12	2 7 0
334 Fly wheel clutch shaft	2B 1018	6	8 2 6
335 Clutch finger plate	7B 5647	8	8 0 0
336 Lock washer		12	2 1 0
337 Bolt	2A 1331	12	10 8 0
338 Master pin with collar D-6	5F 3247	3	4 8 0
339 Clutch collar assembly	3B 696	2	79 2 0
340 Bushing (Phosphor Bronze)	1F 3560	8	24 2 0
341 Khobs	L 829	12	23 9 6
342 Lock washer		12	1 8 0
343 Clutch finger plate	7B 5,758	2	19 1 0
344 Lock washer		12	1 12 6
345 Lock washer		12	1 13 6
346 Wooden foot board		4	2 0 6
347 Clutch drum nut		4	11 0 6
348 Clutch shaft with nuts D-4	1L 23T1	4	103 4 0
349 Sleeve transmission	2B 9787	2	3 14 0
350 Hydraulic pinion bushing and/pin		1	1 12 0
351 Fan drive shaft and coupling		1	10 14 0
352 Trunnion bolts $\frac{7}{8}$ "		12	10 10 6
353 Do. $\frac{3}{4}$ "		12	14 11 0
354 Bull dozer arm pin		4	42 0 6
355 Bush for D-7		1	1 2 0
356 Box spanner 1"		12	28 11 0
357 Crankshaft bolt	2B 4705	4	5 7 0
358 Casting D-7 collar		3	61 8 6
359 Recoil spring bolt		2	11 15 0
360 Clutch brake disc		1	14 6 0
361 Trottle lever bolt		2	1 4 6

APPENDIX No. 42—cont.

List of parts manufactured at Tractor Workshop, Coimbatore—cont.

Serial number and description. (1)	Spare parts number. (2)	Quantity. (3)	Value (4)
			RS. A. P.
362 Nut for recoil spring bolt	..	12	4 6 6
363 Master pin collar	..	15	9 12 0
364 Clutch shaft key	..	4	4 9 0
365 Welding screens	..	4	11 9 6
366 Bulldozer pins	..	2	3 14 0
367 Collor	..	12	9 0 0
368 Recoil spring bolt	..	1	9 0 0
369 Die set	..	1	33 1 0
370 Casting 6" G-M. Coupling	..	20	357 1 6
371 Clutch link assembly	..	22	353 8 0
372 Clutch link assembly	..	12	13 0 6
373 Box Spanner bits	..	1	7 0 6
374 Bulldozer arm nut	..	4	33 6 0
375 Casting roller collar	..	10	22 2 0
376 Pins	..	10	43 9 0
377 Bushes	..	1	5 4 6
378 Special stud	..	1	2 4 0
379 Sleeve for petrol line	..	12	35 17 0
380 Share point	..	1	44 10 6
381 Puller Yoke	..	1	4 9 0
382 D-6 clutch link die set	..	5	53 6 0
383 Eye bolt	..	1	6 9 6
384 Bulldozer arm nut	..	1	9 0 0
385 R & N engine inspection door	..	11	18 14 6
386 Bulldozer arm bolt	..	2	96 0 0
387 Bush for hydraulic pump	..	1	2 9 6
388 D-4 clutch collar	3B 396	2	10 4 0
389 Borings and fixing belt	..	2	1 11 0
390 Bush pedal shaft	..	2	7 8 0
391 Clutch shaft key	..	4	68 0 0
392 Collors	..	4	9 12 6
393 Bolt	IA 5964	6	2 4 0
394 Fuel tank caps	..	2	77 13 0
395 Gate for ramp	..	1	1 15 0
396 Starting wick holder	..	3	5 4 0
397 Centre seat	..	1	102 0 0
398 Lath tools	..	5	1 2 6
399 Bush for bell crank pin	..	1	15 13 6
400 Pins, 1 1/4" x 1/2"	..	2	2 4 6
401 Master pin with washer	..	1	30 8 0
402 Water outlet pipe flange	..	3	17 13 0
403 Bolts	..	12	57 9 0
404 Bolts	..	36	30 8 0
405 Collor rollers	..	14	17 13 0
406 Recoil spring bolt	..	1	12 2 6
407 Yoke screw	IA 1357	6	57 5 0
408 Shovel holding arm pin	..	4	1 8 0
409 Starting handle	..	1	1 2 0
410 Fuel tank	..	1	15 6 0
411 Lock pins	2F 2,022	12	98 0 0
412 Carrier roller Bushing	..	4	391 10 0
413 Derric post with hoist clamp	..	1	1 15 6
414 Clutch bolt	..	1	108 7 0
415 Rough casting of PCU. screws	..	12	9 5 0
416 Plunger assembly	..	2	30 13 0
417 Bearing carrier plate	..	2	9 15 6
418 D4 idler nut	2F 42	2	5 2 0
419 Bushing	2H 6,815	12	5 6 6
420 Bushing	4F 4,384	10	6 2 6
421 Operating lever pin	4F 4,387	4	6 6 0
422 Master pin assembly	..	2	2 4 0
423 Key	..	2	3 0 6
424 Clutch bolt John Deere	..	1	1 2 0
425 Shims (D7 engine block)	..	12	10 13 0
426 Recoil spring bolt and nut	..	2	3 1 6
427 John Deere clutch bolt	..	2	

APPENDIX 42—cont.

List of parts manufactured at Tractor, Workshop, Coimbatore.—cont.

Serial number and description. (1)	Spare parts number. (2)	Quantity. (3)	Value (4)
			RS. P. A.
428 D4 recoil spring bolts	..	12	20 12 0
429 Cutter (milling)	..	1	43 8
430 Swivel Nut	PO 1,149	1	7 11 0
431 Draw bar guide arm	PO 20,742	1	6 12 0
432 Front bell crank	PO 14,450	1	25 10 0
433 Screw housing	PO 14,469	1	7 12 0
434 Callor for adj. screw	PO 9,408	1	1 0 0
435 Pull Iron point Front	PO 14,429	1	14 12 0
436 Hitch clevis	PO 14,402	1	6 11 0
437 Hand latch	PO 15,296	2	3 7 6
438 Reed furrow wheel adjusting screw	PO 14,409A	1	8 9 0
439 Screw raising gear	PO 14,468	1	4 9 0
440 Swivel for adjusting screw	PO 9,407	1	6 7 0
441 Pull Iron rear	PO 14,429	1	10 4 0
442 Pull Iron rear	PO 14,430	1	2 4 0
443 Radiator Supports	..	..	..
444 Drive gear collar and shaft	..	2	13 11 0
445 Plow depth control screw	..	1	3 7 0
446 Bull dozer push bear nut	..	1	18 0 0
447 Roller for clutch finger	..	1	8 10 0
448 Bearing raiser for 24 disc harrow	..	1	1 8 0
449 Tyre leavers	..	2	1 8 0
450 Plow draw bar guide arm	PO 14,418	1	17 10 0
451 Casting spools	..	3	18 4 0
452 Box Spanner bits 1 1/8"	..	12	30 12 6
453 Box Spanner bits 1 5/16"	..	12	57 10 0
454 Fordson major water pump bushing	..	2	7 7 0
455 Fordson major water pump shaft	..	1	3 1 6
456 Cams	7B 5,758	12	49 9 0
457 Link	7B 5,647	16	6 14 0
458 D4 oil collar pipe assembly	..	3	12 10 0
459 Barrel stands	..	4	197 0 0
460 Die set for sprocket shaft	..	1 set	60 8 0
461 Track roller washers	..	12	9 15 0
462 Trunion bearing block nut	CI 1,5 1	12	14 4 0
463 Bulldozer centre eye bolt nut	..	1	14 13 0
464 Lorry generator bush	..	1	1 2 0
465 D7 fuel line bracket	..	3	16 0 0
466 Box Spanner bits	..	12	22 3 0
467 Fuel tank bracket	..	1	6 2 0
468 Steering lever bushes	..	12	6 1 0
469 Fuel tank delivery fitting	..	1	7 2 0
470 P.C.U. screws	..	12	432 6 0
471 Pin	5F 684	12	24 13 6
472 Pin	5F 689	4	38 0 0
473 Plow bolt 7/8" x 6"	PO 13,567	2	10 14 6
474 Plow bolt 7/8" x 7"	PO 13,567	2	11 11 0
475 Shaft	..	12	36 9 0
476 Plug	..	4	18 11 0
477 Plug	..	4	16 11 0
478 Bolts	..	2	5 2 0
479 Pin for clutch (D7)	S 64	6	5 6 0
480 Pulley	..	1	12 7 0
481 D4 Master pin assembly	..	1	1 11 0
482 Clutch shaft	8B 7,274	12	..
483 Master pin collar	..	6	1 2 0
484 Clutch roller and pin	..	3	0 8 0
485 Shaft	6B 7,834	12	..
486 Plug	..	4	..
487 Plug	..	4	..
488 Bolts	..	2	..
489 Bulldozer adjusting rod	..	2	..
490 Trunion	..	6	..
491 Pin	(only 2 completed) S 64	6	..

APPENDIX 42—cont.

List of parts manufactured at Tractor Workshop, Coimbatore.—cont.

Serial number and description (1)	Spare parts number. (2)	Quantity (3)	Value. (4)
492 Making Square nut and welding to a frame	..	1 No.	
493 Master pin collars	..	8 Nos.	
494 Aluminum Alloy pulley	..	1 No.	
495 D4 Master pin assembly	..	1 No.	
496 D6 Master pin collars	..	6 Nos.	
497 Radial drilling Machine collars bushes and shaft ..	..	3 Nos.	
498 Starter switch board	..	1 No.	
499 Drainage channel	..	4	
500 Idler wheel welding stand	..	1	
501 "V" Blocks for Workshop use	..	3	
502 Plow clutch roller and pins	..	3	

APPENDIX No. 43.

New designs of agricultural implements and designs tested.

- 1 Fertilizer placement unit.
- 2 CE. CO. CO. Power operated Rice Huller.
- 3 Japanese Rotary Weeder with Fertilizer Attachment.
- 4 Fin Fly Plough.
- 5 CE. CO. CO. Rice Huller (with winnower).
- 6 Coir Filter Point.
- 7 Tractor drawn seed drill for groundnut.
- 8 Groundnut grader.
- 9 Japanese type Thresher for Groundnut Picking.
- 10 Tractor drawn Guntika harvester.
- 11 Pedal operated groundnut decorticator.
- 12 Peanut Picker (Minor).

The above are mentioned in the chapter relating to Agricultural Engineering (Research).

APPENDIX No. 44.

List of articles sent for publication in the "Agricultural Newsletter".

A big seeded groundnut strain for desert purposes.
 Use of press mud (or) press cake as a manure for sugarcane.
 Maturity of Potato seed tubers—Its effect on yield.
 A plant of distinction for December in Sims' Park, Coonoor—"AOER LAEVIGATVM".
 Trials with "Copper Sandoz"—A new Fungicide.
 Manurial trials on Kikuyu Grass.
 Compost your Phosphatic Fertilizers.
 Early sowing is beneficial for Summer Cotton.
 Peach Leaf-curl.
 Economic importance of Bristles.
 The Coconut Caterpillar Control.
 The Cholan Ear-head Bug Control.
 Cambu—Co. 4. Highly promising in Tirunelveli district.
 Lodging in sugarcane.
 Sprouting in Tapioca Setts.
 Cultivate Perennial Cotton for Home Spinning.
 Record yield of Ragi in an alkaline field at Agricultural Research Station, Palur.
 Root Rot of Chillies.
 Cropping Rice fallows with early cottons.
 A new industrial crop for Wynad.
 Honey Bees—Colony manipulation during the honey flow season.
 Honey bees—Colony strength and long yield.
 Varietal schedule in sugarcane cultivation.
 A proserner for Oranges.
 Tuyamalli (ASD. 8)—A high yielding strain in Paddy.
 Perenox—As a remedy for Paddy Blast—(PIRICULARIA ORYZAE).
 Integrated work on Summer Cotton in Madras State.
 Cotton in rice fallows—Does it impair soil fertility?
 Pest damage to grain in storage—Latest methods for complete control.
 One more prospective paddy strain from Rice Research Station, Ambasamudram.
 Conquest of Solar Energy.

APPENDIX No. 45.

STATEMENT I.

Quality analysis.

Name of the market.	(1)	Total number of lots for the season.	(2)	Total arrivals of quantity in bags.	(3)	Total number of samples analysed.	(4)	Quantity represented in bags.	Spreading Variety.		Bunch Variety.		Machine Shelled.		Hand beaten.		Hand shelled and hand beaten.		Average dryage.	Average reduction to common basis.
									Number of samples.	Quantity.	Number of samples.	Quantity.	Number of samples.	Quantity.	Number of samples.	Quantity.				
Cuddalore	..	15,287	..	67,280	..	848	..	4,207	885	4,142	13	65	235	1,175	593	3,015	20	17	5-66	10-07
Tindivanam	..	19,904	..	62,001	..	391	..	1,170	379	1,184	12	86	234	699	157	471	..	..	3-86	8-51
Tirukollur	..	12,993	..	53,599	..	702	..	2,243	687	2,193	15	45	561	1,683	141	560	..	..	6-93	3-91
Vilupuram	..	35,807	..	173,909	..	648	..	2,760	638	2,710	10	50	388	1,582	260	1,208	..	..	6-32	6-35
Virudhachalam	..	13,440	..	49,249	..	656	..	2,146	643	2,104	13	42	78	233	583	1,913	..	..	3-30	3-07

STATEMENT II.

Classification of the number of samples and quantity sold by growers accounted for according to the size of the holding and time of harvest and interval between harvest and sale.

Name of the markets.		Size of the holdings.										Variation between harvesting.				Interval between harvesting market.							
		1 acre and below.		1 to 2 acres.		2 to 3 acres.		3 to 4 acres.		4 to 5 acres.		5 to 10 acres.		Above 10 acres.		Very early.	Early.	Normal.	Late.	Very late.			
		Quantity.	Lots.	Quantity.	Lots.	Quantity.	Lots.	Quantity.	Lots.	Quantity.	Lots.	Quantity.	Lots.	Quantity.	Lots.								
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
	456	1,368	229	1,408	41	378	26	262	18	182	14	366	6	245	139	141	301	114	95	163	489	116	22
Cuddalore	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	104	259	87	35	108	273	25	..
Tindivanam	..	344	771	35	243	..	10	100	..	..	2	56	..	..	186	138	192	102	64	240	400	62	..
Tirukollur	..	640	1,495	25	384	20	223	17	141	..	..	..	..	..	90	54	204	216	60	196	322	108	..
Vilupuram	..	514	1,542	85	970	20	148	4	61	..	..	..	1	39	66	100	340	120	30	Not more than a month.	..	..	..
Virudhachalam	..	512	1,580	92	286	30	163	13	117	..	..	..	..	..	..	..	..	..	..	..	..	..	..

APPENDIX No. 45—cont.

STATEMENT III.

Name of the market.	(1)	Total number of samples.	(2)	Moisture below 1 per cent	(3)	Quantity.	(4)	Moisture between 1 and 2 per cent	(5)	Quantity.	(6)	Moisture between 2 and 4 per cent	(7)	Quantity.	(8)	Moisture between 4 and 6 per cent	(9)	Quantity.	(10)	Moisture between 6 and 8 per cent	(11)	Quantity.	(12)	Moisture between 8 and 10 per cent	(13)	Quantity.	(14)	Above 10 per cent	(15)	Quantity.	(16)	Average dryage.	(17)
Cuddalore ..	..	848	10	55	165	186	584	317	1,229	162	1,798	76	297	43	55	5.66	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Tindivanam ..	..	391	9	83	193	168	499	83	288	41	155	5	19	2	6	3.86	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Vilupuram ..	..	648	5	18	126	131	530	215	910	170	747	73	338	21	82	6.32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Tirukollur ..	..	702	12	44	110	161	438	164	668	150	481	85	304	86	225	6.98	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Virudhachalam ..	..	656	88	137	430	254	1,149	121	187	38	34	13	88	10	14	3.30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Percentage in each classification as against the total number of samples	..	..	3.42	10.34	..	27.7	..	27.7	..	17.22	..	7.8	..	5.1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	

STATEMENT IV-A.

Showing number of samples in each category.

Name of the market.	Foreign matter, such as stones and dust.				Nuts in shell.			Damaged seeds.				Splits.		Broken.		Nooks.			Shrivelled.		Total number of samples.	(1)
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)				
	4 per cent and below.	Above 4 per cent up to 8 per cent.	Above 8 per cent.	Below 10 per cent.	Above 10 per cent.	Above 10 per cent.	2 per cent and below.	Above 2 per cent up to 4 per cent.	Above 4 per cent up to 10 per cent.	Above 10 per cent.	25 per cent and below.	Above 25 per cent.	10 per cent and below.	Above 10 per cent.	5 per cent and below.	Above 5 per cent up to 10 per cent.	Above 10 per cent.	2 per cent and below.	Above 2 per cent.			

APPENDICES

STATEMENT IV-B.

Showing the number of bags in each category.

Name of the market.	(1)	Below 10 per cent.	(2)	Below 10 per cent.	(3)	Below 10 per cent.	(4)	Below 10 per cent.	(5)	Below 10 per cent.	(6)	Below 10 per cent.	(7)	Below 10 per cent.	(8)	Below 10 per cent.	(9)	Below 10 per cent.	(10)	Below 10 per cent.	(11)	Below 10 per cent.	(12)	Below 10 per cent.	(13)	Below 10 per cent.	(14)	Below 10 per cent.	(15)	Below 10 per cent.	(16)	Below 10 per cent.	(17)	Below 10 per cent.	(18)	Below 10 per cent.	(19)	Below 10 per cent.	(20)	Below 10 per cent.				
Cuddalore ..	..	3,950	315	42	3,635	522	423	917	1,787	1,080	3,808	701	3,877	380	2,807	958	442	825	3,382	4,207	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Tindivanam ..	..	1,078	82	10	1,168	2	713	295	180	2	1,044	126	1,053	117	1,180	40	..	72	1,088	1,170	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Tirukollur ..	..	2,243	..	..	2,243	..	1,620	492	181	..	2,243	..	2,243	..	2,243	..	..	639	1,604	2,243	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Vilupuram ..	..	2,424	312	24	2,698	72	999	1,029	687	45	2,585	175	2,504	256	2,284	473	23	237	2,523	2,760	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Virudbachalam ..	..	2,123	20	3	1,980	186	1,975	187	19	15	2,146	..	2,038	108	1,571	503	72	714	1,452	2,146	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..		
Total ..	..	11,818	629	79	11,744	782	5,780	2,870	2,784	1,142	11,824	1,002	11,715	811	8,808	2,772	946	2,487	10,089	12,524	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
Percentage ..	..	94.8	5.1	0.6	98.7	6.3	45.7	23.9	22.2	9.2	92.0	8.0	92.6	6.4	70.5	22.0	7.5	19.8	80.2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

APPENDIX No. 46:

List of agricultural schemes in progress in Madras State during 1954-55.

(a) Schemes financed by the Indian Council of Agricultural Research.

Number and name of the scheme.	Place of working.	Officer-in-charge.	Object of the scheme.
(1)	(2)	(3)	(4)
1 Banana Scheme	Aduthurai (Tanjore district).	Banana Research Officer.	For research work on bananas of the State classification breeding and improvement work.
2 Pepper Research Scheme.	Panniyur (Malabar district).	Pepper Specialist	For improvement work on pepper by selection and hybridization and to investigate into the causes of 'Pollu' diseases.
3 Scheme for research in ginger cultivation.	Wynad	Horticulturist and Professor of Horticulture.	For research in varietal, manurial, cultural, preservation and cure of diseases of ginger.
4 Scheme for the multiplication and distribution of hybrid cumbu strains.	Coimbatore district and Kollipatti.	Millet and Pulses Specialist.	To evolve and multiply on a large scale cumbu hybrid strains which have hybrid vigour.
5 Scheme for investigation of blast and foot-rot disease of rice.	Coimbatore	Assistant Mycologist.	To control blast and foot-rot by resistant varieties and use of fungicides.
6 Scheme for varietal and agronomic trials to determine optimum yield.	Tanjore	Government Agricultural Chemist.	To conduct simple manurial experiments and soil survey.
7 Scheme for investigation of possibilities of pre-soaking seeds in nutrient salt solutions.	Coimbatore	Systemic Botanist and Professor of Botany.	To investigate the possibilities of pre-soaking seeds in nutrient solutions for improving crop yields.
8 Scheme for research on cashewnuts.	South Kanara	Assistant Specialist, Fruit Mangalore.	To undertake research in cashewnut in the State varieties cultivation method, etc.
9 Scheme for Regional Bee Research Station in Madras State.	Coimbatore	Government Entomologist.	To investigate the possibilities of improving the Indian Honey Bee.
10 Scheme for crop cutting experiments on paddy, millets, oil-seeds and for statistical assessment of the results due to Grow More Food aids.	Madras State	Special District Agricultural Officer (Crop Sampling), Madras.	To work out the normal yields of food crops, paddy, millets, oil-seeds, etc., and to assess the effect of the Grow More Food aids on production in the State.
11 Scheme for improvement of sweet potato and tapioca.	Mangalore, Coimbatore of Madras State.	Horticulturist and Professor of Horticulture.	For improvement work in sweet potato and tapioca by breeding and manuring evolution of strains resistant to soils and diseases, etc.
12 Scheme for research on eradication of weeds by herbicidal chemicals.	Coimbatore	Systematic Botanist and Professor of Botany.	Control and eradication of the most important weeds infesting food crops.
13 Scheme for the breeding of Pircularia resistant strains of paddy of different duration.	Coimbatore and Aduthurai.	Paddy Specialist	To evolve different types of paddy of varying durations suitable to the several tracts with added disease resistant through hybridization, etc.
14 Scheme for the investigation of the causes resulting in insect infestation of pepper exported to U.S.A.	Taliparamba, Malabar.	Pepper Specialist	Investigation on insect infestation of pepper exported to U.S.A.
15 Co-ordinated scheme for the Preservation and storage of fruits and vegetables by use of hormones and chemicals.	Coimbatore	Plant Physiologist	To investigate the storage response of important fruits and vegetables after treatment with hormones and chemicals. Mangoes and Bananas are investigated at Coimbatore.
16 Scheme for refresher course for young farmers.	Central Farms, Coimbatore.	Superintendent, Central Farm, Coimbatore.	A six months' course for training young farmers in improved method of agriculture.
17 Scheme for improvement of vegetables in Madras State.	Coimbatore	Assistant Fruit Specialist, Coimbatore.	For improvement of vegetables of the plains.

(b) Schemes financed by Indian Central Cotton Committee.

1 Scheme for breeding of long staple cotton, Madras.	Palur and Srivilliputtur (Ramanathapuram district).	Assistant Specialist, Srivilliputtur	Cotton To evolve a long staple cotton suitable for cultivation in the State.
2 Scheme for improvement of Tinnies and Karunganni cotton.	Kollipatti	Assistant Specialist, Kollipatti.	Cotton To evolve a cosmopolitan Karunganni type with high ginning percentage and staple length.

APPENDIX No. 46—cont.

List of agricultural schemes in progress in Madras State during 1954-55—cont.

Number and name of the scheme.	Place of working.	Officer-in-charge.	Object of the scheme.
(1)	(2)	(3)	(4)
3 Scheme for the breeding of long staple American cotton as winter crop for Central district and Sea Island cotton for West Coast.	Tiruchengode, Avanasahi, Coimbatore, Bhavanisagar and Pattambi.	Assistant Specialist, Cotton Winter Scheme, Coimbatore.	To evolve long staple American type suitable for cultivation as a winter crop in Central districts and conducting trials of Sea Island cotton in the West Coast.
4 Scheme for the breeding of unirrigated Cambodia cotton in Periyakulam.	Periyakulam, Madurai district.	Assistant Specialist, Kollipatti.	To breed a suitable irrigated Cambodia cotton suitable for Coimbatore, Salem, Tiruchirappalli and Madurai district.
5 Scheme for maintenance of nucleus of pure seeds of improved cotton strains.	Coimbatore	Cotton Specialist, Coimbatore.	To produce selfed seeds of all improved strains Co. 2 and MU. 1.
6 Scheme for the multiplication of MU. 1 cotton.	Coimbatore district	Assistant Specialist, Tiruppur.	To multiply and distribute pure seeds of MU. 1 cotton on large scale.
7 Combined scheme for multiplication and distribution of K. 2, M.U. 1 and M.U. 2 cotton.	Madurai, Tirunelveli and Ramanathapuram districts.	Assistant Specialist, Cotton Scheme, Kollipatti and Assistant Cotton Specialist, Srivilliputtur.	To multiply and distribute on large scale pure seeds of K.2 and M.U. 1 and M.U.2 cotton strains in Madurai, Tirunelveli and Ramanathapuram districts.
8 Scheme for breeding an early variety of cotton suitable for cultivation as an off-season crop in rice fallows of Madras State.	Agricultural Research Stations, Palur, Aduthurai and Central Farm, Coimbatore.	Assistant Cotton Specialist, Coimbatore.	Breeding an early variety of cotton suitable for cultivation as an off-season crop in the rice fallows of this State.
9 Scheme for Multiplication and distribution of K. 5 cotton seeds.	Coimbatore district.	Assistant Cotton Specialist, Tiruppur.	To multiply seeds to cover the entire Karunganni area with K. 5. seeds in the Central districts.

(c) Schemes financed by the Indian Central Sugarcane Committee.

1 Scheme for sugarcane research in Madras State.	Gudiyattam and Palur.	Sugarcane Specialist.	To select useful strains of high yielding canes suited to different cane tracts of the State and for carrying out research in physiology, Chemistry and diseases of sugarcane.
2 Scheme for research on sugarcane borers, and other pests and biological control.	Coimbatore	Government Entomologist.	For research on sugarcane pests with reference to growth of cane weather conditions and parasites of the cane borers with a view to control them.
3 Sugarcane Development Scheme, Liaison Sugarcane Farms.	Nellikuppam and Kulitalai and 13 taluks in 13 districts.	Sugarcane Specialist (abolished with effect from 1st June 1955).	For increasing the yields of sugarcane round about the sugar factories and to concentrate and intensify the propaganda work in 24 taluks.

(d) Scheme financed by the Indian Central Oilseeds Committee.

1 Scheme to run six zonal nucleus seed farms of improved oilseeds.	Pollachi, Tindivanam, Srivilliputtur and Bhavanisagar.	Oil seeds Specialist	For large scale multiplication of pure seeds of improved strains of oil-seeds.
2 Scheme for increasing the production of oilseeds in the Madras State.	Entire State except Nilgiris district.	Oil seeds Specialist, Coimbatore.	For increasing the production of oil seeds.
3 Scheme for research on physiology of groundnut.	Coimbatore	Do.	For research on physiology of groundnut in Madras State.
4 Scheme for the intensive breeding groundnut in Madras State.	Tindivanam	Superintendent, Agricultural Research Stations, Tindivanam, and Oil seeds Specialist, Coimbatore.	For research on breeding of groundnut.
5 Scheme for the research on Cytology of groundnut.	Coimbatore	Oil seeds Specialist, Coimbatore.	For research on cytology of groundnut.

(e) Scheme financed by the Indian Central Coconut Committee.

Scheme for establishment of coconut nurseries in the State	Tikkotti (Badagara), Nilleshwar and Pattukkottai.	Oil seeds Specialist	To produce and supply good quality seedlings to the public on a large scale.
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APPENDIX No. 46—cont.

List of agricultural schemes in progress in Madras State during 1954-55—cont.

Number and name of the scheme. (1)	Place of working. (2)	Officer-in-charge. (3)	Object of the scheme. (4)
<i>(f) Schemes financed by the Madras Government alone.</i>			
1 Scheme for the investigation of land development and reclamation of waste lands in the State.	Whole of State	Headquarters Deputy Director of Agriculture.	To survey and draw up a plan of reclamation of fallow and weed infested lands by tractors.
2 Scheme for the opening of regional Millets Research sub-stations.	Ariyalur, Tiruppattur.	Millet Specialist, Coimbatore.	To evolve new strains of improved millets regions of the State.
3 Scheme for eradication of white borer of coffee.	Nilgiris	Government Entomologist.	To eradicate the white borer of coffee.
4 Cotton Certification Scheme.	Coimbatore, Tiruchirappalli, Madurai, Salem, Ramanathapuram and Tirunelveli districts.	Certification Officer, Rajapalayam.	To issue certificate on purity of Co. 4 cotton to enable it to get exemption from price control.
5 Development of Fruit Industry in Kodakanal.	Kodaikanal (Madurai district).	Horticulturist and Professor of Horticulture.	To improve the Fruit Industry in Kodakanal.
6 Scheme for training additional fieldmen and maistries.	Whole State	Director of Agriculture.	To provide additional trained fieldmen and maistries for extension work.
7 Opening of an Agricultural Research Station, Satyamangalam.	Coimbatore district	Government Agricultural Chemist.	To study problems arising out of lower Bhavani Project in Coimbatore district.
8 Scheme for study of laterite soils.	Agricultural Research Station, Pattambi.	Do.	To find out the suitability of laterite soils for paddy cultivation.
9 Scheme for training of Agricultural and Botany graduates in Horticulture.	Coimbatore	Horticulturist and Professor of Horticulture, Coimbatore.	To give special training in Horticulture extending over a year for Agricultural and Botany graduates to provide trained personnel to man Horticultural Research and Extension Schemes.
10 Scheme for the establishment of model orchard-nurseries in the State.	Selected districts in the State.	Do.	To establish model orchards and nurseries which will serve as visual demonstrative centres of scientific orchard practices and nursery maintenance in an economic way.
11 Scheme for the large-scale production of ergot on rye on the Nilgiris (permanent).	Ooty.	Government Mycologist and Assistant Mycologist, Ooty.	Production of high quality ergot.
12 Scheme for the Coordinated crop weather studies in Madras State.	Central Farm, Coimbatore and Agricultural Research Stations, Aduthurai, Pattambi and Kollipatti.	Agricultural Meteorologist, Coimbatore.	To study the relationship between weather and crop growth occurrence of pests and diseases, etc.
13 Coconut nursery	Agricultural Research Station, Pattambi.	Superintendent, Agricultural Research Station, Pattambi.	To produce and supply good quality seedlings to the public. Five thousand two hundred and fifty seedlings per year.
14 Scheme for extension of area under nursery at Pomological Station, Coonoor.	Pomological Station, Coonoor.	Agricultural Fruit Station, Coonoor.	For developing the fruit nursery at Coonoor and thus increase the output of nursery materials in fruits and plants.
15 Scheme for research on fruit preservation.	Agricultural Research Institute, Coimbatore.	Government Agricultural Chemist, Coimbatore.	To demonstrate scientific methods of preserving fruits and fruit products.

(f-1) Schemes jointly financed by the Indian Central Arecanut Committee and State Government.

1 Scheme for the investigation of stem breaking disease of arecanut palms in South Kanara districts.	Arecanut Research Station, Vittal.	Government Mycologist.	To investigate the stem-breaking disease of areca palms by the application of lime and phosphate zinc and manganese, etc.
2 Scheme for organization of and Mahali Campaign in South Kanara and Majabard districts.	....	....	Not put into operation during the year.

APPENDIX No. 46—cont.

List of agricultural schemes in progress in Madras State during 1954-55—cont.

Number and name of the scheme.	Place of working.	Officer-in-charge.	Object of the scheme.
<i>(g) Schemes financed partly by the Government of India.</i>			
1 Cotton extension plan for production of cotton in 1952-53 employment for the one year specialist staff.	Madras State	Cotton Extension Officer, Coimbatore.	For increasing the production of cotton by (1) extension of areas; (2) manuring with ammonium sulphate and (3) mixed cropping with oil seeds, chillies, and ragi and use of improved seeds.
2 Scheme for the cultivation of cotton in rice fallows of Tanjore, Tiruchirappalli and South Arcot districts.	Tanjore, Pattukottai, Tiruchirappalli and South Arcot.	Do.	To extend cultivation of short duration cotton in the rice fallows of Tanjore, Tiruchirappalli and South Arcot districts.
3 Intensive cultivation schemes given below:			
1 Plant Protection Scheme.			
2 Production and distribution of improved seeds of paddy.			
3 Production and distribution of improved seeds of millets.			
4 Production and distribution of improved green-manure seeds.			
5 Oil engine pumpsets.	Whole State	Director of Agriculture.	To produce increased foodgrains as per target fixed.
6 Electric motor pumpsets.			
7 Tractor cultivation.			
8 Central Agricultural Engineering Stores.			
9 Distribution of ammonium sulphate.			
10 Soil Conservation Scheme, Nilgiris.			
11 Intensive Manuring Scheme.			
12 Scheme for increasing production and quality of fruits.	Periakulam, Thimmapuram and Mangalore.	Horticulturist and Professor of Horticulture, Coimbatore.	For exploring and exploiting the fruit wealth through spotting out individual trees of merit, multiply their progress and distributing them.

APPENDIX No. 47.

Programme of work for 1955-56.

Research.

Research activities will be directed towards problems of integrated production schemes included in the Five Year National Plan and the following programme for 1955-56 is drawn up.

Agricultural Chemistry.

Soils—(1) *Rapid soil tests*.—To determine the quantities of the major plant nutrients in the soil by means of rapid chemical tests.

(2) *Plant tissue tests*.—To assess the nutrient level of the soils.

(3) *Chromatography*.—Rapid estimation of inorganic and organic substances by means of paper chromatography.

(4) *Trace elements*.—Standardization of methods for the estimation of trace elements such as chromium, boron, manganese, cobalt, zinc and molybdenum and the use of these for the estimation of these elements in soil.

(5) *Manures and plant nutrition*.—Studies on compost-making.—To evolve the most efficient and most rapid method for compost-making.

APPENDIX No. 47—cont.

(6) *Legume studies*.—To select the most suitable nodule bacteria for specific legume inoculation and study their behaviour on host plant.

(7) *Water requirement of green manure crops*.—To aid in selecting suitable green manure for the different tracts of the State in relation to moisture condition obtaining in the tracts.

(8) *Permanent manurial experiments—Old and new*.—To obtain information on the organic and inorganic forms of manures and the function of each of the major nutrients on soil fertility, crop yield and plant composition.

(9) *Studies on indirect manuring of phosphate for paddy*.—To supply phosphates as per TVA plan to leguminous green manure crop which will be ploughed in later before paddy.

(10) *Indian Council of Agricultural Research and Technical Co-operation Mission Schemes*.

(11) *Manures—All India Scheme—Technical Co-operation Mission Scheme—Agronomic Trials*.—To study the suitability of the imported fertilizers like urea, amophos, etc., for the paddy crop.

(12) *Soil Survey—All India Scheme—Technical Co-operation Mission Scheme*.—To obtain a picture of the soil types occurring in South India.

Agricultural Entomology.

I. Main Section.—Research work on the control of—

(1) *Pests of paddy*.—(a) The Paddy Stem Borer.

(b) The Paddy Mealy Bug.

(c) Rice Jassid and the Rice Fulgarid.

(2) *Pests of vegetables*.—(a) The sweet potato weevil.

(b) The potato tuber moth.

(c) The vein clearing disease of bhendai.

(d) The little leaf disease of brinjal.

(3) *Pests of fruits*.—(a) Fruit flies on plums.

(4) *Pests of cotton*.—(a) The cotton spotted bollworm.

(5) *Pests of stored products*.—(a) Chemical treatment of seeds.

(b) Preservation of dry ginger.

(c) Fumigation of oil seeds with Methyl Bromide.

(d) Bionomics and control of bruchids.

(6) *Insecticides and fumigants*.—(a) Testing of proprietary insecticides and new chemicals.

(b) Work on soil insecticides.

(c) Vegetable insecticides.

(d) Adverse effects and beneficial effects of insecticides.

(e) Fumigants.

(f) Trials against the castor semilooper.

(7) *Biological control*.—(a) The Australian predator beetle.

(b) Utilization of new parasites and predators.

(8) Systematic work and fundamental work on aphids and coccinellids.

(9) Study on the incidence of pests on groundnut, ragi and cholam with reference to weather conditions in collaboration with the Agricultural Meteorologist.

II. Bee-keeping.—(a) Breeding of pedigree queens.

(b) Influence of weather factors on nector secretion and concentration.

(c) Estimation of the quantity of pollen collected by bees per trip from different sources.

(d) Biometric studies.

(e) Bee-enemies.

(f) Pollen substitute.

(g) Swarm prevention.

III. *Sugarcane*.—(a) Influence of weather factors on borer population—mortality and compensation indices studies—alternative hosts and exploitation of new parasites, if any.

Agricultural Mycology.

Programme for 1955-56.

I. *Study of the Puthiaceous fungi*.—Studies on the mode of survival of the fungi and the control of the diseases caused by these will be continued. Investigations on new diseases caused by this group and evolution of methods of control of those diseases will be continued.

II. *Rice disease*.—(a) *Blast*.—Further tests on the resistance of promising cultures to blast and the relative reaction of the varieties and cultures of rice evolved by Paddy

APPENDIX No. 47—cont.

Specialist will be carried out. The host range of the pathogen, factors contributing to the resistance to blast and the role of fungicides in controlling the spread of infection will be investigated.

(b) *Foot rot*.—Varietal resistance trials and testing of new fungicides in the control of this disease will be continued.

(c) *Stem rot*.—The conditions favouring the onset of the disease and the reactions of different varieties will be investigated. Suitable control measures will be evolved.

III. *Ragi 'blast'*.—Varietal resistance of different cultures will be continued further in collaboration with Millets and Pulses Specialist. Conditions favouring the disease and the host range of the pathogen will be investigated. Fungicidal and manurial trials will be carried out to study the incidence of blast.

IV. *Cereals rusts*.—(a) *Wheat rust*.—Varietal resistance trials and the search for collateral hosts of the rusts will be continued.

(b) *Cumbu rust*.—Varietal resistance studies and search for collateral hosts will be continued. Incidence of rust in relation to manure (N.P.K.) will be investigated.

(c) *Tenai rust*.—Varietal resistance studies and search for collateral hosts will be continued. Incidence of rust in relation to manure (N.P.K.) will be investigated.

V. *Cotton black-arm*.—(a) The relative reaction of the different cultures and strains of cotton to this disease will be investigated further. Seed treatment and effect of spraying the crop with fungicides will be continued.

(b) *Cotton root-rot*.—The conditions favouring the disease and the reaction of different varieties of cotton under artificial inoculation will be continued. The study of the methods of control and isolates of the causal organism from different localities will be carried out.

VI. *Vegetable diseases*.—(a) *Root-rot of pulses*.—Varietal resistance trials and fungicidal trials will be continued.

VII. *Banana wilt*.—Varietal resistance studies and studies on the different isolates of causal fungi will be continued. The conditions favouring the disease and evolution of control methods will be investigated.

VIII. *Ergot of Rye Claviceps Purpurea*.—Large-scale production of ergot and attempts to step up the alkaloid contents as well as the acre yield of ergot will be continued at the Ergot Farm, Ootacamund.

IX. *Stem-breaking diseases of arecanut*.—The factors responsible for stem-breaking of areca will be investigated at Arecanut Research Station, Vittal.

Agricultural Meteorology.

The crop weather experiments will be continued. Collection of data on the incidence of pests and diseases with reference to weather conditions will be pursued. Statistical analysis of several factors of weather and their effects on crops will be done.

Crop Improvement Work.

Paddy.

1. *Improvement of local varieties by pure line selection*.—Continuation of selection work in the following varieties, namely, Velutharikayama, Valiachamban, Vadakkan (Cannanore), Vadakkan (Tellicherry), Allikannan for the first crop and Vellakoli for the second crop in Malabar district. Culture 6027 in Arikkirai is ready for release as strain Bililkayama, Doddari, Parambannavara and Athikraya for South Kanara; culture 2482 of Athikraya is ready for release as strain. For Tanjore, Mattakuruvai, Tiruthuraiipoondy kar for the Kuruvai season and Kattuvanam, Kattavellai, Kodavellai and Kaivarisamba for Samba season; Malkuruvai and Seenkanni for Kar season and Sembali, Varigarudansamba and Arikkiravi for Pishanam season in Tirunelveli district and Kuliadichan and Pulidipratti for rainfed conditions in Ramanathapuram district. The work for Chingleput district consists of Sornavari yield trials, Mottakar, Bairavadlu and Sanappalai for rainfed conditions; Vadansamba, Kaliganasamba and Kappasamba for semi-dry conditions and Samba, Chinnasamba, Kittansamba, Sirumani, Kappakar and Karthigaisamba for Samba season and Sathikan and Kesari for Navarai season.

2. *Hybridization*.—(a) Study of 3,002 single-plant selections of short duration hybrids under disease bombardment test for the evolution of blast resistant strains and comparative yield trial 43 pure breeding cultures; confirmatory trial of culture 6517 and 6522 in the district against Co. 13 standard. Comparative yield trial of 25 cultures of

APPENDIX No. 47—cont.

medium duration crosses and trial of culture 6538 of cross GEB. 24 × Co. 4 in the district and study of 775 single plants and comparative yield trial of 14 cultures of long duration crosses.

(b) Study of crosses between wild and cultivated types and between reputed drought resistant types at Tirurkuppam, Pattambi and Coimbatore for the evolution of high yielding drought resistant strains.

(c) Study of crosses between short duration exotic types and popular short duration strains of Coimbatore, Aduthurai and Pattambi for the evolution of short duration dormant strains.

(d) Study of progenies of crosses between Japonica and Indica parents received from Cuttack for the evolution of Indica strains which will respond well to heavy manuring. A total of 1,597 progenies will be studied.

(e) A total of 232 progenies of crosses for the evolution of saline resistant strains will be maintained at Coimbatore. In addition, work on this aspect will be pursued at Palur also.

(f) Ten pure breeding cultures of crosses between Burma types, namely, T. 285 and T. 301 and Co. 10 will be studied under comparative yield trial to fix the promising cultures for the evolution of non-lodging short duration strain.

(g) Study of other cross progenies intended for the evolution of non-shattering strain, crosses between GEB. 24 and Kolamba types, GEB. 24 and Kavinginpothala cross progenies, crosses for the evolution of cosmopolitan strains; crosses between Co. 3 and Pattambi strains for the evolution of non-deteriorating type.

3. *Varietal studies*.—Study and maintenance of 2,307 types as a store house of valuable breeding material. Comparative yield trial of Chinese types to find their suitability as short duration varieties. These types possess non-lodging character.

4. *Fundamental work*.—Trial of mutants of Co. 13, GEB. 24 and Co. 2 induced by Acenaphthene, Benzene and Cereson for the evolution of high yielding strains Multiplication Co. 13 mutant for trial in the district.

5. *Agronomic trials*.—The following experiments will be conducted during the year at different Rice Research Stations:—

(a) *Manurial*—

- (i) Co-ordinated manurial experiments on rice.
- (ii) Deep placement of ammonium sulphate experiment.
- (iii) Placement of phosphate experiment.
- (iv) Varietal response to manuring.
- (v) To study the deleterious effects (if any) of continuous application of ammonium sulphate.
- (vi) Sesbania green versus sesbania dry experiment.

(b) *Cultural*—

- (i) Japanese versus Farm method of cultivation.
- (ii) Interculture experiment.
- (iii) Ridging experiment.
- (iv) Spacing experiment.
- (v) Udu trials to find out the optimum seed proportion of the two component varieties and the economics of manuring Ottadan after the harvest of Kuruvai.

Millets and Pulses.

A. *Cholam*.—(1) Maintenance of types.(2) *Rainfed cholams*—

- (i) *Periamanjai cholam*.—Evolution of strains of Periamanjai cholam superior to Co. 1 in yield of grain and quality of straw.
- (ii) Evolution of short duration strains for sowing in late season (September-October) for Coimbatore.
- (iii) *Talaivirchan cholam*.—(a) Improvement of grain size and fodder quality.
- (b) Evolution of strains of Talaivirchan suited to the West Coast.
- (iv) *Irungu cholam*.—Improvement of size and colour of grain and quality of fodder.

(3) *Irrigated cholams*—(i) *Sen cholam*.—Improvement of grain size and fodder quality.

(ii) *Chinnamanjal cholam*.—Evolution of high yielding strains with bold grains and juicy stalks.

(iii) *Vellai cholam*.—Evolution of high yielding strains with juicy stalks.

(4) *Control of root parasite, striga on cholam*.—Evolution of resistant strains by (i) selection and (ii) hybridization.

(5) *Smut control*.—Evolution of strains resistant to smut by (i) selection and (ii) hybridization.

APPENDIX No. 47—cont.

(6) *Fundamental studies*.—(i) Relationship between axil and sheath and axil and juiciness.

(ii) Study of glume texture in sorghum.

(iii) Studies in the silica pattern of the plants in the genus sorghum with special reference to classification.

(7) *Agronomic experiments*.—(i) Manurial experiments in rainfed cholam.

(ii) Mixed cropping and rotation experiments with millets and pulses.

B. *Ragi*.—(1) Maintenance of types.

(2) Evolution of short duration strains (90 days).

(3) Evolution of strains resistant to *Piricularia*.

(4) Evolution of strains suitable for the West Coast and the Nilgiris.

(5) *Fundamental research*.—Study of the inheritance of reniform grain shape.

(6) Age of seedlings or the number of days from sowing the nursery to the transplanting of seedlings.

C. *Tenai*.—(1) Evolution of high yielding strains.

(a) Short duration strains of 85 days for dry lands.

(b) Evolution of strains better than Co. 1.

(c) Evolution of strains better than Co. 2.

(d) Evolution of strains resistant to rust.

(2) *Fundamental research*.—Study of tillering habit.

D. *Minor millets*.—Evolution of high yielding strains of Samai, Panivaragu and Kudiraivali.

E. *Pulses*.—(i) Evolution of high yielding strains and multiplication and distribution of seeds of improved strains of redgram, greengram, blackgram, horsegram, bengalgram, field varieties of lablab and cowpea.

(ii) Study and maintenance of types of redgram, cowpea, soyabeans and bean types.

IV. *Hybrid cumbu scheme (Indian Council of Agricultural Research)*.

A. Collection and maintenance of pure cultures.

B. Multiplication and distribution of seeds of established strains.

C. Evolution of hybrids and their yield studies.

- (i) Collection of samples and their study for utilization as parents of crosses.
- (ii) Production of new hybrids, (iii) inbreeding, (iv) testing the hybrids for yield, (v) studies on the effect of diversity in the origin of parents on the vigour of the hybrids, (vi) studies of the relationship between the yields of inbreds and their top cross performance to the yield of the hybrids.

D. Trial of strains and hybrids in the fields of the cultivators in the districts.

E. *Agronomic experiments*.—Manurial experiments on rainfed and irrigated cumbu.

Pulses.—(i) Evolution of high yielding strains for the State and multiplication and distribution of seeds of improved strains.

(ii) Study and maintenance of types of redgram, vegetable cowpeas, soya beans and bean types.

Cotton.

The several items of work that were in progress in 1954-55 will be continued further in 1955-56. The breeding work for the improvement of irrigated Cambodia and un-irrigated Karunganni will be pursued to evolve strains superior to MCU-1 and K5 for the respective tracts. The Nadam improvement work will be continued in the limited scale as at present. Research work on perennial cottons and wild cottons and their hybrids will continue to engage serious attention. Fundamental studies to elucidate the hereditary behaviour of several mutant characters will be carried on for gaining further knowledge. Studies on hybrid vigour in the intraspecific and interspecific hybrids involving annual and perennial cottons will be continued. For effecting crosses choice of parents will be made in the perennial types based on their purity, yield, quality and resistance to pests and diseases. Grafting trials and trials on induction of parthenogenesis will be continued and enlarged.

Oil seeds.

Groundnut.—(i) Trials in different stages with strains from other States and countries and with promising cultures under observation.

(ii) District trials of promising big seeded selections and other bunch and spreading strains.

(iii) Hybridization work and study of the progenies of previous crosses to (a) improve the shelling outturn of TMV. 1 strain, (b) evolve a high yielding white-seeded strain, (iii) evolve a dormant bunch strain and (iv) evolve a big-seeded strain for dessert purposes.

APPENDIX No. 47—*cont.*

(iv) Study of the inheritance of (a) habit of growth, (b) smooth and wrinkled seeds and (c) white seed coat.

(v) Cytogenetic and physiological studies.

(vi) Manurial experiment with two complete fertilizers and three methods of application.

(vii) Rotation experiment.

(viii) Spacing trial with rainfed and irrigated groundnut.

(ix) Cultural experiment.

(x) Mixed cropping experiment.

(xi) A new three-year rotation experiment to determine the role of legumes in crop rotation in rainfed areas.

Gingelly.—(i) Collection and testing of new varieties and types.

(ii) Trials at different stages of promising strains and selections.

(iii) Hybridization work to evolve (i) a white-seeded strain, (ii) a cosmopolitan type and (iii) new economic types combining as many desirable characters as possible.

(iv) Manurial experiment with chilean nitrate.

(v) Cultural experiment.

Castor.—(i) Collection and testing of new varieties and types.

(ii) Trials at different stages of the promising selections among progenies of crosses, including trials in the districts.

(iii) Hybridization work to (i) reduce the duration of the standard-strains, (ii) impart distinct colour to the strains for easy identification and (iii) study the inheritance of the number of nodes to first inflorescence and other characters.

(iv) Maintenance of purity and vigour of the inbred and ornamental types and of the strains.

(v) Manurial experiment.

(vi) Observations on resistance to semi-looper pest.

Coconut.—(i) Effecting new crosses between the tall and spikeless varieties; observations on the progenies of the tall × dwarf and tall × exotic variety crosses; production of tall × dwarf seedlings in still larger numbers.

(ii) Observations on the exotic varieties.

(iii) Manurial experiments.

(iv) Cultural experiments.

(v) Depth of planting experiment.

(vi) Further trials with green manure and cover crops.

Minor oil seeds.—Collection and testing of varieties and isolating single plants for yield and quality.

Sugarcane.

Main yield trial of early and late varieties.

Maturity observations on the early varieties.

Preliminary yield trial of early and late varieties.

Varietal trial for adsali.

Adsali manuring.

Water in relation to form of nitrogen.

Permanent manurial experiment garden land condition.

Permanent manurial experiment wet land condition.

Monthly planting and harvesting experiment.

Study of new varieties from Coimbatore.

Time of planting and ratooning on maturity in sugarcane.

Study of suitability of Rayangan as seed material.

Form of manure in relation to Gur.

Horticulture.

Improvement work on fruits and other horticultural crops peculiar to the humid tropics such as mangosteen, mandarin orange, jack, annonas, duran, avocado, clove, nutmeg and cacao will be continued. The progeny trials with mangosteen mandarin nutmeg will be pursued. Hybridization work to evolve new and promising types of citrus pineapple, banana, annonas, etc., will be continued on planned lines. Efforts will be made for the enrichment of the collection through new introductions, location of bud sports, etc.

Trials on staggering fruit harvests, varietal and propagational studies in pineapple, rootstock trials, with sapota, jack and mango, hybridization in mango and study of clonal and seedling progenies of outstanding jack selections will be continued.

The scheme for research on clove and nutmeg and cacao (jointly financed by Indian oil of Agricultural Research) will be put under operation.

APPENDIX No. 47—*cont.*

Study of hybrid progenies of sapota, study of the rootstocks of sapota and grape, breeding programme in papaya, improvement work in amaranthus and studies on the effect of pruning of terminal buds on flowering in mango will be continued. The performance of the newly introduced kinds and varieties will be assessed. Studies will be taken on hand to finalise the taxonomical work on brinjal and bhendi varieties.

Cashew.—Survey and establishment of comprehensive collection of types, maintenance of progeny plots, standardization of vegetative propagational methods and multiplication of clonal progenies of promising types, blossom biological studies, trials to determine the optimum manurial and irrigation practices, etc., will be pursued.

Pepper.—Survey and collection of pepper varieties, hybridization, manurial and cultural trials, studies on the incidence of pollu, wilt and spike shedding, vegetative propagation studies and rootstock trials will be continued.

Ginger.—Varietal studies, cultural and manurial trials, studies on curing, preservation and storage of rhizomes will be continued.

Varietal collection and cultural and manurial trials weevil resistance and storage studies with sweet potato, tapioca and elephantyam will be continued.

Growth, flowering and performance studies of shrubs and trees, acclimatization and seed multiplication of annuals, introduction of new kinds and varieties, germination and propagation studies, studies to determine budding and pruning practices in roses, potting and transplanting methods in orchids and annuals will be pursued.

Vegetable Research Scheme, Coimbatore.—The type collection studies will be continued in tomato, brinjal, bhendi, cucurbits, radish and colocasia with a view to formulate a key for the classification of the first three vegetables and to isolate promising types in the other kinds. Comparative yield trials in tomato, brinjal and bhendi will be continued in summer and monsoon seasons to find out the most promising types in each kind. Hybridization of brinjal and radish will also be undertaken to evolve new types. Hybrid vigour studies in brinjal will be undertaken to determine the best combinations for crossing for vigour. Cultural and manurial trials will be laid out in both the seasons to determine the optimum manurial and water requirements. The best method of preparing seedbeds for brinjal and tomato will be determined.

Systematic Botany.

The following items of work will be done:—

(1) *Herbarium (systematic botany)*—

(a) Identification.

(b) Economic information.

(c) Compilation of *Dt. floras*.

(2) *Economic botany and acclimatization trials*—

(a) Fodder grasses.

(b) Fodder legumes.

(c) Green manure plants.

(d) Soil binding plants.

(e) Essential oil milking plants.

(3) Viability studies in grass seeds.

(4) Study on the impurity of weed's seeds.

Cytogenetics.

Cytogenetical studies in paddy, millets and horticultural crops and plants will be continued. Chromosome numbers of cultivated crops and their wild and allied species will be worked out.

Plant Physiology.

Pre-treatment studies.—Work will be conducted as per the technical programme of the Indian Council of Agricultural Research. A large number of seeds will be treated with various nutrient salt solutions alone and in combination with trace elements and the trials conducted.

Weed control by chemical herbicides.—Studies will be continued with pure weedicide chemicals as well as some trade product on major weeds.

Viability and dormancy test.—The studies will be continued.

APPENDIX No. 47—cont.

Agricultural Engineering (Research).

Testing of new implements and machinery received from firms. Designing new implements—Research on animal-drawn and tractor-drawn implements for groundnut scheme.

General—Extension work.

The extension staff in the districts will continue to concentrate their attention on the supplies and works schemes of the Intensive Cultivation Schemes under the Five-Year Plan. The campaigns of intensive growing of sesbania, Japanese method of rice cultivation, filter point tube wells, cotton and sugarcane development will be continued. Collaboration with departments of Revenue, Co-operation, Animal Husbandry, Community Projects, National Extension Service Blocks will be maintained to ensure efficient progress. Agricultural Associations will be organized and all associations will be kept functioning. The extension staff in the districts will tour frequently and maintain close contact with farmers and carry out demonstrations, trials, distribute loans and advise them on all agricultural improvements. Preservation of cattle-manure and preparation of compost will be demonstrated extensively. Use of urban compost will be popularized.

Trials of improved strains of paddy, millets, sugarcane, oil-cakes, pulses, cotton, etc., will be continued. Supplies of seedlings, grafts, etc., of fruit plants, vegetables and subsidiary food crops will be maintained.

Bee-keeping.—Bee-keeping will be extended and popularized in the districts.

Control of pests and diseases of crops will be attended to in all the districts with the aid of the special staff and adequate stocks of pesticides and equipments will be maintained.

Loans.—Loans for the purchase of seeds and manures and implements will be issued on a much wider scale. Special manure loans will be issued for purchase of fertilizers in all the districts.

Cotton extension work.

Comprising of introduction of improved varieties, manuring of irrigated cotton with ammonium sulphate, mixed cropping with chillies, groundnut and ragi, extending cotton cultivation in the rice fallows and control of pests and diseases will be continued to reach targets fixed.

Vanamahotsava.

Will be celebrated in all the districts in the first week of July along with Compost Week and Wild Life Day as usual and supply of seedlings, cuttings and seeds of ornamental economic and other trees will be done on an extensive scale.

Publicity.—The Grow More Food journals in the regional languages will continue to be published in the improved style. The Villagers' Guide and Calendar will be published in the regional languages. Pamphlets on agricultural subjects will be distributed to farmers on all occasions like festivals, fairs and shandies. Popular handbooks will be published on agricultural subjects. Radio talks on agricultural subjects will be arranged to be broadcast in the Rural Services of All-India Radio. Agricultural news letter and Press Notes will be continued as periodical features.

Exhibitions.

Exhibitions and shows will be organized at the districts at the time of festivals, fairs and shandies and demonstrations of improved implements and machinery and preservation of fruits will be conducted.

Agricultural Engineering (General).

The intensive cultivation engineering schemes will be continued to reach targets fixed. Supplies and services to agricultural machinery will be maintained.

Tractors.—Land reclamation with tractors and mechanical equipment, ploughing farmers' lands by tractors hired, supply of tractors on hire purchase basis, and supply of pump-sets will be continued. Trial with various agricultural implements and machinery will be continued.

Irrigation appliances.—Hiring of oil engine and sale directly through firms will be continued. Supplies of electric motor pump-sets will be continued. River pumping will be expanded.

Tube wells.—The sinking of filter point tube wells will be intensified to utilize sub-soil water effectively in summer and pre-monsoon periods with a view to raise more crops.

Re-purchase basis.—Oil engines and electric pump-sets will be distributed on re-purchase basis to aid poor cultivators to take to power-lift irrigation and raise profitably.

APPENDIX No. 47—cont.

Hillmen Uplift Schemes.

Aids to poor and backward hill-tribes of Nilgiris to facilitate their farming profitably will be continued.

Colonization Schemes.

Work in the colonization scheme at Wynaad will be continued.

Projects.

Crop planning for farmers in the new irrigation project ayacuts will be done through experimental work in the Agricultural Stations in the area.

Crop Competitions.

Crop yield competitions to enthuse farmers to raise larger crops will be conducted in all districts.

Agricultural Marketing.

Market survey reports will be made up to date. Grading work on rice, eggs, ghee, fruits and other products will be amplified and continued. Establishment of regulated markets and expanding market facilities in the notified areas will be done. Help, advice and guidance will be extended to the Market Committees. Market reports, prices, statistics, reviews of market conditions will be continued. Advice on general marketing matters will be given to other departments.

Soil Conservation.

Soil conservation measures will be adopted as per approved programme.

APPENDIX No. 48.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955.

Post.	Period		Name of the officer-in-charge.
	From	To	
Director of Agriculture	(Throughout)		Sri M. S. Sivaraman, I.C.S.
Headquarters Deputy Director of Agriculture (Engineering).	(Do.)		„ B. M. Lakshmiopathi.
Headquarters Deputy Director of Agriculture (Inspection and General).	(Do.)		„ S. N. Venkataramana Iyer.
Headquarters Deputy Director of Agriculture (Research).	(Do.)		Dr. K. C. Naik.
Personal Assistant to the Director of Agriculture.	(Do.)		Sri W. G. Janakiraman.
Accounts Officer	1 July 1954 .. 19 Feb. 1955.		„ K. Viswanathan Nair.
	20 Feb. 1955 .. 15 June 1955.		„ T. Krishna Shetty (Junior Accounts Officer in additional charge).
	16 June 1955 .. 30 June 1955.		„ T. M. Meenakshisundaram.
Junior Accounts Officer	(Throughout)		„ T. Krishna Shetty.
Gazetted Assistant	1 July 1954 .. 10 Oct. 1954.		„ T. Natarajan.
	11 Oct. 1954 .. 23 Oct. 1954.		„ B. Santhanakrishnan (Assistant Marketing Officer, in additional charge).
	24 Oct. 1954 .. 31 Mar. 1955.		„ T. Natarajan.
	1 Apr. 1955 .. 15 Apr. 1955.		„ B. Santhanakrishnan (Assistant Marketing Officer in additional charge).
	16 Apr. 1955 .. 30 June 1955.		„ V. K. Appaji.
State Marketing Officer	(Throughout)		„ V. Satagopan.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period		Name of the officer-in-charge.
	From	To	
Assistant Marketing Officer.	1 July 1954 ..	4 July 1954.	Sri T. Natarajan, Gazetted Assistant (additional charge).
	5 July 1955 ..	27 Jan. 1955.	„ B. Santhanakrishnan.
	28 Jan. 1955 ..	26 Feb. 1955.	„ K. C. Thomas.
	27 Feb. 1955 ..	20 Apr. 1955.	„ B. Santhanakrishnan.
	21 Apr. 1955 ..	30 June 1955.	„ S. V. Ramachandran.
Assistant Agricultural Engineer (Headquarters).	1 July 1954 ..	15 Oct. 1954.	„ T. Radhakrishnan.
	16 Oct. 1954 ..	30 June 1955.	„ A. Muhammad Ali.
*Assistant Agricultural Engineer (C.A.E.S.).	1 July 1954 ..	30 Nov. 1954.	„ C. S. Sridharan.
Special District Agricultural Officer (Crop Sampling), Madras.	1 July 1954 ..	14 Feb. 1955.	„ P. P. Syed Muhammad.
	15 Feb. 1955 ..	28 Feb. 1955.	„ N. G. Punja (Statistical Officer additional charge).
	1 Mar. 1955 ..	30 June 1955.	„ U. B. Md. Abbas.
Assistant Agricultural Engineer (River Pumping Scheme), Madras.	1 July 1954 ..	7 Oct. 1954.	„ C. R. Subramaniam.
	8 Oct. 1954 ..	15 Oct. 1954.	„ T. Radhakrishnan (Assistant Agricultural Engineer, Headquarters additional charge).
	16 Oct. 1954 ..	23 Oct. 1954.	„ A. M. Muhammad Ali (Assistant Agricultural Engineer additional charge).
	24 Oct. 1954 ..	30 June 1955.	„ C. R. Subramanian.

DISTRICTS.

Marketing Section.

Assistant Marketing Officer, Tiruchirappalli.	1 July 1954 ..	6 Jan. 1955.	Sri K. Narayanan Nair.
	7 Jan. 1955 ..	6 Feb. 1955.	„ U. B. Md. Abbas.
	7 Feb. 1955 ..	30 June 1955.	„ P. N. Nayar.
Assistant Marketing Officer, Coimbatore.	1 July 1954 ..	1 Sep. 1954.	„ C. Raman Moosad.
	2 Sep. 1954 ..	8 Oct. 1954.	„ K. Narayanan Nair (Assistant Marketing Officer, Tiruchirappalli, additional charge).
	9 Oct. 1954 ..	20 Dec. 1954.	„ T. S. Francis.
	21 Dec. 1954 ..	14 Jan. 1955.	„ J. H. S. Ponnayya (District Agricultural Officer, Coimbatore additional charge).
	15 Jan. 1955 ..	6 Mar. 1955.	„ K. Narayanan Nair.
	7 Mar. 1955 ..	16 Apr. 1955.	„ K. C. Thomas.
	17 Apr. 1955 ..	30 June 1955.	„ T. S. Francis.

* Declared as head of office with headquarters at Saidapet, Madras.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period		Name of officer-in-charge.
	From	To	
<i>Agricultural College and Research Institute, Coimbatore.</i>			
Principal	(Throughout.)		Sri R. Balasubramaniam.
Agronomist and Professor of Agriculture.	1 July 1954 ..	1 Apr. 1955.	„ P. A. Venkataswara Iyer.
	2 Apr. 1955. ..	13 Apr. 1955.	„ A. H. Subramania Sarma (Lecturer in Agriculture, additional charge).
	14 Apr. 1955 ..	29 May 1955.	„ P. A. Venkateswara Iyer.
	30 May 1955 ..	8 June 1955.	„ A. H. Subramania Sarma (Lecturer in Agriculture, additional charge).
	9 June 1955 ..	30 June 1955.	„ P. A. Venkateswara Iyer.
Lecturer in Agriculture	1 July 1954 ..	5 July 1955.	„ A. H. Subramania Sarma.
	6 July 1955 ..	30 June 1955.	„ P. A. Venkateswara Iyer (Agronomist and Professor of Agriculture, additional charge).
Lecturer in Animal Hygiene.	1 July 1954 ..	21 Mar. 1955.	„ S. Krishnaswami.
	22 Mar. 1955.	31 Mar. 1955.	„ V. S. Krishnamoorthy, (Assistant, additional charge).
	1 Apr. 1955 ..	30 June 1955.	„ S. Krishnaswami.
Lecturer in Agricultural Economics.	1 July 1954 ..	19 Dec. 1954.	„ S. V. Doraiswami Ayyar.
	20 Dec. 1954 ..	8 Jan. 1955.	„ M. K. Lingiah, (Assistant Lecturer, additional charge).
	9 Jan. 1955 ..	30 June 1955.	„ M. Srinivasan.
Lecturer in Entomology (1)	1 July 1954 ..	21 June 1955.	„ S. Kanakaraj David.
	22 June 1955.	30 June 1955.	„ Md. Basheer.
Lecturer in Entomology (2)	(Throughout.)		„ A. R. Seshadri.
Lecturer in Mycology	Do.		„ M. Kandaswami.
Lecturer in Chemistry (1)	Do.		„ M. Sundaram.
Lecturer in Chemistry (2).	Do.		„ A. Mariakulandai.
Systematic Botanist and Professor of Botany.	1 July 1954 ..	31 July 1954.	„ T. R. Narayanan (Plant Physiologist, additional charge).
	1 Aug. 1954 ..	4 Feb. 1955.	„ C. Rajasekara Mudaliar.
	5 Feb. 1955 ..	30 June 1955.	„ T. R. Narayanan (Plant Physiologist, additional charge).
Lecturer in Botany	1 Oct. 1954 ..	30 June 1955.	„ D. Daniel Sundararaj.
Lecturer in Civil Engineering.	1 July 1954 ..	23 Oct. 1954.	„ N. Sankaranarayana Reddy.
	24 Oct. 1954.	8 Jan. 1955.	„ T. Radhakrishnan.
	9 Jan. 1955 ..	30 Jan. 1955.	„ M. Subramaniam, (Civil Supervisor, additional charge).
	31 Jan. 1955.	1 May 1955.	„ T. Radhakrishnan.
	2 May 1955 ..	8 June 1955.	„ M. Subramaniam, (Civil Supervisor, additional charge).
	9 June 1955 ..	30 June 1955.	„ T. Radhakrishnan.

APPENDICES

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period		Name of officer-in-charge.
	From	To	
<i>Agricultural College and Research Institute, Coimbatore—cont.</i>			
Lecturer in Mechanical Engineering.	1 July 1954 ..	11 Aug. 1954.	Sri C. Venkatanarasimham, Teaching Assistant, additional charge).
	12 Aug. 1954.	18 Oct. 1954.	„ N. Sankaranarayana Reddy, [Assistant Agricultural Engineer, (Civil) additional charge].
	19 Oct. 1954.	30 June 1955.	„ S. Gonsalves.
Superintendent, Central farm.	1 July 1954 ..	17 Apr. 1955.	„ K. Ramaswamy Iyer.
	18 Apr. 1955.	30 June 1955.	„ K. C. Thomas.
* Administrative officer, Agricultural College and Research Institute Coimbatore.	6 Apr. 1955 ..	30 June 1955.	„

RESEARCH SECTIONS.

Paddy Section.

Paddy Specialist	1 July 1954 ..	3 Aug. 1953.	Sri K. Ramaswamy.
	4 Aug. 1954 ..	3 Nov. 1954	„ S. M. Kalyanaraman, (Cotton Specialist, additional charge).
	4 Nov. 1954 ..	9 Feb. 1955	„ K. Ramaswamy.
	10 Feb. 1955 ..	16 Mar. 1955	„ A. Kunhikoran Nambiar, (Millet and Pulses Specialist, additional charge).
	17 Mar. 1955 ..	14 June 1955	„ N. Bhavanishankar Rao.
	15 June 1955 ..	30 June 1955	„ K. Ramaswamy.
Assistant Paddy Specialist, Pattambi.	1 July 1954 ..	4 Nov. 1954	„ P. C. Sahadevan.
	5 Nov. 1954 ..	30 June 1955	„ A. Abdul Samad.

Cotton Section.

Cotton Specialist	1 July 1954 ..	14 Jan. 1955	Sri S. M. Kalyanaraman.
	15 Jan. 1955 ..	7 Mar. 1955	„ M. A. Sankara Iyer, (Cotton Extension Officer, additional charge.)
	8 Mar. 1955 ..	30 June 1955	„ N. Kesava Iyengar.
* Assistant Cotton Specialist, Coimbatore.	1 July 1954 ..	13 Apr. 1955	„ V. Santhanam.
			* Post converted into Additional Superintendent C. F. from 14 April 1955.
Assistant Cotton Specialist, Tiruppur.	(Throughout.)		„ A. Raghavan.
Assistant Cotton Specialist, Srivilliputtur.	1 July 1954 ..	6 Sep. 1954	„ N. G. Narayanan.
	7 Sep. 1954 ..	30 June 1955	„ V. Ramaswamy Mudaliar.
Assistant Cotton Specialist, Karunganni Scheme, Koilpatti.	(Throughout.)		„ L. Neelakantan.
Assistant Cotton Specialist, K. , and Co. 4 Scheme, Koilpatti.	Do.		„ C. K. Ramachendran.

* New post created in the year, officer joined on 6th April 1955.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period		Name of officer-in-charge.
	From	To	
Cotton Section—cont.			
Assistant Cotton Specialist, Winter Cambodia Scheme, Coimbatore.	1 July 1954 ..	12 Dec. 1954	Sri T. V. Rengaswami.
	13 Dec. 1954 ..	12 Jan 1955	„ S. M. Kalyanaraman, (Cotton Specialist, addi- tional charge).
	13 Jan. 1955 ..	13 Apr. 1955	„ Sri K. Kannian.
	14 Apr. 1955 ..	30 June 1955	„ V. Santhanam.
Cotton Certification Officer, Rajapalayam.	(Throughout.)		„ S. Mayandi Pillai.
Gazetted Assistant to the Cotton Certification Officer, Rajapalayam.	1 July 1954 ..	14 Oct. 1954	„ P. N. Krishnaswami.
	15 Oct. 1954 ..	25 Oct. 1954	„ S. Mayandi Pillai, (Cotton Certification Officer, addi- tional charge).
	26 Oct. 1954 ..	9 Jan. 1955	„ N. G. Narayanan.
	10 Jan. 1955 ..	29 Jan. 1955	„ S. Mayandi Pillai (Cer- tification Officer, additional charge).
	30 Jan 1955 ..	30 June 1955	„ N. G. Narayanan.
Cotton Extension Officer.	(Throughout.)		„ M. A. Sankara Iyer.
Assistant Cotton Extension Officer, Coimbatore.	1 July 1954 ..	7 Mar. 1955	„ N. Kesava Iyengar.
	8 Mar. 1955 ..	11 Mar. 1956	„ M. A. Sankara Iyer, (Cotton Extension Officer, additional charge).
	12 Mar. 1955 ..	30 June 1955	„ R. Krishnamoorthy.
Assistant Cotton Extension Officer, Madurai.	1 July 1954 ..	22 Oct. 1954	„ Dr. P. Abraham.
	23 Oct. 1954 ..	6 Mar. 1955	„ P. N. Krishnaswami.
	7 Mar. 1955 ..	8 Mar. 1955	„ R. Krishnamoorthi.
	9 Mar. 1955 ..	30 June 1955	„ P. N. Krishnaswami.
Millets and Pulses Section.			
Millet and Pulses Specialist.	1 July 1954 ..	14 July 1954	„ V. Gomathinayagam Pillai.
	15 July 1954 ..	28 Jan. 1955	„ A. Kunhikoran Nambiar, (Assistant Millets Specia- list, additional charge).
	29 Jan. 1955 ..	9 Apr. 1955	„ A. Kunhikoran Nambiar.
	10 Apr. 1955 ..	14 June 1955	„ M. A. Sankara Iyer.
	15 June 1955 ..	30 June 1955	„ M. Bhavanisankar Rao.
Assistant Millet Specialist.	1 July 1954 ..	28 Jan. 1955	„ A. Kunhikoran Nambiar.
	29 Jan. 1955 ..	20 Mar. 1955	„ A. Kunhikoran Nambiar (Millets and Pulses Specia- list, additional charge).
	21 Mar. 1955 ..	30 June 1955	„ B. W. X. Ponnayyan.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period		Name of officer-in-charge.
	From	To	
Oil-seeds Section.			
Oilseeds Specialist	(Throughout.)		Sri C. R. Seshadri.
* Assistant Oilseeds Specialist, Coimbatore	1 July 1954 ..	31 Jan. 1955	„ S. G. Ayyadurai.
			* Post kept in abeyance from 1st February 1955.
Oilseeds Development Officer, Coimbatore.	1 Feb. 1955 ..	30 June 1955	„ S. G. Ayyadurai.
N.B.—Post newly created.			
Superintendent, Agricultural Research Station, Tindivanam.	1 July 1954 ..	14 Mar. 1955	„ M. Bhavanishankar Rao.
	15 Mar. 1955 ..	30 June 1955	„ K. Thandavarayan, (Senior Assistant, additional charge).
Superintendent, Agricultural Research Station, Nileshtar.	1 July 1954 ..	22 Mar. 1955	„ P. M. Sayeed.
	23 Mar. 1955 ..	30 June 1955	„ S. D. S. Albuquerque.
* Cytogeneticist (Groundnut Scheme), Coimbatore.	3 Jan. 1955 ..	30 June 1955	„ V. S. Raman.
			* New Post—Officer joined on 3rd January 1955.
Horticultural Section.			
Horticulturist and Professor of Horticulture Coimbatore.	1 July 1954 ..	23 May 1955	Sri U. Narsinga Rao.
	24 May 1955 ..	26 May 1955	„ R. Bettai Gowder (Assistant Fruit Specialist, additional charge.)
	27 May 1955 ..	30 June 1955	„ T. Gopalan Nair.
* Assistant Fruit Specialist, (Vegetable Scheme), Coimbatore.	16 Nov. 1954 ..	30 June 1955	„ R. Bettai Gowder.
			* New post—Officer joined on 6th November 1954.
Assistant Fruit Specialist, Coonoor.	1 July 1954 ..	23 July 1954	„ K. Fazlulla Khan.
	24 July 1954 ..	29 May 1955	„ J. Samuel Sundararaj.
	30 May 1955 ..	30 June 1955	„ B. S. Kuppuswami.
Banana Research Officer, Aduthurai.	1 July 1954 ..	26 May 1955	„ T. Gopalan Nair.
	27 May 1955 ..	7 June 1955	„ T. Gopalan Nair (Horticulturist and Professor of Horticulture, additional charge).
	8 June 1955 ..	30 June 1955	„ J. Samuel Sundararaj.
Assistant Fruit Specialist (Cashewnut Scheme), Mangalore.	(Throughout.)		„ V. N. Madhava Rao.
Pepper Specialist, Taliparamba.	Do.		„ P. Govindakutty Kurup.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period.		Name of officer-in-charge.
	From	To	
<i>Botany Section.</i>			
Systematic Botanist and Professor of Botany.	1 July 1954 ..	31 July 1954	Sri T. R. Narayanan, Plant Physiologist, additional charge.
	1 Aug. 1954 ..	4 Feb. 1955	„ C. Rajasekhara Mudaliar.
	5 Feb. 1955 ..	30 June 1955	„ T. R. Narayanan, Plant Physiologist, additional charge.
Lecturer in Botany	(Throughout.)		„ D. Daniel Sundararaj.
Cytogeneticist	Do.		„ Dr. N. Krishnaswami.
Plant Physiologist	1 July 1954 ..	29 Oct. 1954	„ T. R. Narayanan,
	30 Oct. 1954 ..	29 Jan. 1955	„ Dr. P. Abraham.
	30 Jan. 1955 ..	30 June 1955	„ T. R. Narayanan.
<i>Sugarcane Section.</i>			
Sugarcane Specialist, Palur.	16 Apr. 1955 ..	30 June 1955	Sri S. V. Parthasarathi.
	(New post created in the year.)		
Sugarcane Agronomist Gudiyatham.	1 July 1954 ..	15 Apr. 1955	Sri S. V. Parthasarathi.
	(Post abolished from 16 April 1955).		
Superintendent, Sugarcane Liaison Farm, Kulitalai.	(Throughout.)		Sri S. Ramaswami.
Superintendent, Sugarcane Liaison Farm, Nellikuppam.	1 July 1954 ..	31 May 1955	„ C. Ekambaram.
	1 June 1955 ..	..	Post abolished.
N.B.—The sugarcane section was under the control of the Paddy Specialist from 1 Nov. 1953 to 15 Apr. 1955. It is now, under the control of Sugarcane Specialist from 16 Apr. 1955.			
<i>Chemistry Section.</i>			
Government Agricultural Chemist.	(Throughout.)		Sri T. Rajagopala Iyengar, (Agricultural Bacteriologist, additional charge).
Agricultural Bacteriologist .. Coimbatore.	(Throughout.)		„ T. Rajagopala Iyengar.
Assistant Agricultural Chemist, Coimbatore.	1 July 1954 ..	24 Dec. 1954	Sri F. L. Daniel.
	25 Dec. 1954 ..	25 Dec. 1954	„ T. Rajagopala Iyengar, additional charge.
	26 Dec. 1954 ..	30 June 1955	„ K. M. Krishna Menon.
Assistant Agricultural Chemist (Mandula Trials Scheme), Tanjore. (Headquarters shifted to Coimbatore from 16 Apr. 1955.)	1 July 1954 ..	10 Feb. 1955	„ C. Raghavendrachar.
	11 Feb. 1955 ..	30 Apr. 1955	„ P. Kunhirama Menon.
	1 May 1955 ..	23 June 1955	„ C. Raghavendrachar.
	24 June 1955 ..	30 June 1955	„ P. Kunhirama Menon.
<i>Entomology Section.</i>			
Government Entomologist .. Coimbatore.	(Throughout.)		Sri K. P. Ananthanarayanan.
Assistant Entomologist (Sugarcane Borer Scheme), Coimbatore.	1 July 1954 ..	8 July 1954	„ Md. Basheer.
	9 July 1954 ..	30 Sep. 1954	„ K. S. Nagarajan.
	1 Oct. 1954 ..	28 Oct. 1954	„ K. P. Ananthanarayanan, Government Entomologist, additional charge.
	29 Oct. 1954 ..	30 June 1955	„ P. R. Nagaraja Rao.
Apiculturist, Coimbatore.	(Throughout.)		„ M. S. Subbiah.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period.		Name of officer in charge.
	From	To	
<i>Mycology Section.</i>			
Government Mycologist.	1 July 1954 ..	24 Aug. 1954	Sri T. S. Ramakrishnan.
	25 Aug. 1954 ..	7 Oct. 1954	„ C. S. Krishnaswami, [Crop and Plant Protection Officer (Mycology) Coimbatore, additional charge.
	8 Oct. 1954 ..	30 June 1955	„ M. Kandaswami, Lecturer in Mycology, additional charge.
Assistant Mycologist (Ergot Scheme), Ootacamund.	1 July 1954 ..	1 Aug. 1954	„ C. V. Govindaswamy.
	2 Aug. 1954 ..	30 June 1955	„ C. S. Krishnamoorthi.
<i>Crop and Plant Protection Officers.</i>			
Crop and Plant Protection Officer (Entomology), Coimbatore.	1 July 1954 ..	24 Dec. 1954	Sri C. S. Balasubramaniam.
	24 Dec. 1954 ..	18 Jan. 1955	„ C. V. Govindaswami Crop and Plant Protection Officer, (Mycology) additional charge
	19 Jan. 1955 ..	21 June 1955	„ Md. Basheer.
Crop and Plant Protection Officer (Mycology), Coimbatore.	22 June 1955.	30 June 1955	„ S. Kanakaraj David.
	1 July 1954 ..	7 Oct. 1954	„ C. S. Krishnaswami.
	8 Oct. 1954 ..	30 June 1955	„ C. V. Govindaswami.
<i>Agricultural Research Engineering Section.</i>			
Assistant Agricultural Engineer (Research), Coimbatore.	1 July 1954 ..	14 Nov. 1954.	Sri R. G. Menon.
	15 Nov. 1954 ..	30 June 1955.	„ K. Natarajan, Assistant Agricultural Engineer (Tractor Workshop), Coimbatore, additional charge.
Assistant Agricultural Engineer (Groundnut Scheme), Coimbatore.	(Throughout.)		„ T. S. Palanivelu.
<i>Agronomy Section.</i>			
Agronomist and Professor of Agriculture, Coimbatore.	1 July 1954 ..	1 Apr. 1955.	Sri P. A. Venkateswara Iyer.
	2 Apr. 1955 ..	13 Apr. 1955.	„ A. H. Subramania Sarma Lecturer in Agriculture, in additional charge.
	14 Apr. 1955 ..	29 May 1955.	„ P. A. Venkateswara Iyer.
Agricultural Meteorologist, Coimbatore.	30 May 1955 ..	8 June 1955.	„ A. H. Subraamania Sarma, Lecturer in Agriculture, in additional charge.
	9 June 1955 ..	30 June 1955.	„ P. A. Venkateswara Iyer.
	(Throughout)		„ C. Balasubramanyam.
Additional Superintendent, Central Farm, Coimbatore.	14 Apr. 1955 ..	14 Apr. 1955.	„ K. Kannian.
	15 Apr. 1955 ..	30 Apr. 1955.	„ K. C. Thomas, Superintendent, Central Farm, additional charge.
	1 May 1955 ..	30 June 1955.	„ K. Kannian.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period		Name of officer-in-charge.
	From	To	
Vellore Division.			
Deputy Director of Agriculture, Vellore.	(Throughout.)		Sri K. Varadachari.
District Agricultural Officer, Vellore.	1 July 1954 ..	18 Apr. 1955 ..	„ S. V. Ramachandran.
	19 Apr. 1955 ..	24 Apr. 1955 ..	„ P. S. Ananthachari, Personal Assistant, additional charge.
	25 Apr. 1955 ..	30 June 1955 ..	„ N. S. Rajagopalan.
District Agricultural Officer, Salem.	1 July 1954 ..	13 May 1955 ..	„ N. Krishna Pillai.
	14 May 1955 ..	30 June 1955 ..	„ G. Venkatakrishnan.
District Agricultural Officer, Guindy	(Throughout.)		„ T. K. Thangavelu.
Superintendent, Agricultural Research Station, Tirurkuppam.	Do		„ M. K. Venkatasubramaniam.
Seed Development Officer (Paddy), Vellore,	Do.		„ P. Uttaman.
Assistant Agricultural Engineer (Inspection), Vellore, now at Coimbatore (headquarters shifted to Coimbatore from 18 Sep. 1954).	1 July 1954 ..	10 Sep. 1954 ..	„ A. K. Subramaniam.
*Assistant Agricultural Engineer (C.A.E.S.), Saidapet.	1st Dec 1954	30 June 1955 ..	„ C. S. Sridharan.
Special District Agricultural Officer (Crop Sampling), Vellore.	1 July 1954 ..	16 July 1954.	„ N. C. Thirumalacharya.
	17 July 1954 ..	3 Sep. 1954.	„ N. Krishna Pillai, (District Agricultural Officer, Salem additional charge.
	4 Sep. 1954 ..	14 Oct. 1954.	„ N. V. Kalyanasundaram.
	15 Oct. 1954 ..	7 Apr. 1955.	„ V. K. Appaji.
	8 Apr. 1955 ..	30 June 1955.	„ N. C. Thirumalacharya.
Block Development Officer, Kadambathur.	1 July 1954 ..	7 May 1955.	„ E. G. Sivaswami.
	8 May 1955 ..	..	Block Development Officer, Tiruvellore additional charge.
Tanjore Division.			
Deputy Director of Agriculture.	(Throughout.)		Sri A. Md. Ali.
District Agricultural Officer, Tanjore.	1 July 1954 ..	26 Aug. 1954 ..	„ N. V. Kalyanasundaram.
Do.	27 Aug. 1954 ..	30 June 1955 ..	„ A. Venkataraman.
District Agricultural Officer, Pattukkottai.	(Throughout)		„ M. J. David.
†Additional District Agricultural Officer (Manuring Scheme), Tanjore.	25 June 1955 ..	30 June 1955 ..	„ S. Venkatarama Iyer.
†Additional District Agricultural Officer (Manuring Scheme), Pattukkottai.	23 June 1955 ..	30 June 1955 ..	„ M. Kasiviswanathan.
District Agricultural Officer, Kumbakonam.	1 July 1954 ..	3 Nov. 1954 ..	„ L. Krishnan.
	4 Nov. 1954 ..	30 June 1955 ..	„ N. Ganeshameorthi.

* Declared as head of office with headquarters at Saidapet from 1st December 1954.

† New posts sanctioned for a period of six months.

APPENDIX No. 48—cont.

Appointments, postings and transfers of Gazetted Officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period.		Name of officer-in-charge.
	From	To	
<i>Tanjore Division—cont.</i>			
District Agricultural Officer, Mayuram.	(Throughout,)		Sri T.N. Balasubramaniam.
District Agricultural Officer, Cuddalore.	Do.		„ S. Muthuswami Iyer.
Block Development Officer, Paaruti.	Do.		„ R. Alagiamanavalan.
District Agricultural Officer, Tiruchirappalli.	Do.		„ K. H. Subramania Iyer.
*Additional District Agricultural Officer (Manuring Scheme), Tiruchirappalli.	24 June 1955 ..	30 June 1955 ..	„ K. Govinda Kurup.
Special District Agricultural Officer (Crop Sampling), Tanjore.	1 July 1954 ..	4 Aug. 1954 ..	„ N. V. Kalyansundaram, District Agricultural Officer, Tanjore, additional charge.
	5 Aug. 1954 ..	25 Apr. 1955 ..	„ K. S. Krishnamoorthi.
	26 Apr. 1955 ..	1 May 1955 ..	„ A. Md. Ali, Deputy Director of Agriculture, Tanjore, additional charge.
	2 May 1955 ..	30 June 1955 ..	„ R. Ananthapadmanaba Pillai.
Principal, Gramasevaks Training Centre, Pattukottai.	(Throughout,)		„ M. Subramania Chetty.
Superintendent, Agricultural Research Station, Palur.	1 July 1954 ..	31 July 1954 ..	„ A. Abdul Samaad.
Do.	1 Aug. 1954 ..	17 Sep. 1954 ..	„ W. R. Nargunam, Paddy Assistant, additional charge.
	18 Sep. 1954 ..	19 Oct. 1954 ..	„ A. Abdul Samaad.
	20 Oct. 1954 ..	4 Mar. 1955 ..	„ M. Rayappa Pillai.
	5 Mar. 1955 ..	30 June 1955 ..	„ A. Shanmugasudaram.
Superintendents, Agricultural Research Station, Aduthurai.	1 July 1954 ..	9 July 1954 ..	„ K. Ramaswami, Paddy Specialist, additional charge.
	10 July 1954 ..	30 June 1955 ..	„ V. Srinivasan.
Seed Development Officer, (Paddy), Tanjore.	(Throughout,)		„ V. Krishnaswami.
Assistant Agricultural Engineer (Inspection), Tiruchirappalli.	Do.		„ M. Umapathi.
Principal, Gramasevaks Training Centre, Aduthurai.	21 June 1954 ..	5 May 1955 ..	„ G. Venkatakrishnan.
	6 May 1955 ..	15 May 1955 ..	„ S. Mahadevan, (Agricultural Instructor, additional charge).
	16 May 1955 ..	30 June 1955 ..	„ E. G. Sivaswami.
<i>Madurai Division.</i>			
Deputy Director of Agriculture, Madurai.	1 July 1954 ..	30 Sep. 1954 ..	„ T. S. Francis.
	1 Oct. 1954 ..	6 Dec. 1954 ..	„ S. S. Katchapeswaran.
	7 Dec. 1954 ..	26 Dec. 1954 ..	„ Md. Obaidullah Shah, Deputy Director of Agriculture, Coimbatore, additional charge.
	27 Dec. 1954 ..	6 Mar. 1955 ..	„ T. S. Francis.
	7 Mar. 1955 ..	30 June 1955 ..	„ S. S. Katchapeswaran.

*New posts sanctioned for a period of six months.

APPENDIX No. 48—cont.

Appointments, postings and transfers of gazetted officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period.		Name of officer in charge.
	From	To	
Madurai Division—cont.			
District Agricultural Officer, Madurai.	1 July 1954.	11 Nov. 1954.	Sri P. S. Venkatasubramaniam.
	12 Nov. 1954..	30 Nov. 1954.	„ R. Krishnamoorthy (Additional District Agricultural Officer, Madurai, additional charge).
	1 Dec. 1954 ..	3 Dec. 1954 ..	„ M. N. Meenakshisundaram, Personal Assistant, additional charge.
	4 Dec. 1954 ..	18 Jan. 1955 ..	„ K. C. Thomas.
	19 Jan. 1955 ..	12 May 1955 ..	„ P. S. Venkatasubramaniam.
	13 May 1955 ..	13 May 1955 ..	„ M. N. Meenakshisundaram, Personal Assistant, additional charge.
	14 May 1955 ..	30 June 1955 ..	„ N. V. Kalyanasundaram.
* Additional District Agricultural Officer (Manuring Scheme), Madurai.	25 June 1955.	30 June 1955 ..	„ K. Meenakshisundaram. * New post sanctioned for a period of six months.
District Agricultural Officer, Sattur.	(Throughout)		„ A. K. Ramasubba Iyer.
District Agricultural Officer, Tirunelveli.	1 July 1954 ..	18 Apr. 1955 ..	„ N. S. Rajagopalan.
	19 Apr. 1955 ..	26 Apr. 1955 ..	„ T. K. Sankarasubramaniam, Personal Assistant, additional charge.
	27 Apr. 1955..	30 June 1955 ..	„ B. Santhanakrishnam.
Special District Agricultural Officer (Crop Sampling), Madurai.	(Throughout)		„ B. P. Masilamani.
Principal, Gramasevaks Training Centre, T. Kallupatti	1 July 1954 ..	7 May. 1955..	„ K. Santhanam.
	8 May 1955 ..	30 June 1955 ..	„ Honorary Principal, additional charge.
Superintendent, Agricultural Research Station, Koilpatti.	1 July 1954 ..	12 Mar. 1955 ..	„ B. W. X. Ponnayya.
	13 Mar. 1955 ..	30 June 1955..	„ G. Ramabadrar.
Assistant Agricultural Engineer (Inspection), Madurai.	(Throughout)		„ R. S. Subramaniam.
Principal, Gramasevaks Training Centre, Koilpatti.	Do.		„ M. Vaidyanathan.
Vice Principal, Training Centre for Village Guides, Gandhinagar.	1 July 1954 ..	9 Nov. 1954 ..	„ R. Ananthapadmanaba Pillai.
	10 Nov. 1954.	30 June 1955..	„ L. Krishnan.
Coimbatore Division.			
Deputy Director of Agriculture, Coimbatore.	(Throughout)		Sri Md. Obaidullah Shah.
District Agricultural Officer, Coimbatore.	Do.		„ J. H. S. Ponnayya.

APPENDIX No. 48—cont.

Appointments, postings and transfers of gazetted officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period.		Name of officer-in-charge.
	From	To	
Coimbatore Division—cont.			
District Agricultural Officer, Shoranur (Headquarters shifted to Kozhikode)	(Throughout.)		Sri K. Krishnan.
District Agricultural Officer, Tellicherry.	Do.		„ P. K. Parameswara Menon.
District Agricultural Officer, Mangalore.	Do.		„ K. Sanjiva Shetty.
District Agricultural Officer, Ootacamund.	Do.		„ K. Raman Menon.
Curator, Government Botanical Gardens, Ootacamund.	Do.		„ B. G. Narayana Menon.
Special District Agricultural Officer (Crop Sampling), Shoranur.	Do.		„ B. Srinivasa Rao.
Superintendent, Agricultural Research Station, Nanjanad.	1 July 1954 ..	8 May 1955 ..	„ K. Saptharishi.
	9 May 1955 ..	28 May 1955 ..	„ K. Radhakrishna Alwa, Assistant, additional charge.
	29 May 1955 ..	30 June 1955 ..	„ K. Saptharishi.
Superintendent, Wynaad ..	1 July 1954 ..	7 Aug. 1954 ..	„ P. K. Natesan, Senior Farm Manager, additional charge.
	8 Aug. 1954 ..	30 June 1955 ..	„ K. Fazlulla Khan.
Superintendent, Agricultural Research Station, Mangalore.	(Throughout)		„ K. Hanumantha Rao.
Assistant Agricultural Engineer (Indigenous Implements Survey), Coimbatore (new post).	*22 Apr. 1955.	30 June 1955 ..	„ P. K. Radhakanth. * Officer took charge on this date.
Principal, Gramasevaks Training Centre (Extension), Bhavanisagar.	10 Feb. 1955 ..	15 Apr. 1955 ..	„ R. Ananthapadmanaba Pillai.
	16 Apr. 1955 ..	30 June 1955 ..	„ K. Santhanam.
Assistant Agricultural Engineer (Soil Conservation Scheme), Coimbatore.	24 Oct. 1954 ..	9 Mar. 1955 ..	„ N. Sankaranarayana Reddy.
	10 May 1955 ..	24 Mar. 1955 ..	„ A. N. Ramalingam, Soil Conservation Assistant, Coimbatore, additional charge.
	25 Mar. 1955 ..	15 Apr. 1955 ..	„ N. Sankaranarayana Reddy.
	16 Apr. 1955 ..	28 May 1955 ..	„ A. N. Ramalingam, Soil Conservation Assistant, Coimbatore, additional charge.
	29 May 1955 ..	30 June 1955 ..	„ N. Sankaranarayana Reddy.
Principal, Gramasevaks Training Centre (Basic), Bhavanisagar.	28 June 1954 ..	18 Nov. 1954 ..	„ M. Mukundan.
	19 Nov. 1954 ..	9 Feb. 1955 ..	„ R. Ananthapadmanaba Pillai.
	10 Feb. 1955 ..	....	Post kept in abeyance.

APPENDIX No. 48—cont.

Appointments, postings and transfers of gazetted officers from 1st July 1954 to 30th June 1955—cont.

Post.	Period		Name of officer-in-charge.
	From	To	
Coimbatore Division—cont.			
Principal, Gramasevaks Training Centre, Taliparamba.	(Throughout)		Sri P. K. Nambiar.
Block Development Officer, Tiruppur.	Do.		„ S. M. Sulaiman.
Principal, Training Centre for Village Guides, Parli.	1 July 1954 ..	2 Nov. 1954 ..	„ P. N. Nayar.
	3 Nov. 1954 ..	22 Nov. 1954 ..	„ K. Ganesh Shenoy.
	23 Nov. 1954 ..	30 June 1955..	„ M. Mukundan.
Superintendent, Agricultural Research Station, Bhavanisagar.	1 July 1954 ..	12 Nov. 1954..	„ S. Sundaram.
	13 Nov. 1954 ..	9 Dec. 1954 ..	„ J. H. S. Ponnayya, District Agricultural Officer, Coimbatore, additional charge.
	10 Dec. 1954 ..	13 Feb. 1955 ..	„ R. Krishnamoorthy.
	14 Feb. 1955 ..	12 May 1955 ..	„ N. V. Kalyanasundaram.
	13 May 1955 ..	30 June 1955 ..	„ M. Rayappa Pillai.
Seed Development Officer (Millets), Coimbatore.	(Throughout)		„ V. Achutha Warriar.
Assistant Agricultural Engineer (Soil Conservation Scheme), Ootacamund.	1 July 1954 ..	9 Mar. 1955 ..	„ S. Narayanaswami.
	10 Mar. 1955 ..	29 Apr. 1955 ..	„ K. R. Thiruvengadaswamy, Soil Conservation Assistant, additional charge.
	30 Apr. 1955 ..	6 June 1955 ..	„ C. R. Shanmugam.
	7 June 1955 ..	30 June 1955 ..	„ K. R. Thiruvengadaswamy, Soil Conservation Assistant, additional charge.
Assistant Agricultural Engineer (Tractor Workshop), Coimbatore.	(Throughout)		„ K. Natarajan.

APPENDIX No. 48—cont.

Officers who were on leave during the year (1st July 1954 to 30th June 1955).

Name.	Period	
	From	To
A. Abdul Samad	1 Aug. 1954.	17 Sep. 1954.
Dr. P. Abraham	20 Oct. 1954.	26 Oct. 1954.
V. K. Appaji	30 Jan. 1955.	15 Feb. 1955.
C. Ekambaram	1 July 1954.	29 Sep. 1954.
T. S. Francis	1 June 1955.	25 June 1955.
E. R. Gopala Menon	7 Mar. 1955.	15 Apr. 1955.
	1 July 1954 (preparatory to retirement.)	
S. S. Katchappeswaran	1 July 1954.	23 Sep. 1954.
	7 Dec. 1954.	6 Mar. 1955.
B. Santhanakrishnan	1 July 1954.	3 July 1954.
	28 Jan. 1955.	26 Feb. 1955.
C. S. Krishnamoorthy	1 July 1954.	1 Aug. 1954.
K. S. Krishnamoorthy	1 July 1954.	31 July 1954.
	26 Apr. 1955.	23 June 1955.
	(Preparatory to retirement.)	
U. B. Md. Abbas	29 Sep. 1954.	28 Dec. 1954.
	7 Feb. 1955.	28 Feb. 1955.
U. Narasinga Rao	24 May 1955.	30 June 1955.
T. Natarajan	11 Oct. 1954.	23 Oct. 1954.
P. N. Nayar	3 Nov. 1954.	2 Feb. 1955.
T. Radhakrishnan	9 Jan. 1955.	30 Jan. 1955.
	2 May 1955.	8 June 1955.
C. Raghavendrachar	11 Feb. 1955.	22 Apr. 1955.
C. Rajasekara Mudaliar	1 July 1954.	31 July 1954.
	5 Feb. 1955.	1 Apr. 1955.
	(Preparatory to retirement.)	
K. Ramaswami	4 Aug. 1954.	3 Nov. 1954.
	10 Feb. 1955.	9 June 1955.
V. Ramaswami Mudaliar	1 July 1954.	30 Aug. 1954.
T. V. Rangaswami	13 Dec. 1954.	22 Feb. 1955.
N. G. Narayanan	7 Sep. 1954.	25 Oct. 1954.
	10 Jan. 1955.	29 Jan. 1955.
S. Sampath	17 May 1955.	31 May 1955.
N. Sankaranarayana Reddy	10 Mar. 1955.	24 Mar. 1955.
	16 Apr. 1955.	28 May 1955.
P. A. Venkateswara Iyer	30 May 1955.	8 June 1955.
N. Krishna Pillai	14 May 1955.	30 June 1955.
N. C. Thirumalachari	1 Mar. 1955.	31 Mar. 1955.
K. Fazlulla Khan	24 July 1954.	7 Aug. 1954.
Dr. M. Srinivasan	20 Dec. 1954.	9 Jan. 1955.
P. S. Venkatasubramaniam	12 Nov. 1954.	11 Jan. 1955.
	13 May 1955.	30 June 1955.
K. Narayanan Nair	7 Mar. 1955.	6 Apr. 1955.
N. V. Kalyanasundaram	15 Oct. 1954.	14 Jan. 1955.
M. Rayappa Pillai	20 June 1954.	19 Oct. 1954.
	5 May 1955.	4 Mar. 1955.
S. Rajaratnam	18 Sep. 1954.	28 Oct. 1954.
	20 May 1955.	15 June 1955.
P. Rajavadan	1 July 1954.	15 Oct. 1954.
K. Satharishi	9 May 1955.	28 May 1955.
C. R. Subramaniam	8 Oct. 1954.	23 Oct. 1954.
K. Kannian	15 Apr. 1955.	30 Apr. 1955.

APPENDIX No. 49.

Strength of staff of Agricultural department as on 30th June 1955 (gazetted).

Serial number and name of post.	Permanent.		Temporary.
	(1)	(2)	(3)
Director of Agriculture	1		
Headquarters Deputy Director of Agriculture (Research)	1		
Headquarters Deputy Director of Agriculture (Inspection and General)	1		
Headquarters Deputy Director of Agriculture (Engineering)	1		
Personal Assistant to Director of Agriculture	1		1
Gazetted Assistant	1		
Assistant Marketing Officer	1		
Accounts Officer	1		
Junior Accounts Officer	1		
Assistant Agricultural Engineer (Headquarters)	1		
Assistant Agricultural Engineer, Central Agricultural Engineering Stores			1
Other Establishments.			
Regional—			
State Marketing Officer	1		
Regional Deputy Directors of Agriculture	3		1*
District Agricultural Officers	14		1†
Assistant Marketing Officers, Coimbatore and Tiruchirappalli	2		
Additional District Agricultural Officers (Intensive Manuring Scheme)			4
Special District Agricultural Officer, Crop Sampling			5
Vice Principal and Principal, Community Project Training Centres			2
Block Development Officers			6
Principals, Gramasevak Training Centres			
Seed Development Officers (2 for Paddy and 1 for Millets)			3
Assistant Agricultural Engineers (Inspection) (Coimbatore, Tiruchirappalli and Madurai)			3
Crop and Plant Protection Officers (Entomology and Mycology)			2
Agricultural College Principal	1		
Agro-nomist and Professor of Agriculture	1		
Systematic Botanist and Professor of Botany	1		
Lecturer in Agriculture	1		
Superintendent, Central Farm	1		
Agricultural Meteorologist	1		
Assistant Lecturing and Systematic Botanist	1		
Cytogeneticist	1		
Cytogeneticist, Groundnut Scheme	1		
Plant Physiologist			
Lecturer in Entomology and Gazetted Assistant	2		
Lecturer in Entomology	1		
Lecturer in Mycology			
Lecturer in Chemistry and Gazetted Assistant Lecturer in Chemistry	2		
Lecturer in Agricultural Economics	1		
Lecturer in Civil Engineering	1		
Lecturer in Mechanical Engineering	1		
Lecturer in Animal Husbandry	1		
Agricultural Research Institute—Government Agricultural chemist	1		
Government Entomologist	1		
Government Mycologist	1		
Paddy Specialist	1		
Millets and Pulses Specialist	1		
Oil-seeds Specialist	1		
Cotton Specialist	1		
Horticulturist and Professor of Horticulture	1		

* Post at Madurai.

† Post at District Agricultural Office, North Malabar at Tallicherry.

APPENDIX No. 49—cont.

Strength of staff of Agricultural department as on 30th June 1955 (gazetted)—cont.

Serial number and name of post— (1)	Permanent. (2)	Temporary. (3)
<i>Other Establishments—cont.</i>		
Agricultural Bacteriologist	1	..
Assistant Agricultural Chemist	1	..
Assistant Entomologist (Apiculture)	..	1
Assistant Entomologist (Sugarcane Borer Scheme)	..	1
Assistant Millet Specialist, (Hybrid Cumbu Scheme), Coimbatore	..	1
Assistant Oil-seeds Specialist, Coimbatore	..	1
Assistant Cotton Specialist, Coimbatore (now styled Additional Superintendent, Central Farm)	1	..
Assistant Fruit Specialist	..	1
Assistant Fruit Specialist (Vegetables), Coimbatore	..	1
Assistant Agricultural Engineer (Research)	1	..
Assistant Agricultural Engineer (Groundnut Machinery Scheme)	..	1
Administrative Officer	..	1
<i>Agricultural Research Stations—Experimental Farms, Special schemes, etc.—</i>		
Cotton Extension Officer	..	1
Assistant Cotton Extension Officers, Coimbatore and Madurai	..	2
Assistant Agricultural Engineer (Soil Conservation), Ootacamund	..	1
Assistant Agricultural Engineer (Soil Conservation Scheme), Coimbatore	..	1
Assistant Agricultural Engineer, Tractor Workshop, Coimbatore	..	1
Cotton Certification Officer, Rajapalayam, and Gazetted Assistant	..	2
Curator, Government Botanical Gardens, Ootacamund	1	..
Assistant Mycologist, Ergot Scheme, Ootacamund	1	..
Banana Research Officer, Aduthurai	..	1
Pepper Specialist, Taliparamba	..	1
Assistant Cotton Specialist, Karunganni Scheme, Kovilpatti	..	1
Assistant Cotton Specialist, (K. 2 and Co. 4 Scheme), Kovilpatti	..	1
Assistant Cotton Specialist, Srivilliputtur	..	1
Assistant Cotton Specialist, Tiruppur	..	1
Assistant Cotton Specialist, Winter Cambodia Scheme	..	1
Superintendents, Agricultural Research Stations (Nileshwar, Nanjanad, Palur, Aduthurai, Kovilpatti, Tindivanam and Tirurkuppam)	7	..
Superintendent, Agricultural Research Station, Mangalore	..	1
Superintendent, Agricultural Research Station, Bhavanisagar	..	1
Superintendent, Wynaad Colonization Scheme, Ambalavayal	..	1
Assistant Fruit Specialist, Coonoor	1	..
Assistant Fruit Specialist (Cashewnut Research Scheme), Mangalore	..	1
Superintendents, Sugarcane Liaison Farms, Kulittalai and Nellikuppam *	..	2
Assistant Agricultural Chemist (Scheme for agronomic and manurial trials), Tanjore	..	1
Assistant Paddy Specialist, Pattambi	1	..
Assistant Agricultural Engineer, River Pumping Scheme, Madras	..	1
Assistant Agricultural Engineer, Indigenous Imple- ments Scheme, Coimbatore	..	1
Compost Development Officer	..	1

* Abolished on 31st May 1955.

APPENDIX No. 49—cont.

Abstract of permanent and temporary posts as on 1st July 1955.

Serial number and name of posts.	Number of posts.		
	Permanent.	Temporary.	Total.
<i>Agricultural Section.</i>			
1 Personal Assistant	13	1	14
2 Agricultural Demonstrator	117	105	222
3 Agricultural Demonstrator (Vegetables)	3	..	3
4 Additional Agricultural Demonstrator	..	..	..
5 Special Agricultural Demonstrator (Cotton)	..	..	..
6 Special Agricultural Demonstrator (Sugarcane)	..	15	15
7 Special Agricultural Demonstrators for training Demonstration maistris and Todas	..	..	..
8 Special Agricultural Demonstrator (Manures)	..	..	..
9 Marketing Assistants	4	..	4
10 Journal Assistants	1	2	3
11 Farm Manager	8	13	21
12 Seed Development Assistant	..	..	..
13 Plant Protection Assistant	6	25	31
14 Technical Assistant in Agriculture and Econo- mics	8	..	8
15 Teaching Assistants in Jails	1	..	1
16 Technical Assistant	1	..	1
17 Farm Manager, Hosur Cattle Farm	1	..	1
Total	163	161	324
<i>Research Section.</i>			
1 Paddy section	29	5	34
2 Millet and Pulses section	13	6	19
3 Cotton section	10	24	34
4 Oil-seeds section	11	9	20
5 Fruit section	7	15	22
6 Assistant in Horticulture training	..	..	..
7 Botany section	6	1	7
8 Potato section	3	..	3
9 Curator section	3	..	3
10 Chemistry section	16	13	29
11 Entomology section	11	5	16
12 Mycology section	8	5	13
13 Sugarcane section	2	4	6
14 Pepper section	1	2	3
15 Cytogenetics section	1	..	1
16 Meteorology section	1	2	3
17 Plant Physiology section	1	5	6
18 Librarian section	1	..	1
Total	123	97	220

Strength of non-gazetted staff as on 1st July 1955.

Serial number and name of posts.	Number of posts.		
	Permanent.	Temporary.	Total.
<i>Madras Ministerial Service.</i>			
1 Manager	1	..	1
2 Senior Superintendents	4	3	7
3 Junior Superintendents	9	12	21
4 Stores Superintendents	..	2	2
5 Head Clerk	..	1	1
6 Upper division clerks and accountants	35	146	181
7 Lower division clerks (including Store-clerks)	159	343	502
8 Store-keepers, III Grade	..	14	14
9 Store-keepers, II Grade	5	4	9
10 Typists and stenotypists	38	62	100
Total	251	587	838

APPENDIX No. 49—cont.

Strength of non-gazetted staff as on 1st July 1955—cont.

Serial number and name of posts.	Number of posts.		
	Permanent.	Temporary.	Total.
Engineering Staff.			
1 Senior tractor driver		85	85
2 Junior tractor driver		227	227
3 Oil engine and pumpset driver		405	405
4 Lorry drivers		22	22
5 Jeep drivers		23	23
6 Fitters		6	6
7 Loading inspector		1	1
8 Welders		2	2
9 Tractor cleaners		156	156
10 Lorry and jeep cleaners		23	23
11 Bus drivers		2	2
12 Millers		1	1
13 Mechanists		3	3
14 Moulder		1	1
Total		957	957

List of posts as on 1st July 1955.

Name of the post.	Number of posts.		
	Permanent.	Temporary.	Total.
Madras Agricultural Subordinate Service.			
Fieldmen	120	442	562
Madras General Subordinate Service.			
Demonstration maistris	266	475	741
Madras Agricultural Subordinate Service.			
Artists	9	2	11
Madras General Subordinate Service.			
Sanitary Inspector	1		1
Assistant Librarian	5	7	12
Attenders	1		1
Ward attendant	1		1
Museum Curator	1		1
Compounder	1		1
Insectory attendant	20	16	36
Laboratory attendants			
Madras Last Grade Service.			
Peons	181	166	347
Total	607	1,109	1,716

Statement showing the strength of the non-gazetted staff in the Agricultural department under various categories on 30th June 1955.

Category and name of post.	Number of posts.		
	Permanent.	Temporary.	Total.
1 Agricultural Engineering Supervisors	14	38	53
plus 1 [Second grade Electrical Supervisor.]			
2 Tractor Foreman	7	14	21
3 Assistant Tractor Foreman	7	9	16
4 Senior Mechanic	1	14	15
5 Junior Mechanic	1	15	16
6 Mechanic III, grade	1		1
7 Draughtsman		5	5
8 Mechanic, I grade		1	1
9 Tracer		1	1
Total	32	97	129

APPENDIX No. 50.

List of temporary posts of Upper Subordinates under various schemes as on 1st July 1955.

Serial number.	Name of scheme.	Post.	Number sanctioned.	G.O. number and date.	From	To
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Wheat Colonisation Scheme ..	Farm Manager ..	5	G.O. Ms. No. 589, Agriculture, dated 1st March 1955.	1st March 1955 ..	26th February 1956.
2	Cotton Seed Multiplication Scheme ..	Seed Development Assistant ..	3	G.O. No. 1883, Agriculture, dated 6th April 1954.	1st July 1953 ..	30th June 1955.
3	Scheme for the Evolution of Long Staple Cotton.	Cotton Assistant ..	2	G.O. No. 768, Food and Agriculture, dated 21st March 1953.	23rd November 1951 ..	22nd November 1953.
4	Pepper Research Station, Paddy Assistant ..	Paddy Assistant ..	1	G.O. Ms. No. 8689, Agriculture, dated 27th December 1954.	1st March 1955 ..	29th February 1956.
5	Hybrid Cumbu Scheme, Cumbu-Millet Assistant ..	Millet Assistant ..	4	G.O. Ms. No. 539, Food and Agriculture, dated 28th March 1952.	20th March 1952 ..	19th March 1957.
6	Scheme for Multiplication, Distribution and Marketing of K2 and Co., 4 Cotton Seed.	Special Agricultural Demonstrator (Cotton) ..	8	Government Memorandum No. 15443-B-IV-54-8-A, Agriculture, dated 5th March 1955.	1st March 1955 ..	31st May 1956.
7	Comprehensive Scheme for Re-establishment of Coconut Nurseries in important districts.	Coconut Nursery Assistant ..	3	Government Memorandum No. 15443-B-IV-54-15, Agriculture, dated 1st June 1955.	1st June 1955 ..	31st August 1955.
8	Additional Staff for Plant Protection work in districts.	Plant Protection Assistant ..	24	G.O. No. 3215, Agriculture, dated 30th October 1954.	1st April 1954 ..	30th September 1955.
9	Scheme for Banana Research at Agricultural.	Fruit Assistant ..	2	G.O. Ms. No. 121, Agriculture (Food Production) dated 26th March 1955.	1st March 1955 ..	29th February 1956.
10	Sugarcane Development Scheme.	Farm Manager, Special Agricultural Demonstrator (Sugarcane), ..	3	G.O. Ms. No. 760, Agriculture, dated 18th March 1955.	1st April 1954 ..	31st March 1956.
11	Scheme for production of improved strains of millets	Millet Assistant ..	2	Government Memorandum No. 121335 (a) B. II/52-53, Agriculture, dated 2nd July 1955.	1st July 1955 ..	31st July 1955.
12	Scheme for the breeding of long staple American Cotton in the Central Districts.	Cotton Assistant ..	7	G.O. Bt. No. 695, Agriculture, dated 10th May 1955.	1st April 1954 ..	31st March 1959.
13	Scheme for scientific aid for Pepper Industry.	Pepper Assistant ..	3	G.O. Ms. No. 2402, Agriculture, dated 26th July 1954.	1st April 1954 ..	31st March 1956.
				G.O. No. 1947, Food and Agriculture, dated 12th August 1953.	1st April 1953 ..	31st March 1958.

APPENDIX No. 50—cont.
List of temporary posts of Upper Subordinates under various schemes as on 1st July 1955—cont.

Serial number.	Sanction number.	Name of scheme.	Post.	Number sanctioned.	G.O. number and date.	From	To
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
14	129	Publications of departmental journals in Malayalam and Kannada.	Journal Assistant	..	G.O. Ms. No. 1231, Agriculture, dated 4th May 1955.	1st March 1955	.. 29th February 1956.
15	135	Scheme for improvement of Tinnevely and Karungudi Cotton.	Cotton Assistant	..	G.O. Ms. No. 1554, Agriculture, dated 13th June 1955.	18th June 1954	.. 17th June 1956.
16	141	Scheme for Research on Ginger Cultivation.	Ginger Assistant	..	G.O. Ms. No. 847, Food and Agriculture, dated 1st June 1955.	1st February 1953	.. 31st January 1956.
17	143	Seed Development Scheme.	Seed Development Assistant.	2	Continued beyond 28th February 1955 in anticipation of sanction of Government. Orders of Government are awaited.		
18	144	Employment of Additional Agricultural Demonstrator.	Additional Agricultural Demonstrator.	4	G.O. Ms. No. 813, Agriculture, dated 21st March 1955.	1st March 1955	.. 29th February 1956.
19	152	Paddy Breeding Station, Mangalore.	Paddy Assistant	..	G.O. Ms. No. 93, Agriculture, dated 10th January 1955.	28th February 1955	.. Do.
20	156	Fruit Products Development Scheme.	Fruit Assistant.	..	Government have decided to continue the Scheme for three years beyond 23rd April 1955—Vide Government Memorandum No. 19539-B. IV-55-8, Agriculture, dated 27th May 1955.		
21	159	Improvement to Todas in Nilgiris district.	Special Agricultural Demonstrator.	1	G.O. Ms. No. 1138, Agriculture, dated 22nd April 1955.	1st May 1955	.. 31st December 1955.
22	169	Agricultural Meteorology Scheme.	Statistical Assistant	..	G.O. No. 269, Agriculture, dated 31st January 1955.	1st March 1955	.. 29th February 1956.
23	176	Scheme for breeding of unirrigated Cambodia Cotton.	Cotton Assistant	..	G.O. No. 1698, Food and Agriculture, dated 2nd September 1950.	26th October 1950	.. 25th October 1955.
24	177	Scheme for the improvement of Sweet Potato and Tapioca.	Paddy Assistant	..	G.O. No. 2018, Agriculture, dated 18th June 1954.	17th July 1954	.. Do.
25	188	Recreation of Malabar district.	Personal Assistant to District Officer.	1	G.O. No. 745, Food and Agriculture, dated 16th May 1953.	1st October 1953	.. 30th September 1956.
26	193	Opening of an Agricultural Research Station at Sathyamangalam.	Chemistry Assistant	..	G.O. No. 810, Agriculture, dated 3rd March 1955.	1st March 1955	.. 29th February 1956.
27	195	Scheme for running six Zonal Nucleus Seed Farms of Improved Oilseeds Strains.	Farm Manager	5	G.O. No. 1457, Food and Agriculture, dated 21st September 1953.	21st August 1955	.. 6th August 1956.
			Oil Seeds Assistant	4	G.O. No. 3713, Agriculture, dated 31st December 1954.	..	2nd January 1957.
				..	G.O. No. 1092, Food and Agriculture, dated 25th May 1951.	..	..

28	199	Cotton Certification Scheme	Certification Inspector	..	G.O. Ms. No. 663, Industries, Labour and Co-operation, dated 24th February 1955.	1st April 1955	.. 29th February 1956.
29	200	Scheme for Manual Varied and Agronomic Trials to determine optimum yield.	Field Assistant	5	Government Memorandum No. 3359 B-IV/54, 24 Agriculture, dated 1st April 1955.	19th September 1951	.. 30th September 1955.
30	202	Scheme for conducting Research on Cashewnut in Madras.	Assistant in Cashewnut	2	G.O. No. 1573, Food and Agriculture, dated 7th August 1951.	1st August 1952	.. 31st July 1956.
31	205	Opening of an Agricultural Research Station at Paramakudi.	Farm Manager	1	G.O. No. 152, Agriculture, dated 18th January 1955.	29th February 1955	.. 29th February 1956.
32	208	Scheme for stem breaking diseases of Aracanut Palm.	Myology Assistant	3	G.O. No. 1500, Food and Agriculture, dated 10th September 1951.	1st August 1952	.. 31st July 1952.
33	209	Scheme for starting Regional Bee Research Station at Paramakudi.	Entomology Assistant	1	G.O. Ms. No. 1605, Agriculture, dated 18th May 1954.	1st April 1954	.. 31st March 1956.
34	215	Scheme for investigation of the possibility of pre-soaking seeds in nutrient salt as method of improving crop yield.	Assistant in Plant Physiology.	1	G.O. Ms. No. 889, Agriculture, dated 24th March 1955.	1st April 1955	.. Do.
35	224	Contour Bunding Scheme for Soil Conservation.	Soil Conservation Assistant.	2	Government have been addressed for continuation of the scheme till 30th September 1955 and their orders are awaited.		
36	225	Scheme for the Establishment of Farm to Breeding Station for Biological control of Popillia ferruginea.	Entomology Assistant	1	G.O. Ms. No. 985, Agriculture, dated 6th April 1955.	4th December 1954	.. 3rd December 1956.
37	228	Scheme for Research on eradication of Weeds by herbicidal chemicals.	Plant Physiology Assistant.	1	G.O. Ms. No. 949, Agriculture, dated 2nd April 1955.	1st April 1955	.. 31st March 1956.
38	230	Administration of work relating to the Madras Sugar Factories Control Act, 1949.	Special Agricultural Demonstrator (Sugar cane).	2	G.O. Ms. No. 95, Agriculture, dated 12th January 1955.	7th January 1955	.. 6th January 1956.
39	237	Scheme for Breeding of Parasitic resistant strains of Paddy of different duration.	Paddy Assistant	..	Government Memorandum No. 46488 B-IV/54-9 Agriculture, dated 3rd May 1954.	1st July 1953	.. 31st March 1956.
40	242	Scheme for improvement of Vegetables.	Assistant	3	G.O. Ms. No. 428, Agriculture, dated 24th December 1953.	1st December 1954	.. 30th November 1959.

APPENDIX NO. 50—cont.

List of temporary posts of Upper Subordinates under various schemes as on 1st July 1955—cont.

Serial number.	Sanction number.	Name of schemes	Post.	Number sanctioned.	G.O. number and date.	From	To
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
41	246	Scheme for Beehive Diseases.	Plant Protection Assistant.	1	Government have been addressed for continuance of one post at Tiruchirappalli till 28th February 1956 and their orders are awaited.	....	....
42	247	Soil Conservation Scheme for Kanyakumari and Vellakoll Fickal.	Soil Conservation Assistant ..	3	G.O. No. 1732, Agriculture, dated 24th May 1954.	2nd October 1954 ..	1st October 1954.
43	248	Soil Conservation Scheme for Kothamangalam Fuel Series.	Do.	3	G.O. No. 1803, Agriculture, dated 1st June 1954.	15th January 1955 ..	14th January 1956.
44	251	Scheme for Breeding of Cotton.	Agricultural Demonstrator ..	3	G.O. No. 153, Agriculture, dated 18th January 1955.	(Up to 31st August 1955.)	
45	252	Scheme for investigation for causes resulting in insecting infestation of Pepper export to United States of America.	Entomology Assistant ..	1	Government Memorandum, No. 5003, B-11/54-8, Agriculture, dated 7th September 1954.	1st November 1954 ..	31st October 1955.
46	254	Scheme for increasing the production of Oilseeds in Madras State.	Oilseeds Assistant ..	5	G.O. Ms. No. 3048, Agriculture, dated 11th October 1955.	18th January 1955 ..	31st March 1956.
47	256	Scheme for Collection and Analysis of samples of sliced and balled arecanut at the Agricultural College and Research Institute, Coimbatore.	Analyst ..	1	G.O. No. 3433, Agriculture, dated 3rd December 1954.	11th February 1955 ..	8th November 1955.
48	257	Employment of additional staff for doing propaganda Work in Lower Bhavani Project Area.	Agricultural Demonstrator ..	1	G.O. Ms. No. 740, Agriculture, dated 15th March 1955.	1st March 1955 ..	29th February 1956.
49	260	Scheme for the preservation and storage of fruits and Vegetables.	Research Assistant ..	1	G.O. Ms. No. 56, Agriculture, dated 6th January 1955.	1st April 1955 ..	31st March 1956.
50	266	Scheme for Research on the Physiology of Groundnut.	Physiology Assistant ..	2	G.O. No. 144, Agriculture, dated 17th January 1955.	18th February 1955 ..	17th February 1960.
51	261	Scheme for intensive breeding of Groundnut.	Assistant ..	2	G.O. Ms. No. 820, Agriculture, dated 22nd March 1955.	30th June 1955 ..	29th June 1960.
52	262	Scheme for Research on and improvement of legumes and	Research Assistant ..	1	G.O. Ms. No. 918, Agriculture, dated 31st March 1955.	(Up to 29th February 1956.)	
53	263	Scheme for better cultivation of coconuts in Lacadive and Amindivi Islands.	Agricultural Demonstrator ..	1	G.O. Ms. No. 954, Agriculture, dated 20th March 1955.	Two years from date of appointment.	
54	264	Sugarcane smut and Borer disease at Karur taluk in Tiruchirappalli—eradication of.	Do.	1	G.O. Ms. No. 933, Agriculture, dated 2nd April 1955.	9th Apr. 1955 ..	8th July 1955 ..
55	265	Reorganization and revision of jurisdiction ..	Do.	73	G.O. Ms. No. 3890, Agriculture, dated 12th December 1954.	....	....
56	266	Sugarcane Research Station, Palur.	Cane Assistant ..	4	G.O. Ms. No. 917, Agriculture, dated 31st March 1955.	Up to 29th February 1956.	
57	269	Fruit Preservation Scheme.	Chemistry Assistant .. Entomology Assistant .. Mycology Assistant ..	3 1 1	G.O. Ms. No. 1032, Agriculture, dated 11th April 1955.	Do.	
58	271	Soil Conservation Scheme, Kammandur of Ketti Village, Coonoor taluk.	Soil conservation Assistant ..	1	G.O. No. 636, Agriculture, dated 9th March 1955.	1st June 1955 ..	31st December 1955 ..

APPENDIX No. 51.

Statement showing the number of cases of defalcation pending, new cases, etc.

Serial number.	The number of cases of defalcations etc. pending at the beginning of the year under report.	The place of occurrence.	District.	Amount involved.	Number of cases disclosed during the year.	The nature of action taken against the persons responsible.	The number of new cases detected during the year.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				RS. A. P.				
1	..	Madras Vegetable Seed Stores.	Chingleput	586 1 0	..	Amount is being recovered from the surety of the ex-Store-keeper Sri Quannuruddin. Amount so far recovered is Rs. 306-9-9. The balance of Rs. 279-7-3 has yet to be recovered.	..	....
2	..	Ponneri depot	Do.	1,532 4 0	..	Responsibility is fixed on the store clerk Sri R. Chandrasekharan. Action is being taken for the recovery of the amount from the Agricultural Demonstrator Sri S. Chandrasekharan.	..	Out of the above amount, a sum of Rs. 1,144-4-3 is yet to be accounted for. Government have been addressed to recover 1/5th of the above amount from the Agricultural Demonstrator and to write off the balance sum. Their orders are awaited.
3	..	Pinayur River Pumping Scheme.	Do.	406 0 0	..	Action is being taken by the District Agricultural Officer to recover the loss from the persons concerned.	..	....
4	..	Kancheepuram	Do.	22,191 8 10	..	Criminal proceedings are in progress.	..	....
5	..	Chingleput and Sriperumbudur.	Do.	2,189 2 8	..	Rs. 973-5-10 has so far been recovered. Rs. 1,215-12-10 is yet to be recovered. Action is being taken for recovery and write off.	..	....

1. During the closure of Trivellore depot July 1954 handing over to N.E.S. loss occurred to the tune of Rs. 3,886-8-3. Responsibility has been fixed on the persons concerned and action taken for the recovery.

Serial number.	The place of occurrence.	District.	Amount involved.	Number of cases disclosed during the year.	The nature of action taken against the persons responsible.	The number of new cases detected during the year.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
7	..	Central Agricultural Engineering Stores, Saidapet.	83,271 4 11 (vide col. 9).	..	The entire case of defalcation and other irregularities have been reported to police for investigation and a reply from police is awaited.	4	(a) Misappropriation of cash in 7 bills, complaint against Sri Nagaraja Rao, Store-keeper. (b) Misappropriation of pipes in 5 transferred bills, Ramnathapuram, Mangalore, Tellicherry, Tirumangalam and Kurnool. (c) Misappropriation of cash in December 1950 for the cost of one pulley. (d) General complaints regarding acknowledged bills for pipes, net physical shortages in pipes, etc.
8	1	Madras (Director of Agriculture's office).	671 13 0	1	The cashier of the office Sri P. Masilamani Chettiar who had temporarily misappropriated the Government money, has been compulsorily retired from service.	..	Sri P. Masilamani Chettiar has preferred a mercy petition to the Government. It has been submitted to Government and their orders are awaited.
			Total ..	83,271 4 11			

APPENDIX No. 51—cont.

Statement showing the number of cases of defalcation pending, new cases etc.—cont.

Serial number (1)	The number of cases pending at the beginning of the year under report. (2)	The place of occurrence. (3)	District. (4)	Amount involved. (5)	Number of cases disposed of during the year. (6)	The nature of action taken against the persons responsible. (7)	The number of new cases detected during the year. (8)	Remarks. (9)								
RS. A. P.																
II. South Arcot district.																
9	6	Cuddalore ..	.. South Arcot ..	4,226 11 1	..	Sri K. Srinivasan kept under suspension.	..	A sum of Rs. 1,319-2-6 was already recovered. Sri K. Srinivasan is held responsible for the amount of Rs. 1,415-8-2. The case not yet disposed of. The question of write off of the amounts of Rs. 833-9-2 relating to Sri R. Narasimham and Rs. 559-12-9 relating to Sri V. Ramadoss is under consideration.								
10	..	Tindivanam ..	.. Do. ..	2,293 8 11	..	Final orders have not yet been passed in the case of Sri Anantham Pillai.	..	Records are awaited.								
11	..	Do. ..	.. Do. ..	1,432 4 6	..	Pending with the Deputy Director of Agriculture, Tanjore.	..	....								
III. Tanjore district.																
12	..	Maletur ..	.. Tanjore ..	1,905 11 0	..	The Agricultural Demonstrator concerned Sri B. Gopalakrishnan has been placed under suspension.	1	The case was detected by the District Agricultural Officer, Kumbakonam, during his surprise inspection. An amount of Rs. 1,557-11-0 has been recovered from the Agricultural Demonstrator and he has replaced paddy and sesbania seeds to the remaining sum of Rs. 348. The District Agricultural Officer has been instructed to take suitable disciplinary action against the depot clerk concerned and the Agricultural Demonstrator also.								

13	1	Papanasam ..	.. Do. ..	5,600 5 9	..	Suit filed in the Kumbakonam Sub-Court in O.S. No. 53154. The case is in progress.	..	....
14	1	Papanasam and Kumbakonam.	.. Do. ..	1,143 13 0	..	Deficits were noticed in the Kumbakonam and Papanasam depot when Sri V. Ramsean was in additional charge of Kumbakonam. The Deputy Director of Agriculture, Tanjore, has been asked to conduct a <i>de Novo</i> enquiry in the case and his report is awaited.	..	....

IV. Tiruchirappalli district.

15	..	Tiruchirappalli (Engineering Branch of the office of the District Agricultural Officer, Tiruchirappalli).	.. Tiruchirappalli ..	Not yet assessed.	2	The clerk concerned, Sri N. Sitaraman has absconded. A Police complaint has been lodged and the case is pending in the Court. The Deputy Director of Agriculture, Tanjore, has been instructed to frame charges against the Agricultural Engineering Supervisor, Personal Assistant to District Agricultural Officer and upper division clerk for slack supervision. Charges have also been framed against the District Agricultural Officer concerned.	..	....
16	..	Thuraiyur sub-depot ..	.. Do. ..	110 10 9	1	The amount was adjusted from the cash security of the clerk. His services were also terminated. The Agricultural Demonstrator and the upper division clerk concerned were awarded a censure each for neglect of duties.	..	....

APPENDIX No. 51—cont.

Statement showing the number of cases of defalcation pending, new cases, etc.—cont.

Serial number.	The number of cases pending at the beginning of the year under report.	The place of occurrence.	District.	Amount involved.	Number of cases disposed of during the year.		The nature of action taken against the persons responsible.	The number of new cases detected during the year.	Remarks.
					(5)	(6)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
RS. A. P.									
V. Madurai district.									
17	1	Madurai ..	..	Madurai ..	5,076	15 2 ..	Recovery is being effected from the persons responsible.	..	Responsibility has been fixed on the persons concerned and action is being taken to realise the value (S4. 1400/53).
18	2	Madurai depot ..	..	Do, ..	11,891	7 0 ..	Pending in the court.	..	....
19	..	Do. ..	..	Do. ..	3,289	5 0 ..	The Agricultural Demonstrator and the fieldman were convicted to one month rigorous imprisonment each by the City First-Class Magistrate, Madurai. Both were acquitted in the Court of Sessions, Madurai, on appeal.	..	....
20	..	Alvarpuram godown ..	..	Madurai ..	646	0 0 ..	..	1	The Police authorities have since reported the case as undetected and the District Agricultural Officer, Madurai, has been instructed to take suitable action against the watchman and the Agricultural Demonstrator for effecting the recovery of the loss.
21	1	Palni ..	..	Do. ..	500	0 0 ..	The District Agricultural Officer, Madurai is taking disciplinary action against the Agricultural Demonstrator concerned for the recovery of the loss to Government.	..	....

21	1	Madukulathur ..	..	Ramanathapuram ..	Not known.	..	The Deputy Director of Agriculture, Madurai, has since framed charges against the Agricultural Demonstrator concerned and the final report is awaited from him.	..	
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VII. North Arcot district.

22	..	..	..	Engineering Stores, Vellore.	About Rs. 200.	526 4 6 ..	Action is being taken by the District Agricultural Officer, Vellore, to recover the value of the shortages.	3	Misappropriation of subscription of Madhichelvam hire charges and acceptance of illegal gratification total amount involved about Rs. 200.
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VIII. Salem district.

23	1	Attur ..	..	Salem ..	3,911	15 9 ..	Amounts ordered for recovery from the Agricultural Demonstrator and clerk. Disciplinary action against the Agricultural Demonstrator is pending. The clerk is no longer in service.	..	
24	..	Velur depot (Burglary case).	Do.	Do.	3,339	13 0 ..	Action is being taken for the recovery of a sum of Rs. 991 from the Agricultural Demonstrator.	..	

APPENDIX No. 51—cont.

Statement showing the number of cases of defalcation pending, new cases, etc.—cont.

APPENDIX No. 51—cont.

Statement showing the number of cases of defalcation pending, new cases, etc.—cont.

Serial number of cases at the end of the year under report.	The place of occurrence.	District.	Amount involved.	Number of cases disposed of during the year.	The nature of action taken against the persons responsible.	The number of new cases detected during the year.	Remarks.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

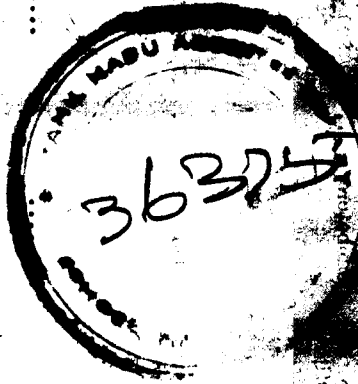
M. A. P.

Chimbatote district—cont.

Rs. 1,367-0-6 has been ordered to be recovered from the following persons besides awarding them the punishments noted against each.

- (i) Sri N. Gopalan, Agricultural Demonstrator, Rs. 70-12-6 and censure.
- (ii) Sri K. Raghava Paniker, Agricultural Demonstrator, Rs. 91-10-0 and censure.
- (iii) Sri A. P. Vijayaraghavan, Agricultural Demonstrator, Rs. 1,203 and stoppage of increment for one year with cumulative effect.

* The Agricultural Demonstrator preferred an appeal to Director of Agriculture against the recovery of Rs. 1,212 and stoppage of increment for one year with cumulative effects. The Director of Agriculture has since passed orders, reducing the recovery to Rs. 1,000 and stopping the recovery of Rs. 212.



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