

REPORT OF THE COMMITTEE ON
AGRICULTURAL PRODUCTION,
MADRAS
1959



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REPORT OF THE
COMMITTEE ON AGRICULTURAL
PRODUCTION, MADRAS

CHAIRMAN

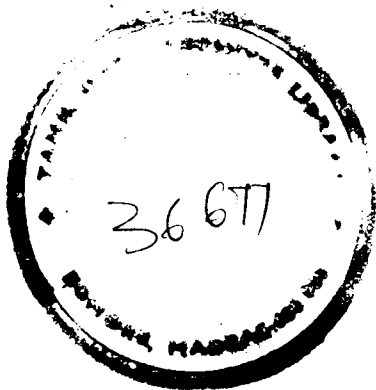
SRI M. BHAKTAVATSALAM,
Minister for Home and Agriculture

MAY 1959

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COMMITTEE ON AGRICULTURAL PRODUCTION.

Chairman.

Sri M. BHAKTAVATSALAM, B.A., B.L., Minister for Agriculture.

Members.

Sri T. N. S. RAGHAVAN, I.C.S. (on leave) (from 4th September 1958 to 11th March 1959).

Sri R. A. GOPALASWAMY, I.C.S., Commissioner of Food Production (from 12th March 1959).

Sri P. P. I. VAIDYANATHAN, Bar.-at-Law, I.C.S., Secretary to Government, Food and Agriculture Department.

Sri A. VENKATESAN, I.A.S., Director of Agriculture.

Sri A. R. VENKATACHARI, I.S.E. (Retired), Retired Chief Engineer, Public Works Department.

Sri V. K. PALANISWAMY GOUNDER, M.L.C.

Sri M. G. SANKER, M.L.A.

Sri V. S. THYAGARAJA MUDALIAR, M.A.

Secretary.

Sri V. VASUDEVAN, M.A., Deputy Secretary to Government.

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REPORT OF THE COMMITTEE ON AGRICULTURAL PRODUCTION.

CHAPTER I.

INTRODUCTION.

The Government of Madras desired that a Committee consisting of the principal officers responsible for the implementation of the schemes for increasing agricultural production and representatives of progressive farmers should undertake a thorough scrutiny of the food production schemes with a view to assess the results achieved so far and to consider the further steps to be taken to accelerate the Grow More Food Programme. They also desired that such a survey should not be confined to food production alone but should be extended to the production of commercial crops also and thus cover the entire field of agricultural production in the Madras State. They accordingly constituted the following Committee in G.O. Ms. No. 2929, Food and Agriculture, dated 21st August 1958 :—

Chairman.

- 1 Sri M. Bhaktavatsalam, Minister for Agriculture.

Official Members.

- 2 Sri T. N. S. Raghavan, I.C.S., Commissioner of Food Production.
- 3 Sri P. P. I. Vaidyanathan, Bar.-at-Law, I.C.S., Secretary to Government, Food and Agriculture Department.
- 4 Sri A. Venkatesan, I.A.S., Director of Agriculture, Madras.

Non-Official Members.

- 5 Sri A. R. Venkatachari, Retired Chief Engineer, Public Works Department.
- 6 Sri V. K. Palaniswamy Gounder, M.L.C.
- 7 Sri M. G. Sanker, M.L.A.
- 8 Sri V. S. Thyagaraja Mudaliar.

Sri V. Vasudevan, M.A., Assistant Secretary to Government, Food and Agriculture Department (since promoted as Deputy Secretary to Government), was appointed as the Secretary to the Committee. He was given the assistance of two stenographers and this was all the staff which the Committee had throughout the period of its enquiry.

Sri V. S. Thiagaraja Mudaliar who had to be away in the United Kingdom for unavoidable reasons could actually serve as a Member of the Committee only from 8th December 1958.

Sri T. N. S. Raghavan, I.C.S., proceeded on leave from about the beginning of March 1959. As his services thus became no longer available to the Committee in his capacity as the Commissioner of Food Production, the Government appointed Sri R. A. Gopalaswami, I.C.S., the present Commissioner of Food Production, as a Member of the Committee in the place of Sri Raghavan in G.O. Ms. No. 1131, Food and Agriculture, dated 12th March 1959.

2. The following are the Committee's terms of reference:—

(a) To examine the progress made by the various food production schemes in the First Five-Year Plan and the first two years of the Second Five-Year Plan.

(b) To assess the relative efficiency of the different types of schemes in increasing food production and suggest modifications in the relative emphasis on the different types of schemes.

(c) To examine if the facilities provided to the farmers in the form of improved seeds, fertilizers, irrigation, etc., are put to the best possible use and suggest any additional facilities that are deemed necessary.

(d) To enquire into the adequacy of the administrative organization now in charge of the implementation of the food production schemes and to suggest modifications in the organization which are considered advisable for greater efficiency.

(e) To suggest any other measures for ensuring the speedy achievement of the maximum possible results from the Food Production Programme.

3. The Committee decided at its first meeting not to issue any questionnaire. The Members felt that all the preliminary data required by the Committee were already available in a publication entitled "A Critical Survey of the Food Production Programme in the Madras State" by Sri P. P. I. Vaidyanathan, B.A.-at-Law, I.C.S., Secretary to Government, Food and Agriculture Department, which proved to be a very useful basis for their enquiries and of which they have made free use while writing this report.

4. The Government issued a Press Release announcing the constitution of the Committee and its terms of reference and inviting the members of the public to place their views and suggestions before the Committee by means of written communications addressed to its Secretary. A list of those who responded to this invitation is given in Appendix I.

5. The Secretary to the Committee addressed a communication individually to each Member of Parliament belonging to the State and to each Member of the Madras Legislative Assembly and the Madras Legislative Council requesting them to write to him conveying their views and suggestions for being placed before the Committee. Only a few Legislators responded to this invitation and sent their views and suggestions. A list of them is given in Appendix II.

6. The non-official members of the Committee toured in all the districts of the State. The official members did not participate in these tours as they considered it better to leave the non-official members to go wherever they pleased and see whatever they desired to see and put questions and elicit answers from non-officials and officials without the embarrassing presence of the official members. Sri M. G. Sanker, M.L.A. and Sri A. R. Venkatachari participated in all the tours. Sri V. K. Palaniswamy Gounder, M.L.C., could not participate in the tours in four of the districts owing to ill-health and Sri V. S. Thyagaraja Mudaliar could not participate in the tours in six of the districts as he was away in the United Kingdom when these tours were arranged. In addition to these joint tours individual members of the Committee were authorized to undertake tours on their own for a personal study of the problems coming up before the Committee. Sri A. R. Venkatachari undertook a few individual tours in the districts of Chingleput, South Arcot, Tanjore and Coimbatore. A list of the Development Blocks, Agricultural Research Stations, etc., visited by the non-official members of the Committee in the course of their tours is given in Appendix III. In addition to these places they visited a large number of holdings and farms of progressive agriculturists. They also met at the headquarters of each district the legislators of that district, who were available, other prominent non-officials, progressive agriculturists and the district officials concerned. A list of the legislators whom they met at these conferences and at the other places visited by them and from whom they received suggestions is given in Appendix IV.

7. The Committee constituted the following ten Sub-Committees:—

- (i) Seed Sub-Committee;
- (ii) Manures Sub-Committee;
- (iii) Minor Irrigation Sub-Committee;
- (iv) Lift Irrigation and Agricultural Machinery Sub-Committee;
- (v) Commercial Crops Sub-Committee;
- (vi) Agricultural Credit Sub-Committee;
- (vii) Research Sub-Committee;
- (viii) Administrative Organization Sub-Committee;
- (ix) Yardsticks Sub-Committee; and
- (x) Miscellaneous Subjects Sub-Committee.

Each Sub-Committee consisted of two or more members of the Committee and one or two officers dealing with the subjects coming up before it who were included as co-opted members. A list of the members of these Sub-Committees is given in Appendix V. There was no hard and fast rule in regard to the membership of the Sub-Committees and the official and non-official members of the Committee often attended the meetings of even those Sub-Committees of which they were not members. Much valuable spade-work was done by these Sub-Committees by undertaking useful enquiries into specific problems, scrutinising the mass of suggestions received from various quarters and sifting those which alone were worthy of consideration and collecting the requisite data to enable the Committee to take decisions on those suggestions.

CHAPTER II.

THE FIRST FIVE-YEAR PLAN—TARGETS AND ACHIEVEMENTS.

8. Planned development of agriculture in the Madras State dates much earlier than the inauguration of the First Five-Year Plan. The Grow More Food campaign was launched in our State in the year 1942-43 in order to increase food production both by extensive cultivation, i.e., by bringing new areas under food crops and increasing double-crop cultivation and off-season cultivation and by intensive cultivation, i.e., by increasing the yield from the area already under cultivation by the use of improved seeds, better manures, etc. The campaign was intensified in 1949 consequent on the announcement by the Government of India of their decision to stop imports of food-grains by 1951 and all the Grow More Food Schemes were enlarged in scope and integrated into a Three-Year Plan of intensified cultivation schemes. From the year 1951-52 all the intensive cultivation schemes were continued under the First Five-Year Plan.

9. Madras was a composite State when the First Five-Year Plan was launched. The target for additional production of food-grains in the First Five-Year Plan period was fixed at 9 lakh tons for the composite Madras State and it was expected that this target would be achieved as a result of the following Grow More Food measures :—

Head of development.					Targets (in lakhs of tons).
1	Major Irrigation	...	...	...	2.17
2	Minor Irrigation	...	...	...	3.73
3	Land Improvement	...	...	...	0.77
4	Fertilisers	...	...	...	0.90
5	Manures	...	...	...	1.16
6	Seeds	...	...	...	0.29
					9.02

10. The actual production of foodgrains in the areas covered by the present Madras State from the year 1949-50 up to the end of the First Five-Year Plan period is given below :—

First Five-Year Plan period						
Year.	Rice.		Millets and other food grains.		Total food grains, rice and millets.	
	Area.	Production.	Area.	Production.		
	(2)	(3)	(4)	(5)		
(1)	(2)	(3)	(4)	(5)	(6)	
	ACS.	TONS.	ACS.	TONS.	TONS.	
1949-50	4,769,000	1,791,460	4,854,000	1,255,540	8,047,000	
1950-51	4,299,000	1,955,000	4,875,000	1,144,330	8,094,330	
1951-52	4,420,000	2,035,000	5,333,000	1,368,970	8,463,970	
1952-53	4,309,000	1,989,000	5,730,000	1,112,560	8,101,560	
1953-54	5,143,000	2,539,000	6,008,000	1,568,280	4,107,280	
1954-55	5,375,000	2,753,000	5,908,000	1,777,240	4,530,240	
1955-56	5,456,900	2,955,000	5,528,000	1,466,980	4,421,980	

NOTE.—The statistics from 1950-51 for rice are according to crop-cutting experiments. The figures from 1952-53 for cholam, cumbu and ragi included under "Millets" are also according to crop-cutting experiments. All the other figures are according to the traditional method.

11. The figures given in the preceding paragraph will show that the production in the Madras State increased by 13.74 lakhs tons from 30.47 lakhs tons in the year 1949-50 which was the base year of the First Five-Year Plan to 44.22 lakhs tons in 1955-56 which was the last year of the First Plan. This increase cannot be entirely attributed to the various food production measures adopted by the Government as part of it was undoubtedly due to the fact that the seasonal conditions which were bad at the beginning of the First Five-Year Plan period improved and became decidedly better during the Plan period.

12. The following is the break up of the increase of 13.74 lakhs tons achieved in the First Five-Year Plan period :—

	LAKHS TONS.
1 Major Irrigation	1.18
2 Minor Irrigation	1.66
3 Land Improvement	0.30
4 Chemical fertilizers	0.89
5 Local Manures	1.01
6 Improved seeds	0.25
7 Japanese method	0.21
8 Plant Protection measures	0.32
Total production potential created	5.82
9 Seasonal factor	7.92
Total—Actual increase	13.74

13. The data given above would show that while the target of additional production fixed for the composite Madras State was 9 lakhs tons, the actual achievement for the reduced Madras State

alone was of the order of 5.8 lakhs tons which represents an increase of about 20 per cent over the production in the base year (1949-50) of 30.47 lakhs tons.

14. The annual area under the production of raw cotton in the composite Madras State during the pre-war years stood at about 25 lakhs of acres and 5 lakhs bales (392 lb. of lint each) respectively, but there had been a steady decline thereafter both under area and production on account of various measures taken for intensifying food production under the Grow More Food Campaign. Consequently the annual production of cotton came down to 2.7 lakhs bales in 1947-48 while the annual requirements of raw cotton in the State mills were about 6.5 lakhs bales. Thus there was a wide gap between the internal production and consumption.

15. The Cotton Extension Scheme was therefore launched to augment the production of cotton. This scheme was first sanctioned in June 1950 with technical staff exclusively for work connected with this Scheme. The target to be achieved during the First Plan for the residuary State was fixed as 3.00 lakhs bales. The area under cotton and the production in the present Madras State during the years 1952-56 are given below :—

Year.	Area in acres.	Production in terms of lint in bales of 392 lb. each.
	LAKHS.	LAKHS.
1952-53	7.25	2.15
1953-54	9.01	2.63
1954-55	9.97	3.00
1955-56	11.11	3.11

Thus it would be seen that the anticipated increase in area and production of cotton was achieved.

16. The actual production of sugarcane in 1950-51 in the State was 29.76 lakhs tons. Under the First Five-Year Plan an additional production of 3.61 lakhs tons was targetted by the end of 1955-56, which meant that a total production of 33.37 lakhs tons had to be achieved in that year. But the actual production in that year was only 30.73 lakhs tons as the then prevailing downward trend in prices and the glut in the gur markets offered little inducement to the ryot to bring more area under sugarcane.

17. Before the implementation of the First Five-Year Plan the area under and production of the main oilseeds crops of this State were as follows :—

Variety.	Area in acres.	Production in tons.
	LAKHS.	LAKHS.
Groundnut	20.03	7.66
Gingelly	3.10	0.32
Castor	0.37	0.06
Total ..		8.04

The Oilseeds Development Scheme was started during 1954-55 with the object of increasing the production of oilseeds by 50,000 tons by the end of the First Five-Year Plan through (1) spread of improved strains, (2) adoption of intensive cultivation methods and effective control measures against pests and diseases, and (3) extension of the area under groundnut, gingelly and castor. Because the scheme was commenced late the production of oilseeds could be stepped up only slightly from 8.04 lakhs tons in 1950-51 to 8.76 lakhs tons in 1955-56.

CHAPTER III.

SECOND FIVE-YEAR PLAN—TARGETS AND PROGRESS.

18. While the First Five-Year Plan gave top priority to agriculture, the Second Five-Year Plan gave that place to industry. However, later developments tended to increase the emphasis on agriculture. Hence, though the original draft of the Second Five-Year Plan of the Madras State was prepared on the basis of an increase in food production of about 16 per cent the question of revising the targets in respect of each of the commodities was soon taken up. It was considered at length at the Conference of Agricultural Ministers at Mussoorie in June 1956. Later on the position was discussed by the Planning Commission with each State Government and detailed calculations were made. As a result of these discussions the targets were revised considerably in respect of foodgrains and to a smaller extent in respect of the other commodities.

19. The original and revised targets are as follows :—

Serial number and crop.	Production in 1955-56 (tons).	Original targets of additional production (lakhs tons).	Percentage increase in original plan.	Revised targets for additional pro- duction (lakhs tons).	Percentage increa- se as per revised plan.
(1)	(2)	(3)	(4)	(5)	(6)
1 Foodgrains ..	44.22	7.12	18	12.79	29
2 Oilseeds ..	8.76	1.40	16	1.66	19
3 Sugarcane ..	30.73	10.00	33	10.00	33
4 Cotton ..	3.11 (lakhs bales of 392 lb. lint).	1.29 (lakhs bales).	41	1.55 (lakhs bales).	50

20. The revised targets compare favourably with the All-India targets except in the case of oilseeds as shown below :—

Serial number.	Crop.	Production in 1955-56 (million tons).	Revised target (million tons).	Percentage increase All-India.	Percentage increase in 1955-56 Madras.
(1)	(2)	(3)	(4)	(5)	(6)
1 Foodgrains (Cereals) ..	..	55.0	60.0	25	29
2 Oil seeds ..	..	5.5	7.0	38	19
3 Sugarcane (Gur) ..	..	5.8	7.8	34	33
4 Cotton ..	..	4.2 (million bales)	6.5 (million bales)	55	50

21. As regards food production the original and revised targets of additional production under the various heads are given below :—

Serial number.	Heads.	Original target of additional production (in lakhs tons).	Revised target (in lakhs tons).
(1)	(2)	(3)	(4)
1 Major Irrigation ..	..	0.90	0.90
2 Minor Irrigation ..	..	0.70	1.10
3 Fertilisers and manures ..	..	8.14	0.08
4 Improved seeds ..	..	2.13	3.90
5 Land reclamation ..	..	0.23	0.80
6 Soil conservation ..	..	0.02	0.23
7 Improved agricultural practices ..	..	..	..
		7.12	12.79

22. A complete statement showing the manner in which the present targets of additional food production have arrived at is given below :—

Schemes.	Outlay in lakhs.	Additional area to be benefited.	Additional production (tons).	Yardstick.*
(1)	(2)	(3)	(4)	(5)
I. Major Irrigation ..	1,365.00	1.81 lakh acres.	90,000	1/3 ton per acre.
II. Minor Irrigation—				
1 (a) Special minor irrigation ..	187.40	50,000 new 2 lakhs (existing acres).	47,000	4 1/2 ton per acre new, 1 1/8 ton per acre existing.
1 (b) National Extension service minor irrigation programme.†	200.00	35,000.	38,000	1.1 ton per acre.
2 Desilting of tanks ..	50.00	4,000 acres.	500	1/8 ton per acre.
3 Tube wells ..	46.18	3,000 acres.	6,000	1 ton per acre.
4 Filter Point wells ..	47.50	30,000 acres.	15,000	0.5 ton per acre.
5 River Pumping Scheme ..	3.44	3,000 acres.	4,000	1.1 ton per acre.
Total for minor irrigation ..	534.52	128,000 acres.	110,500	
III. Manures and Fertilisers—				
1 (a) Ammonium sulphate ..	..	135,000 tons.	270,000	2 tons p. r. ton of Ammonium Sulphate.
2 (b) Super-phosphate ..	..	60,000 tons.	60,000	..
3 Urban compost ..	22.87	38,000 acres.	4,000	1/8 ton per acre.
3 Rural compost ..	1.91	1.3 lakhs tons.	3,250	Do.
4 Green manures ..	..	2.8 million acres.	268,000	200 lb per acre.
Total for manures and fertilizers ..	26.42	..	605,750	
IV. Improved seeds ..	93.51	3.9 million acres.	3,90,000	1/10 per ton acre.
V. Land Reclamation and Development :—				
1 Tractor hiring 17.08 ..	17.08	1 lakh acres current follows + 80,000 acres virgin area.	30,000	1/10 ton per acre current follows, 1/4 ton per acre virgin area.
2 Soil Conservation ..	100.20	62,000 acres.	22,800	..
Plant Protection and improved agricultural practices.	13.10	3 lakhs acres.	30,000	..
Grand total ..	..	..	12.79 lakhs tons.	..

* These yardsticks here since been revised.

† The figures given under this item are under verification.

23. The achievements as against these targets of additional food production during the first three years of the Second Plan period, namely, 1956-57, 1957-58 and 1958-59 as estimated by the Department of Agriculture are given below :—

Serial number and heads.			1956-57 (in lakhs tons).	1957-58 (in lakhs tons).	1958-59 (in lakhs tons).
1	Major Irrigation	.. ..	0.16	0.31	0.20
2	Minor Irrigation	.. ..	0.17	0.14	0.21
3	Land reclamation	.. ..	0.05	0.03	0.07
4	Fertilisers and manures	.. ..	1.35	0.61	1.03
5	Improved seeds	.. ..	0.42	0.98	1.20
6	Soil conservation	.. ..	0.01	0.01	0.01
7	Plant Protection	.. ..	0.10	0.15	0.11
Total ..			2.26	2.29	2.83

Total for the first three years of the II Plan = 7.38 lakhs tons.

These estimates are corroborated by the following figures of actual production of foodgrains during the last year of the First Plan period and the first two years of the Second Plan period :—

Year.	Rice.		Millet's and other foodgrains.		Total foodgrains. (3) and (4)
	Area.	Production.	Area.	Production.	
	(2)	(3)	(4)	(5)	(6)
	ACRES.	TONS.	ACRES.	TONS.	TONS.
1955-56	5,456,000	2,955,000	5,528,000	1,466,980	4,421,980
1956-57	5,724,105	3,196,190	5,449,700	1,433,170	4,629,360
1957-58	5,605,000	3,234,000	5,575,000	1,683,000	4,920,000

(The figures for the first two years are actuals and the figure for the year 1957-58 is the final forecast figure.)

24. The achievements should be considered to be satisfactory especially if it is borne in mind that during these years the supply of chemical fertilizers was very inadequate. It is gratifying that in spite of this handicap, viz., shortage of chemical fertilizers the average yield per acre of rice rose steadily from 1,034 lb. in 1952-53 to 1,251 lb. in 1956-57 as shown below :—

Year.	Average yield per acre (rice).
1952-53	1,034
1953-54	1,106
1954-55	1,156
1955-56	1,213
1956-57	1,251

But for the continuing shortage of chemical fertilizers, we would have been quite confident that provided the seasonal conditions continue to be satisfactory and the recommendations made by us in the succeeding pages are promptly implemented, the targets of additional production fixed for the Second Plan period will be achieved in full. As it is, we do not expect that the increase in the production of food-grains during the Second Plan period will be anything more than nine lakhs tons.

25. As regards commercial crops the target of additional production of sugarcane has been fixed as ten lakhs tons of cane to be achieved by the end of the Second Plan period at the rate of 2 lakhs tons of cane per year. The achievement so far has been very poor. The production of cane at the end of the First Plan period was 30.73 lakhs tons. This should have been stepped up to 32.73 lakhs tons in 1956-57, 34.73 lakhs tons in 1957-58 and 36.73 lakhs tons in 1958-59. But the actual production in those years was only 29.84 lakhs tons, 31.04 lakhs tons and 32.94 lakhs tons (final forecast estimate for 1957-58 and rough estimate for 1958-59) respectively. If the Plan target is to be achieved by the end of the Plan period the production has to be stepped up from 32.94 lakhs tons to 40.73 lakhs tons during the remaining two years of the Plan period. Perhaps some of the short fall is due to the delay in the establishment of new sugar factories. The Agricultural Department should investigate the reasons for the poor progress so far and take special steps to achieve the Plan target in full by the end of the year 1960-61.

The target of additional production for cotton by the end of the Second Plan period is 1.55 lakh bales over the production in the base year, namely, 1955-56. As against the target of 40,000 additional bales fixed for 1956-57, only 28,000 bales could be achieved in that year due to unfavourable seasonal conditions. During the year 1957-58 about 38,000 additional bales were obtained against the target of 69,000 bales fixed for the year, the reason for the shortfall being the same as in the previous year, i.e., adverse seasonal conditions in some of the cotton growing areas. The increase in production during the year 1958-59 is estimated to be only about 13,000 bales. The Plan target can be achieved in full only if very vigorous measures are taken by the Agricultural Department in the remaining two years of the Plan period.

26. When the Second Plan was drawn up, the total production of the three major oilseeds in this State at the end of the First Plan period was estimated at 8.76 lakhs tons. After a discussion at various levels and in order to fall in line with the policy of increased production of oilseeds laid down by the Government of India a total production of 11 lakhs tons has been fixed as the target for achievement before the end of 1960-61. There are two oilseeds development schemes in operation in this State—one within the

Plan with a target of additional production of 70,000 tons by the end of the Plan period and another outside the Plan with a target of additional production of 96,000 tons by the end of the Plan period. The total production was stepped up to 9.12 lakhs tons in 1956-57. The progress in 1957-58 was very poor as the production in that year was only 9.11 lakhs tons. There was, however, a distinct improvement in 1958-59 in which year the production amounted to 9.59 lakhs tons according to the final forecast estimate. Even if the same rate of progress as in the year 1958-59 is maintained in the remaining two years of the Plan period, the Plan target cannot be achieved in full. Every endeavour should therefore be made to accelerate the pace of progress and step up the total production to eleven lakhs tons by the end of the Plan period.

CHAPTER IV.

MAJOR AND MEDIUM IRRIGATION.

27. The most serious obstacle that has always stood in the way of our agriculturists maximising agricultural production has been their almost complete dependence on the vagaries of the monsoons. Therefore the very first requisite for ensuring the success of the Grow More Food Programme is the provision to the cultivator of as assured a supply of water for cultivation as possible. The progress of our State in this regard is gratifying. According to the Special Officer appointed by the Government of India for studying the utilization of the water potential in various States, Madras tops the list of States in the matter of utilization of irrigation potential created during the Plan period, more than 80 per cent of the potential having been brought to beneficial use in this State.

28. The old pre-Independence policy of the Government under which a return of 4 per cent from each irrigation project was being insisted upon has now been revised in order to encourage more areas being brought under cultivation. The Government are now undertaking even those schemes which cost more than Rs. 300 per acre and from which consequently the Government will obtain a return of less than 2 per cent subject to the following conditions :—

(a) betterment fees should be forthcoming which will reduce the cost to Rs. 300 or less per acre;

(b) the scheme will serve a backward area and afford protection to the people in that area during periods like those when famine conditions are prevailing; and

(c) by sanctioning the scheme the Government will be utilising their share of the waters of an inter-State river or stream fully or to the maximum extent possible.

In implementing this new policy the Government are giving due importance to the bigger as well as the smaller schemes.

29. In the First Five-Year Plan, the following major and medium irrigation schemes were taken up. The total estimated cost was Rs. 28.98 crores and it was expected that 346,000 acres will be brought under fresh irrigation and 123,500 acres of the existing ayacuts would be stabilized :—

- (1) Lower Bhavani Project.
- (2) Manimuthar Project.
- (3) Mettur Canals Scheme.
- (4) Cauvery Delta Drainage Improvement Scheme.
- (5) Sathanur Project.
- (6) Krishnagiri Project.
- (7) Amaravathi Project.
- (8) Araniar Project.
- (9) Vaigai Reservoir Project.

Of these nine schemes the Lower Bhavani Project and the Cauvery Delta Drainage Improvement Scheme were nearly completed and the other schemes were under various stages of execution by the end of the First Plan period.

30. In the Second Five-Year Plan provision was made not only for the completion of the incomplete schemes of the First Five-Year Plan but also for the execution of the following new schemes :—

- (i) New Kattalai High Level Canal Scheme;
- (ii) Pullambadi Canal Scheme;
- (iii) Vidur Reservoir Project; and
- (iv) schemes for diverting west-flowing rivers (Parambikulam-Aliar Project).

31. In addition to the schemes referred to in the previous paragraph there are schemes intended to benefit the areas which formed part of the former Travancore-Cochin State before the reorganization of States and which now form part of this State. In the Kanyakumari district seven medium irrigation schemes have been taken up for execution at a total cost of about Rs. 22.12 lakhs. The Neyyar Irrigation Project which was recently inaugurated in the Kerala State is expected to irrigate about 9,200 acres in the Kanyakumari district. The cost of the necessary works to be executed within the limits of this State is estimated at Rs. 41 lakhs. Schemes under consideration are the Poigai Scheme estimated to cost Rs. 1.42 lakhs in the Kanyakumari district and the Kundar Scheme, the Srimoollaperi Reservoir Project and the Mottai Reservoir Project in the Shencottah taluk.

32. All the First Plan Schemes which remained unfinished at the beginning of the Second Plan period have been completed and good progress is being maintained in the implementation of all the

Second Plan schemes also. Considering that the Sathanur, Krishnagiri and Vaigai Projects, each of which might have ordinarily taken four or five years to finish, were completed within a period of three years each, it may well be expected that the schemes now on hand will be implemented as per schedule. The target of acreage fixed for receiving irrigation from both the continuation schemes and the new schemes during the Second Plan is 2.84 lakhs acres. Of this acreage 1.72 lakhs acres received irrigation by the end of 1957-58 and another 0.39 lakh acres in 1958-59 totalling up to 2.11 lakhs acres which represents a 74 per cent achievement of the target by the end of the third year of the Second Plan period. Another 25,000 acres will receive irrigation during 1959-60. This rate of progress is highly creditable.

33. The most important irrigation project now on hand is the Parambikulam-Aliar Project. An agreement which the Madras Government have reached with the Government of Kerala has rendered it possible to take up this scheme. Such an agreement was necessary as the river Parambikulam in its lower reaches passes through the Kerala State. Under this Project which is estimated to cost Rs. 35 crores, it is proposed to dam the Sholayar, Parambikulam, Thunakadavu, Paruvarippallam, Tekkadi, Nirar, Aliyar and Palar rivers and impound the waters in eight reservoirs interconnected by tunnels and open channels, the total length of the tunnels being $5\frac{1}{2}$ miles. This project is expected to irrigate 2.5 lakhs acres in the Pollachi, Udumalpet, Dharapuram and Palladam taluks of the Coimbatore district and to generate 1.25 lakhs kilowatts of electric power. Preliminary work on this project for which a Special Chief Engineer has been sanctioned has already commenced. We have no doubt that this project will be pushed through with the utmost expedition so that the very great benefits promised by it are realised as early as possible.

34. We have practically reached the end of our resources in the matter of harnessing the waters of the rivers in this State. We have therefore to look elsewhere for the irrigation water required for the parched areas that still remain in our State. The surplus waters that are now being allowed to go to waste to the sea down the rivers in the neighbouring States of Kerala and Andhra Pradesh should be diverted to this State as quickly as possible with the willing co-operation of the Governments of those States. The agreement reached between the Madras and Kerala Governments in respect of the Parambikulam Project has demonstrated that such inter-State co-operation is not only very necessary but also quite feasible. We understand that the Government of Madras are already seized of the matter and that they are going to discuss with the Government of Kerala the question of diversion to this State of the waters of the west-flowing rivers in the Pambar and Periyar basins. We also understand that the subject of diversion of the surplus waters of the Godavari and Krishna rivers in Andhra

Pradesh to the needy areas in this State is under the active consideration of the Southern Zonal Council. We trust that this most vital question will be viewed by all concerned in a spirit of goodwill and accommodation and that no drop of water which can be profitably utilized for stepping up the country's food production and removing its dependence on imports of food will be allowed to run to waste into the sea.

35. The jungle streams in the State are in floods only in a few days every year and only in a few years the rainfall in their catchment areas is appreciable. But in those years considerable quantities of water are carried by them into the sea. The time has come for conducting a systematic survey of all the jungle streams in the State with a view to harness their flood waters either by building reservoirs or by constructing diversion weirs and channels leading to existing storage tanks in all cases where it is worthwhile doing so taking into account the quantity of water that can be impounded and utilized and the cost involved. Specific soil conservation measures such as the construction of contour trenches, contour bunds and accessory works should be adopted in the watershed areas to prevent silting up of tanks and channels in the catchment basins.

CHAPTER V.

ECONOMY IN THE USE OF WATER.

36. As the demand for irrigation water is far in excess of the supply the need is imperative to conserve every drop of the available water and to derive the utmost benefit from it. We have therefore gone into the question of economizing the use of irrigation water and have also examined the possibility of using drainage water for irrigation. Sri A. Venkatesan, I.A.S. and Sri A. R. Venkatachari, I.S.E. (retd.), jointly examined the question of effecting economy in the use of irrigation water and Sri Venkatachari also examined the possibility of using drainage water for irrigation in some areas.

37. As rice is the most important crop of this State attention may be directed first to the possibility of economizing water used for irrigating this crop. On pages 49-50 of his book entitled 'Rice in Madras' Dr. K. Ramiah, who was formerly the Paddy Specialist in Madras Agricultural Department and who is now the Special Officer—Rice with the Indian Council of Agricultural Research has observed—

"Though in India it is considered essential to keep the water always in the field throughout the growth of the crop, in some of the other countries like Italy, Spain or America, there is often a practice to drain the water off completely from the fields now and then; this practice is supposed to make the plants grow more vigorous. It looks as if rice can stand this treatment without any harmful effect. In some years due to

adverse season and rather limited supply of water there is no possibility of keeping water always in the field. Provided this does not occur too often or too long to make the soils crack, there is apparently no damage done to the crop. This draining off can be done only before the plants start forming ears. When once the plants enter this phase, water must be supplied in plenty as this is the period when the transpiring activity is most intense. Frequent draining off and keeping the fields without water should encourage growth of weeds and their removal is one of the most expensive items of cultivation in the countries which adopt this practice. There is however, no doubt that a good deal of water is wasted in our rice cultivation methods. It should be possible to economize, as experience and experiments have shown, that such excessive flooding as is usually practised is not essential to the growth of the crop. In some parts of Kistna, it is known that crops irrigated by water lifts, yield even better than crops receiving flow irrigation. That rice can do with much less water than is usually given in the deltas is apparent from the fact that certain varieties of rice under well-irrigation where much less water is used yield just as well as and even better than in the deltas. Flooding, however, keeps the weeds under check effectively".

38. The requirements of water depend primarily on the duration of the crop. The short duration crop naturally requires less water than the long duration one. The requirements of water also depend on the soil and on the rain-fall during the period when the crop is on the ground. The quantity of water required also varies with the stage of each crop. The periods of high water requirements are the transplantation, preflowering, flowering and grain formation periods. During the other periods, i.e., during the time of slow or stagnant growth it should be possible to reduce the water supplied.

39. Irrigation experiments have been conducted at the Agricultural Research Stations at Aduthurai and Pattukkottai in the Tanjore district and at the Paddy Breeding Station, Coimbatore. It was found that no conclusive results could be obtained from the experiments conducted at any of these three centres in regard to the depth of the water in the field or in regard to the intervals between the irrigations. However the following broad indications were obtained :—

(1) The smaller quantities of water at shorter intervals gave better yield than larger quantities at longer intervals.

(2) The plots in which 2 inches of water was maintained always recorded the highest yields. Nearly as good yields were obtained from the plots receiving 2 inches of water once in three days and 4 inches of water once in six days.

(3) In the case of the long duration varieties maximum yields were obtained from the control plots in which 2 inches of standing water was always maintained as well as from the plots which received normal irrigation up to four weeks and 4 inches once in twelve days thereafter.

(4) The plots receiving 2 inches of water once in nine days and 4 inches of water once in twelve days and eighteen days gave very low yields.

(5) In the experiment in which three weekly plantings were adopted with four quantities of water, the treatment differences were not significant either for the depth of water or for their interaction.

(6) Lateral seepage occurs even with the best of precautions.

(7) The quantity of water required lies between 47 inches and 57 inches for Kuruvai, 70 inches to 82 inches for Samba and 54 inches to 63 inches for Thaladi Samba.

40. It is necessary to conduct fresh experiments to obtain definite results regarding the optimum quantities of water and the optimum intervals between irrigations to obtain the maximum yield from one acre of land and to get the maximum return from one cubic foot of water. Experiments have to be laid out to determine separately the requirements of water (a) for the nursery, (b) for puddling, preparation of the field and transplanting, (c) for the period from planting to flowering and (d) for the period from flowering to harvest and to work out the optimum quantities of water required for the various stages of cultivation. It is understood that a scheme with the above objectives was prepared by the Paddy Specialist in consultation with the Chief Engineer for Irrigation as early as 1957 and that this scheme which is proposed to be worked with financial assistance from the Indian Council of Agricultural Research is still under the consideration of the Government. We recommend that this scheme should be sanctioned and implemented at once. If for any reason this could not be done at least a more modest scheme should be drawn up at once and implemented by the State Government entirely at their cost at the Agricultural Research Station, Aduthurai. Simultaneously pot cultivation trials with paddy crop grown under varying frequencies of irrigation and with varying quantities of water should be conducted at the Paddy Breeding Station, Coimbatore, with a view to determine the minimum quantity of water required for irrigating the paddy crop.

41. Besides economies realizable as a result of experiments suggested already, there appear to be possibilities of using the drainage waters in several of the irrigated areas with a view to effect improvement in the duty of water. Though some of these drainages in the higher areas are already being used for irrigation lower down, a limited study of the problem shows that there is still considerable scope for using a great deal more of these waters either by flow or pumping schemes. The matter was discussed with the Chief Engineer for Irrigation and we suggest that he should take appropriate action in his department and formulate suitable schemes for the utilization of such waters. We have included also the necessary financial provision in our proposals relating to the Third Five-Year Plan for this purpose, as also for the work mentioned in the next two paragraphs.

42. Allied to the above is the improvement of drainage over large areas of rice crops which suffer under water-logged conditions, during rainy seasons and even otherwise. The condition of these lands calls for improvement in the interest of increased production. This state of affairs occurs not only under major but also minor sources of irrigation under the control of both the Public Works and Revenue Departments. This matter also requires investigation and execution of schemes, calculated to relieve submersion.

43. In old and new irrigated areas and projects, both under major and minor irrigation, it appears that there are lands which do not now get adequate irrigation supplies due to lack of field channel (bothie) facilities. In cases where the existing system of field to field flow is affecting production, land for field channels (bothies) should be acquired and channels got excavated by the interested farmers.

CHAPTER VI.

MINOR IRRIGATION.

(a) TANK AND CHANNEL IMPROVEMENT.

44. The repair and restoration of minor irrigation sources has been an essential part of the Grow More Food work in this State for the last fifteen years. The following statement will give an idea of the number and distribution of tanks in this State :—

Serial number and district.			Total number of Government tanks both Revenue and Public Works Departments tanks.
1	Salem	...	2,107
2	Coimbatore	...	90
3	North Arcot	...	3,166
4	Chingleput	...	2,628
5	South Arcot	...	2,710
6	Tiruchirappalli	...	5,414
7	Tanjore	...	447
8	Madurai	...	3,005
9	Tirunelveli	...	2,413
10	Kanyakumari	...	2,192
11	Ramanathapuram	...	3,272
12	The Nilgiris	...	...
Total			27,444

If to this number is added the channels also the total number of minor irrigation sources in this State will work out to 33,171.

45. Of these, a number of sources are small in size and the recorded ayacut is less than even 10 acres in many cases. It may be assumed that tanks of such a small size can be repaired by local effort and so they may be left out of our calculations. The irrigation sources existing in this State can be classified as follows on this basis :—

(a) Sources with an ayacut of 10 acres and below—			
Government sources	...	...	about 1,764
Ex-zamin tanks	...	...	about 786
Total	...	...	about 2,550
(b) Sources with an ayacut of more than 10 acres—			
Government sources	...	...	22,914
Ex-zamin sources	...	...	7,707
Total	...	...	30,621

46. With a view to improving the efficiency and storage capacity of the irrigation tanks, it was found necessary to raise the calingulabs and the bunds of tanks and to take other suitable measures. The Government have equipped themselves with powers to take necessary action by enacting the Madras Irrigation Tanks (Improvement) Act, 1949. The object of this Act is to enable the Government to undertake works for increasing the capacity or efficiency of all irrigation tanks in the State by raising their Full Tank Levels or otherwise. This enactment has helped the Government in taking up tank improvement works in areas which badly needed additional irrigation facilities. The types of work undertaken under the Tank Improvement Scheme which is also known as the Special Minor Irrigation Programme are as follows :—

- (1) Repairs to non-deltaic river channels with direct ayacut
- (2) Spring channels and kasams.
- (3) Wells in ayacuts of tanks.
- (4) Repairs to tanks depending upon regular sources of supply like canals and rivers and to the supply channels and anicuts thereof.
- (5) Repairs to rainfed tanks and tanks depending on the surplus of other tanks.

47. The works in respect of sources under the control of the Revenue Department are being attended to by the special staff sanctioned for the purpose with its administrative chief in the Commissioner of Food Production. The special staff consists of a Superintending Engineer of the Food Production Circle with a number of divisions and subdivisions. The works in respect of sources under the control of the Public Works Department

are attended to by the Public Works Department staff with its administrative head in the Chief Engineer (Irrigation). Both the Superintending Engineer (Food Production) and the Chief Engineer (Irrigation) are under the administrative control of the Commissioner of Food Production in respect of these minor Irrigation works which are taken up for execution.

48. The Collectors, the Chief Engineer (Irrigation) and the Superintending Engineer (Food Production) have been instructed to have the minor irrigation works inspected by the officers in order to see whether the works are in good order. Of the inspections made, at least 5 per cent of the works will be overchecked by superior officers. The Board of Revenue has been made responsible to see that all minor irrigation works undertaken are brought on record in the village accounts and verified at the jamabandi.

49. After the repairs or improvements are carried out under the Food Production Programme the tanks are maintained by the Public Works Department for irrigation sources having an ayacut of 200 acres or more and by the Revenue Department for irrigation sources having an ayacut of less than 200 acres. In regard to tanks which the Revenue Department is in charge of, special rules are laid down for their upkeep and maintenance. They are periodically inspected by the Minor Irrigation staff and the Revenue Officials and all works necessary to keep them in efficient condition are carried out by the Revenue Department. Works requiring special technical skill and supervision which the Collector considers cannot be executed by the Revenue Department will be attended to by the Public Works Department.

50. With a view to ensure systematic inspection of the minor irrigation sources and to devote proper attention for the maintenance of these sources in good condition, the 'Circle system of inspection and maintenance' has been introduced and the Collectors have been instructed to draw up a circle system with a six or seven years' programme as is suitable to their districts and adhere to the programme without any variation. Under the system, each taluk is divided into six or seven circles, compact and contiguous, and the minor irrigation tanks are attended to in rotation. While investigation and estimation of works in one circle is going on, the execution of works in the adjacent circle will be attended to simultaneously.

51. The one important criterion for taking up a scheme is that there should be additional food production by undertaking repairs or improvements to the sources of irrigation. The works usually bridge the gap between the registered ayacut and the actual ayacut, and bring additional area under cultivation in some cases.

52. The schemes are eligible for financial assistance from the Government of India in the shape of loan for the remunerative portion of the expenditure and grant for the unremunerative portion. The Government of India were meeting 50 per cent of the unremunerative portion of the works, the Central share of subsidy being worked out as follows :—

$$\frac{90 \text{ per cent of the estimated cost minus}}{20 \text{ times the additional revenue.}}$$

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The assumption is that if a State can recover 90 per cent of the cost of the scheme as additional revenue during a period of twenty years, the scheme is good enough to be taken up by the State without subsidy. From the year 1957-58 the Government of India have changed the pattern of assistance to the disadvantage of the States. According to the revised pattern, 50 per cent of the unremunerative portion is to be borne equally by the Central and State Governments, subject to the maximum subsidy being limited to 25 per cent of the total cost of the schemes. These schemes are executed without insisting on popular contribution by the ryots as a prior condition with a view to ensure that agricultural production does not suffer for want of repairs or improvements to the small irrigation sources.

53. During the First Five-Year Plan, 2,458 works were completed at a cost of Rs. 289.93 lakhs benefiting an area of 428,314 acres existing and 31,615 acres new or 459,929 acres in all. For the Second Five-Year Plan a provision of Rs. 194.54 lakhs has been made for these schemes and a rough target of 40,000 acres new and 1,59,000 acres existing to be stabilized has been fixed.

54. The number of works completed, the expenditure incurred and the area benefited in each of the years 1956-57, 1957-58 and 1958-59 are as follows :—

Year.	Number of works completed.	Cost incurred (rupees in lakhs).	Area benefited (acres).
(1)	(2)	(3)	(4)
1956-57	355	48.23	26,500
1957-58	281	55.94	26,170
1958-59	220	76.81	22,162
(To end of February 1959).	(Target for the year 454).	(Final grant for the year 90.50).	

For the year 1959-60 a budget provision of Rs. 84.21 lakhs has been made for the execution of 1,306 works.

55. We have tried to find out the benefits in actual practice of the implementation of the Special Minor Irrigation Programme and have collected relevant statistics relating to 146 works completed during the year 1955-56 in the districts of North Arcot, Salem, Madurai, Tirunelveli, Ramanathapuram, South Arcot and

Tiruchirappalli. These figures show that while the average extent under cultivation served by the tanks in question before their restoration work was taken up (average for the five years ending 1952-53) was 10,155 acres, the average area actually benefited after the work of repairs to these tanks was completed (average for the two years 1956-57 and 1957-58) was 14,322 acres which represents a 42 per cent increase in the cultivated area. This increase in the cultivated area should no doubt be considered to be satisfactory but the area cultivated after the completion of the works has not come up to the ultimate ayacut fixed for the tanks in question which is of the order of 16,199 acres. The Board of Revenue considers that the short-fall in achievement when compared with the ultimate ayacut may be due to (i) optimistic estimation of the ultimate ayacut by the Food Production Engineering Branch, (ii) adverse seasonal conditions (which is said to be the main cause) and (iii) ryots' neglect. The validity of the reasons given for the short-fall can be tested only if the evaluation of the results of the tank restoration work is done over a continuous period of at least five years so as to allow for cyclical variations in seasonal conditions and other factors affecting cultivation. We therefore recommend that the evaluation already initiated by us may be continued in a more comprehensive way with a view to assess the benefits derived from implementing the entire Special Minor Irrigation Programme.

56. We recommend that in implementing this very useful scheme the highest priority should be given to the repair and restoration of the tanks in the ex-estate areas, particularly those in the Ramanathapuram district which are in need of immediate attention. As all of them cannot be attended to at once in view of the limited technical staff available, the following order of priority should be observed in repairing and restoring them:—

- (a) tanks which have an immediate food production value;
- (b) tanks in the case of which the gap between the registered ayacut as per the latest settlement figures and the actual ayacut is wide; and
- (c) the remaining tanks.

The pace of repair and restoration of these tanks should be accelerated as soon as the position in regard to the availability of the requisite technical personnel improves. Meanwhile facilities for training the requisite additional technical personnel should be stepped up.

57. We understand that there are instances where in the cases of tanks repaired under the Special Minor Irrigation Programme there is a gap between the registered ayacut and the actual area which can be cultivated with the help of the irrigation water drawn from the tank after its restoration amounting to as much as 100 acres owing to various causes such as the defectiveness of the

supply channels and consequent poor supplies to the tank, defectiveness of the sluices and absence of field bothies to take the tank water to the individual fields. It will not therefore suffice if the repair and restoration work of a tank is confined to the tank alone. In order to restore the actual original ayacut of each tank or in other words in order to make the original ayacut effective, the work of repair and restoration should also cover the repair and restoration of the supply channels, the field bothies and the sluices of the tank in the case of all Government sources of irrigation including those in the ex-estate areas. It should be ensured that the supply channels are in proper condition to fill the tank up to its full capacity to feed the original ayacut, that the field bothies exist down to the individual holdings and that the sluices are in good working order and fitted with shutters which are in good working condition and which are provided with locking arrangements. If necessary the lands required for repairing and improving the tank and providing it with the supply channels that it needs and for providing the individual holdings with the field bothies which they require should be acquired. The feasibility of providing a sump in front of the sluice so that water can be baled into the sluice when the tank gets dry should be examined in the case of each tank. In the case of existing anicuts and channels which have silted up heavily to crest levels suitable action should be taken to restore old conditions of supply as far as possible.

58. At present while the estimates for the repair and restoration of the tanks under the control of the Superintending Engineer (Food Production) are sanctioned by him and the work executed and his action got ratified later on by the Board of Revenue, the procedure is different in the case of works executed by the Public Works Department where prior approval of the estimates by the Collector concerned is insisted upon. As this entails avoidable delay the Superintending Engineers in the Public Works Department and the Chief Engineer, Public Works Department, should be authorized to accord sanction to estimates for works, proceed with the execution of the works and then seek the *ex-post facto* approval of the Collector concerned.

59. We have examined a suggestion that has been made to us to the effect that the execution and maintenance of minor irrigation works in the Development Blocks should be entrusted to the Block Agency. We are not in favour of any sudden and violent departure from the existing arrangements being made. On the one hand it has to be ensured that there is no undue increase in the work load of the Block Agency while on the other there should be the certainty before any major change in the existing arrangements is effected that the Block Agency will be not only competent to execute the Special Minor Irrigation Programme but will also be able to maintain the same rate of spending and speed in the execution of works which the Food Production Branch is now

maintaining in implementing this programme. There is also another aspect, viz., the desirability of having one and the same agency for both the Block and Non-Block areas so far as the food production works and the Special Minor Irrigation Programme are concerned. So all things considered our recommendation is that for the present it will suffice if the maintenance of the tanks and other irrigation sources which are now in the charge of the Revenue Department and the execution and maintenance of small irrigation schemes of purely local interest for which standards have already been laid down are entrusted to the Block Agency provided competent technical personnel is available in the Blocks.

60. A serious problem which calls for an urgent solution is the long and continuous neglect by the agriculturists of their customary kudimaramath liability and the consequent damage to the irrigation sources. Under the Madras Compulsory Labour Act, 1858, minor repairs and maintenance of irrigation works have to be carried out by the ryots owning lands under those irrigation sources and they should also provide necessary labour to carry out these works when called upon to do so by the officers of the Revenue Department concerned. This arrangement is popularly known as kudimaramath. The kudimaramath work was neglected by the ryots for such a long time that irrigation under the various sources was adversely affected. The Government therefore ordered in 1946, as a Grow More Food measure that kudimaramath works might be taken up and executed at Government cost in cases where irrigation had materially suffered and where there was likely to be an appreciable increase in food production by the execution of such works. This concession was extended from year to year. In 1949 the Government, however, placed a restriction and directed that the Chief Engineer (Irrigation) should use his discretion-carefully without dispensing with the kudimaramath liability of the ryots altogether and consult the Board of Revenue in cases where a channel benefits more than a village. This restricted concession is now being extended from year to year.

61. Though the existing provision in the Kudimaramath Act is legally sufficient to enforce the discharge of the customary duties expected of the ryots, in practice it is found very difficult to secure compliance as the ryots are disunited. The neglect is so widespread that administratively it is difficult to initiate action in all cases and the Public Works Department and the Food Production (Engineering Branch) with their normal staff are unable to take up this additional burden in all areas and in all cases.

62. We have examined the possibility of kudimaramath being undertaken as an item of work under the Block Development Programme and consider that it is better that this problem is tackled at an even lower level. According to section 85 of the Madras Panchayats Act, 1958, the Government, may, subject to

such conditions and control as may be prescribed transfer to any Panchayat or to any Panchayat Union Council the protection and maintenance of any irrigation work, the management of turns of irrigation or the regulation of distribution of water from any irrigation work to the fields depending on it. The Panchayat or Panchayat Union Council shall have power subject to such restrictions and control as may be prescribed to execute kudimaramath in respect of any irrigation source in the village or town and to levy such fee and on such basis for the purpose thereof as may be prescribed. In the same section it has been stated that nothing contained in it shall be deemed to relieve the village community or any of its members of its or his liability under the Madras Compulsory Labour Act, 1858, in respect of any irrigation source in the village or town in case the Panchayat makes default in executing kudimaramath in respect of that irrigation source. The maintenance and silt clearance of supply channels and irrigation channels may be left to be attended to by the Panchayats and Panchayat Union Councils trusting that they will take advantage of the enabling provisions referred to above. But in cases where the Panchayat or Panchayat Union Council concerned does not take up this work on account of its disinclination to levy a fee to meet the cost of the work we recommend that the Government themselves should collect the levy and hand over the collections to the Panchayat or Panchayat Union Council concerned for executing the works. We also recommend that in those cases where the Panchayat or the Panchayat Union Council is not only not willing to collect the levy but also not willing to undertake the work of maintenance and silt clearance of supply channels and irrigation channels the Government themselves should execute the work in addition to collecting the levy with the proceeds of which they should reimburse themselves of the expenditure incurred by them.

63. The question has often been asked why there should be so many different agencies dealing with irrigation. Theoretically it can be readily conceded that all irrigation works should be the responsibility of one agency, viz., the Chief Engineer for Irrigation. But in actual practice the issue is not so very simple in view of the number, the nature and the size of the innumerable irrigation works ranging from the Mettur System on the one hand and the smallest field channel on the other. While the Chief Engineer for Irrigation is the obvious agency for executing the large works the Revenue Department is the proper agency for undertaking all work connected with small tanks. The line of demarcation between the spheres of responsibility of these two agencies can only be, and has been, drawn in an arbitrary manner based on experience alone and so far the division or allocation of the work between the Revenue and Irrigation Departments has proved workable although there might have been occasional difficulties caused by the arbitrary division. We are not in favour of integrating the work relating to

the maintenance of the small irrigation sources and the major irrigation works under one and the same agency as we consider that the present arrangement is working satisfactorily and does not call for any change.

64. In addition to the Chief Engineer for Irrigation and the Revenue Department there is a third agency dealing with irrigation, viz., the Food Production (Engineering Branch) headed by the Superintending Engineer (Food Production) who is under the Board of Revenue (Food Production). This agency is concerned with the renovation of Revenue Department tanks mainly estate tanks which have been neglected for a long time. It undertakes comprehensive repairs of the tanks and hands them over to the Revenue Department for future maintenance. It is essentially an emergency department which will be wound up the moment all the tanks have been repaired to the desired extent. But this stage is not likely to be reached for another decade or more. The tanks which the Food Production (Engineering Branch) is taking up for renovation are the ultimate responsibility of the Revenue Department and the Collector is more in the picture than the Chief Engineer and that is why the Food Production (Engineering Branch) has come under the control of the Board of Revenue (Food Production). Incidentally this helps the Chief Engineer to concentrate on the larger irrigation works.

65. The Food Production (Engineering Branch) can be wound up only if the Irrigation Department can take over its work and do it with expedition. The funds available for renovation of tanks have generally been divided equally between the Chief Engineer for Irrigation and the Superintending Engineer (Food Production). While the utilization of the funds allotted to the Superintending Engineer (Food Production) has been very satisfactory and has steadily gone up from about Rs. 35 lakhs in 1955-56 to about Rs. 60 lakhs in 1958-59 the same cannot be said of the Chief Engineer for Irrigation in whose case there has been a decrease in the funds utilized from Rs. 55 lakhs in 1955-56 to about Rs. 24.34 lakhs to the end of February in 1958-59 against a final grant of Rs. 30.50 lakhs for the year. As the funds provided for implementing the Special Minor Irrigation Programme are being steadily increased and as nothing should be done which might stand in the way of these funds being fully utilized we strongly recommend that the present set-up may be allowed to continue.

(b) DESILTING-cum-RECLAMATION OF IRRIGATION TANKS.

66. The desilting-cum-reclamation scheme undertaken in the Madras State is designed to restore the lost capacity of silted tanks partially by raising the full tank level and partially by removing a part of the accumulated silt from the beds of tanks. The silt so removed is deposited on the submergible foreshore area which is thus reclaimed and brought under cultivation.

67. The following is a brief outline of the technical features of the scheme :—

A small dowel bank will be put up on the tank side, to prevent flow of water over the newly reclaimed land. Runoff from the catchment will generally be entering the tank at the flanks or through valleys in the foreshore. Suitable gaps will be left at these valleys while reclaiming the lands in the foreshore. The gap can be controlled with a series of check dams encouraging the deposit of silt first above the check dams and not in the tank-bed. A slight reverse slope to the reclaimed land will be given and the drainage of the area effected by the provision of a few pipes or rough stone drops here and there.

68. This scheme which was first started in the Chiungleput district as an experimental measure has since been extended to the South Arcot, North Arcot, Ramanathapuram and Kanyakumari districts and to the Pudukkottai division of the Tiruchirappalli district for trial under varying conditions.

69. The scheme is included in the Second Five-Year Plan and it is eligible under the Central rules of financial assistance for Grow More Food Schemes for a loan to meet the remunerative portion and a grant equal to 50 per cent of the net cost as in the case of works included in the Special Minor Irrigation Programme. The progress made so far during the Second Plan period in working the scheme is indicated below :—

Year.	Number of works taken up.	Cost incurred (rupees in lakhs).	Area benefited. (Acres).
(1)	(2)	(3)	(4)
1956-57 .. ..	....	6.12 (Spent on purchase of machinery).	....
1957-58	10	1.16	282
1958-59	5	6.86	405
(To end of February 1959).		(Targeted provision 7.50).	

The budget provision made for this scheme for the year 1959-60 is Rs. 10 lakhs.

70. As the scheme is still in the trial stage it may be continued at the present pace. The results of the works already executed and now being executed under it should be carefully watched and if it is found that these results are encouraging enough the pace of implementation of the scheme should be accelerated.

CHAPTER VII.

LIFT IRRIGATION.

(a) OPEN WELLS.

71. Wells form a very important source of irrigation in this State as indicated by the following figures:—

Source of irrigation.	Percentage of area covered.
(i) Tanks	40.8
(ii) Government canals ..	35.7
(iii) Wells	21.2
(iv) Others	2.8

The following figures will give an idea of the number of wells existing in this State which are used solely for irrigation:—

Source of irrigation.	Percentage of area covered.
(i) Government wells ..	4,214
(ii) Private masonry wells ..	345,246
(iii) Private non-masonry wls.	240,234
Total	789,694

72. So, construction of new wells and renovating all old ones are important items in the extension of irrigation facilities. With this object in view, Well Subsidy Schemes were sponsored by the Government from time to time since 1940. Under the 1946 scheme, the ryots were granted outright subsidies for effecting repairs to old wells and for construction of new wells, subject to a maximum of Rs. 300 per well and they were also allowed to construct the wells at the sites selected by them, recovery of the subsidy being effected for non-compliance with the conditions of the grant. From 1947 onwards, the scheme was partially modified and extended uniformly to all the districts, the subsidy being fixed at 50 per cent of the cost subject to a maximum of Rs. 300 per well; the maximum was raised to Rs. 750 from 1948. This scheme under which a sum of Rs. 384.44 lakhs was advanced as loans during the period from 1947-48 to 1951-52 in respect of 81,400 wells is not now in force.

73. The conditions attached to the grant of loans under the defunct scheme were generally the following:—

(i) The well should be 24 feet deep with 4 feet of water even during the height of summer.

(ii) The well should have adequate water capable of irrigating not less than one acre of land all the year round in normal seasons.

(iii) The side walls of the well should be revetted properly.

(iv) A baling stand should be put up.

The amounts eventually granted as subsidies were shared by the Central and State Governments on a 50 : 50 basis.

74. Summary recovery of the subsidy loans advanced was resorted to in cases where either no work or negligible work had been done. Waiver of recovery of subsidy was ordered in all bona fide cases where genuine attempts had been made and where the wells sunk had failed for reasons beyond the control of the grantees. (The Government of India have been sharing 50 per cent of these amounts also.) In cases where substantial work had been done, the loan advanced was converted into a regular takkavi loan recoverable in five equal annual instalments. All these recoveries (either summary or in instalments) were postponed to the extent to which collections of takkavi loan arrears were postponed in areas affected by adverse seasonal conditions. The Government granted from time to time extension of time for completion of wells bearing in mind the difficulties experienced by the agriculturists due to adverse seasonal conditions.

75. As the scope for further intensive development of minor irrigation sources other than wells is limited the Government examined some time ago the question of reviving the New Well Subsidy Scheme and sanctioned in October last the implementation of a loan-cum-subsidy scheme for sinking 2,000 new wells in all the districts in the State except Madras, the Nilgiris and Kanyakumari during 1958-59 and 1959-60. The number of new wells to be sunk under this latest scheme was recently increased by another 750 new wells to 2,750 new wells. The allotment of wells for each district ranges from 100 for Tanjore to 500 for Salem as shown below:—

1 North Arcot	...	...	...	...	350
2 South Arcot	...	...	...	...	250
3 Chingleput	...	...	...	...	250
4 Coimbatore	...	...	...	...	350
5 Madurai	...	...	...	...	200
6 Ramanathapuram	...	...	...	...	250
7 Salem	...	...	...	...	500
8 Tanjore	...	...	...	...	100
9 Tiruchirappalli	...	...	...	...	300
10 Tirunelveli	...	...	...	...	200
Total	...	...	...	...	2,750

76. The amount of subsidy for each well is 25 per cent of the cost of the work subject to a maximum of Rs. 250. A sum not exceeding Rs. 1,000 will first be advanced as loan under the Land Improvement Loans Act. The amount of subsidy will be adjusted therefrom only on due completion of the well work according to the standards prescribed by the Collector and satisfactory fulfilment of the conditions of the grant. The disbursement of the loan sanctioned will be made in two instalments. The first instalment will be 50 per cent of the total loan and will be disbursed before the commencement of the work. The balance will be disbursed as

the second instalment after satisfactory proof that the first instalment of loan has been usefully spent *in full* for the work. The work should be finished before 30th September 1959 failing which the loan advanced will be recovered summarily with interest.

77. The scheme is confined to new wells only and under it a ryot is eligible for a loan for only one well irrespective of the fact whether he holds lands in one or more villages. The well should be sunk only in a site approved by an officer not lower in rank than a Deputy Tahsildar who should satisfy himself that the work when completed will result in growing substantially more food. The Collector concerned will fix the dimensions of each well with reference to the local water table. In order to declare a well as complete, it should in addition to its having been constructed according to the specified dimensions have at least 4 feet of water even during the height of summer, should be capable of irrigating not less than one acre and should have been provided with a suitable contrivance for baling water. Only an officer not lower in rank than a Deputy Tahsildar will be competent to declare a well as having been completed. The estimates of work shall in all cases be prepared by a Minor Irrigation Overseer. On satisfactory completion of the work the ryot should give an undertaking in the prescribed form agreeing to grow only food crops in the ayacut of the work of not less than one acre for three years from the date of utilisation of the well water for irrigation. For the purpose of the scheme paddy, millets, all other cereals, pulses, potatoes, sweet potatoes, tapioca and other root crops are considered as food crops. Loans will not be granted under the scheme if it is known that in a certain locality the water is not fit for irrigation.

78. We welcome the revival by the Government of the well subsidy scheme but we consider that the scope of the revived scheme is very limited. We therefore recommend that the subsidy for digging wells should not be confirmed only to those wells dug under this scheme with the help of loans granted under it and that subsidy at the same rate and subject to the same conditions should also be given for new wells dug with the help of the other Government loans such as Takkavi loans. The Committee received many representations that the well subsidy scheme as it stands may not prove of much assistance to the ryots in many areas in the State. The cost of a well varies widely, and though it is about Rs. 1,000 in most areas with soft soil, it is nearly Rs. 3,000 in areas like Coimbatore district or Srivilliputtur and Sattur taluks of Ramanathapuram district where hard rocky soil has to be pierced. The well is the main source of irrigation in the latter areas, and the ryots are eager to utilise the facilities, if adequate enough, to sink new wells. The Committee feels that the case made out is quite convincing and recommends that the loan ceiling may be raised to Rs. 2,000 of which Rs. 500 may be the subsidy in specified areas.

(b) BORE WELLS.

(i) Tube wells.

79. The Government of India have undertaken the construction of 41 exploratory tube-wells in this State under the Indo-American Technical Co-operation Programme, with a view to exploring the possibilities of development of underground water resources. The successful wells would be handed over to this Government after completion, equipping them with necessary water-lifting machinery for irrigation. It was estimated that the majority of the test-borings would be approximately 500 feet in depth but in some cases it might be necessary to drill to a depth of 1,500 feet in order to obtain the requisite data. The value of the developed and equipped wells will be treated as a loan to the State on the basis of the normal cost of the construction of such wells. Wells which yield more than 20,000 gallons of water per hour will be treated as successful production wells and will be taken over by the State Government as such. Tube-wells which yield less than 15,000 gallons of water per hour at 20 feet depression will be abandoned, but if the State Government desires, it may take over these wells on payment of the cost of the pipes alone. Wells which yield between 15,000 to 20,000 gallons of water per hour will be completed if the 'local officer' nominated by this Government, viz., the Executive Engineer concerned, agrees to the completion of the well. Out of the 41 exploratory tube-wells sunk by the Government of India in this State, 28 wells have proved to be successful and they have been taken over by the State Government. The schemes for utilising the water from the wells should be drawn up and finalised sufficiently early so that the water can be put to real use immediately after the wells are handed over to the State Government.

80. In the Second Five-Year Plan, a scheme for the sinking of 300 tube-wells in this State at a cost of Rs. 75 lakhs was originally proposed. Consequent on the reorganization of States, it was revised as Rs. 46.18 lakhs. The scheme has not yet been taken up for implementation in view of the suggestion of the Government of India that the State Government may await the results of the exploratory tube-wells that are being constructed in this State under the Groundwater Exploration Project of the Government of India. The actual field work under this project would have been over by March 1959. The Government of India have since intimated that they are proposing to take up a second Groundwater Exploration Project in selected areas on lines similar to those of the first project. While, under the first project only those areas in which a tube-well could be expected to yield more than 20,000 gallons of water per hour were selected for exploration, the Government of India have expressed the desire that under the second project the selection of areas for exploration should be less restricted and that the only criterion in the selection of areas should be

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The following figures will give an idea of the number of wells existing in this State which are used solely for irrigation :—

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72. So, construction of new wells and renovating all old ones are important items in the extension of irrigation facilities. With this object in view, Well Subsidy Schemes were sponsored by the Government from time to time since 1940. Under the 1946 scheme, the ryots were granted outright subsidies for effecting repairs to old wells and for construction of new wells, subject to a maximum of Rs. 300 per well and they were also allowed to construct the wells at the sites selected by them, recovery of the subsidy being effected for non-compliance with the conditions of the grant. From 1947 onwards, the scheme was partially modified and extended uniformly to all the districts, the subsidy being fixed at 50 per cent of the cost subject to a maximum of Rs. 300 per well; the maximum was raised to Rs. 750 from 1948. This scheme under which a sum of Rs. 384.44 lakhs was advanced as loans during the period from 1947-48 to 1951-52 in respect of 81,400 wells is not now in force.

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(ii) The well should have adequate water capable of irrigating not less than one acre of land all the year round in normal seasons.

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The amounts eventually granted as subsidies were shared by the Central and State Governments on a 50 : 50 basis.

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75. As the scope for further intensive development of minor irrigation sources other than wells is limited the Government examined some time ago the question of reviving the New Well Subsidy Scheme and sanctioned in October last the implementation of a loan-cum-subsidy scheme for sinking 2,000 new wells in all the districts in the State except Madras, the Nilgiris and Kanyakumari during 1958-59 and 1959-60. The number of new wells to be sunk under this latest scheme was recently increased by another 750 new wells to 2,750 new wells. The allotment of wells for each district ranges from 100 for Tanjore to 500 for Salem as shown below :—

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5 Madurai	200
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7 Salem	500
8 Tanjore	100
9 Tiruchirappalli	300
10 Tirunelveli	200
Total	2,750

76. The amount of subsidy for each well is 25 per cent of the cost of the work subject to a maximum of Rs. 250. A sum not exceeding Rs. 1,000 will first be advanced as loan under the Land Improvement Loans Act. The amount of subsidy will be adjusted therefrom only on due completion of the well work according to the standards prescribed by the Collector and satisfactory fulfilment of the conditions of the grant. The disbursement of the loan sanctioned will be made in two instalments. The first instalment will be 50 per cent of the total loan and will be disbursed before the commencement of the work. The balance will be disbursed as

that the data already available should tend to show that tube-wells in that area are likely to yield a quantity of water which in the opinion of the State Government is reasonable and economic. In response to an enquiry from the Government of India whether the State Government would like to participate in the proposed second project on condition that the cost of any tube-well constructed in the course of exploration would be treated as a long-term loan to them, the Government of Madras have intimated their willingness to do so and have also indicated the areas in this State where the exploratory tube-wells may be sunk.

(ii) *Artesian wells.*

81. The Government sanctioned in 1948 an experimental scheme for the sinking of 20 artesian wells in Cuddalore and Vridhachalam taluks of the South Arcot district. In view of the assured water-supply from these wells and their great potentiality for augmenting the existing irrigation facilities, the Government sanctioned another scheme for the sinking of 101 artesian wells at a cost not exceeding Rs. 8.08 lakhs. Both the above schemes have been completed and each well is expected to irrigate not less than 50 acres and a consolidated water-rate of Rs. 22-8-0 per acre per annum has been levied. It has been stipulated that at least one crop of paddy should be grown by the ryots using the water from the artesian wells every year. Another five wells have since been sunk in the South Arcot district.

82. Recently, the Government have sanctioned a scheme for the sinking of 50 artesian wells in South Arcot district at a cost of Rs. 7.82 lakhs. The wells will be constructed by the Agricultural Department and handed over to the Revenue Department for maintenance as Government sources of irrigation. The construction of necessary platform, etc., will be attended to by the Revenue Department with the aid of the Minor Irrigation staff. Before taking up the work the Director of Agriculture will decide on the site for sinking the wells in consultation with the Revenue Department, with reference to the suitability of the soil in the area proposed to be irrigated by the wells and other factors. It is expected that the capital invested will be easily recovered from the beneficiaries by the levy of water-cess at the consolidated rate of Rs. 22-8-0 per acre per annum, the life of the artesian wells being taken as ten years. Proposals for the sinking of another fifty artesian wells in the South Arcot district and also for the sinking of 75 sub-artesian wells are reported to be under the consideration of the Government.

(iii) *Filter-point wells.*

83. The filter-point is a device for pumping out water from sandy substrata for agricultural purposes. Coarse sand is necessary for the efficient functioning of the filter-point and generally filter-points have been successful in Madras State in old river beds and

in proximity to perennial sources of water-supply. Sandy substrata are available in the Cauvery area of Tanjore district, Srirangam area of Tiruchirappalli district, and in the sandy layers in the districts of North Arcot, South Arcot, Madurai, Ramanathapuram, Chingleput and in a small measure in Salem.

84. For encouraging ryots to expand paddy cultivation in the kuruvai season in the Tanjore district and to enable cultivation of cotton or groundnut in the off season, a scheme for the construction of 100 filter-points on ryots' lands was sanctioned in December 1951, for implementation by the Agriculture Department. In view of the success of the scheme, it was later extended to other districts and the continuance of the scheme has been sanctioned from year to year. The scheme is to be worked on a self-supporting basis, because the entire cost of sinking the filter-points is recoverable from the ryots. Loans are granted to ryots to an extent of Rs. 2,500 in the shape of pumping machinery for the filter-points, on a hire purchase basis. The extent commanded by a normal filter-point of 8 to 10 gallons capacity is ten acres. Besides, the filter-point is also able to supply water for early preparation of the land and for raising nurseries of green manure and paddy and also for planting early crops such as kuruvai which give a higher yield. In some areas two to three crops have been raised where there was no crop before.

85. The following statement shows the targets and achievements under the Filter-Points Scheme from the inception of the Scheme:—

Year.	Target of units.	Achievements.
1951-52 (Tanjore only).	100	102
1952-53	600	453
1953-54	400	525
1954-55	600	862
1955-56	750	729
1956-57	600	507
1957-58	600	321 (up to March 1958).
1958-59	600	644 (up to March 1959.)

For the year 1959-60 also a target of 600 filter-points has been fixed.

86. During the first five-years of working of this scheme, i.e., during the period from 1951-52 to 1955-56 almost all the potential areas suitable for sinking filter-point tube wells were exhausted. As a result the working of this scheme in the subsequent years has become difficult. Further the supply of filter-points, pipes, fittings, etc., were not being supplied by the Agricultural Department but

were left to be purchased by the ryots before starting the well sinking work and this caused some delay in the sinking of the wells. The supply of the filter-points, etc., to the ryots has since been taken over by the Agricultural Department from June 1958 and comparatively better progress in implementing the scheme may therefore be expected in future.

(iv) *Hiring of boring sets.*

87. The work relating to the maintenance of borewell sets together with the plants and equipment and the staff at the State headquarters and in the districts was transferred from the Industries Department to the Agricultural Department with effect from 1st April 1958. The types of the machinery now available with the Agricultural Department for sinking bore wells and the numbers available in each are given below :—

Type of machinery.	Number.	Strata for which the machinery are suitable.
Handboring sets	106	Soil and soft rocks.
Power drills (percussion drills)	28	Rocky strata.
Rotary drill	1	Soil and soft rocks.
Rock blasting units	4	Rocky areas.
Air compressors	3	For testing the yield.
Calyx drills	3	Rocky strata.

The Government have sanctioned the purchase of the following additional items of machinery :—

Rotary drill	1
Rock blasting units	2
Percussion drills	8
Submersible pumps for testing purposes	2
Truck mounted air compressor	1

88. The boring machinery units are hired out to agriculturists for sinking wells. In all 145 applications were pending on 1st April 1956. Of these 94 were for handboring sets, 37 for power drills and 14 for rock blasting units. During the year 1956-57, 645 applications were received and 632 applications were disposed of. At the end of March 1957, 158 applications were pending. During the year 1957-58, 882 applications were received and 743 applications were disposed of and the remaining 297 applications were pending on 1st April 1958 to be disposed of along with those received during 1958-59. Of the 297 pending applications 234 were for hand boring sets, 54 for power drills and 9 for rock blasting units.

89. The approximate cost of drilling one foot by the boring units is as follows :—

Hand boring sets	Rs. 15 to Rs. 22 in rocky areas.
Do.	Rs. 4 to Rs. 6 in soil formation.
Power drills	Rs. 5 to Rs. 15 in rocky areas.
Rotary drills	Below Rs. 5 in soil formation.

(v) *Suggestions.*

90. The Filter-Points Scheme should be continued and intensified. Particular attention should be devoted to the sinking of tube wells and filter-points in the vicinity of tanks and canals. In order to encourage ryots to sink filter-point tube wells a subsidy of 25 per cent is now allowed in the Development Blocks. We recommend that a similar subsidy subject to a maximum of Rs. 250 per well should be given for sinking filter-point tube wells and bore wells in the non-Block areas also.

91. An examination of the potentialities for ground water development by sinking tube wells and filter-points should be immediately made in respect of the entire State on the basis of the past boring records and the performance of the existing tube well pumps and filter-point pumps. The geological and economic aspects should be investigated simultaneously. If on the basis of this examination a more comprehensive survey is found to be called for it should be undertaken.

92. Such a State-wide investigation as that recommended in the previous paragraph will necessarily take time. Meanwhile, the possibility of launching a scheme for the sinking of tube wells, each of which will be capable of irrigating about 100 acres of paddy land in compact areas, which should be selected on the basis of the report of the results of the first Groundwater Exploration Project conducted in this State by the Government of India, should be investigated and such a scheme should be implemented very soon if it is found to be feasible and promising. The Government of India should be requested to undertake in this State a much larger programme under the proposed second Groundwater Exploration Project than was done under the first project. The scope for further expansion of the artesian well sinking programme in the South Arcot and Tiruchirappalli districts should be explored.

93. The boring equipment of the Agricultural Department is not adequate and it should be improved. The hand boring sets are not fast enough. The Agricultural Department should therefore have more mechanised sets. But in view of the difficulty in securing the foreign exchange required for importing mechanised sets some of the hand boring sets now with the Agricultural Department may be got converted into mechanised sets in the Agricultural Engineering Workshop as an experiment. More ordinary and rotary types of drills may be acquired by the Agricultural Department both for departmental use and for hiring out to agriculturists.

(c) *RIVER PUMPING SCHEME.*

94. Under this Scheme which was started in 1951-52 under the First Five-Year Plan the Agricultural Department arranges for the installation of oil engines or electric motor pumping sets

on the banks of rivers and streams for supply of water by pumping to ryots for bringing large areas of land in compact blocks under cultivation on a permanent basis. The cost is met by the Government in the first instance who reimburse themselves by recovering appropriate water charges from the beneficiaries.

95. During the First Five-Year Plan period as against a total target of 82 River pumping units only 15 units were installed. At first they were being run on a subsidised basis, as the Government of India sanctioned a subsidy towards pay of staff and depreciation and interest charges on the capital cost of the pumping engines. In 1952-53 the Government of India stopped the subsidy and thereafter the scheme had to be run on a self-sufficient basis, i.e., on a "no profit, no loss" basis and the beneficiaries had to bear the entire expenditure which worked out to about Rs. 60 per acre. As a result almost all the schemes had to be closed down one by one.

96. The Government of India have since revived the subsidy for this scheme and have agreed to give financial assistance on the following basis during the Second Plan period. The cost of depreciation and the pay of field staff is to be met by the State Government and the Central Government on a 50 : 50 basis, while the ryots should meet the entire working expenses and the interest on capital. On this basis the cost of irrigation works out to about Rs. 45 per acre. In view of the revival of the subsidy by the Government of India, this scheme is being implemented under the Second Five-Year Plan period with a target of 6 units per year, but no tangible progress has been made so far under the scheme in view of the difficulty in choosing proper places for the location of the pumping units, the difficulty in securing the co-operation of the ryots concerned, the need to ensure that riparian rights of any one are not affected by implementing the scheme and the objections raised to the location of units in certain cases by the Public Works Department. Only two units are now working and they are located at Vadamalapuram in Ramanathapuram district and C. Mutlur in South Arcot district. Arrangements are under way for the installation of two more units which have been sanctioned in Alishikudi in South Arcot district and at Nemmeni in Ramanathapuram district.

97. We consider that the River Pumping Scheme should be continued in view of its usefulness from the point of view of stepping up agricultural production. The existing river pumping units should be transferred to the control of co-operatives which are prepared to take them over and run them. Such of them which could not be transferred to the control of co-operatives should be maintained and run by the Government themselves. Further units should also be started as per targets fixed for achievement under the Second Plan period. But they should be located only in those

areas where the loss on account of running them will be the minimum. As far possible they should be run as community river pumping units by the existing co-operatives or by co-operatives specially formed for the purpose. They should be run by the Government themselves only if it is not possible to entrust their working to co-operatives.

(d) PUMPSETS.

(i) Hiring of oil engine pumpsets to agriculturists.

98. The scheme for the hiring of oil engine pumpsets to agriculturists for raising crops, preferably food crops, has been in operation since 1946. This was started mainly as a protective measure in order to enable the agriculturists to save their withering crops when the seasonal rains fail. The Scheme specially caters to the needs of the poor and middle-class ryots who cannot afford to purchase or maintain a pumpset of their own for irrigating their fields.

99. This Scheme was included in the First Five-Year Plan. Up to the year 1952, the Scheme was being run on a subsidised basis, 50 per cent of the working charges being met by the Government of India and the State Government in equal proportions. Subsequently as the subsidy was discontinued by the Government of India, the State Government decided to work the Scheme on a 'no loss-no profit' basis and the hire charges collected from the ryots had therefore to be increased. The Scheme was not included in the Second Five-Year Plan, but was continued as a Grow More Food Scheme from the year 1956-57. However, it has since been included in the Second Five-Year Plan and from the year 1958-59 the Government of India have revived their subsidy for it which is now calculated at 12½ per cent of the cost of the Scheme.

100. There are now 375 units available with the Agricultural Department for being hired out to agriculturists. Except a few all of them are of low horse-power. The area benefited and the additional production achieved by implementing the scheme are indicated below :—

Year.	Area benefited.		Additional production.
		ACS.	TONS.
1954-55	...	3,800	1,267
1955-56	...	7,847	2,516
1956-57	...	8,585	2,862
1957-58	...	10,719	3,573
1958-59	...	9,505	3,168

101. Though the Government had decided to run the Scheme on a 'no loss-no profit' basis the Scheme has actually been working at a loss for the following reasons :—

(a) Many units remain idle in the course of the year.

(b) In working out the existing rates of hire charges the number of working days for an oil engine was estimated at 350 days in a year as against a working period which cannot exceed 200 days in the year under any circumstances.

(c) While working out the present rates of hire charges only the minimum salary of the drivers had been taken into account whereas in actual practice many drivers are drawing salary in the time scale and are in addition drawing travelling allowance.

The loss incurred every year by running the scheme is about Rs. 90,000.

102. It does not appear that effecting any further increase in the hire charges with a view to wipe out or at any rate to bring down the loss in working the Scheme is feasible because this will most certainly reduce the demand for the units. If this should happen the increase in receipts by way of the increased rate of hire charges will be more than offset by the fall in receipts due to the reduction in the number of units hired out. We understand that already there has been a decline in the demand for the units not only on account of the improved seasonal conditions that have been prevailing in recent years but also because of the appreciable increase in the number of privately-owned units. The Agricultural Department has therefore been taking steps to divest itself of these units to the extent possible. Some of them have been transferred to the Agricultural Research Stations and the State Seed Farms and some of them are also being sold to agriculturists recommended by co-operative societies in the districts. The Government have ordered that the higher-power engines may be utilized in the River Pumping Scheme.

103. We recommend that the hiring scheme for pumpsets should be wound up and that all the pumpsets now in the Agricultural Department should be disposed of by sale at book value preferably to co-operatives. If any of the pumpsets are not taken over by the co-operatives at book value they may be offered for sale at book value to agriculturists from whom the sale price may be collected in suitable instalments, the number of which may be determined by the Agricultural Department. If agriculturists are not forthcoming to purchase the pumpsets at book value they may be sold in public auction to co-operatives.

(ii) *Hire Purchase Scheme for oil engine and electric motor pumpsets.*

104. This Scheme was started in 1949 mainly to help the middle-class agriculturists to acquire pumpsets of their own. The pumpsets are purchased by the Agricultural Department in bulk and sold to individual agriculturists on hire-purchase terms under which the price is payable by the buyer in equal annual instalments

over a period ranging from 3 to 7 years. In addition to the cost of the machinery, interest at 4 per cent per annum and centage at 3 per cent on the overall cost is collected from the buyer to meet the establishment charges of the Agricultural Department for running the Scheme.

105. The achievements under the Scheme are as shown below :—

				<i>Oil engine pumpsets.</i>		
				<i>Units distributed.</i>	<i>Area covered.</i>	<i>Additional production.</i>
					ACS.	TONS.
1951-52	..	..	..	821	6,568	3,284
1952-53	..	..	..	564	4,512	2,256
1953-54	..	..	..	158	1,248	624
1954-55	..	..	..	140	1,120	560
1955-56	..	..	..	231	1,848	924
1956-57	..	..	..	16	128	64
1957-58	..	..	..	175	..	..
1958-59 (Estimate)	..	..	..	..	..	..
				<i>Electric motor pumpsets.</i>		
1951-52	..	..	..	181	905	453
1952-53	..	..	..	323	1,615	806
1953-54	..	..	..	69	345	73
1954-55	..	..	..	132	660	330
1955-56	..	..	..	446	2,230	1,115
1956-57	..	..	..	107	535	268
1957-58	..	..	..	475	..	..
1958-59	..	..	..	..	..	..

The Scheme is being continued in 1959-60 also.

106. In view of the progressive extension of electricity in the rural areas, agriculturists are preferring electric motor pumpsets to oil engine pumpsets as the cost of maintenance is cheaper in the case of the former than in the case of the latter. Though indigenous types of electric motor pumpsets are being produced the difficulty in obtaining adequate supplies of starters which are a vital part of these machines and which have to be imported from abroad is said to be standing in the way of the indigenous production of electric motors and starters keeping pace with the growing demand.

107. We recommend that the Hire Purchase Scheme for pumpsets should be not only continued but also intensified. The centage now charged by the Agricultural Department for the servicing of pumpsets distributed under this Scheme may be waived. The co-operative agency should also be utilized for implementing the Scheme on more or less the same terms on which it is now being run by the Government. The Government should attend to the inspection and servicing not only of those pumpsets which are distributed by them direct under the Scheme but also of those pumpsets that may be distributed under the Scheme by the co-operatives.

108. It has been represented to us that the procedure for supply of pumpsets under the scheme should be simplified giving greater discretion to the ryots. At present, quotations are called for from the various firms in the Madras State which are in a position to supply the pumpsets approved by the Government of India. Before accepting the quotations from these firms the Director of Agriculture sees that the prices quoted are reasonable. The list of the selected firms and the types of pumpsets and the prices accepted in respect of them are communicated by the Director of Agriculture to the District Agricultural Officers with a view to ensure that the supplying firm is paid only the price fixed. The Deputy Directors of Agriculture sanction the loans to the ryots and the District Agricultural Officers distribute the pumpsets to the ryots after the loans as sanctioned. Under this arrangement there is only a restricted choice for the ryot in regard to the pumpset obtained by him on hire-purchase terms. We recommend that complete discretion should be given to the ryot in the matter of choice of the pumpset. He may however be advised to choose the pumpset in consultation with the local Agricultural Demonstrator or the Agricultural Engineering Supervisor so as to ensure that he does not make a wrong choice from the technical point of view. As soon as the ryot makes his choice and intimates it to the Deputy Director of Agriculture the latter should obtain agreements in the prescribed form both from the ryot and from the supplying firm. The loan should not be given to the ryot in cash in order to prevent its misuse. The ryot should be only told to go to the supplying firm and obtain the pumpset. The supplying firm should be asked to send its bill to the Deputy Director of Agriculture concerned and obtain payment. Such an agreement will not only safeguard the interests of the Government and ensure that the loan amount is not mis-spent but also at the same time give complete discretion to the ryot in the matter of choosing the pumpset.

(e) WIND MILLS.

109. The Planning Commission recommended to the States that they should explore the possibility of utilizing wind power as is being done in other countries like Holland, Australia, etc., where wind power has been harnessed for generating electricity and for pumping water. The earlier wind mills were capable of operation only at high wind velocities whereas the wind mills now being made have been designed not only to operate at low wind velocities but are also capable of withstanding winds of very high velocities. The Madras Government have therefore taken up for investigation the possibility of harnessing wind for irrigational pumping purposes in areas where favourable conditions prevail for the major part of the year. As a first step, they have proposed to instal a small wind mill on an experimental basis for lift irrigation purposes in a suitable place so as to explore the possibility of large scale utilization of wind power in this State.

110. The Agricultural Meteorologist, Coimbatore, advised that this experiment might first be tried in Ramanathapuram district in view of the fact that this district is very much subject to the vagaries of the monsoon and as it has also got a good average wind velocity throughout the year ranging from 5.1 to 11.00 miles per hour which works out to an average annual wind velocity of 7.9 miles per hour which is said to be sufficient even for generating electricity on a very small scale. The Director of Agriculture recommended that an initial survey of the Ramanathapuram district by an Expert Committee would be necessary to select an ideal locality for the installation of the wind mill. The Government accepted this recommendation and appointed an Expert Committee with the Director, Regional Meteorological Centre, Madras, as the Chairman and the Agricultural Engineer and the Agricultural Meteorologist as Members to go into the question of installing a wind mill in the Ramanathapuram district and to formulate a Scheme.

111. The Expert Committee has since submitted its report in which it has stated that the Mudukalathur, Paramakudi, Ramanathapuram and Thiruvadanai taluks appeared to be the favourable taluks in that district for installing a wind mill for irrigational purposes. The Committee has discussed the available wind data for the Ramanathapuram district and the neighbouring regions and has expressed the view that before a site is selected for a wind mill there is a real need for a thorough study of the wind regime of these taluks for one cycle of seasons. The Committee has recommended that this may be done by the opening of Wind Observation Stations at Tondi, Kamuthi, Kilakkarai and Pambur and by augmenting the wind observations at the existing Agricultural Meteorological Observatory at Koilpatti, which is close to the border of this district. The Committee has also stated that if, notwithstanding its above recommendations, the Government of Madras are of the view that a wind mill should be installed even now and that this question cannot be deferred for one year, till the study of the wind-regime is over, a cheap wind mill may be installed at the State Seed Farm at Pambur near Paramakudi. The report of the Committee is under the consideration of the Government.

112. We consider that while a comprehensive scheme for setting up wind mills should be pursued on a scientific basis after obtaining more data some pilot wind mills may be set up in areas within the Development Blocks in the selected taluks of the Ramanathapuram district mentioned by the Expert Committee as offering the best chances of success. The Agricultural Department should get into touch with reliable manufacturing firms in the country which may be in a position to supply wind mills at a reasonable cost and obtain quotations from them. If the pilot wind mills prove to be generally economical and successful and the manufacturing firms in the country are able to supply wind mills at

a reasonable cost, a boon would have been conferred on the agriculturists by placing within their reach power for lift irrigation at practically no recurring cost.

CHAPTER VIII.

LAND DEVELOPMENT.

(a) TRACTOR HIRING SCHEME.

113. This scheme was started in the year 1946-47 as one of the items in the Grow More Food Campaign with a view to provide agricultural machinery to the cultivators for the reclamation of virgin lands and the current fallows. There are at present 142 tractors in the Agricultural Department of which 63 are wheel-type tractors, 5 are track or chain-type tractors without bulldozer equipment and the remaining 74 are track or chain-type tractors with bulldozer equipment. All of them are hired to agriculturists for ploughing, levelling, etc., purposes.

114. It is estimated that there are 700 private tractors in the State. There are no private agencies letting out tractors and bulldozers on hire to the agriculturists in this State. Even commercial concerns have not taken to this venture obviously because it is unremunerative.

115. When the scheme was started it was subsidised by the Government of India on a 50 : 50 basis. The Government of India continued the subsidy up to the year 1950-51. Even afterwards, it was included in the First Five-Year Plan as a subsidised scheme but by about the end of the first year of the First Plan, the Government of India withdrew their subsidy and intimated that the scheme should be run on a "no loss-no profit" basis. In view of this there has been a progressive upward revision of the hire charges as indicated below :—

Rate of hire charges including transport charges.

	From 1st April 1946 to 30th June 1950.	From 1st July 1950 to 31st March 1952.	From 1st April 1952 to 25th December 1954.	From 26th December 1954 up to date.
		(RUPEES PER ACRE).		
1 Ploughing by all types of tractors	5	10	12	12
2 Harrowing (shallow ploughing).	3	5	7	7
		(RUPEES PER HOUR).		
3 Levelling with buli- dozers—				
D 7 type	9	12	14	17
D 6 type	7	10	12	16
TD 14 type	7	10	12	16
TD 9 type	7	10	10	13
TD 6 type	7	8	10	12
D 4 type	5	8	10	13
T 6 type	7	8	10	12

The Tractor Hiring Scheme is being continued under the Second Five-Year Plan. Under the Second Plan it has become eligible for a subsidy of 12½ per cent of the gross expenditure from the Government of India.

116. The achievements of the scheme during the First Plan period are as follows :—

Year.	Area covered (in acres).
1951-52	61,750
1952-53	52,273
1953-54	22,827
1954-55	22,957
1955-56	25,607
Total	185,414

Under the Second Five-Year Plan an annual target of 32,500 acres has been fixed made up of 13,500 acres of virgin land and 19,000 acres of current fallows. The achievement so far has been much below the target as indicated below not only owing to diversion of several units for flood relief and cyclone relief work, soil conservation work, etc., but also because some of the units had to be idle for varying periods for want of imported spare parts which are difficult to obtain due to the foreign exchange position :—

Year.	Area covered (in acres)
1956-57	24,440
1957-58	18,749
1958-59 (estimated)	16,000

117. Though theoretically the scheme is expected to be run on a "no profit-on loss" basis it has actually been working at a loss as shown below :—

Year.	Number of tractors and bulldozers.			Net loss.	Average loss per tractor.
	Tractors without bul- dozers.	Tractors with bul- dozers.	Total.		
				(RUPEES IN LAKHS).	
1951-52	139	154	293	10.02	0.04
1952-53	137	165	302	8.44	0.03
1953-54	74	85	159	10.30	0.06
1954-55	73	85	158	7.05	0.04
1955-56	73	85	158	6.85	0.04
1956-57	68	74	142	5.94	0.04
1957-58	68	74	142	3.58	0.03
1958-59	68	74	142	Not worked out yet.	..

118. The Government have been taking all possible steps to keep down the loss to the minimum. They have permitted the hiring of the tractors and bulldozers for non-agricultural purposes after levying double the normal rates. The units are also hired out at normal rates of hire charges to other Government departments, local bodies and educational institutions whenever they are not required for agricultural purposes. With a view to utilize the units to the maximum extent they are used for clearance of shrubs and deep ploughing in forest areas during the off season. Tractors of small horse-power are hired out during the off season for road haulage work.

119. Most of the units now with the Agricultural Department are old having served their normal period of life. In spite of the great care taken to maintain them properly they require repairs and renewals of parts often. As regards spare parts the position is not satisfactory as already stated because they are not being imported in adequate numbers owing to the difficulty in regard to foreign exchange. With a view to provide better servicing and repair facilities for the units the Government have newly opened a Tractor Repairs and Servicing Centre at Tiruvarur in the Tanjore district. It is being equipped with the required machinery and it is expected to start functioning during the current year (1959-60). The Government have also sanctioned the opening of a Salvage Centre as an adjunct to the Tractor Workshop, Coimbatore, for reconditioning used spare parts.

120. We find that the demand by the agriculturists for the wheel type tractors which are useful only for ploughing is only seasonal. There is no case therefore for the Agricultural Department continuing to retain them. The Government themselves have already come to this conclusion and have ordered that all the 63 wheel-type tractors owned by the Agricultural Department should be disposed of on outright cash basis or under the Tractor Hire Purchase Scheme to ryots. The Director of Agriculture will no doubt dispose of as many of the wheel-type tractors as he can with reference to these orders. The Tractor Hiring Scheme may be continued with the remaining wheel-type tractors and it may be wound up gradually as and when these tractors become entirely unserviceable. Meanwhile the possibility of utilising these wheel-type tractors for other agricultural operations like harvesting, threshing, intercultivation, etc., should be tried in the various Agricultural Research Stations.

121. All the track or chain type of tractors equipped with bulldozers should be retained and the Tractor Hiring Scheme in respect of them should be continued as we understand that there is a good demand for the bulldozers type tractors all the year round. In view of the need for accelerating the pace of land reclamation work the number of this type of tractors owned by the Agricultural Department should be increased to the extent

necessary to meet the demand for them in full. The five track or chain type tractors which do not have bulldozer equipment should also be provided with this equipment and retained.

122. It is highly regrettable that some of the tractors of the Agricultural Department are compelled to remain idle for long spells for want of the spare parts required by them. We have received representations that the same difficulty is being acutely felt by the private tractor owners also. These costly units which are meant to play a vital role in stepping up agricultural production deserve special exemption from the import restrictions which are standing in the way of their securing the spare parts which they are badly in need of. Immediate arrangements should be made to import adequate quantities of the fast-moving spare parts required by the tractors—both Government-owned and private-owned—that are already in this State. The Government of Madras should move the Government of India in the matter at once.

123. The existing repair and service facilities for tractors are not adequate. The existing Tractor Workshop at Coimbatore and the newly started Tractor Repairs and Servicing Centre at Tiruvarur will not suffice for the 142 departmental tractors and the estimated 700 private tractors which number will be steadily rising day by day. Tractors in need of servicing and repairs should not be transported over long distances. They should be attended to preferably at the places where they are or at centres which are as near those places as possible. We therefore recommend that there should be three mobile tractor workshops hauled by wheel-type tractors for attending to repairs and servicing of not only the Government-owned tractors but also the tractors owned by private parties, charges being collected for the services rendered based on the "no loss, no profit" principle.

124. Several representations have been received by us urging that the tax on tractor trailers used solely for agricultural purposes should be removed. Though no doubt tractors and trailers are owned only by the well-to-do agriculturists who can afford to pay the tax still as they will be practically confined to the fields and farmsteads of their owners and will be using the public roads only sparingly and as in our opinion there should be some inducement, however little, to the agriculturists to go in for these costly units, we recommend that all tractors and trailers used solely for the owners' personal agricultural purposes should be exempted from taxation under the Madras Motor Vehicles Taxation Act. We also recommend that no tax under this Act should be levied on the tractors and trailers owned by the Agricultural Department.

(b) TRACTOR HIRE PURCHASE SCHEME.

125. This scheme which was included in the First Five-Year Plan has been in operation since the year 1951-52. Under this scheme tractors and bulldozers with complete equipment are

allotted to ryots on hire purchase basis up to a maximum financial limit of Rs. 20,000 per ryot. The cost is recovered in equal annual instalments spread over a period of five to seven years. The scheme is intended to assist ryots owning large extents of lands to reclaim virgin lands and to bring more area under cultivation by mechanised means. During the First Plan period 121 tractors were supplied to ryots under the scheme.

126. The scheme was not included in the Second Five-Year Plan but was continued as a Grow More Food Scheme during the year 1956-57. During that year 22 units were purchased and supplied to agriculturists out of the loan of Rs. 5 lakhs which was sanctioned by the Government of India. Fourteen units were purchased and supplied during the year 1957-58 from State funds. The Government sanctioned the purchase and supply of 45 tractors during the year 1958-59 utilizing the loan of Rs. 10 lakhs given by the Government of India. Because of the non-availability of tractors in the market the Government of India have been addressed to issue licences in favour of the Director of Agriculture to import the tractors from abroad and also for the utilisation of the loan of Rs. 10 lakhs up to 30th June 1959. This scheme has since been included in the Second Five-Year Plan.

127. The scheme is very popular and there is a heavy demand for the units as is evidenced by the fact that over 200 applications are now pending with the Director of Agriculture. Apart from its popularity the scheme is a very useful one enabling the ryots as it does to bring large areas, which would otherwise have been left fallow, under cultivation. The units distributed under the scheme are continuously engaged in field operations as the conditions governing their supply permit the hire-purchaser to hire them out to neighbouring ryots and this permission is largely availed of. The Hire Purchase Scheme for tractors should therefore be not only continued and effectively implemented but its scope should also be expanded providing for the supply under it every year of as many tractors as are applied for. The Government of India should be prevailed upon to permit the import of an adequate number of tractors each year to meet the demand from the ryots in full along with a suitable complement of spare parts which should represent the requirements of the imported tractors for a period of eight years. We also recommend that the Government of India may be requested to implement a suitable manufacturing programme so that we are able to attain self-sufficiency in regard to our requirements of track type tractors in the near future.

(c) SOIL CONSERVATION.

128. During the First Five-Year Plan, soil conservation began to receive for the first time the attention due to it in the scheme of land development. The aim of soil conservation is to protect the top layers of the soil, which are apt to be constantly shifted

from one area to another by wind and water and also to conserve the moisture in the soil. The Soil Conservation Schemes on agricultural lands provide for such measures as contour trenching and bunding, bench terracing, plugging gullies, providing vegetation covers, etc., which will arrest soil erosion and the consequent loss in fertility of the lands. The benefits that will be obtained by implementing the scheme are—

(a) Prevention of erosion and loss of the valuable top soil and silting of channels and reservoirs.

(b) Conservation of moisture.

129. The former is important in the case of the lands in the Nilgiris and the catchment areas of the large reservoirs, where tons of top soil are washed down every year, creating problems for the land-owners both on the hill slopes and the plains. The latter is important in the case of the arid areas in the State where cultivation is of a marginal type and a slight increase of moisture will result in an appreciable increase in the yield of the dry crops. Both types of measures result in increased food production. The yardsticks adopted are 1/20 ton of paddy per acre for lands in the plains and 4/5 ton per acre for lands in the Nilgiris, where potatoes are the main crop grown.

130. According to the existing rules, the Government of India will share 12½ per cent of the cost of Soil Conservation Works, 50 per cent of the afforestation expenses and 12½ per cent of the cost of the work-charged staff, subject to an equal amount being shared by this Government. The State Government will have to bear in addition 90 per cent of the cost of the machinery. The remaining 75 per cent of the cost of the soil conservation measures, 75 per cent of the cost of the work-charged staff, the entire expenditure on the non-work charged staff plus contingencies and 10 per cent of the cost of the machinery are recovered from the ryots in equated annual instalments not exceeding 15. The entire share of the ryots is being obtained from the Government of India by the State Government by way of loans. All Soil Conservation Schemes are being executed by the Agricultural Department, subject to the overall control by the Board of Revenue (Land Revenue) and the Government.

131. Soil conservation work is a season-bound one. It can be carried out only during the agricultural off-season. The main bottle-neck in the execution of the soil conservation works is non-availability of sufficient number of tractors and manual labour. Further, in certain areas there is lack of co-operation on the part of the ryots.

132. Under the First Five-Year Plan as against a target of 72,767 acres about 15,756 acres were covered. The target fixed for the Second Plan period is 62,810 acres. The achievements against this target are indicated below :—

1956-57	...	...	14,818 acres.
1957-58	...	...	16,267 acres.
1958-59	...	...	15,909 acres.

During the year 1959-60 it is proposed to tackle an area of 1,750 acres in the hills and 21,700 acres in the plains or 23,450 acres in all. One of the soil conservation schemes to be implemented this year is intended to check sand dunes spreading on to agricultural lands in the Kodumudi firka in the Coimbatore district and in the Namakkal taluk of the Salem district.

133. At present soil conservation work in this State is being undertaken with bench terracing as the main feature in the hilly regions and contour bunding in the plains. To the extent possible these mechanical methods are also supplemented by biological methods like afforestation, strip cropping, rotational cultivation, etc. But as there is no definite knowledge of the plants suitable for the various regions the Government have sanctioned a scheme for finding out suitable plant materials and species for the various soils and climatic conditions of this State. Under this scheme research on biological and agronomic soil conservation measures will be conducted at two centres, viz., round about the Ketti Valley or the Lovedale Valley in the Nilgiris for the hilly regions and at Bhavanisagar in Coimbatore district for the plains. The Government have also established a Soil Conservation Research Centre in the Rameswaram Islands for studying the problem of raising shelter belts for control of wind erosion.

134. A scheme for giving training to the ryots of the Nilgiris district in simple methods of soil conservation has been in operation since 1st November 1956. Training was imparted to 100 ryots under this scheme during 1958-59 each of whom received a stipend of Rs. 25 for undergoing the four-week course. A similar scheme under which one hundred ryots from each of the two districts of Coimbatore and North Arcot are to receive training is to be implemented during 1959-60.

135. The Madras Land Improvement Schemes (Contour Bunding and Contour Trenching) Act, 1949 (Madras Act XXII of 1949) under which soil conservation schemes are at present executed has been found to be defective and also not adequate for dealing with serious erosion problems in districts like the Nilgiris which have been brought about by indiscriminate cutting of trees and the clean tilling of slopes for potato cultivation. The formalities that have to be followed under the Act before the actual execution of soil conservation measures in the lands are cumbersome and time consuming while speedy action is necessary to check the erosion. Under the Act the responsibility for carrying out the works rests with the Government. It was felt that in

view of the growing magnitude of the work, the ryots themselves should be made responsible for carrying out the works in their lands and that the Government should step in only when the ryots failed to undertake the works. Further, the absence of a penal provision in the existing Act has made it ineffective. The Government have therefore drafted a comprehensive Bill called the Madras Land Improvement Schemes Bill, 1959. This Bill has been introduced in the Legislature and has been referred to a Select Committee consisting of Members of both the Houses of the Legislature.

136. The Bill provides—

(a) for the declaration of any area in the State as a notified area and for regulating, restricting or prohibiting in that area the clearing or breaking up of land for cultivation, the quarrying of stone, the cutting or setting on fire of trees, timber, etc.

(b) for compulsorily carrying out soil conservation works in private lands and for the recovery of the cost of such works wholly or in part from the owners of the lands;

(c) for compulsorily collecting from any person other than the owner of the lands in which soil conservation works are carried out a specified amount in keeping with the benefit likely to be derived by him as a consequence of the works that have been carried out; and

(d) for taking temporary possession for a period not exceeding ten years of any land in the State which has either been lying uncultivated for a period of not less than three consecutive years or which has been lying waste for the same period on account of water-logging, salinity, accumulation of sand, growing of weeds, soil erosion or any other cause for the purpose of reclaiming and settling such land.

Suitable penal provision has also been made in the Bill for punishing persons contravening its provisions after it is enacted.

137. We are confident that as soon as the Bill referred to above is enacted the soil conservation and land reclamation programme in this State will receive a great filip and that there will be appreciable progress in implementing this programme. We reiterate the recommendation which we have already made, namely, that the number of tractors with bulldozers attachments now available for land reclamation work being inadequate, immediate steps should be taken by the Agricultural Department to acquire more such tractors.

(d) LAND UTILISATION.

138. A very important question that has to be examined in the context of making an all out effort for stepping up agricultural production is whether there is proper land use in this State or in other words whether every inch of cultivable land in this State is actually being used for raising a suitable crop.

139. The following table shows the classification of the total land area in this State (as per the Season and Crop Report for 1956-57 which is the latest available):—

Heads of classification.	1952-53.		1953-54.		1954-55.		1955-56.		1956-57.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Total Geographical area—		Area.	Percentage of total.	Area.	Percentage of total.	Area.	Percentage of total.	Area.	Percentage of total.	Area.
By professional survey ..		ACS.		ACS.		ACS.		ACS.		ACS.
By village papers ..		32,012,000	..	32,012,000	..	32,012,000	..	32,012,000	..	32,012,000
Forests ..		31,987,000	..	31,987,000	..	32,022,000	..	32,021,000	..	32,020,484
Barren and uncultivable land ..		4,525,000	14.2	4,534,000	14.2	4,503,000	14.1	4,488,000	14.0	4,419,216
Land put to non-agricultural uses.		2,407,000	7.5	2,381,000	7.4	2,345,000	7.3	2,352,000	7.3	2,446,077
Cultivable waste ..		3,161,000	9.7	3,132,000	9.8	3,199,000	10.0	3,195,000	10.0	3,118,273
Permanent pastures and other grazing lands.		2,340,000	7.3	2,260,000	7.1	2,141,000	6.7	2,116,000	6.6	1,917,143
Land under miscellaneous tree crops and groves not included in net area sown.		962,000	3.0	957,000	3.0	934,000	2.9	933,000	2.9	925,555
Current fallows ..		612,000	1.9	607,000	1.9	590,000	1.8	571,000	1.8	642,896
Other fallow land ..		3,112,000	9.7	2,312,000	7.2	2,393,000	7.5	2,594,000	8.1	2,472,567
Net area sown ..		1,729,000	5.4	1,674,000	5.2	1,545,000	4.8	1,611,000	5.0	1,665,065
Area sown more than once ..		13,199,000	41.3	14,130,000	44.2	14,372,000	44.9	14,171,000	44.3	14,413,692
		2,042,000	6.3	2,763,000	8.6	2,741,000	8.5	2,789,000	8.7	2,731,497
Total cropped area ..		15,241,000	47.6	16,393,000	52.3	17,113,000	53.4	16,960,000	53.0	17,145,189

This table shows that there are still 1,917,143 acres of cultivable waste lands and 1,665,065 acres of "other fallows" (i.e., lands which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years) in this State.

140. The distribution of this large area of cultivable waste and "other fallows" in the various districts is as follows:—

District.	Cultivable waste.		Other fallow lands.	
	ACS.		ACS.	
1 Chingleput ..	..	121,749	..	129,809
2 Madras ..	..	..	..	..
3 South Arcot ..	..	139,512	..	142,188
4 North Arcot ..	..	144,150	..	104,816
5 Salem ..	..	251,689	..	228,917
6 Coimbatore ..	..	97,396	..	173,911
7 Tiruchirappalli ..	..	308,212	..	134,490
8 Tanjore ..	..	115,605	..	93,074
9 Madurai ..	..	96,562	..	170,238
10 Ramanathapuram ..	..	282,960	..	99,739
11 Tirunelveli ..	..	280,026	..	369,805
12 The Nilgiris ..	..	70,882	..	13,895
13 Kanyakumari ..	..	8,400	..	4,183
		<u>1,917,143</u>		<u>1,665,065</u>

141. An investigation of the possibilities of reclamation and development of waste lands was first initiated in the year 1950 and the Government sanctioned a special Agricultural engineering staff headed by an Assistant Agricultural Engineer for carrying out detailed investigation of compact blocks of waste lands in the districts of Nellore, Ramanathapuram, Salem and South Arcot of the former composite Madras State. The special staff listed up lands in compact blocks excluding the areas proposed to be developed as forests, barren hillocks, grazing grounds and areas under Sivoijama occupation and gathered information on various points such as survey numbers of the fields, classification of the lands, extent, nature of soil, available natural sources of irrigation, nature of reclamation required, willingness of parties to take up reclamation (in the case of patta lands), etc., after a field to field inspection. Subsequently in the year 1952 the Government ordered that the regular Revenue staff might be entrusted with the work of survey of the waste lands and to begin with the Collectors were instructed to select one taluk in each district and to gather information in respect of big blocks of lands measuring 50 acres and more on specified points such as nature of reclamation required, fitness for wet or dry cultivation, whether the sub-soil was favourable for digging wells and the measures necessary to

bring the lands under cultivation. This item of work was completed by the beginning of 1954 and similar action to survey blocks of waste lands in all the other taluks of each district was taken up subsequently and this expanded State-wide survey was completed by the middle of 1957. The Government instructed the Collectors that the following course of action should be taken for bringing the compact blocks of waste lands located in their districts in respect of each category of these lands :—

<i>Category of lands.</i>	<i>Course suggested for bringing under cultivation.</i>
(a) Patta lands fit for immediate cultivation requiring neither reclamation nor provision of irrigation facilities.	Enforcement of the provisions of the Madras Land Utilisation Order, 1950.
(b) Patta lands which can be brought under cultivation if loans are granted.	Grant of interest free loans under the Land Improvement Loans Act.
(c) Patta lands lying waste for want of irrigation facilities.	(i) Restoration of registered sources by carrying out necessary repairs to them. (ii) Execution of new irrigation works wherever possible. Concrete proposals to be submitted to Government.
(d) Patta lands lying waste for want of reclamation and irrigation facilities.	Same as for items (b) and (c) above.
(e) Patta lands lying waste requiring only reclamation where the parties are willing to have the reclamation done.	Grant of interest free loans to pay hire charges for the tractors engaged.
(f) Patta lands lying waste for want of reclamation where the parties desire to have the work done by the Government themselves and to pay the charges in easy instalments.	Undertaking of such reclamation work in deserving cases after obtaining the specific orders of the Government.
(g) Compact blocks of Government waste lands.	Outright assignment to landless poor where dry cultivation is possible without much expenditure by way of reclamation. Lands requiring considerable reclamation and provision of irrigation facilities should wait till the improvements could be carried out by the Government.

The Government requested the Board of Revenue to obtain from the Collectors details of blocks of waste lands located by them and the follow-up action required to be taken for each block and to formulate a detailed programme of work to be done in each district. The Board of Revenue was also requested to review the action taken in each district every six months and to furnish to the Government for their information copies of its half-yearly reviews.

142. In the previous paragraph reference has been made to the Madras Land Utilisation Order. This Order was issued in 1950 with the concurrence of the Government of India under the Essential Supplies (Temporary Powers) Act, 1946. It was re-issued as the Madras Land Utilisation Order, 1957, in that year under the Essential Commodities Act, 1955. Under this Order,

Collectors have the power to issue to the holder of any occupied waste or arable land situated within their respective jurisdictions which has not been cultivated during the cultivation season immediately preceding the date of the notice to cultivate it with food crops. In cases of default or where no satisfactory explanation is forthcoming within the prescribed time to show why the land has been kept fallow the Collector can take steps to sell in auction the right to cultivate the land for a period of three faslis. The auction purchaser will be required to cultivate the land with food crops only. The progress made in the implementation of the Madras Land Utilisation Order is being reviewed by the Government periodically. The progress has been very poor so far as the area actually brought under cultivation up to 31st December 1958 as a result of invoking the provisions of this order is only 916 acres.

143. The poor progress is obviously due to the fact that the Collectors and the subordinate Revenue staff to whom the enforcement of this Order has been entrusted have their hands full with ever so many tasks that have been assigned to them of late and are therefore able to devote only limited attention to this work. The feasibility of entrusting the work to a non-Revenue agency was explored sometime ago when the Government examined a suggestion that at least in the Development Blocks, the Block Development Officers with the assistance of the Block staff might be empowered to initiate action under the Madras Land Utilization Order and that District Agricultural Officers and Block Development Officers might collect and maintain the acreage data under "cultivable waste" and "other fallow lands" for each Block and take action to bring these lands under cultivation as per target fixed. The suggestion was not pursued on the ground that this item of work has to be attended to only by the Revenue Divisional Officer even though he may have many more items of work to do as the powers under the Madras Land Utilization Order are of such a nature that they can be exercised only by an officer of the standing of at least a Revenue Divisional Officer.

144. The only remedy that readily suggests itself is the appointment of a Special Officer of the status of a Collector with the requisite subordinate staff to attend to this work solely. This special staff should take up the districts one by one tackling the more promising and more important districts first and concentrating their efforts in one district at a time. In our opinion such a concerted drive is absolutely necessary and should be immediately undertaken. The sense of extreme urgency with which this question is being viewed now can be gauged from a recent news item in which it was stated that the Indian National Congress which adopted at its recent Nagpur Session the report of the Agricultural Production Sub-Committee on Agrarian Reforms had recommended a very drastic remedy as a solution to this problem. This drastic remedy is that a person who lets his land lie fallow

for more than a certain period should lose his right to the land which should lapse to the Village Panchayat without compensation, the only exception to this rule being made in the case of those lands which because of the nature of the soil cannot be cultivated every year.

145. Even bigger and more urgent is the problem of utilising those lands which though cultivable have never been brought under cultivation so far. This problem is being tackled only piecemeal here and there. Elsewhere in this report (Chapter XI) we have referred to the steps that are proposed to be taken to reclaim the Kazhuveli swamp in the South Arcot district and bring it under cultivation. Similarly the question of profitable utilisation of large blocks of lands in Ramanaickenpalayam and adjoining villages in the Attur taluk of the Salem district has been engaging the attention of the Government for sometime past. Out of a total extent of about 52,000 acres of land that were said to be available in this taluk about 33,000 acres were assigned for individual cultivation to 10,226 ryots in 87 villages in six firkas. The bulk of the lands so assigned has not been brought under cultivation so far and the main reasons for this are understood to be—

(a) the comparative poverty of the soil which requires considerable reclamation by way of forming bunds, levelling, etc.;

(b) undependability of the monsoons in this area and lack of irrigation facilities;

(c) lack of resources at the command of the assignees and want of credit facilities; and

(d) assignment of the lands in many cases to non-residents. We understand that the question of taking necessary steps to ensure that all the lands referred to in the previous paragraph are brought under cultivation quickly is under the active and earnest consideration of the Government and we have no doubt that the stalemate will be resolved very soon.

146.. The reclamation of waste lands the soil of which is saline or alkaline poses a problem which is difficult to solve. The Director of Agriculture has reported that a survey of saline and alkaline lands in this State has not been made so far in any systematic manner but practically every district in the State has some patches which are either alkaline or saline or both. The want of sufficient quantities of sweet water is a handicap in reclaiming saline or alkaline lands as adequate quantities of sweet water are necessary to leech out the salt in the soil. We understand from the Director of Agriculture that it has not been possible to come across any alkaline or saline area in the State so far where the tubewell waters are sweet. However, experiments for the reclamation of alkaline lands at Mettumarudur in the Kattalai High Level Channel area were conducted by the Agricultural Department during the years 1938-40.

Application of sulphur and gypsum accompanied by flooding and drainage were the treatments tried in this area the soil of which is the worst type of alkali on which no vegetation grew. Application of gypsum at 10 tons per acre was found to be the speediest and most economical method. But while gypsum was then available at Rs. 7 per ton its cost has now shot up to Rs. 35 to Rs. 40 per ton. In the last two years under an Indian Council of Agricultural Research Scheme experiments are in progress at one centre in each of the districts of Ramanathapuram, Madurai and Tirunelveli to demonstrate to the ryots the possibility of reclamation of alkaline lands using gypsum and molasses. The Madras Land Improvement Schemes Bill, which is now under consideration by the Madras Legislature will, when enacted render the speedy reclamation of all the cultivable waste lands in the State possible.

(e) DEVELOPMENT OF TEMPLE AND MUTT LANDS.

147. Special attention should be devoted to the development of the lands belonging to the Hindu Religious and Charitable Institutions in this State. Complaints have been received by the Committee to the effect that large blocks of these lands are lying undeveloped and fallow particularly in the Ramanathapuram and Tanjore districts and that even those lands which are under cultivation have not been put to the best possible use. There are possibly some notable exceptions here and there like, for example, a block of lands belonging to the Tiruppugalur Agneeswaraswami Devasthanam at Porakkudi in the Tanjore district. The non-official Members of the Committee who inspected this block of 25 acres of waste virgin lands were impressed with the way in which it had been reclaimed and planted mostly with casuarina (one and a half lakhs saplings) and coconut (2,000 seedlings). The cost of reclaiming these 25 acres is stated to be Rs. 15,000 while the revenue expected is estimated by the Devasthanam authorities at rupees three lakhs from casuarina alone even assuming that only two-thirds of the casuarina saplings planted survive. Only 25 acres out of an available extent of 400 acres have been reclaimed so far. It is understood that there is an estimated extent of one lakh acres of lands belonging to Hindu Religious and Charitable Institutions which still remain to be developed in the Tanjore district alone.

148. We learn from the Director of Agriculture that he has obtained from the Commissioner for Hindu Religious and Charitable Endowments a list of blocks of lands which are 100 acres and over in extent belonging to Hindu Religious and Charitable Institutions and that he has communicated this list to the District Agricultural Officers concerned with instructions to inspect those lands and give suggestions for their permanent improvement. We consider that this is not enough as no appreciable progress can be expected if the matter is left entirely to the District Agricultural Officers concerned. We therefore recommend that the Government should take up with the Commissioner for Hindu Religious and Charitable Endowments the question of appointing two two-man

teams each consisting of an officer drawn from the Agricultural Department and another officer drawn from the Public Works (Irrigation) Department. These officers should be full-time officers and the two teams should be asked to make a survey of the lands belonging to the Hindu Religious and Charitable Institutions in the State and draw up schemes within a specified time-limit for putting them to the best possible use from the point of view of agricultural production. Both the teams should work under the Commissioner, Hindu Religious and Charitable Endowments.

149. The lands belonging to the Hindu Religious and Charitable Institutions are now being leased out to the highest bidder in an auction which is held by each institution in respect of its lands every year. The auction lessees are unnecessary intermediaries between the Hindu Religious and Charitable Institutions and the tenants cultivating their lands and we therefore recommend that they should be eliminated.

150. No permanent improvements are now being made to the lands of the Hindu Religious and Charitable Institutions as neither they nor the auction lessees nor the cultivating tenants have now any interest or incentive to effect such improvements. Some arrangement should therefore be evolved under which it can be ensured that the fertility of the lands and the level of their production are increased. As individual cultivating tenants will not be in a position to command the necessary resources to effect permanent improvements to the lands we consider that co-operative tenant farming societies should be formed wherever there are large compact contiguous blocks of land belonging to Hindu Religious and Charitable Institutions rendering the formation of such societies a practical proposition.

CHAPTER IX.

SEED MULTIPLICATION AND DISTRIBUTION.

(a) PRIMARY STAGE.

151. The State Department of Agriculture has by intensive selection and breeding evolved a number of high yielding strains of paddy and millets suited to the varying conditions of cultivation obtaining in the State. These improved strains are subjected to careful trial for a number of seasons under cultivators' conditions and after obtaining their considered views in respect of yield and quality performance, they are released for large-scale multiplication and distribution. The multiplication of these improved strains and the distribution of pure seeds to the cultivators is one of the main functions of the Agriculture Department from its very inception.

152. Prior to the introduction in 1956-57 of the scheme of running State Seed Farms the nucleus seeds produced in the Research Stations were being sent to the Agricultural Demonstrators and Agricultural Extension Officers in the districts for being

multiplied in primary seed farms. With a view to cover the entire area by improved seeds under each crop within a period of three years, the area under primary seed farms for each crop was fixed for each district well in advance and a definite programme of work was drawn up. The primary seed farms were run in holdings of select ryots and each operation connected with the growing of the crop was personally supervised by the Agricultural Demonstrator or the Agricultural Extension Officer concerned. A formal agreement called the seed farm indenture was entered into with the party, whereby the party agreed to attend to the crop personally, remove it (i.e., eliminate other varieties in the field), allow the departmental officials to supervise it, and finally to give a definite quantity of the harvest produced to the department for further multiplication. This quantity was fixed at six bags of 160 lb. each per acre in the case of paddy, two bags per acre in the case of irrigated millets and one bag in the case of rainfed millets. In order to compensate for the extra attention that the ryot paid to this crop and the special drying he undertook before delivery of the seeds, he was paid a premium equal to 12½ per cent per millets and samba paddy seeds and 15 per cent for Kuruvai paddy seeds. The seed was procured at the local market rate plus the premium. These primary seeds were stored in the depots of the Agricultural Demonstrators and Agricultural Extension Officers and distributed in the next season, to the village seed farms.

153. Experience had shown that this system suffered from some serious inherent defects. Firstly, the primary seed farm was owned by the farmer and he was responsible for the cultivation, weeding, plant protection and all other agricultural operations, with the result that the crops grown were not always the best possible. The supervision of the Agricultural Demonstrator was occasional and as agricultural operations in the area took place almost simultaneously, he was not in a position to supervise the operations at the crucial times. The result was a considerable deterioration in the quality of the seed even at this stage. Secondly, the purchase and issue of the seed required a considerable amount of accounting and generally speaking the average Agricultural Demonstrator has been found to be not an expert in accounts. This resulted in a number of disciplinary proceedings in the department and, as a result, there was a noticeable hesitation on the part of these officers in undertaking procurement of seed in adequate quantities.

154. In order to overcome these difficulties the Government decided to run the primary seed farms themselves and produce under the direct personal supervision of the qualified technical staff of the Agricultural Department primary seeds of the requisite quality. This is the genesis of the scheme of running State Seed Farms the aim of which is to open farms of 25 acres each at the rate of one farm for every Development Block for producing the primary seeds needed by the Block in respect of all the principal crops grown

in it such as paddy, millets, sugarcane, cotton, groundnut and vegetables. However, for the sake of convenience and economy in administration it has been decided by the Government to have twin farms of 50 acres each as far as possible. Each farm is provided with the necessary godown facilities.

155. The scheme is eligible for financial assistance from the Government of India on the pattern indicated below :—

(1) Cost of land at Rs. 500 per acre	} 75 per cent subsidy and 25 per cent loan.
(2) Cost of seed stores at Rs. 10,000 per store.	
(3) Cost of irrigation facilities at Rs. 10,000 per farm.	
	100 per cent loan.

A change has since been made in this pattern of Central financial assistance by increasing the provision for cost of land from Rs. 500 per acre to Rs. 1,500 per acre.

156. Every State Seed Farm—whether a single farm or a twin farm—has now one Manager in the grade of an Agricultural Upper Subordinate (Agricultural Demonstrator) assisted by one Lower Division Clerk. If there is any 75 to 100 acre farm the Government have permitted the employment of two Farm Managers. (There are now three such farms.) The Government have also sanctioned one maistry and one watchman for every farm of 25 acres.

157. Under the scheme it was originally intended to set up 400 State Seed Farms during the Second Plan period. But consequent on the reorganization of States, the target for the present Madras State was fixed in 1956 at 360 to be started according to the following phased programme :—

1956-57	...	...	44
1957-58	...	...	136
1958-59	...	...	180
Total	...		360

Out of the target of 44 farms for 1956-57 only 38 were actually opened and out of this number eleven had to be closed as they proved to be unsuitable. During the year 1957-58 one hundred and twenty-seven farms were opened. Thus at the beginning of the year 1958-59 there were 154 farms. During that year 42 uneconomic farms were closed and nine new farms were started. Thus at present there are 119 State Seed Farms. Of them 45 are twin farms of 50 acres each or in some cases even bigger. The remaining are single farms of 25 acres each. The Government have decided that

75 new State Seed Farms should be opened in 1959-60 and that the existing State Seed Farms should be placed on a firm footing before the new farms are started.

158. In order to expedite the opening of State Seed Farms special legislation was enacted. The Madras Requisitioning and Acquisition of Immovable Property Act of 1956 empowers the Government to compulsorily take lands on lease, the rent being fixed on a reasonable basis and also to acquire later such requisitioned property. The Government have empowered the Collectors to exercise in their jurisdiction the powers of requisitioning and acquisition under the Act. This special legislation came into force in 1957. To expedite the opening of State Seed Farms, lands were taken on lease with the consent of the owners through negotiation. Such lands taken on lease through negotiation cannot be acquired under the Act unless they are first requisitioned. The Government have therefore since ordered that requisition of lands under the Act should be resorted to in the first instance itself instead of taking the lands on lease under a privately negotiated agreement. Only thirty of the existing State Seed Farms are located on acquired lands. Six are located on Government lands and all the remaining State Seed Farms are located only on leased lands. The Government have decided that there should be no further acquisition of lands for locating the State Seed Farms and the suitable surplus lands which would become available consequent on the enforcement of the proposed ceiling on land holdings should be utilized for locating State Seed Farms.

159. The following statement shows the quantities of improved seeds estimated to be produced in all the State Seed Farms during the year 1958-59 and the quantities actually harvested or expected to be harvested :—

	Expected production. TONS.	Actual production up to 31st December 1958, TONS.
Paddy	1,325	977
Millets	250	70
Cotton	59	10
Groundnut	90½	54
Other seeds	199	5

160. The experience of the Government so far in running the State Seed Farms has not been quite happy. An assessment made sometime ago by the Agricultural Department in respect of 46 farms covering 1,154 acres which had worked for one complete year revealed that while the gross expenditure was Rs. 6.80 lakhs the gross receipts amounted to Rs. 5.11 lakhs resulting in a net loss of Rs. 1.78 lakhs.

This assessment also revealed that the working expenses and the loss incurred in running one acre of State Seed Farm during one year were as follows :—

	RS.
(1) Average lease amount per acre	233.00
(2) Cost of cultivation per acre	277.70
(3) Cost of supervision	86.40
(4) Gross expenditure per acre including lease amount, i.e., 1+2+3	597.10
(5) Receipts per acre	442.60
(6) Net loss per acre	154.50

The average lease amount of Rs. 233.00 per acre forms 52.5 per cent of the gross receipts while a fair rent should be 40 per cent of the gross receipts and therefore the lease amount should be considered to be on the high side.

161. The loss in running the State Seed Farms was attributed by the Agricultural Department to—

(a) *Lack of experience on the part of Farm Managers.*—The Agricultural Demonstrators (and in some cases even fieldmen) who were posted as Farm Managers had little experience of running farms and they had yet to acquire it.

(b) *Unsettled conditions during the first year of the farm.*—In the first year the planning of the farm was defective and agricultural operations were not undertaken in the very best possible season. This was because the Farm Managers were new to the locality and in some cases they had difficulty in securing labour and ploughs.

(c) *Unfavourable seasonal conditions.*—Although unfavourable seasonal conditions will be a permanent factor in farming, there were some unusual losses caused due to heavy rains, particularly in the large Bhavani Farm.

(d) *Heavy lease amount.*—Loss can be definitely avoided only if a farm is located on acquired lands.

(e) *Unprofitable cropping pattern.*—Seeds were grown according to the demands of the ryots and in some farms millets were grown in large quantities on this account. If cotton had been grown on the lands, the profit would have been much higher but it would not have been possible to meet the demand for millet seeds.

162. The Government have taken the following steps to reduce the losses in future :—

(i) An additional post of Joint Director of Agriculture has been created for attending solely to the work relating to Seed Farms. He and the other newly created Joint Director of Agriculture (Extension) have undertaken a thorough inspection of the Seed Farms and have drawn up a profitable cropping pattern for each

(ii) the leased lands on which uneconomic farms which worked at heavy losses due to poor yield have been returned to the owners; and

(iii) when farms require pumpsets departmental pump-sets have been transferred to the Farm account instead of the farm hiring the pumps and incurring heavy hire charges.

163. With a view to associate progressive farmers with the working of the State Seed Farms, the Government have issued orders for the constitution of an Advisory Committee for each State Seed Farm with the Revenue Divisional Officer of the Revenue Division in which the Farm is situated as the Chairman, the Farm Manager as the Secretary and three experienced farmers as members. The non-official members of the Advisory Committee who have been designated as Farm Visitors and who should be progressive farmers, preferably members of the Farmers' Forum and residents of the village in which the Farm is located or any of the neighbouring villages having time to spare for this honorary work will be appointed by the Collector concerned in consultation with the District Agricultural Officer concerned. The Farm Visitors should visit the Farm at least once a month during the cultivation season and record their observations in the Farm Visitors' Book maintained by the Farm Manager. The Advisory Committee should meet once in three months in the Farm premises and review the action taken on the observations made by the Farm Visitors. The Farm Visitors may examine the cropping pattern of the Farm and make suggestions in regard to it.

164. Time and again a suggestion has been made that the production of the primary seeds might be entrusted to farmers, and that the State need not undertake this responsibility. We have considered this suggestion, but are firmly of the opinion that the work of seed multiplication at the primary stage in the State Seed Farms should be undertaken by the Government themselves even though they may incur some loss on this account, as it is of paramount importance to ensure the quality of the primary seeds released for further multiplication in the secondary stage. At the same time we trust that with the elimination of the uneconomic State Seed Farms and with the constitution of Advisory Committees for the Farms, the working of the State Seed Farms will show good results hereafter. The position should be continuously reviewed and necessary measures for the effective functioning of the Farms taken.

165. Every step should be taken to keep down the total outlay on the State Seed Farms to the minimum. One suggestion that has been made is that assessed waste lands and porombokes which are satisfactory and suitable from the point of view of assured irrigation, fertility of the soil, etc., may be used for locating State Seed Farms wherever such lands are available. These lands may be dry lands, Government or privately owned, grown with rainfed dry crops situated on the off-side of irrigation canals where water

is not usually allowed. After such lands are selected the Government should allow irrigation water to these lands from the irrigation canals as a special case in the interests of seed multiplication. An assiduous search for locating such lands should be made immediately. Every effort should be made to locate the new State Seed Farms that may have to be started mainly on such lands.

166. Most of the existing State Seed Farms are as already stated about 50 acres each in extent and the remaining Farms are about 25 acres each in extent. In order to reduce the number of the Farms and thereby ensure the more effective and closer supervision of the Farms and with a view to effect savings in the overhead charges, all the existing State Seed Farms should be expanded into 75 to 100-acre Farms, which should be managed by the same scale of staff as has now been sanctioned for a 50-acre Farm. All State Seed Farms that may be started in future should be only 75 to 100-acre Farms.

167. In order to improve the efficiency of the State Seed Farms and with a view to induce capable hands to stick on to the jobs of Farm Managers and take an active interest in their work, it is absolutely necessary to give a bonus to each Farm Manager which should have a relation to the profit earned by the Farm during the period of his stewardship. A detailed scheme in this regard should be drawn up by the Director of Agriculture. The scheme should provide for the grant of bonus not only to the Farm Managers but also to the other staff of the State Seed Farms as the successful running of the State Seed Farms is a co-operative endeavour in which all members of the staff should take an enthusiastic part.

(b) SECONDARY STAGE.

168. The further multiplication in the secondary stage of the primary seeds produced in the State Seed Farms has necessarily to be the responsibility of the agriculturists for the simple reason that if the Government themselves were to undertake it, they would have to acquire about 5 per cent of the total cultivated area in the State which is obviously impossible. So the secondary stage multiplication is done in Village Seed Farms which are run by selected ryots on their own lands.

169. Under the Village Seed Farm Scheme the area under each crop in each village is calculated and a programme is drawn up to cover the entire area with improved strains within a period of three years. For the first year the Village Seed Farms are organised to cover a third of the area. If the area under paddy in a village is 1,500 acres, the programme is to cover 500 acres with improved seeds in the first year. With a normal seed rate the produce from one acre of paddy can cover 50 acres and the area to be arranged under Village Seed Farms will be 10 acres for that village. The area for the other crops is also fixed village-wise for all the districts. The primary seeds from the State Seed Farms are distributed to select ryots in each village to make up for the targetted area of the

Village Seed Farms. It is expected that at least one-fourth ton per acre of the produce of the Village Seed Farms will be distributed by the Village Seed Farm ryots to their brother ryots either on cash sale basis or on exchange basis.

170. As the Village Seed Farm ryots have to arrange for the drying of the seeds before they are distributed to other ryots they are given a subsidy of 25 naye Paise per bag of 160 lb. for meeting incidental charges. They are also given in addition 12 naye Paise per bag of 160 lb. towards sealing charges as the seeds are to be kept in specially sealed bags to guarantee their quality. The entire cost of this subsidy is borne by the State Government. The need for the continuance of this subsidy has been examined by us. The non-official members of the Committee discussed this question with agriculturists and the Officers of the Agricultural Department in the course of their tours. Though at one place (in the Coimbatore district) they were informed that the Village Seed Farm ryots did not require much inducement for exchanging the seeds multiplied by them for the produce of their brother ryots and that they were doing this more as a matter of personal prestige than as a purely business proposition the general consensus of opinion among those with whom the non-official members discussed this question was that the subsidy is very necessary. In fact we have received representations from some quarters that the existing rates of subsidy are inadequate and should be increased. After giving careful thought to the matter we have come to the conclusion that the subsidy should be continued but that there is no case for enhancing it at present.

171. The State Seed Farm Scheme and the Village Seed Farm Scheme are interdependent schemes which are complementary to each other. If the entire quantity of the seeds produced in the State Seed Farms is to be fully utilized solely for further multiplication as is the intention there should be enough number of Village Seed Farms to take in the entire output of the State Seed Farms. According to the figures available the number of village seed farms under both paddy and millets is 28,730. We have been assured by the Officers of the Agricultural Department that the entire quantity of primary seeds produced in the State Seed Farms is being transferred to Village Seed Farms and multiplied by the latter. Our enquiries go to show that there is no reason to doubt this assurance. However we have reason to fear that the supply of quality seeds by the Village Seed Farm ryots to their brother ryots may not be up to expectations. As we have already stated the expectation is that that one-fourth ton per acre of Village Seed Farm area will be so supplied. We consider that greater vigilance than is now in evidence is necessary on the part of the field staff of the Agricultural Department and the Block staff in order to ensure that the expected quantity of Village Seed Farm seeds is actually supplied by the Village Seed Farm ryots to their brother ryots.

The achievement against this target has been poor. During the year 1956-57 only 275 tons of village seed farm seeds were distributed covering an area of 40,100 acres. During the year 1957-58, 1,169 tons of village seed farm seeds were distributed covering an area of 197,400 acres. It is estimated that during the year 1958-59, 1,800 tons of village seed farm seeds to cover an area of 270,000 acres would have been distributed. It is hoped that at least during the remaining two years of the Second Plan period an annual spread of about 4 lakhs acres can be effected. If this hope fructifies the area under millets would have been brought up from 25 per cent to about 50 per cent by the end of the Second Plan period. The annual targetted village seed farm coverage given above is 75,000 acres. On the basis that one ton of seeds will cover 150 acres the primary seeds required to cover this area of 75,000 acres of village seed farm area is 500 tons. At the rate of an yield of one-third ton per acre, the State Seed Farm acreage to raise this quantity of 500 tons of primary millet seeds will be 1,500 acres.

177. *Sugarcane*.—As regards sugarcane 95 per cent of the area under the crop is estimated to have been brought under the spread of improved strains by the end of the First Plan period. The entire area would have been covered by now and what remains to be done is only the replacement of the strains in each area every five years in order to maintain the quality of the planting material. The required number of sugarcane setts for effecting such replacement are now being produced and distributed under the Sugarcane Development Scheme. This arrangement may be continued and no separate State Seed Farm acreage is necessary for sugarcane. If and when necessary some area from out of the paddy State Seed Farm acreage may be utilized for raising sugarcane setts.

Nucleus seeds of sugarcane should be arranged to be raised in selected quarantine centres as the introduction of sugarcane seed material raised in a different climatic and soil type and in an area which is ideally a quarantine centre is good in keeping the variety healthy and high yielding for a longer period. The popular varieties like Co. 419, Co. 449 and Co. 527 may be raised in the first instance. Nucleus seeds should be supplied in the first instance to the factory farms or to prominent cultivators free of transport cost and at subsidized price levels to serve as primary seed centres. The primary seed centres should multiply and spread the seed material. The Agricultural Department should draw up a detailed scheme for this purpose and implement it after obtaining the approval of the Government.

178. *Cotton*.—At the beginning of the Second Plan period it was estimated that 60 per cent of the total area under cotton had been covered by improved strains. From the progress so far made

under the various development schemes relating to cotton and taking into account the normal pace of natural spread through private agencies, it is expected that 75 per cent of the area under cotton can be brought under improved strains by the end of the Second Plan period.

Seed multiplication for irrigated cotton is being done in four stages. The first stage is called the "Seed Nucleus Plot" which is located at the Cotton Breeding Stations. Stage II is called the "Proved Farm Bulk". Multiplication at this stage is usually carried on at the Agricultural Research Stations. Stages I and II of multiplication are under the supervision of the Cotton Specialist, Coimbatore. Stage III of multiplication is otherwise known as "Inner Area". The crop under this stage is raised on State Seed Farms and also in the holdings of selected ryots. The fourth and final stage of multiplication is called the "Outer Seed Farm" area. Seeds obtained from this area are distributed to the ryots. Stages III and IV of multiplication are done under the supervision of the Assistant Cotton Specialists.

As regards dry cotton there is also a fifth stage. Stages I to III are common both for irrigated and dry cotton the only difference being that while in the case of irrigated cotton the final stage of multiplication is the IV Stage there is one more stage of multiplication after this for dry cotton. As in the case of irrigated cotton, in the case of dry cotton also Stages I and II are under the supervision of the Cotton Specialist and the remaining stages are under the supervision of the Assistant Cotton Specialists.

179. At present, though quality cotton seed material is produced every year to cover an area of 175,000 acres, the coverage of new area out of this is only about 20,000 to 30,000 acres as the bulk of the quality seed material goes to replace the old seed material. This progress should be considered to be poor. Efforts should be made to cover at least 90,000 acres of new area every year. Even at this rate it will be possible to cover the entire area under cotton in this State only by the year 1965-66. In order to ensure this rate of progress the annual coverage under the village or secondary seed farm stage should be 12,500 acres in the case of irrigated cotton and 7,500 acres in the case of dry cotton. In the case of irrigated cotton this will represent the fourth stage of multiplication. The proposed area of 12,500 acres of irrigated cotton in the fourth stage will cover fifteen times that area, viz., 187,500 acres of ryots' holdings. In the case of dry cotton also the proposed area of 7,500 acres represents the fourth stage of multiplication. This will cover five times the area or 37,500 acres in the fifth stage of multiplication. This area of

37,500 acres will, after multiplication in the fifth stage, cover five times its extent or 187,500 acres of ryots' holdings. On the basis of a seed rate of 100 acres per ton in the case of irrigated cotton and 150 acres per ton in the case of dry cotton, the primary seeds required to cover the fourth stage of multiplication acreage indicated above works out to 125 tons in the case of irrigated cotton and 50 tons in the case of dry cotton. The State Seed Farm acreage required in either case is 1,000 acres on the basis of an average yield of $1/8$ ton per acre in the case of irrigated cotton and $1/20$ ton per acre in the case of dry cotton.

180. Wherever possible the multiplication and distribution of seeds of improved strains of cotton are arranged through the agency of co-operatives. For example, the Srivilliputtur Uganda Cotton Growers' Co-operative Marketing Society is undertaking the multiplication of quality seeds of MCU. 2 cotton after the primary stage and their procurement and distribution to its members under the technical guidance and supervision of the Agricultural Department. The question of starting similar societies at Sattur and Koilpatti for the multiplication and distribution of Karunganni cotton seeds was considered and it has been deferred in view of the proposal to replace the present K. 2 strain by a new strain called K. 6 till sufficient quantities of K. 6 seeds are built up.

181. In the Tiruppur area of the Coimbatore district, the entire quantity of cotton seeds multiplied in the fourth and fifth stages is obtained through the Tiruppur Cotton Seed Farm Growers' Association, while in the Coimbatore area the Agricultural Department is obtaining its requirements of cotton seeds for distribution to ryots through nominated merchants. As the former arrangement is definitely superior to the latter arrangement, the Agricultural Department should either introduce the Tiruppur system in the Coimbatore area also or in case it is not possible to do so, try to increase the quantity obtained from the Tiruppur Cotton Seed Farm Growers' Association and correspondingly reduce the quantity obtained from nominated merchants until a stage is reached when purchase from private individual merchants is entirely eliminated.

182. *Oil seeds.*—In the case of groundnut, the Agricultural Research Station, Tindivanam, is the main breeding station where nucleus seeds of groundnut are produced. The nucleus seeds are supplied to the Agricultural Research Stations and Zonal Nucleus Seed Farms in the State for further multiplication. As the rate of multiplication of groundnut is low, viz., four to six times only,

four Zonal Nucleus Seed Farms are being run at Chittalandur, Srivilliputtur, Pollachi and Tindivanam. The nucleus seeds produced at the Zonal Nucleus Seed Farms and at the Agricultural Research Stations are distributed to those State Seed Farms where adequate facilities are available for multiplication of groundnut seeds and also to selected ryots whose holdings are located in favourable localities and can therefore be treated as primary seed farms. The primary seeds produced in the State Seed Farms and in the primary seed farms run by selected ryots are further distributed to selected ryots for multiplication in the secondary stage. The seeds multiplied in the secondary stage are purchased by the Agricultural Department and sold to ryots. We consider that in view of the high seed rate in the case of groundnut there should be a tertiary stage of multiplication. Multiplication at the secondary and tertiary stages should be attended to as far as possible by co-operatives which should be specially set up for the purpose. The Government should continue to undertake the supply of primary seeds of the required quality for multiplication in the secondary stage. In addition they should buy the secondary stage seeds of the required quality from the co-operatives and selected secondary seed farm ryots and sell them for multiplication in the tertiary stage to co-operatives and ryots selected for the purpose.

183. The Government should make arrangements for the supply of seed material to cover 1.25 lakhs acres every year. Even at this rate the entire area under groundnut in this State can be covered only by the year 1970-71. In view of the high seed rate, it will be obviously impossible for the Government to produce all the primary seeds required for the purpose themselves in the State Seed Farms. However, at least a quantity of 500 tons of primary groundnut seeds per year should be produced by the Government in their State Seed Farms, the remaining quantity of primary seeds being left to be produced by selected ryots whose holdings are located in favourable localities as hitherto. For producing these 500 tons of primary groundnut seeds, a State Seed Farm area of 2,000 acres will be required on the basis of an average yield of $\frac{1}{4}$ ton of pods per acre.

184. It would be better if a procedure which should be adopted for ensuring the quality of groundnut seeds supplied to ryots for sowing is prescribed. The seed material which has undergone a process of thorough drying and cleaning and which has a high percentage of germination (about 85 per cent) may be bagged in standard gunnies to standard weight (80 lb. net) and sealed. Such seed material may be made available to growers, say, at not more than 10 per cent of the cost of local seeds. Even though the growers may be prepared to pay an enhanced price for seeds

of guaranteed quality still in order to make them popular they should not be priced at more than 10 per cent of the local market rate. Since it may not be possible to aim at a uniform quality at all centres and under all conditions the procedure of sealing cannot be adopted in all cases. But where co-operatives or selected seed farm ryots come forward to produce the seed material of groundnuts of the quality prescribed by the Agricultural Department they should be encouraged by payment of handsome subsidy even up to 25 per cent of the cost of local seeds under the scheme for sealing bags. The subsidy should be shared equally by the Central and State Governments.

185. In the case of gingelly and castor, seed material to cover 40,000 acres and 500 acres respectively should be multiplied and distributed. No separate State Seed Farms will be necessary for producing the requisite quantity of primary seeds for these two crops as they can be raised either as mixed or off-season crops in the State Seed Farms intended for the production of primary seeds of paddy and groundnuts.

186. We have examined the question whether the quality seed material of castor and gingelly made available to growers should be sealed. As the castor seed has a hard coat which provides a good protective covering as a result of which the castor seeds can be expected under normal conditions to maintain proper viability for two years and in view also of the fact that the rate of multiplication is comparatively high, no special steps need be taken for maintaining the quality in the case of castor seeds. As regards gingelly which is a commodity which deteriorates rapidly in storage and in the case of which damage and deterioration due to insect pests may be heavy even under ideal conditions of storage bagging of seeds and sealing the bag will not be a practical proposition. However, the Agricultural Department should itself use and also advise the growers to use alkathene bags or alkathene-lined bags for bagging gingelly seed material.

187. One of the questions specifically referred to us by the Government is what should be the total number of State Seed Farms that should be set up for meeting the quality seed requirements of various crops in this State. In other words the question is whether all the 360 State Seed Farms which have been fixed as the target for this State under the Second Five-Year Plan are necessary and need be started. We have examined in the previous paragraphs the State Seed Farm acreage required for each crop in the existing circumstances and have made our suggestions. On the basis of these suggestions the State Seed Farm acreage

required for each crop and the number of units of State Seed Farms of 25 acres each which they work out to are indicated in the statement below:—

<i>Nature of the state seed farm area.</i>	<i>Extent of the State Seed Farm area.</i>	<i>Gross area cropped.</i>	<i>Name of the crop.</i>	<i>Number of units of State Seed Farm (unit is a 25 acre farm).</i>
(1)	(2)	(3)	(4)	(5)
	ACRES.	ACRES.		
Wet lands— Two crops paddy	1,250	2,500	Paddy	
Wet lands— Paddy in the main season followed by millets in the second season.	500	{ 500 500	Paddy } Millets }	20
Garden land— Cotton main crop followed by groundnut or millets as a second crop.	1,000	{ 1,000 500 500	Cotton } Groundnut } Millets }	40
Dry land— One crop of cotton only ..	1,000	1,000	Cotton	40
Dry land— Groundnut in the main season followed by millets in the second season wherever conditions are favourable. It is taken that such double cropping could be feasible only in respect of 1/3 of the area under groundnut.	1,500	{ 1,500 500	Groundnut } Millets }	60
Total ..	8,500	3,000 1,500 2,000 2,000	Paddy Millets Cotton Groundnut	210

It will be observed from the above statement that it will suffice if there are 70 State Seed Farms of 25 acres each for paddy and millets and 140 State Seed Farms of 25 acres each for cotton, groundnut and millets or 210 State Seed Farms of 25 acres each in all.

CHAPTER X.

MANURES.

(a) REQUIREMENTS.

188. Of the various elements required for plant growth nitrogen, phosphorous and potassium are the most important. These major plant nutrients are used in such large amounts in the process of plant growth that in many soils the available quantities

get easily depleted and their replenishment in the form of manures or fertilisers is absolutely essential if soil fertility and crop yields are to be maintained at a high level year after year.

189. Soil surveys and field experiments conducted in this State have amply demonstrated that the main deficiency in our soil is nitrogen. The first step to be taken in re-building the soil over wide areas of the State is therefore the restoration of nitrogen to the soil and that is why a very important place has to be assigned to the application of nitrogenous fertilisers in any scheme of stepping up agricultural production.

190. The extensive use of nitrogenous chemical fertilisers has become popular in our country only during recent years. The attractive prices which the primary agricultural products fetched in those years gave an impetus to the increased use of chemical fertilisers particularly ammonium sulphate. It is well known that the use of this fertiliser is a sure and quick means of stepping up the yield from the land. It is estimated that the application of one ton of ammonium sulphate at the rate of about 150 lb. per acre gives an additional production of 2 tons of rice.

191. Plenty of nitrogen is available in heavy organic manures such as green manure, farmyard manure, town refuse, compost and compost made from vegetable and village wastes. The value of organic manures lies in that they supply not only nitrogen but also other elements including trace elements and hormones and the very essential complex compound called "humus" which is vital for preserving the fertility of the soil. This reason by itself justifies the utmost attention being devoted to increasing the organic manurial resources of the State apart from the compelling necessity for doing so which has now arisen in view of the shortage of chemical fertilisers. Oilcakes are another source of nitrogen but as most of them are valuable as cattle food their use as manure should be avoided if substitutes could be obtained.

192. To a lesser extent the soils in our State require enrichment by the application of phosphorous and potassium. Phosphorous not only helps to keep the soil fertile but also prevents soil erosion by fostering the growth of a good plant coverage. As regards potassium it had hitherto been considered that our soils are well supplied with this plant food and that there was no need to worry about its deficiency. Recent experiments with rice and other crops have however shown the necessity for the application of potassic fertilisers along with nitrogenous and phosphatic manures in judicious proportions for achieving best yields. Though potassium is present in most of our soils in comparatively larger amounts than nitrogen or phosphorous it may not be readily assimilable by the crops. Its application in the form of potassium sulphate or chloride which can be easily utilised is therefore deemed

necessary by experts. It is said that the addition of potassic manures to soils in the Tanjore district has been found by progressive ryots to be beneficial to the rice crop by minimising lodging and incidence of disease. In the case of tuber crops like potato and commercial crops like tobacco, coconuts, chillies and sugarcane the application of potassic fertilisers in adequate doses in suitable forms is indispensable for obtaining increased yields.

193. A note containing the manurial schedules recommended for the more important crops which was presented by the Agricultural Department before the All-India Seminar on Development of Local Manurial Resources which was held at Madras in January last is appended (Appendix VI). On the basis of the recommendations contained in it the total requirements per annum of chemical fertilisers of all the irrigated and unirrigated crops in the State is estimated by the State Compost Development Officer as follows :—

	TONS.
Ammonium sulphate	560,000
Super-phosphate	460,000
Potassium sulphate	440,000

These estimates are based on the assumption that more extensive use of chemical fertilisers will be made in the future than is the case at present. This assumption is not unwarranted considering the fact that, apart from the expected increase in the application of chemical fertilisers in the existing area which is bound to materialise as soon as the supply position becomes easier, there has been a progressive increase in the net area sown in this State which has risen from 13.20 million acres in 1952-53 to 14.41 million acres in 1956-57.

194. As regards organic manures the annual requirements are assessed by Sri A. R. Venkatachari at 10 tons per acre in the case of irrigated crops and at 2 tons per acre in the case of rainfed crops. On the other hand the State Compost Development Officer considers that the annual requirements are 10 tons per acre for commercial crops and 5 tons per acre for other crops in the case of both irrigated and rainfed crops. In his view a dosage of 10 tons per acre of organic manures may not be necessary for paddy, millets and other irrigated cereals as it has been found by experience that five tons of organic manure in the form of compost, farmyard manure or green manure is the optimum for cereal crops. He is also of the opinion that a dosage of two tons per acre for our rainfed lands is rather low as at least five tons of farmyard manure or compost are needed for the maintenance of the fertility of these lands.

195. On the basis of the figures of acreage in the Season and Crop Report for 1955-56 and adopting the dosages suggested by him Sri A. R. Venkatachari has worked out the total annual requirements of organic manures of this State at about 91 million tons. The State Compost Development Officer has estimated these requirements at about 66 million tons adopting his basis of calculation.

196. In the succeeding sections of this chapter the present position in regard to availabilities as against the estimates of requirements given in the previous paragraphs is examined and our recommendations regarding the steps to be taken to step up supplies are indicated.

(b) SOIL TESTING.

197. A rational fertiliser use as recommended by a Soil Testing Service is always desirable. This is much more so at the present juncture when there is an acute shortage of chemical fertilisers. At present the agriculturists in this State are using fertilisers solely on the basis of their own individual assessment of the varieties and doses required based upon personal experience and not on the basis of requirements of individual fields ascertained analytically. Only a Soil Testing Service can recommend the correct fertiliser schedules for each variety of soil. If we are to ensure that the insufficient supplies of chemical fertilisers which are now available are put to the best possible use, we should see that every ryot applies only that variety and dose of chemical fertilisers which his soil requires. We understand that in the United States of America no farmer will apply any chemical fertiliser to his land unless its use is specifically recommended to him by the County Agent or an equally competent expert.

198. One of the 24 Soil Testing Laboratories which have been set up in different parts of the country under an agreement with the T.C.M. authorities is located at Coimbatore. This Soil Testing Laboratory at Coimbatore is equipped to handle about 600 to 700 samples in a month. It was brought to the notice of the Government sometime ago that the Laboratory was getting hardly 50 to 60 samples per month which showed that the facilities provided by it were not taken advantage of adequately by the agriculturists. At the same time it was also brought to the notice of Government that many of the cultivators who got their soil tested at this Laboratory and applied fertilisers as recommended by the Soil Testing Service had reported increase of yields by 30 to 40 per cent. In order to bring home to the agriculturists the advantage of getting their soil tested, the Government decided to press the Block Agency into service. They issued the following

Instructions for the sending of soil samples by the Block staff for analysis by the Government Agricultural Chemist at the Soil Testing Laboratory at Coimbatore :—

(i) Each Extension Officer (Agriculture) should collect not more than ten soil samples per month from cultivators in his jurisdiction.

(ii) These soil samples should be despatched in cloth bags made to hold about one pound of soil and addressed to the Government Agricultural Chemist, Agricultural College and Research Institute, Lawley Road P.O., Coimbatore.

(iii) The Extension Officers in Agriculture will be responsible to give instructions to the Grama Sevaks as to how to collect samples and pack them in cloth bags and get them to Block Headquarters.

(iv) The Block Development Officers will be responsible to have the samples despatched to Coimbatore. They will also make arrangements to get sufficient number of cloth bags made and distributed to Village Level Workers.

(v) The District Agricultural Officers will be responsible to see that this item of work is done by all the Extension Officers in Agriculture under their control and to this effect will give supervision and guidance during their tours in the Blocks.

As a result of these instructions the existing laboratory at Coimbatore will be having more than enough work.

199. We found in our tours that the agriculturists in our State have now realized the benefits of getting samples of their soil tested but it will be inconvenient for the agriculturists belonging to districts other than Coimbatore to send their soil samples all the way to Coimbatore. Further one soil testing Laboratory is not enough for this State. We consider that at least three more soil testing laboratories should be established by the State Government. The three additional laboratories may be located at Madurai, Aduthurai and Madras. These laboratories shall be in addition to the soil testing laboratories in sugar factory areas the maintenance of which from the proceeds of the sugarcane cess we have recommended elsewhere in this report.

(c) CHEMICAL FERTILISERS.

(i) *Ammonium Sulphate and other nitrogenous fertilisers.*

200. To encourage the use of ammonium sulphate, it was sold at half its price to ryots for a brief period during the year 1945-46. With the same object in view, the distribution of the fertiliser,

which had mainly to be imported, was taken over by the Government of India under the Central Fertiliser Pool and they allotted to the State their requirements of the fertiliser. The distribution in this State was done as a State Trading Scheme under the control of the Director of Agriculture till 1954. The Agricultural Department arranged the distribution of the fertiliser through its depots till June 1951 and later the distribution was arranged to be done by selected co-operative societies and private firms.

201. The co-operative societies were maintaining as many as 778 depots and the private firms 553 depots throughout the composite State. In September 1953, the retail distribution of ammonium sulphate was thrown open to normal trade channels, and the private merchants and the co-operative societies purchased their requirements from the agricultural depots or direct from the manufacturing factories through the Agricultural Department. The ryots were also permitted to obtain their requirements from the agricultural depots direct, provided the quantity purchased was not less than 1 ton.

202. The need for control over the distribution of ammonium sulphate was considered necessary by the Government to ensure its equitable distribution and to progressively increase the consumption, and the Government therefore ordered in April 1954, that the scheme be worked under the control of the Board of Revenue (Food Production) and the Collectors in the districts. Under the arrangements in force for the distribution of ammonium sulphate from 1954, the District Co-operative Supply and Marketing Society, Limited, in all the districts except Tanjore and the Tanjore Co-operative Marketing Federation, Limited, in Tanjore district, function as the stockholder of Government on an agency basis for a commission of Rs. 5 per ton for the receipt, storage and release of stocks to retail distributors.

203. The retail distribution was, in the first instance, entrusted to two authorized distributors selected for each taluk of which one was a co-operative society and the other a private merchant. The stocks intended for distribution in a taluk were made available to the co-operative society and the private merchant on a 50:50 basis. The retail distributors are allowed an all inclusive commission of Rs. 20 per ton in the case of ammonium sulphate towards distribution charges and profit, and they have to distribute the fertiliser at an uniform rate throughout the taluk in all the depots opened by them. It has been observed that the expenditure in connexion with retail distribution amounts to Rs. 8 to Rs. 12 per ton and that the distributors get a margin of Rs. 8 per ton on an average towards profit and interest on capital. It is clear that the margin of Rs. 20 per ton is therefore adequate for them.

204. The question of improving the arrangements for retail distribution was again taken up for consideration during 1955, and with effect from 1st May 1955 it was ordered that there should be four distributors for each taluk of which one should be a co-operative society and the remaining three private merchants. One-third of the total quantity of ammonium sulphate intended for distribution was made available to the co-operative societies and the balance of two-thirds allotted equitably among the three private distributors. Each distributor was required to open as many depots as possible subject to a minimum of five depots in a deltaic taluk and three depots in a non-deltaic taluk.

205. The above arrangements for retail distribution continued till June 1957. The co-operative societies and the private distributors had by then opened as many as 800 depots in the State. The question of modifying the distribution arrangements was again taken up for consideration with special reference to the part to be played by the co-operative societies in the retail distribution, and it was decided to allow the co-operative societies a greater share in the fertiliser distribution with the ultimate aim of reaching a total monopoly in a few years and the arrangements were modified as indicated below:—

(i) The share of the co-operative agency in the retail distribution was raised from one-third to one-half.

(ii) The distribution of chemical fertilisers in the Community Development and National Extension Service areas was entrusted solely to co-operative societies, and the private dealers functioning in these areas were allowed to open depots outside these areas.

(iii) Appointment of new distributors in future was to be confined to co-operative societies, if they were available.

The revised arrangements were given effect to in the districts by January 1958.

206. Ammonium sulphate required for consumption in the State is supplied by the Government of India under the Central Pool arrangements. They fix the pool price of the fertiliser from time to time with reference to the import price, production cost in our factories, etc. Prior to January 1954, the pool price was fixed on the basis of f.o.r. works, freight to be paid by the consignees. Since then, the pool price is fixed on the basis of f.o.r. works or ports, freight paid up to any railhead destination. Thus the fertiliser is made available by the Government of India throughout the country at a uniform rate. The price fixed by the Government of India for the period from 19th January 1954 to 25th March 1957, was Rs. 315 per ton f.o.r., works, freight paid up to destination station. After allowing for the commission and

the margin of profit to the stockholders and distributors respectively and the collection of sales tax at two stages, the fertiliser was sold to the ryots at a uniform retail price of Rs. 350-6-3 per ton. The pool price of ammonium sulphate was increased by the Government of India from Rs. 315 to Rs. 350 with effect from 26th March 1957. The revised price was given effect to in this State with effect from 1st April 1957, and the fertiliser is sold at a uniform retail price of Rs. 385.65 per ton.

207. Besides ammonium sulphate, the distribution of urea and ammonium sulphate nitrate also is now being done under the State Trading Scheme. From November 1956, these fertilisers are sold as straight fertilisers to the ryots through the distributors of ammonium sulphate. These fertilisers, which are concentrated nitrogenous fertilisers have some advantages over ammonium sulphate. They produce acidity in the soil to a comparatively lesser extent than ammonium sulphate and to that extent they are preferable to ammonium sulphate. Their use will result in savings in transportation and handling costs. Their prices are also lower than that of ammonium sulphate for the same nitrogen content. With a view to make these fertilisers popular among the ryots, they are also supplied by the Government of India under the Central Pool arrangements on the basis of f.o.r. works or ports freight paid up to railhead destination. The pool prices in force with effect from 1st April 1957 for urea and ammonium sulphate nitrate are Rs. 710 and Rs. 420 per ton respectively. The distributors are allowed a sum of Rs. 10 towards incidentals and profit and the fertilisers are sold at a uniform retail price of Rs. 746.45 nP. per ton in the case of urea and Rs. 447.75 nP. per ton in the case of ammonium sulphate nitrate from June 1957.

208. Calcium ammonium nitrate, another new nitrogenous fertiliser is also distributed in this State. The pool price and the retail price of this fertilizer are Rs. 330 per ton f.o.r. works or ports, freight paid up to railhead destination and Rs. 355.05 nP. per ton respectively.

209. Details of the actual consumption of different types of fertilisers are given below along with the targets of consumption. The targets are based on the actual trends in consumption and can be achieved if adequate supplies are available.

Year	Ammonium Sulphate.	
	Target	Achievement (quantity distributed).
(1)	(2)	(3)
		TONS.
1947-48	..	23,103
1948-49	..	32,045
1949-50	..	29,392

Year.	Ammonium Sulphate.	
	Target.	Achievement (quantity distributed).
(1)	(2)	(3)
1950-51	..	48,454
1951-52	66,000	49,012
1952-53	81,000	46,758
1953-54	51,000	67,533
1954-55	75,000	83,923
1955-56	109,000	93,885
1956-57	125,000	1,20,581
1957-58	140,000	84,045
1958-59	150,000	90,705
1959-60	180,000	..
1960-61	175,000	..

NOTE.—The targets and achievements include distribution to manure mixing firms also.

Year.	Other Nitrogenous Fertilizers.					
	Ammonium sulphate nitrate.		Urea.		Calcium ammonium nitrate.	
	Target.	Achievement (quantity distributed).	Target.	Achievement (quantity distributed).	Target.	Achievement (quantity distributed).
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	TONS.	TONS.	TONS.	TONS.		TONS.
1954-55	..	1,869	..	1,725	..	203
1955-56	..	2,233	..	2,268	..	1,457
1956-57	6,300	2,213	6,000	1,585	..	..
1957-58	19,200	9,280	8,000	7,547	..	..
1958-59	22,000	10,530	9,000	14,825	..	..
1959-60	25,000	..	10,000	..	..	..
1960-61	30,000	..	12,000	..	..	..

(i) No target was fixed for these fertilizers prior to 1956-57.

(ii) No quantity of these fertilizers was distributed prior to 1954.

(iii) The quantities of these fertilizers distributed from 1954 are furnished above.

(iv) No target fixed for calcium ammonium nitrate during the Second Five-Year Plan period. A quantity of 1,000 tons was allotted for 1957-58 out of which about 170 tons are yet to be received.

(v) The quantities shown under "achievement" include the quantities distributed to manure mixing firms.

210. It will be observed from the above statements that the consumption of chemical fertilizers has been progressively increasing. The consumption of ammonium sulphate increased from a mere 23,103 tons in 1947-48 to 120,581 tons in 1956-57. Such a phenomenal rate of increase could have been maintained even

thereafter but for the shortage of the stocks of the fertilizer. The present indications are that during the year 1959-60 also the allotment of ammonium sulphate to this State will be only about 45 percent of the target for that year, viz., 160,000 tons which itself is less than 30 per cent of the optimum annual requirements indicated in a previous paragraph.

(ii) *Superphosphate.*

211. Superphosphate was distributed in the State at 50 per cent of the cost from 15th August 1949 to 31st March 1952 and at 75 per cent of the cost from 1st April to 4th June 1952 when the subsidy was discontinued. With a view to increase the consumption of superphosphate, a scheme for the subsidized distribution of superphosphate was included tentatively in the State's Second Five-Year Plan but it was deleted subsequently when the size of the Plan was reduced. There is at present no control over the distribution of superphosphate.

212. Dr. Parker, Fertilizer Adviser to the Government of India and other experts have given the opinion that to improve the soil fertility, it is necessary to use ammonium sulphate and superphosphate in the ratio of 1:1, but in view of the low production of phosphates in India they have strongly urged the use of ammonium sulphate and superphosphate in the ratio of 2:1. Considering the need for increasing the consumption of superphosphate, the following targets have been fixed for the Second Five-Year Plan :—

	TONS.
1956-57	19,000
1957-58	36,000
1958-59	46,000
1959-60	61,000
1960-61	81,000

Details of actual consumption are given below :—

Year,	Quantity consumed.
	TONS.
1948-49	4,329
1949-50	10,572
1950-51	18,679
1951-52	18,451
1952-53	12,612
1953-54	9,634
1954-55	17,489
1955-56	20,562
1956-57	23,794
1957-58	22,040
1958-59	21,600

For
Composite
State.
For
present
Madras
State.

(For calendar year
1957)
(For calendar year
1958)

213. Complaints have sometimes been received by the Government that adequate quantities of superphosphate are not available at the different centres of consumption in this State. The manufacturing factories in the State have agreed to market adequate stocks of fertilizers in the State through their distributing agencies. To bring superphosphate within the easy reach of the cultivators, the co-operative societies and the private merchants who are functioning as the distributors of ammonium sulphate and other nitrogenous fertilizers have been instructed to stock and sell superphosphate also, so that the cultivators need not go to two different agencies for obtaining their requirements of nitrogenous and phosphatic fertilizers.

214. The question of distributing superphosphate at a subsidized rate was considered by the Government sometime ago and they decided that the proposal be deferred in view of the shortage in supply. We have also considered this question and we have accepted the Government's decision. The present level of consumption of this fertilizer is less than one-twentieth of the optimum requirements indicated in a previous paragraph.

(iii) *Fertilizer mixtures.*

215. At present the manufacture and distribution of manure mixtures in the State is done by the private trade. The question whether the State Government should undertake the preparation and marketing of mixtures of fertilizers was examined in 1956. It was decided that it will not be desirable for the State Government to undertake the business of preparing and marketing fertilizer mixtures and that the manure mixing firms who have developed their own distribution channels may be allowed to continue and that necessary facilities may be made available to them. The Fertilizer (Control) Order is being implemented in the State with effect from 1st September 1957. With reference to the provisions contained in the Fertilizer (Control) Order, a fertilizer mixture can be manufactured and marketed after obtaining a certificate of registration under the Order on payment of a non-recurring registration fee of Rs. 50 for each mixture. However, fertilizer mixtures containing ammonium sulphate and other nitrogenous fertilizers handled by the Government under the State Trading Scheme can be manufactured and marketed only by the manure mixing firms in the approved list maintained by the Government, as ammonium sulphate and other nitrogenous fertilizers distributed under the State Trading Scheme are made available only to manure mixing firms in the approved list. New firms are added to the approved list on the recommendation of the Fertilizer Advisory Committee. Roughly one-fourth of the quantity of ammonium sulphate and other nitrogenous fertilizers allotted to the State Government, is made available to manure mixing firms for use in the manure mixtures.

(iv) *Intensive Manuring Loan Scheme.*

216. The Madras Government introduced in the middle of 1950, a scheme for concentrating the supply of chemical fertilizers in the deltaic areas of the composite Madras State, viz., East Godavari, West Godavari, Krishna, Guntur, Nellore, Tanjore, Tirunelveli, Madurai, Tiruchirappalli and South Arcot districts which are commanded by major irrigation projects and river channels and get an assured water-supply for cultivation. Under this scheme, known as the Intensive Manuring Scheme, takkavi loans were granted to the ryots in the area at liberal rates for the purchase of chemical fertilizers for application to paddy and the loan was recovered after the harvest of long-term crop with the March kist. The ryots are given loan slips for the amounts of the loans which they can exchange for fertilizers at the local depots of co-operative societies or private firms selected as distributing agencies by the Government.

217. The scheme was initially implemented in respect of paddy only and it was extended to the sugarcane crop also from 1955-56. The loans under the scheme were granted in the initial years as interest-free loans, but since 1952-53 interest has been charged for the loans as in the case of other agricultural loans. The loans were given for the purchase of ammonium sulphate only till 1955-56 and the rate for such loans was increased from Rs. 25 per acre initially to Rs. 35 per acre. Since the beginning of 1957, the Government have permitted the grant of these loans for the purchase of superphosphate also, so as to encourage the ryots to maintain balanced manuring of their crops. As the Government have recently introduced the distribution of other nitrogenous fertilizers also, viz., ammonium sulphate nitrate, calcium ammonium nitrate and urea, the grant of these loans for the purchase of these fertilizers has also been permitted. The present rates for the grant of these loans are indicated below :—

Name of the crop.	Rate per acre.		Maximum amount of loan on personal surety.		Maximum amount of loan that can be granted to a ryot on production of additional sureties.
	Ammonium sulphate urea, Ammonium Sulphate Nitrate and Calcium Ammonium Nitrate.	Super-phosphate.	Ammonium Sulphate urea, Ammonium Sulphate Nitrate and Calcium Ammonium Nitrate.	Super-phosphate.	
(1)	(2)	(3)	(4)	(5)	(6)
	RS.	RS.	RS.	RS.	RS.
1 Paddy	35	15	500	250	750
2 Sugarcane	150	15	500	250	1,500
3 Paddy and Sugarcane	(As above)		500	250	1,500

218. With a view to popularize standard manure mixtures among cultivators the Government recently examined the question of extending the loan facilities under the Intensive Manuring Scheme to standard manure mixtures and decided that to begin with standard mixtures may be included as fertilizers eligible for loan under the scheme for paddy and sugarcane in 1958-59 within the existing allotment for the scheme and that the progress may be watched before considering the question of implementation of a detailed scheme for the grant of loans for the purchase of standard mixtures. The rates of loan are—

	Amount per acre.	Maximum amount on personal surety.	Maximum amount on production of additional surety.
	RS.	RS.	RS.
Standard Mixture I (N : P : K :: 12 : 6 : 0)	50.	500.	1,500.
Standard Mixture II (N : P : K :: 12 : 6 : 6)	50.	500.	750

The details of the amounts of loan allotted and utilized under the scheme since 1950-51 are given below :—

Year	Allotment.	Amount.	
	RS.	RS.	
(1)	(2)	(3)	
1950-51	72,00,000	13,905	} For Composite State.
1951-52	87,51,000	27,09,810	
1952-53	82,01,000	78,23,025	
1953-54	62,10,000	58,47,957	} For Residuary State.
1954-55	70,00,000	40,01,474	
1955-56	50,00,000	49,11,246	
1956-57	61,30,000	54,48,963	
1957-58	68,50,000	59,64,818	
1958-59	60,00,000	66,67,265	
1959-60	63,00,000	..	

The Government of India sanction short-term loans to the State Government to finance the Intensive Manuring Scheme and to pay for part of the purchase of fertilizers under the Central Pool.

219. The Intensive Manuring Scheme has been found to be a necessary adjunct to the implementation of the scheme for the distribution of chemical fertilizers, inasmuch as the availability of credit facilities encourages the ryots who require such facilities to avail themselves of the advice given by the Agricultural Department for manuring their crop to the maximum extent. The intensive manuring scheme loans finance the purchase of only 15 per cent of the ammonium sulphate consumed in this State. With the Extension of the use of fertilizers among the smaller cultivators, the demand for these loans may be expected to increase steadily. Loans for sugarcane cultivation are granted under the Sugarcane Campaign organized by the Indian Central Sugarcane Committee.

(v) *The Fertilizer (Control) Order.*

220. With a view to prevent by legislation the marketing of spurious fertilizer materials as this will jeopardise the very basis of a healthy growth of the use of fertilizers in the country, the Government of India have declared fertilizers, whether inorganic, organic or mixed as an essential commodity for purposes of the Essential Commodities Act, 1955, under sub-clause (xi) of clause (a) of section 2 of the Act and following this declaration, they have notified the Fertilizer (Control) Order, 1957, which came into force throughout India on the 15th May 1957. This Order was brought into force in the Madras State with effect from 1st September 1957. The Order provides for the following :—

- (i) licensing of dealers in fertilizers;
- (ii) registration of fertilizer mixtures;
- (iii) fixation of ceiling prices for the fertilizers; and
- (iv) prescribing the requirements in regard to packing of fertilizers maintenance of accounts for sale and grant of sale bills.

The Joint Secretary to the Government of India, Ministry of Food and Agriculture, is the Controller of Fertilizers. The Director of Agriculture, Madras, is in charge of the administration of the Order in this State. He is assisted by a Chief Inspector of Fertilizers. The District Agricultural Officers are the licensing authorities for licensing of dealers, and Agricultural Demonstrators are the Inspectors of Fertilizers under the Order. The Director of Agriculture himself functions as the authority for registration of mixtures of fertilizers. Agricultural Demonstrators and Extension Officers who have been appointed as Inspectors of Fertilizers may take samples of any fertilizers for getting them analysed and assessing the quality of the fertilizers sold by the dealers.

(vi) *Suggestions for improving supply position and distribution arrangements.*

221. The present anomalous position in which the Government are on the one hand propagating the use of chemical fertilizers for stepping up agricultural production while on the other hand they are unable to meet the increasing demand for chemical fertilizers created by their own propaganda on account of the shortage of stocks should be ended as soon as possible. The Government should devote greater attention to the question of increasing the production of chemical fertilizers in the country. More fertilizer factories should be established. They should be distributed throughout the country in such a manner that no difficulty will arise in the matter of transporting the stocks by road or rail from the factories to the consuming areas.

222. We recommend that loans under the Intensive Manuring Scheme should be given also to the landless cultivating tenants and shortriamndars on the security of the crops to be raised by them. All applications for loans under the Intensive Manuring Scheme should be collected six months ahead of the cultivation season and sanction accorded after necessary enquiry so as to enable the ryot to obtain his requirements of manure under the scheme at the proper time with the help of the loan.

223. We have received complaints to the effect that the present practice of reserving a portion of the chemical fertilizer quota for each district to those who obtain their requirements with the help of the loans given under the Intensive Manuring Scheme causes hardship for those agriculturists who want to purchase the fertilizers for cash. As the quantity so reserved represents only a fraction of the total quantity available for distribution we consider that the present practice should be continued. However the Collectors should be asked to apportion the stocks available from time to time judiciously in such a manner that at no time cash sales have to be entirely suspended.

224. The non-official Members of the Committee learnt in the course of their tour in the Nilgiris district that the prices for the various manure mixtures produced by the co-operatives and private firms varied and that the prices charged by the private firms were much more than the prices charged by the co-operatives. Manure mixtures are very essential for raising the potato crop and we understand that the private firms are supplying 60 per cent of the total manure mixture requirements of the potato growers. We recommend that more co-operative manure mixing societies should be started as quickly as possible and they should be given adequate quotas of straight fertilizers.

225. As regards the agency for the distribution of chemical fertilizers we consider that distribution through co-operatives alone should be the ideal to be aimed at. Already co-operatives are having the monopoly of distribution of nitrogenous fertilizers in the Development Blocks. They should be persuaded to take over the distribution of superphosphates, potash and manure mixtures also in the Development Blocks so that they may be given the monopoly for the distribution of these commodities also in the Development Blocks. In the non-block areas also the co-operatives should be given the monopoly of distribution of chemical fertilizers as soon as enough co-operatives to handle the entire requirements of nitrogenous fertilizers, superphosphates, potash, and manure mixtures in these areas are formed and begin to function.

226. The complaint that the supply of chemical fertilizers is not timely is almost universal. We feel that adequate steps should be taken to ensure that chemical fertilizers are made available to agriculturists at the proper time. Each distributor of chemical

fertilizers whether it is a co-operative or a private dealer should draw up sufficiently in advance an estimate of the quantity required for distribution by it during the next cultivation season based upon the experience of previous years. The distributor should on the basis of this estimate place a firm indent on the Collector sufficiently in advance of the time at which supplies are required for distribution to the ryots. The distributor should also specify in the indent the date or dates by which the quantity should be supplied for distribution to ryots. Subject to the availability of stocks the Collector should see that the quantities indented for by the distributor are made available to him by the dates specified in the indent. The sale price should also be fixed and communicated to the distributor at the time when the supply is made to him in order to avoid any delay in the sales being effected to ryots by the distributor after the supplies are received by him.

227. Another complaint that was received by us was that while Agricultural Banks, Village Co-operative Societies and Co-operative Marketing Societies were distributing chemical fertilizers, the District Co-operative Supply and Marketing Societies were also distributing chemical fertilizers side by side through their own depots in all areas. We consider that such direct distribution of chemical fertilizers by the District Co-operative Supply and Marketing Societies and similar institutions having a district wide jurisdiction through their own depots is undesirable and should be stopped except in places where the local co-operative society is unable to take up this work.

(d) GREEN MANURE.

228. Green Manuring is one of the easiest means of raising the crop production capacity of the soil. Till 1951-52, common green manure seeds like sunnhemp, daincha, pillipesara, etc., were acquired from seed farm ryots and distributed to the agriculturists through the Agriculture Department. A subsidy of Rs. 6-8-0 was paid to the seed farm ryots for every bag of 160 lb. of green manure seeds delivered by them to the Agriculture Department. From 1952-53, the Agriculture Department was concentrating on *sesbania speciosa*, which can be easily grown along with paddy on the lines and margins of fields leaving the common green crops to be tackled by the normal trade channels. It is similar to daincha in respect of soil requirements and yield of green matter. Propaganda is now done for all varieties of green manure crops and it is left to the ryots to use the varieties most suited under local conditions though *sesbania* is recommended as the most useful choice. With a view to popularise the use of green manure seeds by the ryots, the Government have permitted sale of green manure seeds at 80 per cent of the cost price. This scheme was in force during the First Five-Year Plan period and the net expenditure of 20 per cent of the cost was met by the Central and State Governments on a 50-50 basis. During the Second Five-Year Plan period,

the Government of India stated that this scheme would not be eligible for any financial assistance from the centre. Considering the importance of green manuring and the need for the development of local manurial resources, especially in view of the short supply of chemical fertilizers, the Government have ordered the continuance of the subsidy scheme at State cost and it is in force from 1956-57 onwards. The Government have permitted payment of cultivation advances to the agriculturists who enter into agreements with the Agriculture Department for running green manure seed farms and producing and handing over to the Department the agreed quantity of green manure seeds.

229. Yearwise details of targets and achievements of departmental distribution of green manure seeds during the First Five-Year Plan and the first three years of the Second Plan are as follows :—

Year.	Units.	
	Target (Tons)	Achievements (Tons)
1951-52 ..	1,848	947
1952-53 ..	1,853	718
1953-54 ..	488	111
1954-55 ..	387	301
1955-56 ..	387	492
1956-57 ..	600	599
1957-58 ..	862	1,028
1958-59 ..	1,142	1,142 (Estimated.)

At the end of the First Five-Year Plan, an extent of 1.2 million acres was covered by green manures. Under the Second Five-Year Plan, it has been proposed to cover an area of about 3.81 million acres under green manures as shown below :—

Year.	Target of distribution.	Area to be covered.
	TONS.	MILLION ACRES.
1956-57 ..	572	1.50
1957-58 ..	862	2.15
1958-59 ..	1,142	2.86
1959-60 ..	1,342	3.34
1960-61 ..	1,532	3.81

230. Under the minimum programme for agricultural development in the Development Blocks prescribed by the Government a subsidy of 30 per cent may be given in respect of distribution of green manure seeds. A sum of Rs. 5,000 has been provided for this purpose for five years per Block. This subsidy of 30 per cent is over and above the 20 per cent subsidy met from the Agricultural Department Budget.

231. The chief reason for the slow progress in the development of green manuring is inadequate supply of green manure seeds. Special steps should therefore be taken to increase the supply. We recommend that the Forest Department should sow *sesbania*

and glyricidia seeds in large patches of forest lands which should total up to not less than 2,000 acres to begin with and allow the plants to grow to seed. The Forest Department should collect the seeds through authorized agents or by utilizing the services of the staff of the Agricultural Department for sale to ryots either direct or through the Agricultural Department whichever alternative is preferred by the Agricultural Department.

232. We consider that very vigorous steps are required to increase the green leaf resources of the State by several times and we recommend that the following measures should be adopted immediately for this purpose :—

(i) The existing concessions in the matter of removal of green manure leaves from the Government reserved forests should be continued and liberalized wherever possible.

(ii) In the village forests which the Forest Department is now developing sufficient prominence should be given for growing green manure plants, shrubs and trees. The Agricultural Department should advise the Forest Department in respect of the species suitable for each area.

(iii) The Forest Department should grow green manure plants, shrubs and trees on the fringes of reserved forests which adjoin villages and make available the green manure leaves to the ryots of those villages.

(iv) Ryots should be allowed to plant green manure plants, shrubs and trees on the canal, channel, river, tank and road porambores in charge of the Revenue, Public Works and Highways Departments on permits issued by the Departments concerned subject to such conditions as may be specified in consultation with the Agricultural Department.

(v) Water may be specially supplied (wherever it can be supplied) from Government irrigation sources for raising and irrigating green manure crops without undue restrictions. The areas on which such crops are grown should be carefully surveyed. The correctness of the recording in the village cultivation accounts of the extent of green manure cultivation should be ensured.

(vi) Lascars of the Public Works Department may be given a suitable cash incentive in order to induce them to grow green manure plants, shrubs and trees on the banks of the Public Works Department canals and channels. The payment should not be made merely on the basis of the number of plants, etc., planted but it should be only on the basis of the number of plants that survive for a specified period, the rules in this regard being drawn up by the Public Works Department in consultation with the Agricultural Department. A similar cash incentive subject to the

same conditions may be given to road gang workers of the Highways Department and to village officers in order to induce them to grow green manure plants, shrubs and trees on the road margins and in the porambores in their charge respectively.

(vii) Ryots should be persuaded to grow green manure as a pure crop on those lands which are classified in the Season and the Crop Report as "Current Fallows", "other fallows" and "cultivable wastes" both for application of the resultant green manure direct to the lands and for the preparation of compost. The ryots should be advised to reserve 10 per cent of the area grown by them for the collection of green manure seeds. As an incentive the Government may announce that there will be a remission of kist for such cultivation. The Agricultural Department should purchase the seeds produced by the ryots at a price fixed and announced by it sufficiently in advance.

(viii) A prize of the value of Rs. 1,000 should be instituted in each district and awarded to that individual who produces the best and maximum yield of green manure per acre in that district. Similar prizes of the value of Rs. 500 and Rs. 250 should be awarded to the prize winners at taluk and village levels respectively in each district. Inter-Village competitions should be held in each district in green manure production and prizes should be awarded to that village in each district which raises green manures over the largest area. The prizes may be in the shape of developmental works, namely roads, schools, dispensaries, etc., or such other item of work which would be of common benefit to all the villagers as the villagers may determine to the tune of Rs. 10,000. The prize winning village may also be given free the green manure seeds required for the entire village for sowing in the next season.

(ix) The sale price for the green manure seeds sold by the Agricultural Department should not vary for each consignment. On the other hand a flat rate inclusive of subsidy should be fixed for sale of green manure seeds by the Agricultural Department during each year and this sale price should be worked out and announced sufficiently in advance of the cultivation season.

(e) COMPOST AND FARMYARD MANURE.

233. The present availability in this State of material which can be composted and used as organic manures in urban and rural areas has been estimated as 40 per cent of the total requirements by the State Compost Development Officer and as 25 per cent of the requirements by Sri A. R. Venkatachari. Both the estimates show how far we have yet to go before we can achieve self-sufficiency.

240. The progress of the achievement under this scheme is indicated below :—

Year.	Target.	Production.	Distribution.	Loan Sanctioned.	Grant and subsidy paid.
	TONS.	TONS.	TONS.	RS.	RS.
1951-52	..	209,16	142,282	..	45,911
1952-53	..	231,376	144,769	..	1,062
1953-54	..	240,608	2,3,908	..	95,393
1954-55	..	241,16	204,291	18,09,000	22,530
1955-56	..	238,240	233,451	2,28,000	1,413
1956-57	326,15	273,544	255,039	43,000	55,562
1957-58	341,30	292,951	258,210	11,09,200	35,596
1958-59	357,30	282,074	243,174	6,26,500	2,75,766
		(up to end of February 1959)	(up to end of February 1959)		
1959-60	373,900	..	..	..	..
1960-61	390,400	..	..	..	..

(i) *Development of local manurial resources.*

241. The shortage of chemical fertilisers led to the realisation that an all-out effort should be made to step up the production of our local manurial resources and ensure their proper utilisation. A special scheme for the development of local manurial resources was therefore launched in this State during the year 1957-58 and it was decided to implement it only in selected Development Blocks as the services of the Block agency could be utilised in those areas and also because conditions for implementing the scheme were more favourable there than they were elsewhere.

242. The Director of Agriculture is implementing the scheme with the assistance of the State Compost Development Officer and three Field Manure Officers with head-quarters at Coimbatore, Madurai and Tanjore. These Field Manure Officers have undergone special training on compost manufacture at New Delhi in a course arranged by the Ministry of Food and Agriculture. There is one Compost Inspector for each selected Block and these Inspectors are given training in compost making. The training of Compost Inspectors is conducted at the headquarters of the Field Manure Officers or other suitable centres for a period of one month by the State Compost Development Officer and the Field Manure Officers. Selected farmers in the selected Development Blocks are also given training by the Compost Inspectors on particular aspects of local manures, methods of compost making, development of local manurial resources and green manuring practices. The selection of farmers in the blocks is done on the basis of not less than one for every two villages. In the case of panchayats a member of the panchayat is selected. The training of farmers and members of panchayats is for a period of seven days. A training allowance for boarding and lodging at Rs. 1.50 per day per individual for the seven days and a lump sum of Rs. 5 per individual towards travelling allowance is paid to the selected farmers who undergo the training.

243. The Government of India give financial assistance to the scheme on the following basis :—

(i) The expenditure on the employment of Inspectors in all the blocks will be borne by the Centre and the States on the National Extension Service pattern, namely, 50 :50 basis.

(ii) The cost of the post of State Compost Development Officer will be borne by the State Government from their own funds as hitherto, while the expenditure on employment of Field Manure Officers and other staff will be borne by the Centre and the States on a 50 :50 basis.

(iii) The cost of training the Compost Inspectors as well as selected farmers will be borne by the Centre.

244. Under the scheme arrangements have been taken on hand in the selected Blocks for a systematic exploitation of all locally available waste materials suitable for composting in the villages. Suitable advice is given to ryots for progressively increasing the use of green manure crops both for direct application to wet-land rice and for composting and using the resultant compost for dry crops and other crops. The ultimate aim will be to apply about 6,000 lb. of green manure per acre for wet rice crop. The multiplication of green manure seeds is arranged within the Block and preferably within the village so that the supply of seeds does not operate as a limiting factor. Demonstrations of green manures are also organised in the villages especially in areas where green manure is not used much till green manure is accepted as a normal practice.

245. This scheme was introduced in 81 selected Development Blocks in the year 1957-58 and a target of 8000 tons of compost per Block was fixed. The scheme was extended to 25 more Blocks during the year 1958-59. The training of the Compost Inspectors for manuring the additional Blocks was over only by the first week of April 1959 and actual work under the scheme will begin only after the trained personnel report themselves for duty in the Blocks to which they are allotted. A target of 848,000 tons of compost was fixed for achievement during the year 1958-59 at the rate of 8000 tons for each of the 106 Development Blocks in which the scheme was expected to function during that year. But as stated earlier the scheme could not commence functioning before the end of the year in the 25 new Blocks. Hence the effective target is only 648,000 tons for the 81 Blocks in which alone the scheme was actually functioning in that year. The achievement up to February 1959 was 710,175 tons and thus exceeded the effective target. It is proposed to extend the scheme to 25 more Development Blocks during 1959-60, and the target fixed for achievement during that year is 1,048,900 tons compost. This is only a beginning, and the targets will have to be considerably stepped up in future.

246. As a result of the efforts of the Compost Inspectors employed under the scheme an area of 68,414 acres was brought under green manure during the year 1958-59. Phosphatic fertilisation of leguminous green manure crops and their inoculation with efficient types of specific bacteria suited to the various localities have been planned and started already in a few Development Blocks for increased production of green manure with higher Nitrogen content. The number of farmers trained in compost manufacture on scientific lines under the scheme was 3,089 during 1957-58 and 2,500 during 1958-59.

247. The objective of the scheme for the development of local manurial resources is to ensure that the compost produced in the rural areas is of such good quality that its nitrogen content is at out 1.5 per cent. With this end in view analytical data of compost and farmyard manure prepared in villages are being collected in each of the selected Development Blocks at the rate of 10 samples per block. We learn that a few samples of compost and farmyard manure prepared by enlightened farmers under the scheme have been found to possess a nitrogen content ranging from 1.5 to 1.8 per cent as compared with the usual 0.3 to 0.5 per cent of the old type farmyard manure.

248. Samples of raw materials such as tank weeds, plantain stems and leaves, cashew leaves, etc., which are available in quantity in several parts of the State are being analysed for ascertaining their manurial values. The data gathered in respect of these waste materials which are not being widely used for composting will enable their utilisation in full in future for compost manufacture after addition of the required quantity of inoculum supplying adequate amounts of nitrogen for efficient and speedy decomposition in the form of cattle dung or similar starter material. In the Agasteeswaram Development Block in the Kanyakumari district the non-official Members of the Committee found that tank weeds and moss particularly water hyacinth were being used for composting on an appreciable scale, incidentally helping to reduce mosquito breeding. They were also informed that in the Sivakasi Development Block in the Ramanathapuram district an enterprising ryot had obtained as large a quantity as 600 tons of compost produced from water hyacinth collected by him using sewage sludge as starter.

249. The maintenance of well laid out Community compost yards in villages where suitable and undisputed Government porombokes or other common lands are available and the formation of village committees to run them on proper lines consisting of influential village leaders and farmers who have undergone training in compost manufacture on scientific lines are important items of work under the scheme for development of local manurial resources. The Village Committees also serve as an advisory body for the dissemination of knowledge to the cultivators in regard to the manufacture

of quality compost and farmyard manure, conservation of cattle urine and the exploitation to the maximum of locally available materials like tank silt and paddy husk.

(iii) *Development of night-soil compost in bigger panchayats.*

250. Under the Second Five Year Plan the Government are implementing from November 1957 a scheme for the conversion of nightsoil into valuable compost manure in bigger panchayats with a population of 2,000 to 4,000 where conservancy systems exist to whom financial assistance by way of loans not exceeding Rs. 2,000 per panchayat are given towards the cost of acquisition of compost site if necessary and for the purchase of a single bullock cart for the transport of the nightsoil to the compost yard and for digging trenches. Due to the late implementation of the scheme and the elaborate procedure that had to be followed for the grant of loans the scheme could not be implemented in the required number of panchayats during the year 1957-58. The Government have since simplified the procedure for the grant of loans and it is expected that 130 out of the 250 panchayats in which the scheme was to have been implemented during the year 1958-59 are now engaged in the production of compost.

251. The non-official members of the Committee were told at Sivakasi in the Ramanathapuram district that the policemen of the Armed Reserve Lines had joined together and were collecting the nightsoil of all the 200 households in the police lines and composting it employing 3 scavengers and that they were making a good profit by the sale of the compost which they were utilising for providing amenities for other colony. The Agricultural Department should give adequate publicity to this venture and place the example of these policemen before the occupants of not only similar colonies of the Police Department but also of other colonies like those established at the sites of irrigation and electricity projects, housing colonies established by industrial establishments for their employees, etc., in those areas which are not situated within the limits of any panchayat running a nightsoil compost scheme of its own.

(iv) *Utilisation of Rural Nightsoil in Villages.*

252. In addition to the schemes for the development of local manurial resources in Community Development areas and the development of nightsoil composting in bigger panchayats the Government of India have desired that a pilot scheme for the utilisation of nightsoil in villages may also be implemented by the State Government. Accordingly, the Government have formulated a pilot scheme for introduction in 1958-59 in fifty villages with a population of less than one thousand. The fifty villages to be selected will be village panchayats and financial assistance will be given through the panchayats and where there is no panchayat,

through the extension staff of the Development blocks, for the construction of latrines, purchase of hand-cart, equipment, etc., as indicated below :—

Items of expenditure. (1)	For each village. (2) RS.	For fifty villages. (3) RS.
I Non-recurring.—		
(1) Cost of construction of latrines ..	Four Wardha type latrines and four water-seal closets (at Rs. 600 plus 60 each).	1,32,000
(2) Hand-cart for collection of rubbish.	500	25,000
(3) Implements—forks, pick-axe, etc.	60	3,000
(4) Water-supply to latrines in each village.	300	15,000
Total		1,75,000
II Recurring.—		
(1) Salary of scavengers at Rs. 30 each per month for each village.	.. ..	18,000
(2) Annual repairs at Rs. 15 for each village .. ..	.. ..	750
Total		18,750

253. It has been estimated that each village will be able to produce 150 tons of compost under this scheme by utilising rural night-soil and other manurial resources totalling 7,500 tons of compost (for 500 villages) which will be sold for Rs. 15,000 at the rate of Rs. 2 per ton of compost, as in the case of compost distributed under the Urban Compost Scheme. The net recurring expenditure, therefore, comes to Rs. 3,750 per annum.

254. The pilot scheme which will be implemented during the year 1959-60 is to be worked by the Agriculture Department and the staff employed for the development of local manurial resources will be utilised for the scheme. In addition, the farmer who has been given training under the abovesaid scheme, will, with the help of the full-time scavenger appointed in the village, work the scheme.

255. To popularise and propagate extensive manufacture and utilisation of compost, the Government have ordered that the Compost Week should be celebrated along with the National Tree Planting Week (Vanamahotsava). Accordingly, meetings are held during the week in different villages at which the necessity of preparing compost is explained and demonstrations for digging pits and preparation of compost are arranged wherever possible. Certificates of merit are awarded to those who prepare the maximum compost and the fact is widely publicised. The names of the recipients are also published in the Villagers' Guide and Calendar and the Grow More Food Journal.

(v) Sewage utilisation.

256. Sewage schemes utilising the sewage water mainly for growing fodder crops are now being run by the following thirteen local bodies :—

- (1) Madras Corporation.
- (2) Vellore Municipality.
- (3) Chidambaram Municipality.
- (4) Tiruvallur Municipality.
- (5) Coimbatore Municipality.
- (6) Dindigul Municipality.
- (7) Madurai Municipality.
- (8) Ootacamund Municipality.
- (9) Mannargudi Municipality.
- (10) Tanjore Municipality.
- (11) Tiruvarur Municipality.
- (12) Pudukkottai Municipality.
- (13) Srirangam Municipality.

257. Proposals for starting sewage schemes in the municipalities of Tiruchirappalli, Sivakasi, Nagapattinam and Srivilliputtur are under consideration. All other Municipalities and major panchayats are being advised to start their sewage farms not only as a remunerative enterprise but also as a measure for improving the sanitation of the towns concerned.

(vi) Suggestions.

258. While the present level of compost and green manure production is only about 25 per cent of the requirements on a safe estimate the target for compost production which is now fixed is far too low. A revised target should be fixed aiming at a production which should be calculated at the rate of 10 tons of compost per acre per annum for irrigated crops and 2 tons of compost per annum per acre for rainfed areas growing dry crops. An intensive drive should be launched to achieve this revised target. The work of compost development should be stepped up both in the Block areas and in the non-Block areas, additional staff being employed where necessary. Village-wise targets should be fixed for compost development and scrupulously adhered to and the progress of their achievement watched periodically.

259. Each ryot cultivating dry crops should be advised to set apart a portion of land—say 4 to 5 per cent—for cultivation of green manure as a pure crop in the regular crop season. If there are no wells in the land the crop may be cut before the end of the rains and

before the flowering stage and composted with rain water collected in a pit. The compost so made should be applied to the field in the following season. The Forest Department should provide space in the fringes of the reserved forests to ryots of the neighbouring villages for constructing their own compost pits. The Department may collect a nominal fee from the ryots per pit of specified dimensions.

260. Although cattle dung is invaluable for use as manure and its use as fuel is an avoidable waste mere propaganda in this regard will not yield any appreciable results until and unless alternative sources of cheap fuel like lignite briquettes from Neyveli are made available to the rural population. It will take some time before the lignite briquettes become available and the village forests that are now being developed for firewood purposes by the Forest Department become ripe for cutting. Meanwhile the feasibility of bringing within easy reach of the average ryot the cattle dung gas plants that are now being used in a very few places in the State should be investigated. The cattle dung gas plant not only permits the use of the cattle dung as fuel after its conversion into methane gas but it also at the same time enables the use of the cattle dung sludge ejected by the gas plant as manure *without any reduction in its manurial properties*. The cost of one cattle dung gas plant designed to utilise fully the cattle dung of four heads of cattle is reported to be Rs. 360. In order to popularise the use of cattle dung gas plants the Government should offer to give financial assistance for the setting up of one thousand of these plants in the shape of 50 per cent of the cost as a subsidy and the remaining 50 per cent as a loan. In all municipal conservancy yards and in the Madhavaram Milk colony the authorities concerned should be asked to instal cattle dung gas plants for the utilisation of the dung obtained by them for conversion into gas for being put to useful purposes so that the ryots in the neighbourhood can be taken to see the working of these cattle dung gas plants with a view to induce them to instal such plants in their own farmsteads.

(f) OTHER MANURES.

(i) Oil-cakes.

261. The field trials conducted with various types of oil-cakes in the different Agricultural Research Stations in the State have shown that oil-cakes when applied to paddy and sugarcane especially in conjunction with ammonium sulphate yield very good results. The estimated production of edible and non-edible oil-cakes in the State during 1956-57 is about 361,157 and 7,195 tons respectively. This quantity is not adequate to meet the cattle food and manurial requirements of this State. Though it is desirable that all the available stocks of edible oil-cakes should be used only as cattle-food

and for the preparation of food articles like biscuits their use as manure especially in the case of commercial crops cannot but be countenanced in view of the present shortage of other kinds of fertilizers. The export of oil-cakes outside the country should therefore be carefully regulated so as to ensure that enough supplies are made available for use within the country both as cattle-food and as manure.

(ii) Fish manure.

262. Fish manure is in the form of dried fish-meal or powder. In those parts of the country where fish oil is extracted, the residue can be used as manure. Fish manure contains in addition to nitrogen fairly large quantities of phosphoric acid. The manurial constituents present therein vary with the type of fish. It is a quick acting organic nitrogenous and phosphatic manure and is suitable for application to all crops on all soils. It should preferably be powdered before use. Very little of this manure is produced in the present Madras State. Prior to the reorganisation of States a limited quantity was produced in the West Coast at Kozhikode by the Fisheries Department. Excellent results have been obtained by application of fish manure to paddy, sugarcane, coconuts, tobacco and other crops in the West Coast and elsewhere. By virtue of its high nitrogen and phosphoric acid contents almost in equal proportions ranging from 3 to 6 per cent each depending upon the nature of the fish and admixture of sand therein, fish manure has a remarkable effect on crop growth and yields. Pamphlets about the efficiency of fish manure have been published by the Department of Fisheries. The result of the field trials carried out by the Agricultural Department have also been published to impress upon the cultivators the value of this important manure. For the production of fish-meal and manure, the Government have sanctioned a scheme for the installation of two plants of 20 cwt. capacity each one at Nagapattinam and the other at Tuticorin. The use of fish meal as manure after processing should be popularised with a view to its utilisation to the fullest extent especially in the coastal areas in this State.

(iii) Bonemeal.

263. Bonemeal is an important source of phosphatic manure in the country and is widely used for various crops with good results both individually and as an ingredient in manure mixtures. Normally raw bonemeal contains 3 to 4 per cent nitrogen and 20-25 per cent P2O5. The nitrogen in the bonemeal being in the organic form becomes slowly available to crops on decomposition in the soil. The phosphoric acid (P2O5) present in bonemeal is in an insoluble form but becomes available to crops rather slowly after the meal is applied to the soil. The availability increases with the fineness of the meal. Particles less than 3/32 inch in size are

considered as suitable for use as manure. Bonemeal may be applied to the soil either at sowing time or just before it. It should not be used as a top dressing but may be either drilled or broadcast. It is specially suitable for application to acid soils having an open texture with good drainage. It can be applied in large quantities without any detrimental effect on crop growth. When applied in conjunction with green manure under irrigated or puddled conditions the phosphorous in the bonemeal is rendered more soluble and thus becomes readily available to crops. Bonemeal is also applied in layers in the preparation of composts from farm wastes to hasten their decomposition and enrich the phosphoric acid content of the manure. Raw bones with horns and hooves are purchased by the bone-crushing firms. They manufacture raw bonemeal, steamed bonemeal, bone grist, sinews and horn and hoof meal. Bone grist is exported outside India and bonemeal is utilised mostly for the preparation of manure mixtures.

264. There is no systematic collection of bones in this State. However, out of the quantities that become available about 60 to 80 per cent in the urban areas and 75 per cent in rural areas are estimated to be collected. The estimated collections of bones of different animals during 1954-55 and 1955-56 were as follows:—

	TONS.
1954-55	8,000
1955-56	16,000

The higher collection during 1955-56 was due to the cyclone during that year in Tanjore and Tiruchirappalli districts and the consequent heavy mortality among animals. The important bonemeal collecting centres are Ootacamund, Valparai, Coimbatore, Pollachi, Munnar, Erode, Salem, Palani, Dindigul, Madurai, Dharapuram, Virudhunagar, Ramanathapuram, Tirunelveli, Tenkasi, Nagercoil, Tuticorin, Tiruchirappalli, Cuddalore, Villupuram and Madras. A few bonemeal digesters are now functioning in the following centres:—

- (i) T. Kalluppati.
- (ii) Virudhunagar.
- (iii) Sattur.
- (iv) Chinnamanur.
- (v) Gangavalli.

265. As bonemeal and hoof meal are two of the best sources of phosphate we recommend that their export to other countries should be banned. At the same time flaying centres equipped with bonemeal digesters should be opened on a co-operative basis in large numbers at the rate of at least one for every group of two or

three Development Blocks with a view to provide sufficient quantity of bonemeal for application to crops. The feasibility of recovering all by-products from bone material and the cost of production should be investigated as the production cost of bonemeal can be considerably reduced if the manufacture of gelatine and other by-products is undertaken by the bone crushing industry in this country.

CHAPTER XI.

DEVELOPMENT OF COMMERCIAL CROPS.

(a) SUGARCANE.

266. The Sugarcane Development Scheme which is included in the Second Five-Year Plan contemplates the stepping up of the production of cane by 10 lakhs tons by the end of the Plan period, i.e., by the end of the year 1960-61 by increasing the yield by 5 tons per acre in the development and non-development areas and by extending sugarcane cultivation in the new factory areas by 15,000 acres at an estimated acre yield of 30 tons. The following are the concessions given under the scheme to the cane growers for achieving the additional yields:—

(i) *Subsidy for raising and planting pure disease-free and healthy seed materials.*—The planting of pure, vigorous and healthy seed obtained from special nurseries is one of the important items in good cane cultivation. Usually, however, the ryots did not pay much attention to this important aspect and they used to plant any seed and mostly tops of mature cane without proper selection. This practice not only resulted in less production but also helped to spread the incidence of pests and diseases in the crop. The Agricultural Department has therefore been advocating the use of pure seed material grown in special nurseries under favourable conditions. The Government are affording the following financial assistance every year to the nursery men who raise good quality seed material and to the growers who plant the setts obtained from the special nurseries:—

(a) For supply of 15,000 sugarcane setts from approved nurseries—Rs. 10 as premium to the nursery-man who raised the seed under the supervision of the Agriculture Department.

(This is in addition to the cost of the seed which he gets direct from the growers at the prevailing rates.)

(b) For planting of 15,000 setts obtained from approved nurseries situated at a distance of six miles and less—Rs. 20 towards the cost of transport of the seed material from the nursery to the field of planting.

(c) For planting of 15,000 setts obtained from approved nurseries situated at more than six miles from the field of planting—Rs. 40 towards the cost of transport of the seed material from the nursery to the field of planting.

(ii) *Laying of manurial demonstration plots.*—In order to bring home to the sugarcane ryots the advantages of following improved methods of cultivation of sugarcane advocated by the Department, the optimum dosages of manure, etc., demonstration plots are laid out by the sugarcane development staff in ryots' holdings. In such cases the ryots who offer their lands and other facilities for laying the demonstration plots are paid a subsidy of Rs. 50 per plot to compensate them for the extra care and attention which they have to bestow for raising the crop.

(iii) *Intensive Manuring Scheme (Sugarcane).*—Under the Intensive Manuring Scheme (Sugarcane) now administered by the Revenue Department loans are given to the sugarcane ryots to adequately manure their crops at the rate of Rs. 150 per acre, subject to a maximum of Rs. 750 per individual. The maximum limit can be increased to Rs. 1,500 if an additional surety is given.

267. After the formation of the Andhra State the residuary Madras State had only one Sugarcane Research Station at Gudiyatham which had very little facilities for conducting intensified research in sugarcane. The Government therefore sanctioned the establishment of a Central Sugarcane Research Station at the Agricultural Research Station, Palur. As the area available at Palur was found to be inadequate a full-fledged Central Sugarcane Research Station was opened at Cuddalore on 17th March 1957 with an area of 77.56 acres taken on lease. The Government have sanctioned the acquisition of 135.49 acres of land at Cuddalore for the permanent location of this Station which is now engaged in all aspects of Sugarcane research. In addition there are two Sugarcane Research Sub-stations, one at Gudiyatham in the North Arcot district and the other at Kumaramangalam in the Tiruchirappalli district where experiments are conducted in the varietal, cultural and manurial aspects of sugarcane cultivation. There are also two Sugarcane Zonal Farms, one attached to the sugar factory at Pandiarajapuram in the Madurai district and the other attached to the sugar factory at Vadapathimangalam in the Tanjore district which are meant to tackle local problems and also serve as regional demonstration farms. The respective factories have provided the land for locating these Zonal Farms and they also meet the working expenses. The produce is delivered to the factories concerned. The Government propose to open such zonal farms subject to the same terms and conditions in other areas also where new factories are proposed to be established.

268. The roads leading to the sugar factories in the State are in many cases not quite fit for transporting sugarcane quickly from

the ryots' field to the factories. Any avoidable delay in the transport of cane from the field to the factory will result in the cane drying up with consequent loss both to the ryot and the factory. A scheme for the development of roads in sugar factory areas has therefore been included in the State Second Five-Year Plan. The length of the roads to be developed and newly formed is roughly 80 miles and the total estimated cost is about Rs. 18 lakhs. The scheme was actually started during the year 1957-58. Much progress could not however be made in that year owing to various administrative reasons. Works to the tune of Rs. 7.40 lakhs were programmed to be executed during the year 1958-59 and a budget provision of Rs. 7.84 lakhs has been made for the year 1959-60. According to the pattern of financial assistance by the Government of India for the scheme the beneficiaries have to meet one-third of the expenditure while the remaining two-thirds is to be shared equally by the Central and State Governments. So far the beneficiaries concerned, viz., the local bodies such as Panchayats and District Boards have not been either willing or able to pay their share of the expenditure due to the financial stringency with which they were faced. This major bottleneck was removed recently by the decision to waive the recovery of the share of the beneficiaries.

269. Another scheme designed for the benefit of sugarcane growers which has been included in the State Second Five-Year Plan is the scheme for the improvement of gur manufacture and storage. The object of this scheme is to find out the best method of producing good quality gur which can be preserved for a long time without undergoing deterioration during storage. The scheme was started in April 1957, at the Sugarcane Research Station, Gudiyatham, in the North Arcot district as the Gudiyatham area is noted for gur production. Under this scheme studies designed to find out the most suitable receptacles and methods for storing gur under village conditions, the best clarificant for obtaining gur of good colour and the furnace best suited for a gur ryot from the point of view of saving in time and economy in fuel consumption are being conducted.

270. We have already pointed out in Chapter III of this Report that the progress in achieving the Second Plan target of two lakhs tons of additional sugarcane per annum has been poor so far and that special steps should be taken by the Agricultural Department to make up for this poor progress in the remaining two years of the Second Plan period. We reiterate that the Agricultural Department should investigate the reasons for the poor progress so far and take special steps to achieve the Plan target in full by the end of the year 1960-61.

271. We consider that registered cane growers attached to a sugar factory should be supplied with their requirements of chemical

fertilizers through that factory. A bulk allotment should be made to each sugar factory calculated on the basis of the supplies to which its registered cane growers are entitled according to the principle adopted for distribution of the available supplies to the various categories of consumers in several areas in the State. The supply to the factory should be made on credit, and the value collected during the crushing season, interest being charged at the usual rates for the period from the date of supply to the date of payment of the value. In its turn the sugar factory should supply the fertilizers on credit to registered cane growers charging interest and collecting the value at the time the grower supplies his cane to the factory by deducting the amount recoverable from the price payable to the grower for his cane.

272. In order that the sugarcane growers may derive the utmost benefit from the inadequate quantities of chemical fertilisers that are now available it is necessary that they should know the nature of their soils and the particular deficiencies from which they are suffering. We therefore recommend that a soil testing laboratory should be established in each sugar factory area, the expenditure being met from the Sugarcane Cess Fund.

273. Representations have been made to us regarding non-availability of tractors for use in sugarcane cultivation. We recommend that the benefits of the Hire Purchase Scheme for tractors should be extended to the sugar factories also provided each factory undertakes to let out the tractors acquired by it under the Hire Purchase Scheme to the cane growers in the area for 50 per cent of the working hours of each tractor. The existing Tractor Hire Purchase Scheme itself need not be made applicable to the sugar factories but a separate new scheme may be launched in respect of them.

(b) OILSEEDS.

274. The target of additional production of oil-seeds to be achieved by the end of 1960-61 is 1.66 lakh tons. Research and development schemes designed to bring about this additional production are being implemented both within and outside the State Second Five-Year Plan.

275. Research work on groundnut, gingelly and castor is being conducted at the Agricultural Research Station, Tindivanam, in the South Arcot district and at the Groundnut Research Station, Pollachi, in the Coimbatore district with the main object of evolving strains with high yield, and high oil content and with the ability to resist pests and diseases. In addition, in the case of castor consequent on the increase in the practice of raising this oilseed on the banks of irrigation channels, on crop borders, tank bunds, etc., research work is being particularly directed towards the evolution of short duration cultures suitable for this purpose.

276. With the object of multiplying nucleus seeds of improved strains of groundnut and castor, a scheme financed jointly by the State Government and the Indian Central Oilseeds Committee was started during the First Plan period. Under this scheme four zonal nucleus seed farms have been established at Pollachi (Coimbatore district), Srivilliputhur (Ramanathapuram district), Tindivanam (South Arcot district) and Salem. The production of nucleus seeds on these farms as against the targets fixed during the last three years is given below :—

Year.	Strains.	Area sown.	Target quantity for nucleus seeds.		Achievement.
			ACS.	LB.	LB.
1955-56	Groundnut TMV. 1, 2, 3 and 4.	190	132,775	108,057	
	Castor TMV. 2 ..	10	2,400	1,437	
1956-57	Groundnut TMV. 1, 2, 3 and 4.	190	132,775	125,742	
	Castor TMV. 2 ..	10	2,400	793	
1957-58	Groundnut TMV. 1, 2, 3 and 4.	190	132,775	64,482	
	Castor TMV. 2 ..	10	2,400	1,370	

The short-fall in achieving the targets has been attributed to the prevalence of unfavourable weather conditions.

277. An oil-seeds development scheme has been included in the State Second Five-Year Plan. Its object is to increase the production of oilseeds by 70,000 tons at the end of the Plan period through (i) spread of area under improved varieties, (ii) adoption of intensive cultivation methods and effective control measures against pests and diseases, and (iii) extension of area under groundnut, gingelly and castor. The State target has been split up and allotted to each one of the Agricultural Demonstrators and Extension Officers for Agriculture throughout the State who carry on demonstration and propaganda for the implementation of the three items of improvement mentioned above and organize on a large scale seed farms for multiplying and distributing seeds of improved strains. To co-ordinate their activities and assist them technically four Special Development Assistants have been appointed under the scheme. The working of this scheme has been satisfactory as the following figures will show :—

Year.	Additional production of oil-seeds.	
	Target.	Achievement.
(1)	(2)	(3)
1956-57	13,088	14,808
1957-58	25,021	23,288

278. The balance target of 96,000 tons of increased oil-seeds production by the end of the Second Plan period is sought to be achieved by implementing a supplemental oil-seeds development

scheme outside the plan in the important project areas such as the Cauvery-Mettur, the Lower Bhavani, the Manimuthar and Amaravathi Project areas where conditions favourable for the large-scale cultivation of groundnut, gingelly and castor exist. Under this scheme which commenced functioning only from 1st January 1958 measures are being taken both for extensive cultivation (such as reclamation of waste lands, double cropping, inter-cropping) and intensive cultivation (such as spread of improved strains, plant protection, etc.). There will be no difficulty in achieving the target fixed for this scheme although it has been started late because the agriculturists in the project areas are very keen to grow oilseed crops especially groundnut. We recommend that maximum advantage should be taken of this favourable circumstance and that the target for the increased production of irrigated groundnut should be stepped up to the extent possible.

(c) COCONUTS.

279. There are about 123,000 acres (1956-57) under coconuts in this State and the production is estimated at 25,000 tons in terms of oil which is not sufficient to meet the internal demand. The need for stepping up the output is therefore imperative.

280. Consequent on the reorganization of States all the three coconut research stations of the composite Madras State went over to the Kerala State. A new Coconut Research Station has therefore since been started in the Tanjore district, where coconuts are extensively grown. The Station is located on a 30.85 acre site at Veppamkulam in Pattukkottai taluk. The programme of work at this station includes manurial and cultural experiments on standing palms designed to obtain maximum profit for unit area and introduction of exotic varieties and hybridisation of local and exotic varieties for making a close study of their performance under local conditions with a view to select the best performers for propagation.

281. Nephantis Serinopa (coconut caterpillar—கருந்தலைப்புழு) is a serious pest of the coconut palm. It feeds on the green matter of the leaves and in due course the attacked leaflets dry up. This pest is amenable to biological control by means of a certain parasite which destroys the pest at the pupal stage itself. The Government have established two stations for breeding this parasite, one at Nagercoil and the other at Gudiyatham.

282. In order to meet the growing demand for quality seedlings a comprehensive Coconut Nursery Scheme is being implemented for the past several years. This scheme was suitably revised and included in the Second Plan. Under this revised scheme which was implemented with effect from 1st September 1957 there are four coconut nurseries at Pattukkottai (Tanjore district), Tindivanam (South Arcot district), Coimbatore and Nagercoil (Kanyakumari district). The target fixed for them is 126,000

seedlings per annum by the end of the Plan period. Each seedling when it attains the normal bearing stage (after ten years) will yield on an average about 50 coconuts and 11,000 nuts will yield one ton of oil. It is expected that there will be no difficulty in achieving this target. The coconut nursery at Nagercoil has since been split up into two, the second smaller nursery being located at Shencottah. Two more nurseries, viz., those at Coimbatore and Tindivanam are also to be bifurcated, the new nurseries being located at Melalathur in Gudiyatham taluk and Kekuppam in Villupuram taluk.

283. Under the Second Five-Year Plan the Planning Commission has allocated a target of additional production of 8,080 tons of coconut oil for being achieved by the Madras State. The coconut palms that will be raised under the comprehensive coconut nursery scheme referred to in the previous paragraph will come to bearing only by 1970-71. A special Coconut Development Scheme is therefore being implemented under the Second Plan with effect from 11th June 1958 for achieving the target of 8,080 tons of coconut oil fixed for this State. The object of this Scheme is primarily to increase the yield of the existing coconut plantations by intensifying improved cultivation practices and secondarily to bring new areas under coconut cultivation. The duties of the special staff of six Agricultural Demonstrators assisted by six Demonstration Maistries employed under the Scheme are—

(a) making an intensive survey of the coconut tracts in each district and drawing up a plan showing the area of the existing coconut gardens and the fresh area that can be brought under coconut cultivation;

(b) laying out demonstration plots for demonstrating correct manurial and cultural practices;

(c) advising the coconut growers on matters relating to proper raising and maintenance of coconut gardens such as spacing, method of planting, inter-cultivation, manuring, control of pests and diseases, raising of subsidiary crops, etc.; and

(d) periodical inspection of the gardens planted with the seedlings supplied from the departmental nurseries and watching their performance.

284. An effective method of extending coconut cultivation is to plant coconut palms on the embankments of canals and channels. The total length of the banks of canals, irrigation channels, flood banks, etc., in this State which are suitable for planting coconuts is estimated at 470 miles. The Government ordered (in August 1958) that coconut seedlings should be planted on the embankments of canals, etc., found suitable for coconut cultivation according to a phased programme extending over three or four years to be drawn up by the Chief Engineer for Irrigation in consultation with the Director of Agriculture fixing a definite target

for each year and for each locality, so that the entire area may be covered in three or four years. The Agricultural Department should supply the required coconut seedlings to the Irrigation Department at the usual rate of fifty naye Paise per seedling ex-nursery. It should also give the necessary advice on the planting and after-care of the seedlings. The Public Works Department has been made responsible for rearing the seedlings and looking after them. The Chief Engineer for Irrigation has been authorized to come up to the Government with necessary proposals at the appropriate time, if any special staff or small temporary additions to the work charged establishment under the various project and canal divisions, minor irrigation works, etc., are considered necessary.

285. The possibility of reclaiming at least some portion of the Kazhuveli swamp near Merkanam in Tindivanam taluk in South Arcot district has been examined. Sometime ago this swamp which is about 27.5 square miles in extent was surveyed by the Joint Director of Agriculture (Planning and Development). He reported that there were two main soil types in this swamp area, viz., red and grey sandy loam and black clay loam with a tendency to crack during summer months. The former type was reported by him to be quite good for raising paddy especially on the south-western portions of the swamp area while the former type was considered ideal for coconut planting. It has been estimated that even if only 50 per cent of the cultivable waste area is utilized 3,000 acres can be brought under coconuts resulting in an annual additional production of 9 million nuts valued at Rs. 13.5 lakhs. The Director of Agriculture drew up a scheme for demonstrating the possibilities of quick reclamation of the swamp area by raising coconuts and other subsidiary crops. The scheme has been sanctioned by the Government who have ordered that it should be run for a period of five years to begin with in order that the manner of planting and maintenance of coconut seedlings up to the time of their coming to bearing may be properly demonstrated. Under this Scheme ten-acre blocks will be selected in at least four centres representing the varying conditions in the swamp. Two of them will be on the western side of the swamp area in Naduppakkam and Puduppakkam village limits where the lands are mostly sandy loam in texture and are not usually submerged. The other two will be in Kunimedu and Kaliperumpakkam villages, where the soils are black clay loam in texture and the lands are liable for submersion during the monsoon period. In the Demonstration Farms in these four centres coconut seedlings will be planted and reared on scientific lines. In the interspace between the coconut palms in the unsubmerged area green manure crops like daincha will be grown and incorporated into the soil. Other saline resistant crops like paddy and ragi will also be grown after the green manure crop during summer months in the initial stages. Growing of commercial crops like groundnut, vegetables, etc., will also be

attempted after one or two years when the soil is able to support a normal crop in order to demonstrate that the ryot who reclaims the swamp area can support himself by raising such crops until the coconut palms come to bearing. The Government of India have agreed to bear 50 per cent of the net expenditure on this scheme which has been included in the Second Five-Year Plan.

286. While appreciating the measures that have been taken and that are being taken by the Government to step up coconut production in the State we consider that some special steps are necessary to develop coconut plantations in the coastal areas. We recommend that a special drive should be launched for coastal planting of coconut palms particularly in the districts of Tanjore and Ramanathapuram.

(d) COTTON.

287. The target of additional production of cotton to be achieved by the end of the Second Plan period has been fixed at 1.55 lakh bales (each bale is of 392 lb. lint) over the production in the base year 1955-56 which stood at 3.12 lakh bales. The present production of various types of cotton and the actual requirements of the mills in this State are as shown below :—

Type of cotton.	Present production in lakh bales (of 392 lb. lint) (1956-57).	Actual consumption by local mills in lakh bales (of 392 lb. lint).	Deficit in lakh bales (of 392 lb. lint).
(1)	(2)	(3)	(4)
Long staple	2.88	3.50	0.62
Medium staple	0.41	4.75	4.34
Short staple	..	..	..

These figures would show that even if the Second Plan target is achieved in full there will still be a big deficit to be made good. The deficit is now being made up by imports from other States within the country and from abroad.

288. Intensive research work for improvement of the cotton strains grown within this State is carried on at the Cotton Section of the Agricultural Research Institute, Coimbatore, where a wide variety of problems in agronomy, genetics and cytology on both irrigated Cambodias and rainfed 'desi' cottons are being tackled. The introduction of new types of cotton and the acclimatisation of suitable types in different areas and the utilization of wild species of cotton collected from various parts of the world to transfer some of their desirable features like resistance to drought and immunity to pests and diseases to the existing cultivated types are some of the other lines of study that are being actively pursued in the Cotton Section of the Agricultural Research Institute, Coimbatore. Sub-stations have been opened in different centres in

the State, viz., Koilpatti, Srivilliputtur, Periakulam, Palur, Aduthurai, Bhavanisagar, Avanashi and Tiruchengode to solve local problems in cotton improvement and meet individual needs of particular tracts.

289. It was in 1908 that Mr. Steele introduced a new irrigated variety of cotton from Cambodia in Indo-China into Virudupatti now known as Virudhunagar. This proved so successful that by 1920 it had spread over an area of 1.25 lakhs acres. The first improved strain in Cambodia cotton was given out in 1929 as CO. 2. This had very desirable features but its long duration of 7 months was a handicap to its wider spread. To remedy this draw-back an extensive hybridisation programme was taken up and this led to the isolation of Cambodia 4 which was released for general cultivation in 1950 after renaming it MCU.I (Madras Coimbatore Uganda 1). This superior strain is now being grown as a standard variety in both the summer and winter cotton areas in Madras State. Even outside the State it is becoming quite popular under the trade name of "Rajapalayam". MCU.I has a staple length of one inch and spins upto 43 counts, besides giving an extra yield of 33 lb. lint per acre fetching an additional income of Rs. 80 per acre. On account of its superior lint length and spinning qualities this cotton strain has been placed outside the purview of price controls by the Government of India. Recently a still better strain has been evolved, viz., MCU.2. This strain too has been exempted from price control and it has been declared as the standard strain for the summer Cambodia area. In the rice fallows of the deltaic areas of the Tanjore district a long staple early maturing Punjab American Cotton strain—P.216F.—of five months' duration has been introduced and it has proved to be very promising.

290. In the improvement of 'desi' cottons work was started very early at the Agricultural Research Station, Koilpatti, and by 1903 several improved selections had been made available such as CO.7, CO.10 and Karunganni I. Further work on hybrid material at Coimbatore and Koilpatti yielded two superior strains viz., K2 and K5 that are suitable for the Southern and Central districts respectively of the Madras State. These strains have now practically replaced all the other older strains by virtue of their yielding 25 per cent more lint, spinning higher counts and giving Rs. 30 of additional income per acre.

291. A new improved Cambodia strain 9030.G is proposed to be released shortly. This new strain is reported to possess better attributes in regard to staple length, ginning per centage and yield. It is also reported that this new strain is resistant to pempherulus (stem weevil) attack. The multiplication and distribution of this new strain with a view to replace the MCU.I strain by it is proposed to be taken up very soon.

292. Similarly a new improved Karunganni strain 6186-9, named as K.-6, is reported to be superior in all respects to the existing strains and to be capable of replacing K-5 in central districts and K.-2 in the southern districts, thus making it possible to unify the entire Karunganni tract under one cosmopolitan strain. A scheme for bringing about such an unification is proposed to be launched from the year 1960 onwards.

293. A Cotton Extension Scheme has been in operation in this State even prior to the implementation of the First Five-Year Plan. This scheme was run as a Plan Scheme during the First Plan period and it is now being continued under the Second Plan. The object of this scheme is to increase the total production of good quality cotton in this State both by extensive and intensive cultivation. The extensive cultivation measures are—

- (i) reclamation of fallow and waste lands and growing cotton on them;
- (ii) replacing other crops by cotton on lands which are better suited for cotton cultivation;
- (iii) double cropping, e.g., growing P-216-F cotton in rice fallows; and
- (iv) inter-cropping i.e., growing of cotton along with other crops wherever this is feasible.

The intensive cultivation measures adopted under the scheme are—

- (i) use of improved seeds;
- (ii) application of ammonium sulphate particularly to irrigated cottons;
- (iii) adoption of improved methods of cultivation such as sowing correct quantities of seeds, sowing in lines or in ridges, adopting correct method of picking, etc.; and
- (iv) adoption of proper, adequate and timely plant-protection measures.

The targets under the scheme and the achievements recorded so far are as follows:—

Year.	Target (bales of 392 lb. lint).	Achievements (bales of 392 lb. lint).
(1)	(2)	(3)
1956-57	40,000	28,320 (a)
1957-58	69,000	37,840 (b)
1958-59	97,000	13,200 (c)
1959-60	128,000	..

- (a) Season and Crop Report (1956-57) figure.
 (b) Final forecast estimate of the Director of Statistics.
 (c) Rough estimate of the Director of Statistics.

294. A scheme for the multiplication and distribution of MCU I cotton seeds in the winter cropped area of the Madras State is in operation. The object of the scheme is to convert the staple

length of the Cambodia cotton grown in the central districts of Coimbatore, Madurai, Salem and Tiruchirappalli from 7/8 inch to 15/16 inch staple to a full one inch staple, thereby reducing the necessity for importing long linted quality cotton from foreign countries like Africa and Pakistan. Another scheme with the object of covering an area of 1,88,700 acres in the central districts of the State comprising the Coimbatore, Salem and Tiruchirappalli districts and part of the Madurai district with Karunganni 5 cotton is also under operation. Yet another scheme that is being implemented is one whose object is to multiply and distribute K-2 and MCU. 2 cotton seeds in the entire Karunganni grown areas and summer Cambodia grown areas of Ramanathapuram and Tirunelveli districts. The strain MCU. 1 was replaced by the new strain MCU. 2 in these areas from the summer of the year 1955. Since then the work of multiplication and distribution of MCU 2 cotton has been handed over to the Srivilliputtur Uganda Cotton Growers' Co-operative Society to which the Government have lent the services of an agricultural Demonstrator and two fieldmen free of cost. Another cotton development scheme which is in operation is the scheme for the multiplication of P. 216-F cotton seeds in the Tiruchirappalli district on a large scale for distribution in the Tanjore, Tiruchirappalli, South Arcot and Chingleput districts for raising cotton in the rice fallows in these districts.

295. With the main object of encouraging the production, marketing and maintenance of special superior varieties of cotton in a pure state the Textile Commissioner, Bombay, while fixing the ceiling and floor prices of cotton in India has excluded certain long staple varieties of cotton from price control. MCU. 1 and MCU. 2 are the two superior varieties of cotton of the Madras State which have been excluded as already stated from the list of controlled varieties and have been exempted from price control. In order to qualify for this exemption certain conditions attached to the Cotton Control Order have to be satisfied and a certificate of purity has to be obtained from the State Department of Agriculture. These conditions are—

(a) every grower of superior cotton should register himself with the State Department of Agriculture indicating the area planted;

(b) the seeds required for sowing such cottons should be approved and supplied by the State Agricultural Department;

(c) the crop registered should be 95 per cent pure.

(d) the kapas or lint should possess a minimum staple length of one inch or more; and

(e) the ginning and processing of the produce should be done in the factories specially licensed for the purpose under the supervision of the certification staff and a certificate of purity issued by the State Agricultural Department for the pressed bales.

296. In order to enable the cotton growers of this State who are eligible for this concession of exemption from price control to obtain the full benefits of it the Government of Madras are running a certification scheme since 1951, which is worked by a special staff of one Gazetted Certification Officer of the rank of an Assistant Cotton Specialist, one Gazetted Assistant, eight Certification Inspectors of the rank of Agricultural Demonstrators, ten fieldmen and sixteen to twenty maistries. Strict compliance with the provisions of the Cotton Control Order necessitates the starting of certification from the time the crop is sown. The crop is examined in the field and all the off-types are arranged to be removed by the growers in order to ensure a minimum purity of 95 per cent. The kapas is examined in the store-house, the lint in the ginneries and godowns and the same is processed under the supervision of the State Agricultural Department with a view to effectively prevent admixture with other inferior cottons. A representative of the textile industry nominated by the South Indian Mill Owners' Association is associated in the final lint certification work in each pressing centre. This procedure has created confidence in the certified cottons among the consuming mills and the traders. It has been reported that on a modest estimate the certification scheme has enabled the grower of certified superior cotton to get an extra income of Rs. 40 to 60 per acre for an average yield of 900 lb. kapas per acre. The merchants benefit as they get higher prices for the certified lint which sells at a premium of Rs. 100 to Rs. 200 per candy of 784 lb. of lint. The consuming mills benefit as they are able to obtain their requirements of superior pure quality cotton. Thus the scheme is very popular with the growers, merchants and millers.

297. In order to step up the area in the State under improved high yielding good quality cotton varieties the Government of Madras have issued the Madras Cotton Control Order, 1958. Under this order the Government may by notification in respect of any area specified therein (a) fix the variety or varieties of cotton, the cultivation of which is permitted in such area or (b) prohibit the cultivation in such area of any variety of cotton other than the permitted variety or varieties or (c) prohibit in such area the mixing of any variety of standard cotton with any other variety of standard cotton or with any prohibited variety of cotton whether mixed with any other standard cotton or not.

298. As has been stated earlier the progress in achieving the annual targets under the Second Plan has been poor so far. Hence unless very vigorous measures are adopted by the Agriculture Department in the remaining two years of the Second Plan period, the Plan target cannot be achieved in full.

(e) TOBACCO.

299. Madras ranks in the matter of tobacco cultivation as the fourth important State in India with a total extent of about 48,000

acres under this crop (1956-57) and a total production of about 28,000 tons of cured leaf of various types both for chewing and smoking purposes. The area under tobacco cultivation is spread over as many as ten districts of which Coimbatore alone accounts for about 34,000 acres.

300. The only research scheme for tobacco now under implementation is the scheme for the improvement of Meenampalayam tobacco. The chewing type of tobacco is one of the chief commercial crops grown in the Coimbatore district. The tobacco grown in the areas now served by the Lower Bhavani Irrigation Project and marketed under the trade name of Meenampalayam tobacco commands a very high market value on account of its taste and keeping quality, which are mainly attributed to the nature of the soil and the brackishness of the well water used for irrigating the crop. But after the opening of the Lower Bhavani Project the seepage water flowing from the adjoining canal into the wells in this area has reduced the original brackishness of the water in the wells in this area and thereby affected the peculiar flavour to which the Meenampalayam tobacco owed its popularity. In order to restore its original qualities to this tobacco investigations on the possibilities of producing a quality crop similar to that previously obtained with brackish water from the wells utilizing the present-day well water or canal water supplemented with potassium salts are being conducted under the scheme referred to above at the Agricultural Research Station, Bhavanisagar. Another object of this scheme is to increase the average yield appreciably by finding out a method of judicious manuring and by selecting the optimum time for planting in order to get the advantage of favourable weather conditions for good growth and development of the crop.

301. In view of the reputed superiority of the cultivation and curing methods adopted in respect of tobacco in Jaffna, Ceylon, to similar methods adopted in this State the Government desired to launch a scheme for the experimental cultivation of Jaffna tobacco and curing Meenampalayam tobacco by the Jaffna method in this State. They therefore deputed an officer of the State Agricultural Department to undergo training in the improved methods at Jaffna for a period of over a year. This officer has returned after finishing his training and has submitted his report. We understand that only a pilot scheme based upon the officer's report is proposed to be implemented and that even this pilot scheme is yet to be drawn up in its final form. We hope that an early decision will be taken in this matter and that the knowledge gained by the officer deputed to undergo training at Jaffna at considerable cost will be fully and properly utilized in improving the cultural and curing operations of the tobacco crop in this State.

302. The only tobacco development scheme which is now being run in this State is a scheme whose area of operation is confined solely to the Kanyakumari district. The main object of this scheme

which is to be worked for a period of three years from 1958-59 is to extend the area under tobacco cultivation in that district from 300 acres to 1,000 acres. The scheme envisages grant of crop loan advances to deserving growers, supply of quality seeds at nominal rates, the conduct of demonstrations on proper methods of manuring plant protection and curing and processing and providing technical assistance to growers in regard to all aspects of tobacco cultivation. We recommend that the question of giving similar incentives and encouragement to tobacco growers in the other districts also should be taken up at once and that a comprehensive tobacco development scheme covering the entire State should be launched very soon.

(f) CASHEW.

303. An area of about 66,000 acres (1956-57) is under cashew in this State, the principal cashew-growing districts being South Arcot, Tiruchirappalli, Tanjore and Kanyakumari. The annual production has been estimated at about 11,000 tons of unshelled nuts. As there is considerable scope for a large-scale expansion of the area under this valuable dollar-earning crop both in the forest areas and the other areas in this State, a very high target of additional production, viz., 21,000 tons which represents 87.5 per cent of the production at the end of the First Plan period has been fixed for achievement by the end of the Second Plan period.

304. The State Forest Department is implementing a big scheme for bringing under cashew over 45,450 acres in the ex-panchayat reserved forests and in the ex-zamin forests in the Chingleput, South Arcot and Salem districts and in other areas in the districts of Tirunelveli, Ramanathapuram, Tiruchirappalli, Tanjore and Coimbatore. This scheme was launched in 1956-57 and during the last two years a total area of 18,574 acres has been covered. The plantings are reported to have established well and progressing satisfactorily. The target is expected to be achieved in full without any difficulty.

305. As regards the non-forest areas, a scheme was sanctioned in September 1957 under which cashewnuts were procured from selected cashew trees and distributed to prospective cashew growers at cost price on a "no loss no profit" basis. During the year 1957-58, a total quantity of 4,228 lb. of cashew seednuts were so distributed the area newly brought under cashew thereby being estimated at about 1,434 acres.

306. This scheme has since been merged with the scheme for the development of cashewnut cultivation in this State which was sanctioned in December 1958. The object of this scheme is to extend the cultivation of cashewnut over an area of 20,000 acres in all the districts of the State except the Nilgiris and particularly in the east coast districts and in Kanyakumari by the end of the Second Plan period. The scheme for implementing which a special staff of one Cashew Development Officer, three Horticultural

Assistants and six Fieldmen has been appointed contemplates the achievement of the target by (a) establishment of nurseries and distribution of good quality planting materials; (b) provision of free technical guidance to growers; and (c) grant of long-term loans for starting new plantations at the rate of rupees eighty per acre subject to a limit of Rs. 2,000 per individual to be recovered with interest in five annual instalments commencing from the sixth year.

307. The targets of increased acreage under cashew have no doubt been fixed high. But we feel that there is scope for fixing them still higher both for the forest and non-forest areas. We would suggest that the possibility of raising the target in both cases should be explored and that the Agricultural and Forest departments should not rest content with merely achieving the targets already fixed.

(g) TAPIOCA.

308. About 40,000 acres (1956-57) are under tapioca in this State. About two-thirds of this area is in Kanyakumari district and about one-sixth of the area is in Salem. Tirunelveli ranks third with about 3,000 acres under tapioca. Tapioca is the poor man's food particularly in the years of scarcity of cereals. It is also valuable as sizing material. In recent years, its value has increased as the sago industry has developed in this State utilizing tapioca as the raw material. This industry is largely centred in Salem town. The non-official members of the Committee saw two Sago Factories one in Salem town and the other at the outskirts of Coimbatore. The Agricultural Department should devote due attention to the improvement of the tapioca crop. Tapioca should be included in the State Seed Farm Programme particularly in the Salem and Kanyakumari districts for raising cuttings of improved varieties of tapioca for supply to ryots.

(h) POTATOES.

309. About 23,000 acres (1956-57) are under potato in this State of which more than 20,000 acres are in the Nilgiris district and about 1,600 acres in the Madurai district. The Nilgiris Co-operative Marketing Society has been functioning from 1935 with the main object of helping the potato growers to market their produce. The non-official members of the Committee who met the officers of this Society at Ootacamund were informed that till the starting of the Society the potato growers were at the mercy of a handful of merchants at Mettupalayam who were monopolising the potato market and were dictating terms which were not favourable to the growers. Proper weights and reasonable prices were not in vogue and growers had to stay at Mettupalayam for days together to obtain payment for their produce incurring heavy expenditure. The Society has a branch at Mettupalayam which is the main marketing centre for potatoes. The society's lorry is used for bringing the produce of the members to the Society's branch at Mettupalayam.

If local market rates are favourable, the stocks are sold to the local merchants in consultation with the members concerned. If the members desire to export, then the goods are weighed and packed in bags of 100 lb. and despatched to places like Calcutta. The Society acts only as an agent of its members and renders marketing service charging a commission of one rupee per bag of 200 lb. If the members require advances before sale, they are paid advances up to 75 per cent of the market value of their produce subject to a maximum of Rs. 3,000 per individual. Such advances are deducted with interest at $6\frac{1}{4}$ per cent per annum from the sale proceeds and the balance paid to members immediately. As against 12,999 bags valued at Rs. 5.04 lakhs marketed in 1951, 94,593 bags valued at Rs. 24.23 lakhs were marketed by the Society in 1957. During the year 1958, 117,214 bags valued at Rs. 39.32 lakhs had been marketed. Although there has been such a considerable increase in the quantity of potatoes marketed through this Society, the non-official members of the Committee were informed that only one-sixth of the total produce of the Nilgiris district was marketed through the Society in spite of the fact that the members obtained by sale through the society a price which was 30 per cent more than the price which they obtained for the produce if they marketed it themselves. It is understood that the reason for this was that while the credit societies gave only cultivation advances and did not give loans to members for meeting their other requirements, they have to raise large amounts as loans from private parties mostly for meeting their domestic requirements. Invariably one of the conditions subject to which the private parties gave loans was that the potato grower should sell a specified quantity of his produce to the money-lender at a price fixed by him and as a result the bulk of the produce was not being marketed through the society. We recommend that steps should be taken to meet the entire credit requirements of the potato growers in the Nilgiris district through co-operative agency with a view to enable them to market their entire produce through the Nilgiris Co-operative Marketing Society.

310. A particular kind of manure mixture suitable for the potato crop evolved by the State Agricultural Department which is known as 'Nanjanad Mixture' and whose ingredients are groundnut cake powder, ammonium sulphate, superphosphate, potash and bone meal is applied to the potato crop. The Nilgiris Co-operative Marketing Society prepares this Nanjanad mixture and sells it to the village co-operative societies on credit terms through the local co-operative central bank. Sales to individual members are generally for cash. Credit is given to them wherever necessary but only to the extent of their paid-up share capital. While in 1951 the Society had supplied 1,781 bags of potato manure valued at Rs. 0.60 lakh, it had supplied in 1958, 104,471 bags of potato manure valued at Rs. 34.47 lakhs. In spite of the phenomenal increase in the quantity of the manure mixtures supplied by the Society to the growers, still the quantity of manure mixture distributed by

the co-operatives and the private firms is in the ratio of 40 : 60. The non-official members of the Committee were informed that usually the price charged by the co-operatives per bag of 200 lb. was Rs. 11 less than the price charged by the private firms. This position will be remedied if our recommendation in Chapter X of this report that more co-operative manure mixture societies should be started and that they should be given adequate quantities of straight fertilizers for the manufacture of manure mixture is accepted and implemented by the Government.

311. It was represented to the non-official members of the Committee when they were at Ootacamund that there was very great dearth of good quality potato seeds and that the extent to which the quality of seed potatoes had deteriorated could be gauged from the fact that while a few years ago they were obtaining 10 bags of potatoes by sowing one bag of seed potatoes, they were now able to obtain only three bags of potatoes by sowing one bag of seed potatoes of the present day quality. The Deputy Director of Agriculture, Coimbatore, informed them that it was necessary to import from Scotland at least 120 tons of seed potatoes per year for three consecutive years. We feel that for some years to come it will be absolutely necessary to import seed potatoes from abroad of Great Scot and other similar varieties, until the State attains self-sufficiency in regard to its good quality potato seed requirements.

(i) HORTICULTURE.

312. At present, horticultural research is being carried on in this State at the following eight stations :—

- (1) Pomological Station, Coonoor.
- (2) Sub-Tropical Station, Burliar (on the slopes of the Nilgiris).
- (3) Tropical Fruit Research Station, Kallar (on the slopes of the Nilgiris).
- (4) Government Botanic Gardens, Ootacamund.
- (5) Sim's Park, Coonoor.
- (6) Central Banana Research Station, Aduthurai.
- (7) College Orchards, Coimbatore.
- (8) Fruit Station, Cape Comorin.

In addition in order to make good the loss to this State of the famous Kodur Fruit Research Station which has gone over to Andhra Pradesh as a result of the reorganization of States, a Multi-crop Fruit Research Station has been started at Periyakulam under the control of an Horticulturist. The object of this station is to intensify research work on the three varieties of fruits, viz., mango, citrus and grapes of the southern and central districts of the State and their improvement by the introduction of superior varieties from other regions. This Station has just been started on lands which have been acquired only recently.

313. The Government established some years ago three model orchards-cum-nurseries at Thimmapuram in Salem district, Coonoor in the Nilgiris district and Periyakulam in Madurai district to serve as demonstration centres of the practical results of fruit research and as supply centres for plants of assured quality. They have since sanctioned the establishment of two more model orchards-cum-nurseries, one at Courtallam to serve the Kanyakumari, Tirunelveli and Ramanathapuram districts and the other at Kodaikanal to serve the Kodaikanal area and the Lower Palnis. The question of establishing two more model orchards-cum-nurseries at suitable centres to cover the remaining districts is under consideration.

314. The Government have sanctioned a scheme for the development of fruit production and the employment of the necessary technical field staff in the districts comprising of one Horticultural Assistant and one Deconstruction Maistry (trained Mali) in each district to give technical advice and guidance to fruit growers in all problems relating to fruit culture. The programme under the Scheme envisages extension of the area under fruit cultivation and improvement of the existing orchards to increase fruit production. Under the Scheme long term loans are issued for planting new orchards at Rs. 300 per acre to prospective fruit growers after inspection of their lands by technical staff to determine their suitability for fruit cultivation. The loans are issued partly in kind in the form of fruit plants and partly in cash and will be recovered in ten annual instalments commencing from the sixth year onwards. Short term loans are issued for rejuvenation of old orchards at Rs. 65 per acre. Accurate statistical data on the area and production of fruits in the State will be compiled under the Scheme. The Scheme which was sanctioned by about the end of the year 1957 commenced functioning only recently as there was some delay in finalising the procedure for the issue of loans. In the Development Blocks vegetable seeds and fruit seedlings are supplied to ryots at half cost.

315. The production and consumption of fruits which are valuable protective foods is very low in this State and they have to be stepped up very considerably in order that the consumption may reach normal nutritional standards. According to Dr. Akroyd the daily consumption of fruits per head should be at least three ounces per day or 68 lb. per head per annum. The actual requirements of this State at this rate and on the basis of the present population (33,153,000 in 1957-58) works out to about 10 lakhs tons. But the present production is estimated to be less than 4 lakhs tons. It is anticipated that by working the various schemes in the Second Plan and adopting the targets specified for each of them production of fruits in this State would be increased only by 5,000 tons due to the planting of new orchards and that too only after the trees attain their normal bearing age and by another 15,000 tons on account of rejuvenation of old orchards. This increase will by no means suffice to bridge the very big gap between the present production and the

consumption requirements. We recommend that steps should be taken to increase the production of fruits to as high a level as possible. As one of the measures for achieving this objective an orchard-cum-nursery and horticultural research centre should be established at the Sathanur Reservoir Project Dam site taking advantage of the facilities available there for this purpose. The possibility of setting up similar orchard-cum-nurseries and research centres in the other irrigation dam sites should be investigated.

316. Care should be taken to propagate the cultivation of those varieties of nutritious fruits which are already popular with the masses and the prices of which will be within the reach of the common man and also those varieties of fruits for developing which the conditions in this State are very favourable. For instance greater attention should be paid to the development of grapes. The Non-official Members of the Committee learnt from the Horticulturist in charge of the Multi-crop Fruit Research Station at Periyakulam that the yield of grapes in South India is the highest in the whole world and that nowhere else in the world does the grapevine yield two crops per year as it does in South India.

317. Adequate attention should be paid to canning. In its bearing season the supply of each fruit will be enormous and also far in excess of the demand for immediate consumption. In order to enable the fruit grower to get an economic price for his produce at this time the canning of fruits and extraction and preservation of fruit juices should be encouraged by giving all the necessary facilities and incentives for carrying on the business on a cottage industry basis in the homes of the orchard owners in the producing areas and for starting fruit growers' co-operatives in those areas to enable the setting up of small plants for canning and for extraction and bottling of fruit juices and for assisting the fruit growers to market their produce without the interference of intermediaries. Steps should also be taken to even out the supply of fresh fruits throughout the year or during the greater portion of the year to the extent possible. For example off season mangoes are thriving well in the Government Fruit Farm at Cape Comorin. The reason for this should be studied and propagated among the fruit growers so that they can even out their production and maintain supplies to the market for a much longer period than is the case at present.

318. Steps should be taken to develop the cocoa industry in this State. The famous and most superior variety of cocoa, viz., the Criollo variety is being grown at Thengumarahada on the lower slopes and practically at the foot of the Nilgiris by the Thengumarahada Co-operative Farming Society. It is understood that the members of this Society were informed by a recent visitor from Ghana that the Thengumarahada area was the best and most suitable area for cocoa cultivation in the whole of India. The forest lands in this area may be leased out to agriculturists who come forward to raise cocoa plantations,

CHAPTER XII.

PLANT PROTECTION.

319. There is a well-organised plant protection service in the Madras State. Till recently it was headed by two Gazetted Officers, viz., the Plant Protection Officer (Entomology) for the control of pests and the Plant Protection Officer (Mycology) for the control of diseases of crops and plants who were assisted by 31 Plant Protection Assistants, 38 Demonstration Maistries and 38 Messengers distributed throughout the State. But as this staff was found to be inadequate to cope with the growing demand for its services the Government have sanctioned the employment of an additional staff of two Plant Protection Officers, six Plant Protection Assistants, four Technical Assistants, six Maistries and six messengers. There are at least two Plant Protection Assistants, one for Mycology and another for Entomology in each district with two Maistries and two Messengers under them and in those districts where the incidence of pests and diseases is usually heavy there are additional Plant Protection Assistants, Maistries and Messengers. The advice and assistance of the Government Entomologist and the Government Mycologist at Coimbatore are always available to the Plant Protection Organization and their services are availed of whenever necessary.

Sprayers and dusters required for carrying out control measures and for conducting demonstrations are stocked in the agricultural depots. For attending to the work of repairing and servicing of these sprayers and dusters there is one mechanic at the headquarters of each of the four Deputy Directors of Agriculture.

320. The Plant Protection Assistants tour in the villages and whenever incidence of pest or disease is noticed the fact is reported to the District Agricultural Officer concerned. If after inspection of the area the District Agricultural Officer finds that the pest or disease is likely to spread he declares the area as "pest affected" and orders the issue of pesticides and fungicides at half cost to ryots. In the Development Blocks he even orders that pesticides may be supplied to ryots free of cost if in his opinion the outbreak of the epidemic is so sudden as to warrant such free supply. A sum of rupees seven thousand five hundred for a period of five years has been provided for each Block for this purpose. He also arranges for demonstrations with the help of the Plant Protection Assistants and Maistries to demonstrate to the ryots the control measures to be adopted with the latest pesticides. The use of hand-operated sprayers and dusters and the use of power sprayers also is popularized among the ryots. With a view to induce ryots to have their own sprayers and dusters to take timely action for the control of pests and diseases without depending on the Agricultural Department these appliances are supplied to the ryots at half cost. Five hundred sprayers and two hundred dusters were distributed at half

cost to ryots during 1957-58. It is estimated that 2,500 sprayers and 500 dusters would have been distributed at half cost during the year 1958-59. It is programmed to distribute an equal number of sprayers and dusters at half cost during the year 1959-60.

321. The District Agricultural Officers have been instructed to keep in stock as much quantity of chemicals as may be needed for plant protection work in their respective districts in the light of past experience. When the stock held proves to be inadequate the required extra quantity is rushed into the district from other areas. The question of giving priority for booking such consignments by rail has been settled with the authorities of the Southern Railway. In cases of emergency where there is likelihood of delay in transport by rail the District Agricultural Officers have instructions to obtain their requirements by lorry.

322. In order to combat sudden outbreaks of pests and diseases in any area four regional plant protection centres have been established at Coimbatore, Madurai, Tanjore and Madras, where a sufficient number of sprayers and dusters are always kept in readiness to meet any emergency. In addition to these four centres maintained by the State Government, the Central Government have established a similar Centre of their own at Tiruchirappalli. Over and above these centres which are common for all crops there is a special plant protection scheme for oilseeds alone sponsored by the Indian Central Oilseeds Committee which has sanctioned the location of three pest fighting units in this State. Each of these units will be equipped with 50 sprayers and 50 dusters and will be capable of tackling 25,000 acres. Thus all the three units can tackle a total area of 75,000 acres. These units will be very helpful in combating the red-hairy caterpillar pest of the groundnut crop.

323. An idea of the progressive results achieved by the Plant protection measures adopted by the Agricultural Department can be had from the following figures:—

(1)	Area treated.	Number of trees treated.	Value of crops, etc., saved.
	(*)	(3)	(4)
	ACRES IN LAKHS.	LAKHS.	RUPEES IN LAKHS.
1955-56	2.95	1.15	108
1956-57	4.15	1.72	128
1957-58	5.73	2.99	168

Roughly speaking Rs. 30 lakhs worth of insecticides are used for crops in the Madras State every year.

324. The State Agricultural Department is arranging to issue a weekly forecast containing information regarding the appearance of pests and diseases and the remedial measures to be taken and to

give wide publicity to it through the Press and over the Radio so that ryots may have advance intimation of the incidence of pests and diseases and may take prompt steps to combat them.

325. It is estimated that about one-fifth of the country's potential agricultural production is destroyed annually while the crops are growing. This destruction is caused not only by insect pests and diseases but also by rodents and animals. Due attention is therefore being paid to the question of protecting the crops from rodents whose numbers are reported to have increased considerably in many areas due to the indiscriminate killing of snakes owing to the great demand for snake skins for manufacture of fancy articles like belts, purses, vanity bags, etc. The Madras Government have sanctioned a pilot scheme for the destruction of rats. The object of the scheme is to destroy the field rats in a compact block in selected Development Blocks which are heavily infested with rats and where a variety of important crops are extensively cultivated.

326. Although the use of insecticides and pesticides for crops is rapidly growing there is still a certain amount of reluctance to use them on the part of the illiterate and less progressive ryots in certain parts of the State which has to be overcome. The Madras Government therefore arranged for the free demonstration of plant protection measures to the ryots in select areas in the districts of South Arcot, North Arcot, Ramanathapuram, Madurai, Salem and Coimbatore, during the year 1958-59, the expenditure to be incurred in this regard being limited to Rs. 500 per district.

327. As prevention is always better than cure the question of giving prophylactic protection to crops by undertaking plant protection measures as a routine measure designed to give immunity to the crops instead of resorting to these measures only after there is an outbreak of disease or a pest attack has been engaging the attention of the Madras Government. The huge cost involved has deferred the Government from launching a scheme of giving prophylactic protection to all crops throughout the State. They have however sanctioned a pilot scheme for the adoption of prophylactic plant protection measures against pests and diseases of the paddy crop in an area of 1,000 acres in the Madurantakam taluk of the Chingleput district. Under this scheme the prophylactic treatment will commence with the treatment of seed with Agrosan G.N. Spraying and dusting for control of diseases and pests will be given at regular intervals at the time when they are expected to break out. This scheme which could not be launched during the year 1958-59 as proposed owing to its late sanction is to be implemented from 1st July 1959.

328. We have received several representations to the effect that the present arrangement under which pesticides and fungicides are

sold at 50 per cent of the cost price only in those areas which are declared as pest-affected by the District Agricultural Officer concerned is not conducive to the prompt treatment of the affected crops as soon as the pest or disease which has to be combated manifests itself because inevitably there is some delay before the pest or disease attack receives official cognizance and the area concerned is declared as pest-affected and the concessional sale of the pesticides and fungicides is permitted and this delay helps the pest or disease to take a firm hold of the crops in that area. There is very great force in these representations as there should be no delay whatsoever in combating a pest or disease attack which should be dealt with with the same urgency as in the case of an outbreak of fire. Further while prevention is always better than cure the present concession is of no use to those who desire to treat their crops with pesticides and fungicides as a prophylactic measure. We therefore recommend that pesticides and fungicides should be sold at a concessional rate in all areas throughout the year.

329. Complaints have been made to us about the insufficiency of stocks of pesticides and fungicides in several places. There is no doubt that shortages of supplies of these chemicals are experienced frequently in many areas owing to the want of sufficient stocks in the country and the difficulty in obtaining timely imports from abroad. Production of pesticides and fungicides within the country should therefore be increased with a view to obtain self-sufficiency in these essential commodities in the shortest possible time.

330. In order to enable the agriculturists to obtain their requirements of pesticides and fungicides more conveniently all co-operatives which are selling chemical fertilizers should be asked to stock and sell pesticides and fungicides also. Co-operatives should be persuaded to take to the distribution of pesticides and fungicides in an increasing measure. They should be made to step up their turnover progressively and ultimately take over the entire distribution of pesticides and fungicides in the State.

331. The concession under which sprayers and dusters are sold to ryots at 50 per cent of the cost price should be extended to co-operatives also. With a view to increase the availability of hand sprayers and dusters their manufacture in large numbers should be undertaken under the Small Scale Industries Scheme.

332. The pest control equipment that is now available being not adequate some arrangement should be made for attending to sudden outbreaks of pests and diseases which are beyond the capacity of the locally available equipment to cope with. The only solution is to organise peripatetic pest control squads. We therefore recommend that there should be four mobile pest control units at the rate of one under each Deputy Director of Agriculture.

CHAPTER XIII.

IMPROVED AGRICULTURAL IMPLEMENTS.

333. Power machinery has only limited scope in this country at present not only in view of the limited means of the average ryot but also of the fragmentation of holdings. For this reason the State Agricultural Department under which an Agricultural Research Engineer has been functioning since 1928 has been paying due attention to the improvement or existing agricultural implements and devising new ones bearing in mind that they should be cheap, light and portable, easily made and easily repaired and constructed of materials which can be easily obtained. The Research Wing of the Engineering Branch of the Agricultural Department also obtains specimens of improved agricultural implements designed by private firms and tests their utility and suitability for the various agricultural areas in the State. Over twenty-five specimens of improved steel ploughs manufactured by different private firms have been so tested. Similarly a large number of cane crushers, sprayers, dusters, hay presses, power-operated threshers and shellers have been tested and suggestions for improving them have been made. Such of the improved agricultural implements as are found to be definitely fit for being recommended for adoption by the ryots are sought to be popularised by the Agricultural Department by means of demonstration and propaganda.

334. The Research Engineering Wing has made a detailed survey and study of all the indigenous agricultural implements and machinery and has made improvements to many of them. Among the improved agricultural implements that have been designed by the Agricultural Department ever since the inception of the Research Engineering Wing are the R.E. Guntaka, the Buck Scraper which is also called the Earth Scoop, the mechanical seed drill mounted on wheels, the Ridge Plough, the Wetland Puddler, the Trampler, the Bund Former, the Basin Lister, the Pitting Crow Bar, the Cotton Stalk Puller, the Expanding Cultivator, different kinds of Harrows, the flat and ring types of Rollers, the improved wooden grinder, Turmeric Polisher, the hand-operated or power-operated rotary type groundnut decorticator, and the oscillating Chinese type of groundnut decorticator, the Disintegrator and the Seed Treating Drum. Among the improved agricultural implements designed during the last ten years are : the Shanti Multipurpose Plough, the Rotary Weeder, the Paddy Thresher, different types of Graders, the hand-operated Fertiliser Distributor, the mechanical wind-operated Bird Scarer, the Coir Rope Filter point, a manually-operated spraying unit, a bullock-operated pump which can be used both for open wells and tube wells, a bark stripping machine, etc.

335. The agricultural depots attached to the Extension Officers for Agriculture in the Development Blocks and to the Agricultural Demonstrators in the non-Block areas serve as show rooms for the

consulted by the Committee has clarified that only for a very short period in 1958 when the power position was very critical due to failure of monsoon and depletion of waters in Hydel reservoirs the connecting up of new agricultural services was stopped. That was the only occasion in the past when connecting up even agricultural services was given up for a few days. This was an extreme measure and the gravity of the situation warranted it. The Electricity Department (now the State Electricity Board) had never banned in the past except for the few days referred to above the connecting up of electric supplies for agricultural purposes. However, at present there is a restriction in the connecting up of new power services involving loads of more than 5 h.p. in each case. This has been introduced in order to avoid a possible power cut due to the present inadequate water storage in the reservoirs. We are assured that the restriction will be short-lived and that it will be removed immediately the water position improves. The condition for extension of lines to new areas is that the loads in the area should fetch a minimum revenue of 10 per cent of the capital cost as mentioned already. When new power plants are installed a specific reservation of power for agricultural pumping is actually made. Project reports are not complete without a load and revenue forecast. Such forecasts take into account the various loads including agriculture that will be catered to by the project.

343. Several representations were received by the Committee to the effect that electric supply should be extended to the villages by the Government themselves at their own cost, without collecting the minimum charges or waiting for applications to be received from the villagers as the agriculturists were sure to take supply of electricity as soon as the electric main was brought to their villages. In fact it was argued that such extension of the main line would induce the ryots to go in for electric pumpsets to increase agricultural production. We have consulted the Chief Engineer for Electricity and have satisfied ourselves that it is not possible to comply with this request. Certain fixed charges such as interest on capital outlay depreciation, operation and maintenance expenses, cost of power, etc., have to be met by the State Electricity Board. That explains why a minimum revenue of 10 per cent of the capital cost is insisted upon to take up extension schemes. Even this 10 per cent is not adequate enough to meet the fixed charges referred to previously as already explained. These charges actually amount to about 18.2 per cent. However in the interests of rural development which would suffer if this higher percentage is insisted upon the percentage is kept at a low level. It is not possible to reduce this percentage further, much less to do away with it altogether as suggested, as the electric supply in the State is a commercial undertaking working on a 'no loss no profit' basis.

344. Likewise the State Electricity Board cannot extend supply to an area without fully knowing what the anticipated load is,

whether the minimum return of 10 per cent will be forthcoming etc. To see whether the scheme will ensure a return of 10 per cent of the capital cost the Board has necessarily to take applications from prospective consumers. Only if the anticipated revenue satisfies the remunerative standard can it take up the extension. Extension of lines without (1) collection of minimum charges when it is required to make the scheme remunerative, or (2) taking applications from prospective consumers assuming that parties will take supply will amount to taking a great financial risk and a leap in the dark which a commercial undertaking can hardly afford to take in the light of the experience gained so far. This experience has shown that it is not safe to assume that agriculturists are sure to take electricity as soon as the electric main line is laid.

345. Another representation with which the Non-official Members of the Committee were confronted wherever they went in all the districts of the State was that the minimum guarantee for supply of electricity was very high and should be reduced. The Chief Engineer for Electricity who was consulted has observed that apparently what is meant by minimum guarantee is the special guarantee. He has explained that the special guarantee is not taken in the case of each and every extension. In cases where the anticipated revenue from the extension is 10 per cent and above of the capital cost no special guarantee is taken. In other cases where the anticipated revenue falls short of the 10 per cent referred to a special guarantee is taken from the consumers of the extensions concerned to the extent necessary to get a revenue of 10 per cent of the capital cost. Naturally the rate of special guarantee varies depending (i) on the extent of the gap between the anticipated revenue and 10 per cent of the capital cost and (ii) the density of the loads to be served in the extension. If the gap is small and the load is also large the rate of special guarantee will be low. As it is it varies from Rs. 35 to Rs. 50 per horse power in the Hydro-electric areas. However in those cases where more revenue is earned by an extension by the addition of more loads the State Electricity Board is de-rating the special guarantee even during the course of the ten years' agreement period to the extent justified by such higher revenues.

346. The stand taken by the Chief Engineer is no doubt quite tenable from the point of view of the State Electricity Board which is, as already pointed out, a commercial undertaking, which has to work on a "no loss—no profit" basis. But we feel that some concessions to the poor agriculturists particularly in the backward areas of the State is called for in the interests of stepping up food production. It has been brought to our notice that in many cases in view of the poverty of the ryots they are unable to meet the demands by way of the special guarantee with the result that the services are disconnected and the dues are recovered through Courts of law. Thus, the special guarantee system has in many cases

caused dislocation in agricultural operations and retarded considerably the progress of supply of electricity to agricultural pumpsets particularly in the backward and interior areas of the State. We therefore recommend that the Government should give a subsidy to the State Electricity Board in order to enable it to supply electricity for agricultural purposes to new areas in the under-developed and backward areas of the State expecting only the normal 10 per cent return from the beneficiaries and without demanding the special guarantee. Even in the well-developed areas of the State many ryots are not coming forward to take up electric supply connection because the special guarantee demanded is too high for them. If the upper limit of the special guarantee which is at present Rs. 50 per horse power is reduced a larger number of ryots will come forward to take electric supply. To the extent that this maximum limit is reduced the Government will have to give a subsidy to the State Electricity Board to reimburse to it the loss that will be incurred thereby. We recommend that the Government should consider by how much it will be feasible and desirable to reduce the present upper limit of the special guarantee in the well-developed areas.

347. Another representation that was persistently made to the Committee was that supply of electricity should be made available to agriculturists for agricultural purposes during day time as it is difficult if not impossible to carry on the agricultural operations during night time. At present supply is given to agricultural services under staggered conditions by rotation one group of services receiving supply for seven hours in the day time from 6 a.m. to 1 p.m. and the other group getting supply from 11 a.m. to 6 p.m. Both the groups receive supply for eight hours in the night. This arrangement has been necessitated by the increasing power demand of the consumers. Keeping the demand within the generating capacity of the grid is in the larger interests of the State as a whole and enables supply being given to new agricultural services to the maximum extent. This regulated supply is only temporary and with the commissioning of new plants the Chief Engineer for Electricity has stated that the generating capacity of the grid will be increased rendering it possible to lift the present restriction. Except for some inconvenience in those cases where the full requirements cannot be met by the running of the pump during the seven hours of day time supply and where consequently supply has to be taken during the night time also there can be no cause for complaint. Anyhow this restriction on the supply of electricity has to be imposed in the larger interests of the community and the Chief Engineer for Electricity has assured the Committee that it will be lifted at the earliest suitable opportunity.

348. Another complaint received by us was that the horse power for the pump indicated by the agriculturist in the agreement signed

by him with the State Electricity Board for supply of electricity is not allowed to be reduced even in those cases where it becomes absolutely necessary to reduce the horse power. We understand that the reduction in the horse power for the pump specified in the agreement is generally allowed to be reduced in all cases where the remunerative aspect of the scheme is not affected and also in cases where the consumer advises the authorities concerned well in advance, that is before the work on the extension is taken up, about the inability to take supply for the contracted load. We feel that any further concession cannot be reasonably expected and that it is the consumer's duty to satisfy himself before signing the agreement about the horse power of the pump for which he proposes to obtain electric supply.

349. Yet another representation received by the Committee from more than one place is that the recurring minimum charges payable by the consumer is being collected by the State Electricity Board even in respect of periods when no supply of electricity is taken by the consumer and that the Board should be asked not to collect the charges during such periods. The Board has since reduced the rates for unconnected power loads for agriculturists. This reduction is applicable to agriculturists who have entered into agreements with the Board for power supply to their well pumps at special guaranteed rates but have not yet taken supply. Such persons may pay for the period the service remained unconnected at the reduced rate of Rs. 6 per horse power per annum for hydro areas and Rs. 15 per horse power per annum for thermal areas, irrespective of any higher guarantee given by them for the period during which they have not availed themselves of electric supply. However, only those consumers who come forward to take supply and execute fresh agreements with the original special guarantee for a period of ten years from the date of their taking supply are eligible for this concession.

CHAPTER XV.

IMPROVED AGRICULTURAL PRACTICES.

(a) JAPANESE METHOD OF CULTIVATION.

350. The "Japanese method" of cultivation is generally understood to include—

- (1) selection of good seed,
- (2) proper preparation of the seed-bed,
- (3) thin sowing of seeds,
- (4) adequate manuring of the seed bed,

- (5) proper preparation of the field,
- (6) careful transplantation of seedlings in lines,
- (7) proper and timely manuring of the field, and
- (8) inter-cultivation.

Of these numerous factors, the following are considered to be the *minimum requirements* constituting the Japanese method of cultivation for purposes of reporting and record :—

- (a) line planting,
- (b) inter-cultivation,
- (c) use of quality seeds, and
- (d) heavy manuring.

351. The Japanese method of paddy cultivation suitably modified for the local conditions of the State was introduced in this State in 1953. This method of cultivation was extended to other crops like millets and cotton in this State in 1954. This State had the largest area, viz., 493,377 acres, brought under the improved Japanese method of paddy cultivation in 1954-55. With intensive propaganda done by the departmental staff, an area of 6.93 lakhs acres was brought under this method during 1956-57.

352. Under the Second Five-Year Plan, it is proposed to cover about 32.00 lakhs of acres under the Japanese method of paddy cultivation by the end of the Plan period. With this object in view yearwise targets have been fixed. Districtwise targets have been fixed for each year of the Plan period. Instructions have been given to the District Agricultural Officers to put forth the maximum possible effort to attain the targets fixed for their respective districts. Similar targets have also been fixed for millet crops. In the year 1954-55 an area of only 13,783 acres was covered under the Japanese method in this State. The coverage rose to 4.15 lakh acres in 1954-55. In 1955-56, the coverage was more than double that of the previous year and amounted to 8.84 lakh acres. It increased to 11.67 lakh acres during 1957-58. During the year 1958-59 an area of 14.70 lakh acres had been brought under the Japanese method of cultivation by 28th February 1959. It is expected that by the end of the year 1960-61 an area of 25 lakh acres would have been brought under this method.

353. The Japanese method includes various items which are already taken into account in the calculations for determining the additional target of food production. Thus, the area under the Japanese method is taken into account in calculating the acreage under fertilizers as well as the area under improved seeds. A series of experiments were conducted in order to assess the additional yield caused by line planting and inter-culture only and they have shown that on an average about 90 lb. of rice will be obtained by

adoption of line planting and inter-culture. So, for the calculations of the additional food production as a result of the Japanese method, 90 lb. an acre is the yardstick. It should not be forgotten that extension of the area under the Japanese method will simultaneously increase the area under improved seeds and under chemical fertilizers.

354. Intensive propaganda is being done for the adoption of the Japanese method not only by the district staff during their tours but also through the various Agricultural Associations and Advisory Committees. The ryots after a period of hesitation have generally realized the benefits of the method and also the increased yield thereby. It can be taken that this method is becoming more and more popular with them.

355. There is another Japanese method of paddy cultivation, viz., the wave method invented by Mr. Nitsuji Akeji in Japan. It is said that this method has been perfected after ten years of experiment and is now being used extensively by modern Japanese farmers. This method was introduced at the Sri Aurobindo Ashram, Pondicherry, by a Japanese farmer and a Japanese Engineer in Agriculture and Forestry and was adopted there after some modification using specially designed implements to suit the nature of the Ashram fields. The Non-official Members of the Committee paid a visit to the Ashram lands to see the working of the Wave Shape Method. The manures generally used are super-phosphate or any fertilizer mixture (150 to 250 lb.) and large quantities of green leaf manure (5,000 lb. to 6,000 lb.) per acre. The yields claimed are very high being 2,175 lb. to 3,705 lb. per acre for the summer crop and 3,020 to 4,500 lb. per acre for the winter crop. An experiment conducted by the Ashram authorities on three one acre plots showed that the plot which was treated with 5,000 lb. of green manure, 50 lb. of ammonium sulphate and 150 lb. of superphosphate yielded the best results.

356. The special features of the Wave Method are—

(a) use of special implements like the Liner, the Mulching or Ridger Hoe, the Single Tillering Hoe and the Double Tillering Hoe (it is said that these implements can be made locally at small cost),

(b) making all round the plot parallel to the footwalk a ditch of even depth which allows proper drainage of the field and facilitates soil aeration,

(c) ploughing the field immediately after each harvest and feeding it with organic manure,

(d) cultivating paddy in rotation with leguminous crops, and

(e) mulching the field three times and top dressing the plants before each mulching with manure in localised areas according to the growth requirements.

357. The following are the advantage claimed for the wave method :—

(a) Increase in the oxidation—reduction potential; roots show an increased growth, up to four inches more within twenty days than under other conditions. The seedling has sixty more roots than those induced by the old method without mulching.

(b) As there is ample space between each row the plants receive ample light, heat and air. The stalks become stiff and hardy as they do not remain immersed in water and water-logging is avoided. These conditions make for greater and healthier plants and they are therefore more resistant to disease.

(c) Owing to the 'waving' of the field the seedlings develop more deep top roots instead of horizontal roots. The plants are able to receive more nourishment from the soil and as a result the grain is heavier and richer and the yield is higher.

(d) There is a saving of water used for irrigation.

(e) The turning of the soil in the field keeps it fresh. The increased volume of roots is converted back into manure, enriching the soil; and

(f) Weeding is not necessary. This greatly saves labour. One cultivator with an inexpensive machine can mulch one acre per day.

358. As the Wave Shape Method has not been tried anywhere else to our knowledge any definite opinion as regards its superiority over the other methods of paddy cultivation cannot be hazarded. For aught we know the soil of the Sri Aurobindo Ashram lands may be inherently very fertile and this factor may account largely for the record yields obtained by the Ashram authorities. This method was tried in the Agricultural Research Station, Aduthurai, in clayey soil and it is said that it did not give any significant results. But as the Wave Method has some promise for suitable soils the Agricultural Department should try it in representative regions in this State on representative plots of land for a few crop seasons and find out which of its features are worthy of adoption and inclusion in the Japanese method of paddy cultivation propagated by the Department.

(b) CROP ROTATION.

359. The advantages of a judicious crop rotation and the adoption of a cropping pattern suited to the soil in order to get the best out of it making full use of its potentialities without at the same time impairing its level of fertility are not unknown to the agriculturists in this State. In fact many of them are following a cropping pattern evolved by them for their lands based on their own personal experience and the advice of the Agricultural Department. But many more are not doing so due to either ignorance or indifference.

In July 1956, the Vice-Chairman, Planning Commission, suggested, *inter alia*, that legislation could be undertaken, if necessary, for compelling ryots to take to improved seeds and improved

methods of cultivation and to provide for rotation of crops in order to preserve the fertility of the soil. The Madras Government examined this suggestion in consultation with the Director of Agriculture and decided that the best course would be to prepare a general pattern of improvement for different types of land as well as the rotation of crops which could be recommended to the ryots, in selected Development Blocks in the State. Intensive propaganda was then to be undertaken with the help of the Block staff to implement the recommendations and at the end of the season, the position was to be reviewed to ascertain to what extent the propaganda had been successful in order to decide about the necessity for, and the possible effectiveness of legislation.

360. Accordingly a scheme has been launched by the Government in six selected Development Blocks, viz., the Tiruvallur Development Block in the Chingleput district, the Suler and Satyamangalam Development Blocks in the Coimbatore district, the Alanganallur and Madurai Development Blocks in the Madurai district and the Kumbakonam and Kodavasal Development Blocks in the Tanjore district. The main features of the scheme are—

(i) Fixing the strain or strains suited to the particular season of cropping and regulation of the time of sowing and planting;

(ii) implementation of a judicious programme of manuring of each crop to replenish the plant food consumed from the soil; and

(iii) the adoption of a suitable plan of crop rotation which would help to preserve soil fertility.

The scheme has been in operation only for one season and it is now therefore too soon to judge its results. We trust that it will not be worked in a perfunctory or routine manner but that the supervising officers of the Agricultural Department will watch its working with great care and ensure that it produced tangible results within a short time. We also hope that the scheme will prove to be successful in the few areas where it is now working and that it will be extended progressively to the rest of the State soon.

CHAPTER XVI.

AGRICULTURAL CREDIT.

361. At present there are three agencies in the State which provide agricultural credit, namely the Revenue Department, the Agriculture Department and the Co-operatives. The following are the loans given by the Revenue Department to agriculturists :—

(1) Under the Land improvement Loans Act, loans are granted for sinking or repairing of wells, reclamation of waste lands or any other kind of work by which the letting value of lands for purposes of agriculture will be permanently increased;

(2) under the Agriculturists Loans Act, loans are granted for the purchase of cattle, for the purchase of carts for agricultural purposes, for cultivation of plantains or certain fruit trees, for construction of cattle-sheds, etc.

(3) Loans are also granted for purchase of seeds and manures.

(4) under special rules loans are granted for installation of pumpsets and for purchase of agricultural implements; and

(5) Loans are granted under the intensive manuring scheme for purchase of fertilisers in order to augment food production. They are now granted only for paddy and for sugarcane.

All the above items except item 5 are not being disbursed in those areas of the State where the Full Finance Scheme of the Co-operative Department is functioning.

362. The following are the loans disbursed by the Agriculture Department :—

(1) Long-term and short-term loans under the Scheme for development of fruit production;

(2) Lift irrigation loans such as loans under the filterpoint tube-well scheme and loans for purchasing oil-engines and electric motor pumpsets;

(3) Loans for the promotion of mechanised cultivation such as loans for meeting hire charges on tractors and bull-dozers engaged for land reclamation work, loans for meeting hire charges in respect of tractors engaged for sugarcane cultivation; and

(4) Long-term loans for the purchase of tractors and matched implements.

363. The bulk of the agricultural credit is provided by the co-operative agencies. The Agricultural Credit Societies, Agricultural Banks and Rural Banks issue short-term loans repayable generally in one year and medium-term loans repayable in three to five years. Land mortgage banks issue long-term loans repayable in fifteen to twenty years. Short-term loans are issued for purchase of seed, manure and agricultural implements, for carrying on agricultural operations, for purchase of cattle and fodder and for payment of kist. Medium-term loans are issued for reclamation of lands, for undertaking other land improvement works such as bunding, etc., for preparation of lands for establishing orchards and plantations, for construction, development and maintenance of irrigation sources, for purchase of livestock, implements, machinery and transport equipment as are necessary and conducive to agriculture, for construction of farm-houses and cattle-sheds and for payment of petty debts. Long-term loans are issued for redemption of mortgages, for discharge of other prior debts, for improvement of land and methods of cultivation and for the purchase of

land in special cases on condition that such purchase will enable the ryots to round off their holdings and work them more economically.

364. In the Development Blocks in the State the agriculturists have yet another agency from whom they could obtain some of their credit requirements namely the Block Agency. There is a provision of Rs. 3 lakhs in the schematic budget for a Development Block in the first stage and a provision of Rs. 75,000 in the schematic budget for a Development Block in the second stage for grant of loans for repair and renovation of sources of irrigation and for carrying out land reclamation, including soil conservation, contour bunding, etc.

365. As has been stated earlier the bulk of the agricultural credit is provided by the Co-operative Agency. The quantum of agricultural credit now provided by the various agencies is very inadequate and the only agency to which the agriculturist can look for meeting the credit requirements in full is the Co-operative Agency. The co-operative credit should ultimately replace all other sources of credit in the sphere of agricultural finance. In consonance with this objective a systematic development of co-operative credit is now taking place and vigorous steps are under way for the expansion of co-operative credit activities in rural areas. The co-operatives which covered over 49 per cent of the villages in the State and served 21 per cent of the rural population at the commencement of the Second Five-Year Plan covered 85.7 per cent of the villages and served 38.08 per cent of the rural population on 31st March 1959. The volume of credit provided by the Co-operatives which was about Rs. 6 crores at the commencement of the Second Five-Year Plan increased by more than 2½ times, the amount lent during the year 1958-59 being Rs. 16.20 crores against the target of Rs. 13.50 crores.

366. This expansion of agricultural credit has been achieved by the formation of large sized societies which are called agricultural banks as well as by the formation of small-sized societies, i.e., organization of new village credit societies and the revitalization of the existing ones. With the formation of 60 agricultural banks during the year 1958-59 as per the target set for that year the total target of 300 agricultural banks set for the Second Five-Year Plan period has been achieved two years in advance of the target date. The agricultural banks have been making very good progress.

367. As regards small-sized societies there is no restriction on their formation and they are being formed wherever there is need for them. Three hundred and thirty-nine such societies were registered during the year 1958-59. The village credit societies are provided with state assistance to employ paid staff to develop their activities and 1,000 societies have so far been selected for such assistance.

368. The target fixed for the year 1958-59 and the achievements are indicated below :—

<i>Serial number and particulars.</i>	<i>Target for 1958-59.</i>	<i>Achievement up to 31st March 1959.</i>
(1)	(2)	(3)
	PER CENT.	PER CENT.
1 Percentage of villages to be covered by the Co-operatives (continuing target).	80	85.7
2 Percentage of rural population to be served by the societies (continuing target).	40	38.08
3 Credit to be supplied	13.50 crores of rupees.	16.20 crores of rupees.
4 Formation of Agricultural Banks	60	60
5 Formation of small-sized societies	200	339
6 Formation of new } Apex societies .. marketing societies. } Primary societies ..	1 6	1 6
7 Construction of new godowns	60	60

It will be observed from the above statement that the credit supplied during the year 1958-59 amounted to 16.20 crores of rupees which works out to about 27 per cent of the total annual credit requirements of the agriculturists. It is expected that during the final year of the Second Plan period, i.e., in 1960-61 the co-operatives will issue loans to the extent of Rs. 22.50 crores representing 37.5 per cent of the total annual credit requirements of the agriculturists.

369. A scheme which is full of promise for the agriculturists in the State has also been launched by the Co-operative Department. This scheme is popularly known as the Full Finance Scheme. The object of this Scheme is to provide the entire credit needs of the villagers by way of short-term and medium-term loans through the agency of co-operatives to the exclusion of other sources of credit. The scheme was introduced as an experimental measure in the Srivilliputtur firka of the Ramanathapuram district in December 1956 and in the Erode firka of the Coimbatore district in February 1957. The Co-operative Societies in the Srivilliputtur firka brought within their fold 30.2 per cent of the population and supplied 83.8 per cent of the total annual credit needs of the cultivators by the end of the second year of the Second Plan period.

The Co-operative Societies of the Erode firka served 48.8 per cent of the population and supplied 47 per cent of the credit needs of the villagers in the firka. As the results of the working of the

Full Finance Scheme in these two areas were encouraging, the Government sanctioned the extension of the scheme to the following seven areas during the year 1958-59 :—

- Sriperumbudur Development Block—Chingleput district.
- Poonamallee Development Block—Chingleput district.
- Perambalur II Development Block—Tiruchirappalli district.
- Thiruparankundram Development Block—Madurai district.
- Edappadi firka—Salem district.
- Ootacamund Development Block—Nilgiris district.
- Vembakkam Development Block—South Arcot district.

It is proposed to introduce the scheme in six more blocks at the rate of one each in the South Arcot, Kumbakonam, Tanjore, Pudukkottai, Tirunelveli and Kanyakumari Co-operative Central Bank areas during the year 1959-60 so that by March 1960 the scheme will be working in select areas in all the districts of the State. The scheme is worked through the agency of Agricultural Banks and small-sized societies in the respective areas. Subsidy for the employment of full-time secretaries in the Agricultural Banks and also for the employment of supervisory staff to supervise the work of a group of societies is given by the Government. As has already been stated the intention is that in the Full Finance Scheme areas Co-operatives alone should supply all the credit requirements of the agriculturists. It has therefore been ordered that no Pakkavi loans should be granted in these areas and that all loans in these areas should be canalized solely through co-operatives.

370. Another development which should be very welcome from the point of view of the agriculturists which has since taken place is the proposal which we understand is under the consideration of the Government to launch a comprehensive scheme for bringing into the co-operative fold not only all the villages in the State but also a larger section of the agricultural community including the cultivating families by the end of the Second Plan period. It is learnt that this is a scheme to improve agricultural production and to give increased attention to the agriculturists in the villages and that it will also ensure to the cultivating families all the necessary facilities like supply of implements, seeds, manure, etc., for better farming. It is understood that under this Scheme at least 50 per cent of the entire annual credit requirements of the agriculturists in the State will be met and that the scheme will cover all the villages in the State.

371. The progress that has so far been made in the State in meeting the credit requirements of the agriculturists through co-operatives is no doubt very impressive. However we feel that in the interests of stepping up agricultural production the pace of development of co-operative credit should be further accelerated. We hope that the scheme referred to in the previous paragraph

will be quickly implemented and that as contemplated under that scheme it will be possible for the agriculturists in the State to secure at least 50 per cent of their entire annual credit requirements through co-operatives by the end of the Second Plan period. We also hope that the scope of the scheme will be rapidly extended with the objective of meeting the cent per cent annual credit requirements of the agriculturists in the State at least by the end of the Third Five-Year Plan period.

372. There should be only one agency for the disbursement of all kinds of loans required by the agriculturists and this agency should be the Co-operative Agency. The Co-operative Department has already made a start in this direction by launching its Full Finance Scheme in selected areas in the State. This scheme should be extended to all Development Blocks in the State immediately and to all other areas in the State as soon as possible and in any event by the end of the Third Plan period.

373. Our recommendation that the entire agricultural credit should be canalized only through the Co-operative Agency should not be taken to mean that no loans of any kind should be disbursed by the Agricultural Department. That Department should continue to disburse the loans now granted by it under the scheme for development of fruit production. It should also disburse loans in those cases where it is considered desirable that it should exercise supervision over the proper utilization of the loans and also in those cases where it has to provide any kind of materials to agriculturists under the loan scheme.

374. The Government have ordered that in the areas in which the Full Finance Scheme is working no Takkavi loans should be granted. The Full Finance Scheme will meet only the short term and medium-term credit needs of the agriculturists. As regards long-term credit the loans given by the land mortgage banks alone will not be adequate. Long-term Takkavi loans should therefore be continued to be granted even in the Full Finance Scheme areas for purposes of land improvement.

375. Provision of credit to the agriculturists should be not only adequate but also timely. Several representations have been made to us stating that the provision of agricultural credit is not timely. As regards the loans issued by the Agricultural Department that department which exists for stepping up agricultural production should not give any cause for complaint. But it is issuing only a very small fraction of the total credit requirements of the agriculturists. The bulk of these requirements is met now by the Revenue Department and the Co-operative agencies. As regards the Revenue Department loans, the enquiry into the loans applications and their disposal are attended to by the Block Agency in the Development Blocks up to the limits of powers in this regard that have been

delegated to it. In the case of loans issued under the Land Improvement Loans Act and the Agriculturists Loans Act, a maximum period of two months has been prescribed in the Loans Manual for the disposal of loan applications for the grant of loans. In the case of applications for loans for purchase of pumpsets and agricultural machinery under the Madras Land Improvement Loans 'Agriculturists' Loans (Pumping Installations and Agricultural Machinery or Plant) Rules, 1933, for the disposal of which the advice of the Industries Department is required, the loan applications are required to be disposed of within four months from the date of receipt. As regards the loans granted under the Intensive Manuring Scheme special instructions have been issued to the effect that applications for these loans should be enquired into expeditiously and that the Revenue Inspector should send his report to the sanctioning authority within a week and that the officer competent to sanction the loans should pass orders within a week of the receipt of the Revenue Inspector's report.

376. Special staff is employed wherever necessary for the disposal of loan applications that are pending. While the number of loan applications pending is too large to be attended to by the Block staff in the Development Blocks additional special staff such as Special Deputy Tahsildars, Special Revenue Inspectors and Lower Division Clerks are employed for the disposal of the loan applications. At the instance of the Block Development Officers the Collectors sanction the special staff required with reference to the scale prescribed therefor and obtain ratification of their action by the Board of Revenue later on. In the areas outside the Development Blocks the regular Revenue staff attend to the disposal of loan applications normally. But in places where the number of loan applications is large and the work relating to their disposal could not be attended to by the Regular Revenue staff additional special staff with reference to the scale fixed in the Loans Manual is employed for the disposal of loan applications. The District Collectors sanction the special staff subject to ratification by the Board of Revenue.

377. As regards the loans issued by Co-operatives in order to minimise delays in disbursing loans a new procedure was evolved some time ago by the Registrar of Co-operative Societies. According to this procedure the societies assess well in advance of each cultivation season the maximum credit requirements of each member with reference to the acreage of land owned or cultivated by him and the nature of the crops usually raised by him. The society then makes out a statement containing the names, addresses, etc., of borrowers, their net assets as per the latest property statement, the extent of the lands cultivated, the crops proposed to be raised, the amount needed for cultivation, the probable yield expected from the crops, repaying capacity, etc. On the basis of this statement the Central Bank fixes a credit limit to the society

subject of course to the society's maximum credit limit and sanctions a cash credit loan. When once this is done the society is free to sanction loans to its members by operating on the cash credit loan and without getting sanction from the financing banks in each case. When the cash credit is about to be exhausted the society sends up to the Central Bank a statement of loans disbursed as also a formal loan application for the amount. The Central Bank thereupon replenishes the cash credit loan by converting it into a short-term loan. This new system is calculated to eliminate delays in disbursement of loans. In a communication addressed recently by the Registrar of Co-operative Societies to the Committee he has informed it that the above procedure for minimising delays in disbursement of loans has been adopted by the Co-operatives and that it is working satisfactorily. He has reported that during the year 1957-58 411 Co-operative Societies including 111 Agricultural Banks obtained cash credit accommodation from the Central Banks to the tune of Rs. 61.37 lakhs and issued loans to their members to the tune of Rs. 60.07 lakhs. These figures are very impressive and go to substantiate the Registrar's claim that the system evolved by him has helped in eliminating delays in the disbursement of loans by the co-operatives to their members. We understand that the newly formed Agricultural Banks are now in a position to sanction loans to their members in about a week's time and that in those areas where the Agricultural Banks are functioning there are no complaints regarding the delays in the grant of loans. We also learn that the supervisory staff of the Central Banks have also been considerably strengthened with a view to bring down the number of societies placed in charge of each supervisor from 18 to 15 and even less in order to ensure the quick disposal of loan applications.

378. While appreciating the various measures that have already been taken by the Government in order to minimise the delay in the disposal of applications for loans by the agriculturists we still consider that there is at present some avoidable delay in the sanctioning of short-term loans to ryots for agricultural purposes which are granted at the beginning of the fasli year and generally recovered at the end of the fasli year. This delay is caused by the verification of the credit-worthiness of the applicant, etc., after his application is received. In order to avoid this delay we suggest that a credit card should be issued to any member of a co-operative society who applies for it furnishing therein all the necessary details on the basis of which loans are now sanctioned and for ascertaining which there is now delay in the disposal of the loan applications. Whatever enquiries are necessary should be made and this credit card should be issued to the ryot in the off-season that is before the cultivation season starts. The credit card should be signed by a Revenue Officer not below the rank of a Deputy Tahsildar. The agriculturist must enclose this credit card with his loan application so that the authority sanctioning the loan can dispose of the

loan application on the basis of the particulars contained in the credit card without any elaborate enquiry. The credit card should be revalidated at the end of every year in case the co-operative society concerned desires that this should be done. As this arrangement is for the benefit of the co-operative agencies disbursing loans and their members, provision should be made for the collection by the Revenue Department of a reasonable fee for this service. The amount collected should be disbursed to the village officers who prepare the credit cards as an honorarium for the extra work which they are called upon to do.

379. The question whether the rate of interest payable by the agriculturists in respect of the loans obtained by them from the co-operatives cannot be reduced has been examined by us. The Madras State Co-operative Bank which is the financing bank for all the District Co-operative Central Banks in the State obtains funds by raising deposits and by borrowing funds from the Reserve Bank of India. The interest paid by the Madras State Co-operative Bank in respect of the deposits raised by it ranges from $3\frac{1}{2}$ to $4\frac{1}{2}$ per cent per annum. The Reserve Bank provides funds to the Madras State Co-operative Bank for financing seasonal agricultural operations and marketing of produce at concessional rate of interest, namely, 2 per cent below the Bank Rate (the present Bank Rate is 4 per cent). The Madras State Co-operative Bank pools all the money and lends it at a uniform rate of $2\frac{1}{2}$ per cent.

380. The District Co-operative Central Banks in their turn raise funds for financing the co-operatives affiliated to them by way of deposits and by borrowing from the Reserve Bank of India through the State Co-operative Bank. The rate of interest paid by the District Co-operative Central Banks for deposits ranges from 3 to 5 per cent per annum. They issue short-term loans to Agricultural Credit and Marketing Societies at $4\frac{1}{2}$ per cent. They raise medium-term deposits at five per cent interest and grant medium-term loans at 6 per cent interest per annum. As the pivot of the Co-operative Movement in the districts the District Co-operative Central Bank maintains a net work of supervisory staff besides its office staff for the organization and supervision of all credit societies, etc. To cover these items of expenditure the District Co-operative Central Bank adds 2 per cent to its borrowing rate of $2\frac{1}{2}$ per cent and lends at $4\frac{1}{2}$ per cent to the primary societies. The primary societies, namely, Village Credit Societies, Agricultural Banks and Rural Banks issue short-term loans at $6\frac{1}{2}$ per cent and medium-term loans at 7.2 per cent.

381. It will thus be seen that the margin available to the State Co-operative Central Bank is only $\frac{1}{2}$ per cent and the margin for the District Co-operative Central Banks is 2 per cent in the case of short-term loans and 1 per cent in the case of medium term loans.

We learn from the Registrar of Co-operative Societies that without these margins at least it will not be possible for the State Co-operative Bank and the District Co-operative Central Banks to function efficiently. Taking into consideration the expenditure which has to be incurred nowadays by the State Co-operative Bank and the District Co-operative Central Banks and the rate of interest charged by the commercial banks and private money-lenders we agree with the Registrar of Co-operative Societies that the rate of interest now paid by the members of the Co-operative Credit Societies and the Agricultural Banks, namely, $6\frac{1}{2}$ per cent, cannot be reduced. We understand that this is the lower rate in the entire country.

382. We recommend that short-term loans to the required extent should be granted by the co-operatives on the security of the crops raised to landless cultivating tenants, marginal cultivators, sub-marginal cultivators, etc. We are aware that the loans that are at present being made available to these categories of borrowers is negligible because of the risk involved in lending to them. If the crops on the security of which loans are granted to them fail on account of unexpected causes like attacks of pests and diseases, prevalence of drought conditions, etc., the borrowers will be reduced to a position in which they cannot repay the loans taken by them from the co-operative credit societies who will in their turn fail to meet their dues to the financing banks. The financing banks are handling the money of others as they obtain the finances required by them in the shape of loans from the Reserve Bank of India and deposits from the public. They have therefore to be protected to some extent at least against the losses, if any, that will be incurred by them in such cases. The Government should give a guarantee to the financing banks agreeing to make good one-half of such losses incurred by them, the remaining one-half being left to be borne by the financing banks themselves so that they too may have an interest in keeping down the losses to the absolute unavoidable minimum.

383. The agricultural credit provided by the Government and the co-operatives to the agriculturists should be related to and be based upon the extent of lands and not the individual. In other words there should be only an acre limit for the loans **given** and not an individual limit. The amount of loan to which a person is eligible should be worked out as so many rupees per acre of land cultivated and this rate per acre should be fixed differently for different crops taking into account the cost of production of the crop concerned. The maximum number of acres in respect of which loan at this acre rate can be given to an individual should be fixed

384. The National Development Council has in its statement of policy issued in November 1958 assigned to the co-operative movement a new role in re-building and rejuvenating the rural

community. The Council has suggested that the co-operatives should be organized on the basis of the village community as the primary unit and that responsibility and initiative for social and economic development at the village level should be placed fully on the village co-operative and the village panchayat. We welcome this statement of policy because we too consider that the co-operatives should play a much greater role than at present in agricultural development. In the words of Mr. Douglas Enslinger, Ford Foundation Representative in India, it has become essential to organize a supply and distribution system which will assure that the supplies of improved seeds, implements, fertilisers, insecticides, etc., required by the agriculturists are made available to them when they are needed and in the required quantities within a bullock-cart's hauling distance. Only a village co-operative can successfully and satisfactorily undertake this task. In order to ensure that co-operatives do play a much bigger role than at present in agricultural development we recommend that the basic policy which the Government should adopt should be that all Government aids to the agriculturists should be made available only through co-operatives. This policy should be implemented progressively taking into account the availability of the required number of co-operatives. The Development Block should be taken as the unit for implementing this policy and for extending it from stage to stage. With a view to ensure the expeditious implementation of this policy a definite date should be fixed for each group of Development Blocks according to a phased programme for bringing this policy into force in those Development Blocks. Due publicity for the dates so fixed should be given well in advance and it should be announced that on and from the date fixed for each Block all takkavi medium and short-term loans will be discontinued in that Block.

385. We have already made two recommendations elsewhere designed to enable the co-operatives to play a much bigger role than hitherto in the field of agricultural development. One of them is our recommendation that the co-operatives in the Development Blocks should take over the work of multiplication of paddy and millet seeds in village seed farms and the distribution of the seeds so multiplied to ryots. The other is our recommendation that co-operatives distributing chemical fertilisers should be utilised as the agents for the disbursement of loans under the Intensive Manuring Loans Scheme. The objective which the Government should have before them should be to have at least one multipurpose Co-operative society for each village to serve as a service co-operative for the agriculturists and to cater to all their cultivation needs like fertilisers, seeds, credit, etc.

386. We recommend that the arrangement proposed by us in the case of disbursement of loans under the Intensive Manuring Loans Scheme, namely that the co-operatives should be utilised as agents for the purpose should be adopted in all other similar cases

where co-operatives are called upon to undertake service functions. In other words, this arrangement may also apply to all new kinds of loans and services that are transferred to the co-operatives from the Government departments which are now administering them.

387. We have considered the question whether there should be any authority at the Block level to co-ordinate the activities of the village agricultural multipurpose co-operative societies within the Block. We recommend that one of the standing committees of the new Panchayat Union Council should undertake the work of co-ordinating the activities of the agricultural multipurpose co-operative societies within its jurisdiction and ensure that all of them are treated alike in the matter of financial assistance, allotment of quotas, etc.

CHAPTER XVII.

CO-OPERATIVE FARMING. .

388. Co-operative Farming which before the recent Nagpur session of the Indian National Congress was more or less a matter for academic discussion and for experimentation on a pilot scale has since then assumed tremendous importance. In his recent utterances the Prime Minister of India has been stressing that co-operative farming is very essential for bringing about all round prosperity and he has placed co-operative joint farming before the country as the ultimate objective to be arrived at. This objective is to be achieved in two stages. During the first stage which is to be spread over a period of three years each ryot is to cultivate his holding separately but service co-operatives will be established throughout the country to place at the easy disposal of the ryot all his agricultural requirements and also to encourage ryots to get together for various economic purposes and make them realise the benefits of collaboration and joint action. Then will come stage two when co-operative joint farming will be introduced as the general pattern of agriculture throughout the country but only with the consent and approval of all concerned.

389. These proposals have touched off a nationwide controversy regarding the merits and demerits of co-operative farming. The protagonists of co-operative farming claim that only by its universal adoption in the country can Indian agriculture be modernised by the ryots being enabled to resort to improved cultural practices and take to scientific techniques and thereby increase agricultural production significantly. On the other hand the critics of co-operative farming contend equally vehemently that its adoption on a mass scale will be a leap in the dark and that far from stepping up agricultural production, the universal adoption of co-operative farming at the present juncture will be the surest way

of depressing production. They also doubt whether it will be possible to introduce co-operative joint farming without some form of compulsion.

390. It is not as though the idea of co-operative farming has now been placed before the country for the first time. Though till now this idea had not come so much to the fore as it has done now, it has been under serious consideration for quite a long time. The All-India Planning Committee on Co-operation classified co-operative farming societies into the following four type :—

- (1) Co-operative Better Farming Societies;
- (2) Co-operative Joint Farming Societies;
- (3) Co-operative Collective Farming Societies; and
- (4) Co-operative Tenant Farming Societies.

391. The Land Revenue Reforms Committee, Madras, which submitted its report to the Government of Madras in 1951 described the essential features of these four types of co-operative farming as follows :—

(i) A Co-operative Better Farming Society is a society designed to introduce improved methods of farming. Its members agree to follow a plan of cultivation laid down by it; but they are independent of one another in other respects. They may, however, agree to joint purchase of seeds and manure, joint sale of produce and other joint efforts, and the society may help them in these directions.

(ii) A Co-operative Joint Farming Society is one in which small landholders pool their lands and entrust them to the administration of the society. They then work on the pooled lands in return for wages from the society, which sees to the cultivation of the land on its own account according to modern agricultural methods. The income from the pooled land less expenses constitute the profits of the society. Each member is entitled to a share in the profit in proportion to the value of the land contributed by him. This recognizes individual ownership in the land. Each member will also have to pay for any improvement made on his plot of land.

(iii) A Co-operative Collective Farming Society holds lands by freehold or on leasehold. The lands are cultivated on the society's account by its members who are paid wages. The yield belongs to the society. The profits, after meeting expenses, are divided as in every other co-operative society, and the members are given a bonus on the wages earned.

(iv) A Co-operative Tenant Farming Society owns land by freehold and on leasehold; but the land is divided into smaller holdings, each of which is leased to an individual cultivator, who is a member of the society and settles on the land with his family. He pays to the society rent for his land, if the lands are leasehold,

and land revenue and other assessment, if the lands are Government lands alienated to the society. He cultivates the land of his own account and detains the profits thereof himself. The society assists him in the cultivation by supplying credit, seeds, manures, implements, etc., and by marketing his produce.

392. The first policy decision to form co-operative farming societies was taken in the year 1948 when Government ordered that compact blocks of Government waste lands should be assigned only to groups of colonists consisting of landless poor people. In pursuance of this decision Co-operative Farming Societies of the Tenant Farming type, otherwise known as Land Colonization Societies came to be organized. There are now 26 land colonization societies functioning in this State for landless poor, Harijans, ex-toddy tappers, weavers and other Backward Classes. It is seen from a recent report of the Registrar of Co-operative Societies that out of the 26 land colonization societies, only the following five can be said to be functioning satisfactorily :—

- (i) Kangayampatti Land Colonisation Society, Tanjore district,
- (ii) Gettisamudram Land Colonisation Society, Coimbatore district,
- (iii) Alletti Vachnampalayam Land Colonisation Society, Coimbatore district,
- (iv) Sivasankarapuram Land Colonisation Society, Salem district, and
- (v) Thengumarahada Co-operative Farming Society, Nilgiris district.

393. In 1951 the Land Revenue Reforms Committee, Madras, made certain recommendations relating to co-operative farming. This Committee was of the view that collective farming as a deliberate State policy should be ruled out. Nevertheless it recommended that where the community of a village came forward to organize co-operative farming by taking the land on lease and cultivating the land and sharing the produce according to collective principles the State should endeavour to encourage such collectives. It also suggested that where in a particular area 85 per cent of the adult population covering also 85 per cent of the land under holdings had agreed to collective farming the entire community should be taken to have agreed and that legislation would be necessary for compelling the dissenting minority.

394. The Government considered that the State should encourage the formation of co-operative collective farming societies in areas where the village community voluntarily comes forward for the purpose and that in cases where 75 per cent of the adult population covering also 75 per cent of the land under holdings in a particular area had agreed to try collective farming, legislation

should be undertaken to compel the dissenting 25 per cent minority to come into the collective farm. Such legislation has not, however, been undertaken so far.

395. Agreeing with the Congress Agrarian Reforms Committee which had recommended the formation of a multi-purpose co-operative society in every village, the Land Revenue Reforms Committee recommended that co-operative better farming societies particularly as part of multi-purpose co-operative societies are eminently desirable irrespective of the size and type of the holdings concerned and should be encouraged as a matter of State policy. It also recommended that co-operative joint farming also should be encouraged in an equal measure with co-operative better farming, it being felt to the cultivators to choose whichever of the two types they preferred. The Government accepted both these recommendations.

396. The Committee was against any compulsion in the formation of co-operative joint farming societies. However in the case of small holdings with inadequate resources the holding being less than the unit of profitable cultivation, the Committee was of the opinion that compulsion might be considered. But even here the Committee did not advocate compulsion at the very outset but suggested that societies should be left to be formed by voluntary effort as a result of intensive propaganda and that if, however, at the end of a period of five years it was found that no tangible results had been achieved compulsion might be exercised to bring them into a co-operative better farming or a co-operative joint farming society, whichever was found to be then suitable. The Government after examining this recommendation considered that no compulsion should be used in the formation of co-operative joint farming societies or co-operative better farming societies even in respect of small holdings.

397. The Land Revenue Reforms Committee pointed out that the Co-operative Department was confining its activities to the formation of land colonization societies and that in respect of the existing sectors of cultivation there was no sustained drive for the formation of co-operative better farming societies or what are sometimes called agricultural improvement societies. The Committee considered that the Co-operative Department should make an intensive drive for the formation of better farming societies or joint farming societies in such sectors and that this should be accompanied by active and educative propaganda. The Government accepted this recommendation with the modification that the drive need not be State-wide but that it should be in two or three taluks in a district at a time. The progress made in regard to the promotion of better farming societies and joint farming societies is being watched by the Government with the help of half-yearly progress reports received from the Registrar of Co-operative Societies.

403. The Government have constituted the Madras State Co-operative Farming Board for considering schemes of Co-operative Farming with the following members :—

- (1) Minister in charge of Co-operation.
- (2) Minister in charge of Agriculture.
- (3) Minister in charge of Revenue.
- (4) Development Commissioner.
- (5) Additional Development Commissioner.
- (6) Joint Development Commissioner.
- (7) Member, Board of Revenue (Land Revenue).
- (8) Registrar of Co-operative Societies.
- (9) Director of Agriculture.
- (10) Chief Engineer (Irrigation).
- (11) Commissioner for Hindu Religious and Charitable Endowments; and
- (12) Four non-official members.

This Board has a Deputy Registrar of Co-operative Societies as its Secretary. This Deputy Registrar is also assisting the Registrar of Co-operative Societies in matters relating to co-operative farming.

404. The Non-official Members of the Committee made enquiries about the working of the Valandur Co-operative Joint Farming Society in the Usilampatti Development Block of the Madurai district. In the first year of cultivation (1956-57) out of 156.55 acres of wet lands already under cultivation pooled by 183 members the society undertook direct cultivation of 134.59 acres while the remaining 21.96 acres were let out to the Agriculture Department for running a State Seed Farm. The increase in yield recorded in that year was 26 per cent. The members considered that the cultivation expenses were abnormally high. Some of the members insisted that there should be no appropriation from the annual income to the reserve fund. This led to discontent as a result of which many members withdrew their lands from the common pool. In 1957-58 the extent of lands pooled amounted to only 61.92 acres owned by 37 members. The lands pooled for cultivation during the year 1958-59 season was still lower amounting only to 48.11 acres pooled by 26 members. The Non-official Members of the Committee had a discussion with some Directors and members of the society. The members complained that though there had been an increase in yield of 26 per cent and 12 per cent respectively in the first and second years of the working of the society the expenditure was much more than was the case prior to the formation of the society. The Secretary of the society and the Deputy Registrar of Co-operative Societies, Madurai, who were present explained that the increase in expenses was due to

the fact that the members did not offer their labour readily for cultivation operations and even if they did they did not turn out that amount of labour that the wages paid to them warranted. As a consequence hired labour (i.e., agricultural labourers who are not members of the society) had to be engaged. Pilferages and thefts of grain from the field were it is reported a common feature. The facts mentioned by the Deputy Registrar of Co-operative Societies and the Secretary of the society show that the Valandur Society could not strictly be considered to be a co-operative joint farming society because the members of such a society should work on the pooled lands in return for wages. The Deputy Registrar of Co-operative Societies stated that the co-operative spirit was very much wanting on the part of the members of the society. The general impression gathered by the non-official Members of the Committee was that the society was not functioning as it should and that there was not much enthusiasm on the part of its members to run the society well.

405. The non-official Members of the Committee also inspected the working of the Nadhagoundanpudur Co-operative Joint Farming Society in the Coimbatore district. There are 28 members in the society all of whom are owners of lands. An extent of 105.48 acres of unirrigated dry lands has been pooled by the members of the society for joint cultivation. Agreements have been executed by the members to carry on farming operations through the society for a period of 15 years. They have also mortgaged to the society the entire extent of the pooled lands besides certain other lands belonging to them to the extent of 44.88 acres (not brought under the scheme) as security for the loans borrowed. The society in its turn has mortgaged the lands to the Government who have sanctioned to the society an interest-free loan of Rs. 28,500 repayable in 20 years for sinking of trial bore-wells to find out the availability of water, for sinking two wells for irrigation and for the purchase and installation of three electric motor water pumps and laying of pipe lines. The year 1958-59 was practically the first year of the working of the society. Unlike in the case of the Valandur Co-operative Joint Farming Society which is distributing dividend on the basis of the value of the lands contributed by the members the Nadhagoundanpudur Co-operative Joint Farming Society is treating all the pooled lands alike and the dividend is distributed at the rate of so much per acre for the lands contributed by each member. An amount not exceeding 60 per cent of the net income of the lands brought under joint cultivation according to the rates fixed by the general body will be paid to the members as annual rentals for their lands. The Non-official Members of the Committee asked the representatives of the Society why they preferred joint cultivation under which they got only 60 per cent of the net income as rental for their lands while they could have the entire income in case they did individual cultivation of their lands. The answer was that the result of the cultivation of their lands was

398. The Committee on Co-operation in Madras (1955-56) was of the considered view that joint farming on a co-operative basis was not likely to be popular and capable of implementation on an extensive scale. It held that the general future pattern of farming should be in the direction of evolving peasant proprietorship. It considered that there was no objection to the formation of collective farming societies where people came forward to work on such lines and suggested that the Government might in such cases give all the assistance required for the successful working of the societies such as free services of administrative and technical staff, subsidy and loans for the purchase of agricultural implements, bulls, etc. It recommended that such experiments might in the first instance be tried when large blocks of Government lands were assigned to co-operatives for colonization.

399. In 1957 the Government of India published the Report of the Indian Delegation to China on Agrarian co-operatives. This report explained why the Delegation considered that we should not stop short of establishing service co-operatives but should go further and adopt co-operative farming. It said:

"Service co-operatives are helpful in providing supplies and funds where land is abundant and holdings are cultivated for considerations of net money return rather than gross productivity. In India, both land and capital are scarce and labour is plentiful. The emphasis in India has, therefore, to be not only on net return, but more so on increased productivity over the total area through intensified cultivation by making the fullest use of the available manpower. This calls for the pooling of land, manpower and capital resources by co-operative action so that it may be possible to fully utilize the available resources and also to obtain economies of large scale production."

The benefits of co-operative farming as visualised by the Delegation are given in a nut shell in the following passage extracted from its report:—

"Co-operative farming will enable the fuller utilization of the capital resources, reduction of cost, and mobilizing savings and capital formation. It will also offer opportunities for utilizing a part of the surplus labour force for improving village communications and housing and for the provision of other social amenities. Planning at the village level will become possible. Besides, it will provide opportunities of working together for the various groups of people now held apart by social and communal divisions and thus bring about increasing emotional integration of the people into a living entity."

400. The Delegation recommended that a well-laid demonstration programme of co-operative farming societies should be worked out with the object of having at least one society in every group of 50 villages in the next four years which would mean roughly about 10,000 societies. It added that an effort should be made to organise as many societies as might be possible in the Community Project areas and the National Extension Blocks which have been

in existence for two years. The Government of Madras decided to encourage the formation of Joint Farming Societies in order to demonstrate their value. The Registrar of Co-operative Societies has been submitting proposals for the organisation of such societies in pursuance of that decision. It may be mentioned that even before the Government took this policy decision two societies of the Joint Farming type had been organised in 1956, one at Valandur, Madurai district and the other at Sivagiri, Chingleput district, under a scheme included in the Second Five-Year Plan which has for its target the formation of 30 Co-operative Farming Societies during the Plan period.

401. There are at present nine co-operative joint farming societies in all in this State and the progress made by them is indicated below:—

Name of society.	Year in which started.	Number of members.	Extent of all kinds of land pooled.	Extent cultivated.	Financial assistance sanctioned by the Government.		Amount of Central Bank loan guaranteed by Government.
					Subsidy	Loan	
			ACRES.	ACRES	RS.	RS.	RS.
Valandur	1956-57	222	48.28	48.28	3,200	32,500	70,000
Sivagiri	1956-57	20	65.89	34.00	5,000	11,000	15,000
Nadbagoundanpudur.	1957-58	26	105.46	105.46	Nil	28,500	33,000
Mecheri	1958-59	23	96.00	96.00	4,000	42,000	15,000
Periammapalayam.	1958-59	23	70.00	70.00	Nil	12,000	3,000
Bokkapuram	1958-59	118	500.00	100.00	7,500	61,300	52,000
Mangalam	1958-59	..	220.00	Nil	17,350	27,000	15,000
Lathur	1958-59	..	98.53	Nil	11,150	13,150	20,000
Kalappanaickenpalayam.	1958-59	25	96.97	..	22,570	46,370	15,000

402. There are 37 tenant farming societies in this State with 3,015 members and a paid up share capital of Rs. 3.90 lakhs. The area under cultivation by the members of these societies amounts to 8,675 acres. The formation of tenant farming societies for the cultivating tenants of the lands belonging to the temples, mutts, etc., is a new line of expansion in co-operative farming. There are fourteen such societies with 620 members and a paid up share capital of Rs. 13,043 in the districts of Tanjore and Tirunelveli. An extent of 841 acres of land was under cultivation by the members of six of these societies. Similar societies in respect of the Bhoodan and Gramdan lands have also been formed. There are eleven such societies in the Madurai and Coimbatore districts. They have 1,617 members and a paid up share capital of Rs. 898 and 1,557 acres of land within their fold. These societies are provided with financial assistance and free services of staff.

very precarious depending on the rainfall before the society was formed as they could not dig wells at a huge cost. They had therefore pooled their lands for joint cultivation with the help of assured irrigation from the wells dug from the loans obtained by their joint effort on the joint mortgage of their pooled lands and other assets. With this assured irrigation the production in their lands is reported to have increased by one hundred per cent on some of the lands. The scheme has just started but the prospects appear to be bright though it is now too early to express any definite opinion about it. While the working of the Valandur Society evokes pessimism about the future of co-operative joint farming the working of the Nadhagoundanpudur Joint Farming Society justifies a more optimistic outlook.

406. The Non-official Members of the Committee also paid a visit to Thengumarahada on the eastern slopes of the Nilgiri Hills to study the working of the Co-operative Farming Society there. The society is run by a group of colonists who have reclaimed a considerable extent of forest area and brought it under profitable cultivation. There are 141 members. The society has obtained 500 acres of Government Forest lands with water facilities on lease from the Government. The entire lands have been reclaimed and brought under cultivation. The lands have been sub-leased by the society to its members at the rate of three acres per head for individual cultivation. Each member has been allotted two acres of wet land and one acre of dry land. The lessees have to pay 750 lb. of grain per acre of wet land annually to the society and they can keep the rest of the produce. The Government are not assisting the society by lending the services of any one of their officers free of cost; nor are they giving any subsidy or other financial assistance. The members of the society have developed the area entirely by their own efforts and out of their own funds. An idea can be had of the remarkable way in which the area leased to them has been developed by the colonists from the following area and yield figures of the principal crops in the last few years:—

Name of crop.	1955-56		1956-57.		1957-58.		1958-59.	
	Area. Yield.		Area. Yield.		Area. Yield.		Area. Yield.	
	ACS.	TONS.	ACS.	TONS.	ACS.	TONS.	ACS.	TONS.
1. Paddy ..	518	426	569	525	575	717	577	988
2. Ragi ..	112	120	112	119	137	167	137	202
3. Cholan ..	112	108	112	112	137	157	137	..

The colony has considerably developed its own green manure resources. The colonists have not confined their cultivation only to paddy and millets. While they are cultivating these crops individually in their respective blocks they are cultivating jointly

coconuts, arecanuts, spices like nutmeg and cloves, fruits like Jack, Mangoostine, Papaya and Malta lemon and also cocoa. The colonists are maintaining entirely at their own cost a 22-mile road from their colony to Bhavanisagar. The Thengumaranada Co-operative Farming Society is a good example of how cultivable waste lands can be brought under profitable cultivation by resorting to co-operative farming.

407. We have set out above the history of co-operative farming in this State and have given some idea of the progress that it has made so far. It will be quite clear that the idea of co-operative joint farming is by no means new and that it has been before the country for quite a long time. We believe that much of the present day opposition to co-operative joint farming is due to its being linked up in the public mind with the proposal to impose ceilings on land holdings. The controversy regarding land ceilings has raised so much dust that it has, in our opinion, stood in the way of the agriculturists, particularly those who do farming on a small scale, realising the undoubted advantages of co-operative joint farming. We are afraid that the agriculturists are labouring under some misconceptions which are unwarranted. They seem to think that if they join a co-operative joint farming society they will lose their rights of ownership over their lands and become mere wage-earners. There is no justification for this fear. The agriculturists will do well to remember that co-operative joint farming is different from collective farming. Only under collective farming the position may be as feared by them. Under the system of co-operative joint farming the agriculturists will retain full proprietorship over their lands and each of them will get a share of the yield in proportion to the value of the lands contributed by him. It will certainly be beneficial not only from the national but even from the purely individual selfish point of view for several agriculturists to pool their resources, obtain thereby supplies and services which will be beyond the means of any single individual if he were to plough a lonely furrow, increase the level of production and obtain a better return. At present, there are two principal incentives operating in the field of agricultural production. They are the pride of ownership of land and the desire for increased profit, resulting from increased output. It is not the intention to destroy or in any way reduce the power of either of these incentives. What is aimed at is to strengthen the power of these factors, by adding a third factor, viz., the means of concerted action by a group of farmers. A group functioning through a co-operative will be able to do many things which the individual farmer is not able to do to-day, for want of resources. The addition of the advantages of collective co-operative action to all the incentives operating at present is the basic idea of co-operative farming, as contemplated now, and we believe such co-operative farming will contribute greatly to increased production.

408. The only valid objection that can be raised against co-operative joint farming as that agriculturists may be forced to join a co-operative joint farming society against their will. This objection does not arise as it has been made abundantly clear by the Prime Minister that the formation of Co-operative Joint Farming Societies will be purely voluntary and that there will be no compulsion. We trust that the proposal for the universal adoption of co-operative joint farming as the future pattern of our country's agriculture will be considered by all concerned dispassionately untrammelled by other considerations and that in effecting the change-over to voluntary co-operative joint farming, the Government will receive the requisite measure of enlightened co-operation from the agriculturists and others interested in stepping up agricultural production.

409. It is the Registrar of Co-operative Societies who is now concerned with co-operative farming. His hands will be full in view of the tremendous expansion in the supply of agricultural credit through the co-operative agency that is envisaged and so he may not be in a position to devote adequate attention to questions relating to co-operative farming all by himself. Further, in view of the proposal to make co-operative joint farming as the future pattern of the country's agriculture, the Director of Agriculture will have to come into the picture to a large extent as it is his department which should supply the technical guidance to the Co-operative Joint Farming Societies of the future. As the avowed object of the Co-operative Joint Farming Societies that are expected to voluntarily come into being throughout the country is stepping up agricultural production particularly food production, the Commissioner of Food Production should also have to be associated with the formation and working of farming co-operatives. We, therefore, recommend that the Commissioner of Food Production should be designated as the authority for implementing all co-operative farming schemes. All orders and instructions which the Government may have to issue in respect of such schemes should be addressed to the Commissioner of Food Production who should carry them out with the assistance of the Registrar of Co-operative Societies and the Director of Agriculture. The Commissioner of Food Production should be included as a member in the Madras State Co-operative Farming Board which should be reconstituted in the light of the latest developments.

CHAPTER XVIII.

AGRICULTURAL RESEARCH.

410. Agricultural research, the aim of which is to discover ways and means of increasing the yield from the land and to make them available to the agriculturists in order that they may utilise them

in their day-to-day agricultural practices and obtain better results, is of fundamental importance. Its importance is all the greater in a predominantly agricultural and densely populated country like ours, where, the scope for extending the area under cultivation to keep pace with the growth in population being extremely limited, the only alternative is to intensify agricultural production by pressing agricultural research into service to the fullest extent.

411. The headquarters for agricultural research in this State is at Coimbatore, where the Agricultural Research Institute and the Agricultural College are located side by side. The Dean of the Agricultural College and Research Institute, Coimbatore, is also the ex-officio Additional Director of Agriculture and he is in charge of the direction and co-ordination of research throughout the State.

412. The Agricultural Research Institute at Coimbatore has done very useful work during the past half a century and has laid firm foundations for the development of scientific agriculture in this part of the country. It was in the Sugarcane Section of this Institute that the work on the development of the improved sugarcane strains which ultimately became world famous was carried on until 1924 when the Central Sugarcane Breeding Station was started at Coimbatore. How much patient work has been done in the direction of improvement of paddy can be inferred from the fact that there is at present in the Paddy Section of the Institute a collection of over 2,400 paddy types. The results of the basic studies in the Millets Section have won recognition from outside the country and it has been recorded in the United States Year Book of Agriculture for 1936 that the contributions to sorghum (chulam) breeding made at this institute are the most extensive and comprehensive.

413. In the Agricultural College and Research Institute, Coimbatore, to which is attached a Post-Graduate Research Institute also, there are the following sections each dealing with a particular branch of research with the help of requisite staff:—

- (i) Genetics and Plant Breeding Section.
- (ii) Agronomy Section.
- (iii) Soil Science Section.
- (iv) Plant Pathology Section.
- (v) Entomology Section.
- (vi) Horticultural Section.
- (vii) Agricultural Economics Section.

(viii) Agricultural Engineering Section.

(ix) Animal Husbandry Section.

All the sections mentioned above between themselves cover practically the whole field of agriculture.

414. There is a Research Council at Coimbatore consisting of the Heads of all the Research Sections. This Council scrutinises the three-year programmes of research work of the Agricultural Department and reviews the progress of the work every half-year. It also scrutinises the annual reports of the Agricultural Research Stations and also the annual reports of the Heads of the Research Sections in order to secure uniformity of presentation and to bring out the achievements from year to year with a view to translate the results of research into the farmers' fields and to plan the follow-up programme. No experiments are discontinued and no new ones are introduced without the express approval of the Research Council.

415. There are a large number of agricultural research stations and Government Farms throughout the State. These institutions are intended to tackle local problems, demonstrate the improved methods and scientific agricultural practices evolved by the Research Sections and advocated by the Agricultural Department and test their suitability to local areas and conditions of new crop strains released by the Agricultural Department. A list of these institutions is given in Appendix VII. The non-official members of the Committee who paid a visit to and saw the working of many of them found that they were doing very useful work.

416. We have gone into the question whether the Agricultural Research Institute and the Post-Graduate Research Institute should be asked to concentrate solely or largely on problems of applied research ignoring or devoting only minor attention to problems of fundamental research. That applied research will yield results of practical utility quicker and that the legitimate function of the Agricultural Department should therefore be to engage itself purely in applied research leaving fundamental research to be tackled by Universities and other academic institutions is a view which is largely held. But the line of demarcation between fundamental and applied research is faint and sometimes almost indeterminable particularly in the field of agriculture. Fundamental research is an essential pre-requisite for applied research and without devoting proper attention to the former it will be difficult to maintain the requisite high standards in the latter. We, therefore, consider that fundamental research should be accorded a prominent place in the current and future research programmes of the Agricultural Department. The Head of every one of the Research Sections

should be given at least one Assistant and necessary additional laboratory or field equipment and facilities and he should be asked to undertake mainly basic or fundamental research while continuing to be responsible for guiding the subordinates in applied research. The highest priority should be given to rice research for obvious reasons.

417. Though there is a shortage of ammonium sulphate and other chemical fertilisers at present the position may be expected to ease considerably in the next seven or eight years. At this stage we would have reached the maximum use of fertilisers for the strains now in vogue and will not be able to benefit from any further supply of fertilisers. The basis of the very high yields of rice in Japan is the evolution of strains of paddy which can absorb very heavy doses of fertilisers. The Agricultural Department should therefore take up even now necessary steps for evolving suitable paddy strains which will respond well to doses of ammonium sulphate higher than the maximum dose of 30 lb. of nitrogen per acre now recommended by the Agricultural Department. A suitable scheme with this object should be formulated at once and implemented after scrutiny by the Research Council. We also recommend that an experimental scheme for the use of chemical fertilisers by applying them to the sub-soil in pellet form with a view to effect economy in the use of chemical fertilisers should be taken up for immediate implementation. One of the objectives of this scheme should be how to produce pellets at a cheap cost which will be within the reach of the average agriculturist in this State.

418. Drought-resistant strains should be developed for supply to those areas where the soil has a low moisture content for prolonged periods. We understand that at present the work of developing such strains is confined to paddy. We recommend that the Agricultural Department should intensify at once the programme of evolving drought-resistant strains of other crops also.

419. We consider that urgent steps should be taken to see that this State is not perpetually deficit in regard to its requirements of pulses as at present and that its chronic dependence on imports from outside is reduced gradually and eliminated ultimately. We therefore recommend that the Agricultural Department should intensify the research work on pulses and evolve improved strains and varieties of pulses largely consumed in this State which are capable of catching the fancy of the agriculturists and inducing them to bring increased areas under pulses adopting those improved strains. The present arrangement under which there is only one Crop Specialist for both millets and pulses put together is not satisfactory. The separate post of Pulses Specialist which was abolished some years ago should therefore be revived forthwith for tackling the problems relating to pulses exclusively.

420. The Agricultural Department should acquire an intimate and detailed knowledge of the nature and condition, the aptitude and potentialities and the deficiencies and requirements of the soil in the various parts of the State. Such knowledge is now lacking. This is a desideratum because only if it is based on such basic knowledge can agricultural research be fruitful and agricultural extension purposeful. We, therefore, recommend that a systematic survey of the soil in all the regions of this State should be conducted by the Agricultural Department starting from the predominantly rice areas of the State with a view to draw up a detailed soil map of this State. Linked with this survey there should also be an agronomical survey of the entire State.

421. Though centralised direction and hierarchical control are no doubt necessary we feel that there should also be some scope left for individual initiative among those in the lower rungs. We therefore recommend that discretion should be given to persons of the position and status of Farm Managers to conduct observation trials and pilot trials on their own initiative without waiting for the approval of those above them. A report should, however, be sent by the subordinate official concerned to the Research Council as soon as each such item of work is started.

422. We have already stressed that the highest priority should be given to rice research. Various suggestions for intensifying rice research have been made by Sri A. R. Venkatachari, a copy of whose note on the subject is appended (Appendix VIII). Though the Research Sub-Committee has had the benefit of discussing Sri Venkatachari's suggestions with Dr. K. Ramiah, D.Sc., F.N.I., Special Officer—Rice, Indian Council of Agricultural Research, who is an acknowledged authority on the subject, we do not make any specific recommendations on this technical subject. We however trust that the Director of Agriculture will have all the suggestions of Sri Venkatachari examined by the Research Council and take steps to implement as many of them as possible in view of the imperative need to step up the scope and intensity of rice research for greatly increasing the production of rice.

423. A very useful line of investigation is the correlation of the seasonal conditions with the level of agricultural production over a wide range of years. We understand that a considerable volume of unanalysed data on this subject for several successive years is available with the Agricultural Meteorologist, Agricultural College and Research Institute, Coimbatore. We recommend that the analysis and study of this data should be undertaken expeditiously with a view to examine the possibility of obtaining any useful results from them if they are found to be adequate or to collect further data on scientific basis to the extent necessary.

CHAPTER XIX.

AGRICULTURAL EXTENSION.

(a) PUBLICITY AND PROPAGANDA.

424. The primary object of agricultural extension is to take the results of agricultural research and the improved cultural practices evolved by the Agricultural Department and tested by it in the Government Farms and found to be beneficial to the doorstep of the agriculturist with a view to induce him to substitute scientific methods of cultivation for the traditional and less productive methods. An efficient publicity and propaganda organization is necessary for this purpose.

425. The Agricultural Department has been carrying on propaganda for the adoption of improved agricultural practices by disseminating information regarding them in popular language through pamphlets, leaflets, posters, radio talks, propaganda meetings, etc. Since 1944 the Department has been publishing the *Mezhichelvam*, a monthly journal in Tamil, which has been propagating knowledge of scientific agriculture among the agriculturists. The annual subscription for this journal is only rupees three and the average monthly circulation is about 18,000 copies. The Annual Villagers' Guide and Calendar in Tamil published by the Department is a very cheap, useful and popular publication. About 25,000 copies of it are sold every year at nineteen naye paise per copy.

426. Due attention is being paid to the visual education of the agriculturist. The Museum and the central permanent exhibition at the Agricultural College and Research Institute, Coimbatore, are well worth a visit by every progressive agriculturist. As an aid to propaganda the Agricultural Department organises exhibitions in connection with all important fairs and festivals and during social, religious or political conferences. On such occasions besides putting up exhibits and posters, demonstration with improved implements, magic lantern shows, etc., are arranged. Eighty-seven exhibitions, big and small, were held during the year 1957-58.

427. The publicity work gathered momentum after the appointment of a full-time Agricultural Information Officer under the scheme for maintaining an agricultural information service which is one of the agricultural schemes included in the State Second Five-Year Plan. The object of this scheme which was launched in January 1957 is to disseminate up-to-date agricultural information to the farmers quickly through publications, films, exhibitions, etc. The Agricultural Information Officer is conducting information workshops at which Crop Specialists and the higher level extension officers are given training about the methods of pooling together the results of agricultural research, rationalising them and producing information for the farmers in the form of folders,

posters, leaflets, flannel-graphs, etc. He also holds training classes for the extension personnel at lower levels at various regional centres by rotation. He prepares the requisite propaganda literature and arranges to get them printed in a suitable form for distribution. He tours the Development Blocks and trains the Gramasevaks in the best and most up-to-date agricultural practices to be passed on for adoption by the agriculturists.

428. Publicity work received a further fillip with the appointment during the year 1958-59 of a Joint Director of Agriculture exclusively for attending to the work of agricultural extension in the Development Blocks. This officer is to concern himself principally with the educational phases of farming in order to bring about technological improvements in agricultural production. He is to be in close contact with research agencies and formulate authoritative recommendations for the use of the field extension staff in the Development Blocks. He should help in arranging field demonstrations, crop campaigns, rural exhibitions, Village Leaders' Camps and assist the Informing Wing of the State Agricultural Department in the preparation of extension information material on a mass scale for the use of Gramasevaks and farmers. He is associated with the supervision of the Rural Extension Training Centres in the State. He provides the liaison between the "Extension Wing" of the Ministry of Agriculture at the Centre and the State Agricultural Department in all matters relating to farm advisory work, dissemination of agricultural information and the supervision of the Rural Extension Training Centres.

429. Some amount of agricultural publicity is done by the State Department of Information and Publicity also. About the end of the year 1954 the Government transferred to the control of the Director of Information and Publicity the mobile publicity vans maintained by some of the Heads of Departments with a view to centralise field publicity through these vans under one Department. They directed that the Director of Information and Publicity should maintain a close liaison with the Heads of Departments in order to ascertain their publicity needs, formulate an integrated programme so as to accommodate the requirements of all departments and bring into effect an efficient field publicity scheme. At present this scheme is functioning in the districts of Salem, Coimbatore, Tanjore, Madurai, Chingleput and Kanyakumari in each of which there is a District Publicity Officer.

430. The Government have constituted an Agricultural Information Committee at the State headquarters with the Director of Agriculture as its Chairman, and the Director of Animal Husbandry, the Director of Information and Publicity and the Station Director, All-India Radio, Madras and an agriculturist

The object of this Committee is, among other things, the organisation of publicity for such items as the Japanese method of cultivation, collection, preparation and distribution of literature for agricultural extension work and conducting campaigns for better farming.

431. In order to gear up the agencies engaged in agricultural extension work, mobilise all other agencies and organisations engaged and interested in stepping up agricultural production and co-ordinate their activities with a view to achieve the maximum results the Government have launched a special campaign for increasing the production of foodgrains in this State during this year's main crop season. This campaign was inaugurated on 14th April 1959 (Tamil New Year's Day). Under this campaign plans are being prepared on a Block-wise basis in the Development Blocks and on a taluk-wise basis in non-Block areas for assessing the needs of the areas in the matter of improved seeds, fertilizers, green manure, compost manure, etc., and for making arrangements for the supply of the requirements taking into account the cropping pattern in different areas. In order to direct and guide the campaign the Government have constituted a State Level Committee with the Commissioner of Food Production as the Chairman, the Director of Agriculture as the Convenor, the Additional Development Commissioner, the Registrar of Co-operative Societies, the Secretary of the State Farmers' Forum and the four Non-official Members of the Committee on Agricultural Production as Members. This Committee has formulated plans for the effective conduct of the campaign. The Government have also constituted Committees at district level and also at Block level in the Development Blocks and at taluk level in the non-Block areas for carrying on the campaign. The Government have also ordered the formation of group teams by the Block or Taluk Level Committees for carrying on intensive work in pursuance of the campaign. In the Development Blocks these teams will consist of Gramasevaks, village leaders and progressive farmers. In the non-Block areas the teams will consist of Gramasevak trainees drafted from the various Rural Extension Training Centres and the students of the Agricultural College, Coimbatore.

432. In view of the vital role which the Panchayats can play in the successful implementation of this special campaign, the Minister for Agriculture issued a direct and personal appeal to the Panchayats in this State seeking their co-operation and assistance in the campaign. In this appeal he pointed out that the 8,000 and odd Panchayats functioning in this State are composed of members who command the respect and love of the village population and whose words therefore carry considerable weight and exhorted them to persuade their fellow agriculturists both by example and by precept to practice improved methods of agricultural production. Detailed instructions are being issued to the Panchayats setting out t they can do for ensuring the success of the special campaign.

433. We find that the publicity now being given to the concessions extended to agriculturists is not adequate. For example, it was brought to the notice of the Non-official Members of the Committee at the Top Slip on the Anamallais that only in four coupes in the Sethumadai area in the Pollachi division out of the 25 coupes in that division the concession of removal of green manure leaves by the agriculturists from fuel coupes in natural forests which had to be cut at the end of the next twelve months was being availed of. The Non-official Members of the Committee felt that this was because the agriculturists were not sufficiently aware of the concession. We therefore consider that adequate publicity should be given both by the Agricultural Department and by the other Departments concerned regarding all the concessions that have been extended by them to agriculturists. Adequate publicity should be given to these concessions by the Information and Publicity Department also through the District Publicity Officers in those districts in which such posts are in existence. In addition to the existing methods for giving publicity, these concessions should also be publicised by the beat of 'tom-tom' in the villages by the Agricultural Department so that the illiterate ryots who form the vast majority of the agricultural population will come to know of them and take advantage of them if they are eligible. Special publicity is necessary for the several concessions available to the agriculturists for producing and using green manure in their own lands or in porambokes or other areas and the methods of collecting and composting all wastes. This should be compiled in a booklet in Tamil using simple language and distributed either free of cost or at nominal cost in the villages.

434. The project sites like those of the Bhavanisagar and Sathanur Projects to which agriculturists from far and near go for sight-seeing are some of the best places for carrying on agricultural propaganda about the improved techniques advocated by the Agricultural Department. Hence arrangements should be made immediately by the Agricultural and Public Works Departments to display in the Project Information Office in each project site, charts, models, photographs, posters, etc., of the Agricultural Department and to sell or distribute free of cost, as the case may be, pamphlets and other extension literature of the Agricultural Department to the agriculturists visiting the project sites.

435. In the permanent museum at Gandhigram in the Madurai district the Non-official Members of the Committee saw a set of interesting posters in Tamil of very high educative value produced by the trainees of the Rural Extension Training Centre at Gandhigram as part of their training in cultural activities. Such posters will be very useful in agricultural extension work in the rural areas as they have been designed to catch the eye of the average ryot. The Information Officer of Agricultural Department should periodically inspect such posters and other publicity material produced not only

in this Rural Extension Training Centre but also in all the other Rural Extension Training Centres in the State, select such of them as he finds to be worthy of reproduction on a large scale, have the required number of copies of them made and distribute them at the rate of at least one copy for each Gramasevak for use in extension work. As an inducement to the Rural Extension Training Centre trainees to produce good posters the Government may sanction the payment of a reasonable amount for each such poster or other propaganda material selected by the Information Officer of the Agricultural Department for large scale reproduction and distribution.

436. We recommend that documentary films in colour should be taken by the Agricultural Department in consultation with the Information and Publicity Department depicting the improved cultural practices advocated by the Agricultural Department weaving them round simple and appropriate stories. In order to ensure that these films have the utmost popular appeal the best talent for preparing the scripts for them should be tapped by offering prizes for the scripts approved and accepted by the Agricultural Department. Due publicity for the prize scheme should be given among short story writers, writers of stories and scenarios for films and authors of radio plays. The film should be prepared both in 35 mm. and 16 mm. sizes, the former for being shown in regular cinema theatres and the latter for being shown in those Development Blocks which have film projectors and also through the agency of the District Publicity Officers of the Information and Publicity Department.

(b) DEMONSTRATION PLOTS.

437. Experience has revealed that by far the best and quickest method of influencing the practices adopted by the cultivator is to demonstrate the use of an improved agricultural or manurial practice on a small plot cultivated by him under departmental direction. The work done on a Government Farm is slower in influencing the cultivator than a demonstration conducted on his own lands. A demonstration on a Government Farm is apparently suspect to the cultivator because he imagines that the method demonstrated there is beyond his means or unsuitable to his conditions. A demonstration on a ryot's holding however brings conviction to him more easily.

The following precautions are taken in running demonstration plots :—

(1) The field selected should be one which is easily accessible, preferably on the main road.

(2) It should be neither too fertile nor very poor but should be of average fertility typical of the locality.

(3) It should be free from root or shade effect of trees and inundation or water-logging.

(4) Two strips of land of $\frac{1}{4}$ to $\frac{1}{2}$ an acre each located side by side should be selected. In one plot the ordinary method normally adopted by cultivators should be adopted. In the adjoining plot the improved method should be adopted.

(5) The difference in yield and the value of the extra yield should be assessed and given wide publicity.

438. The demonstrations conducted by the Agricultural Department relate to several aspects of agriculture. There are for instance the demonstration plots which exhibit an improved cultural practice, for example, line planting, wider spacing, etc. Then there are the manurial demonstrations intended to show the ryots the utility of a particular dosage of manure recommended. There are also demonstration plots which are called "varietal" intended to exhibit how an improved variety of seed grows well and yields better than the ordinary local variety. Again there are demonstrations to show the utility of improved implements. Lastly there are plots in which a combination of the above as for instance the Japanese method of paddy cultivation is demonstrated.

439. It is reported that during the year 1957-58, the Agricultural Department laid out a total of 117,712 demonstrations as shown below in all the districts:—

	Numbers.
Cultural demonstrations	12,156
Manurial	8,707
Varietal	5,814
Improved implements	12,527
Other including Japanese method demonstrations ..	78,508
Total ..	117,712

These demonstration covered a total area of 59,232 acres.

440. Under the minimum programme of agricultural development in the Development Blocks laid down by the Government each Gramasevak should lay out at least three demonstration plots in each village. He should bring into existence a minimum of thirty demonstration plots within his jurisdiction every year. One Demonstration Farm (as distinct from demonstration plots) should be set up in each Gramasevak's circle, the total expenditure that may be incurred in this behalf being limited to Rs. 2,500 over a period of five years per Block.

441. We recommend that the Agricultural Department should continue to attach very great importance to this item of work and bring home to the ryots the benefits which they can derive by the

results achieved in individual research programmes or schemes of the Agricultural Department by demonstrating these results on the fields of selected ryots in representative areas in the State.

(c) CROP COMPETITION.

442. The creation of a healthy spirit of competition among the farmers of our country is one of the means of stepping up food production. The average yield of food crops in this State is considerably lower than those obtaining in more advanced countries and the results of research have to find their way to the agriculturists rapidly and crop competitions provide a good stimulus to the farmers to use improved methods.

443. In this State, crop competition on a State wide scale has been organized from the year 1950-51 and there has been encouraging response from the farmers. The competition was originally confined to paddy but it has later been extended to the other main cereal crops, viz., cumbu and cholam and also to sugarcane, groundnut, potatoes and cashew. The competitions are organized in each firka and prizes are awarded at the firka, taluk, district, regional and State levels. The Government of India also have instituted All-India prizes for the main crops of the country. In the Development Blocks the competitions are organized at the village level also.

The main features of the crop yield competition are—

(i) Prizes are awarded on the basis of the net yield of the crops

(ii) The harvest of the competition plot is done and the yield determined by a Committee under the supervision of a departmental officer.

(iii) The entrance fee for each plot which should be not less than half an acre is Re. 1.

These competitions are popular. The number of participants and the yield obtained by the State prize winner in the case of each crop in the year 1956-57 which is the latest year for which the data are available are given below:—

Crop.	Number of participants.	Yield per acre obtained by the State Prize Winner.
Paddy	9,368	9,250 lb.
Cholam	362	3,610 lb.
Cumbu	Competition not conducted.	
Potato	188	30,060 lb.
Sugarcane	297	143 tons and 1,530 lb.
Groundnut	2,262	6,285 lb.

444. In order to provide encouragement for really meritorious work among the village level workers, a scheme of prize competition has been formulated at the following levels :—

- (a) Block level;
- (b) District level;
- (c) State level; and
- (d) National level.

To supplement the scheme, a separate scheme of prize competition among the best villages has also been formulated for the Development Blocks.

The competitors will be adjudged on the actual accomplishments in respect of the following eight items of work chosen for the purpose during the period of competition on the basis of weightages attached to them :—

- (1) Quantity of seeds distributed;
- (2) Quantity of fertilizers distributed;
- (3) Number of demonstrations held;
- (4) Number of compost pits dug;
- (5) Number of members in Youth Clubs and Farmers' Unions;
- (6) Number of meetings held by the Youth Clubs and Farmers' Unions;
- (7) People's contribution realised;
- (8) Number of villagers trained.

At the Block level, a Committee of judges consisting of the Block Development Officer, one officer chosen by him from his team and two non-official members of the Block Advisory Committee, will select the best village level worker and the best village in the Block. Similarly, at the district level, a Committee comprising the Collector, one District Officer and two non-official members of the District Advisory Committee will select the best village level worker and the best village in the district. At the State level, a judging committee headed by the Development Commissioner, one Head of Department and two members of the Legislative Assembly will select the best village level worker and the best village in the State. At the National level, a judging Committee will adjudge the best village level worker and best village.

445. We understand that the unit for judging now adopted in crop competition is a 10-cent plot. We consider that this is too small. We therefore recommend that the units for judging in the crop competitions should be at least 25-cent plots.

446. Spectacular yields are often obtained not only by the prize-winners but also by other competitors in the crop competitions relating to rice and millets. The conditions under which such high yields are obtained by them and the methods adopted by them to get these record yields should be closely investigated and the relevant data analysed fully in each case and studied with a view to isolate the useful features for general adoption.

(d) ENLISTING NON-OFFICIAL CO-OPERATION.

447. The special campaign which we have referred to earlier has recognized the need for whipping up the required public enthusiasm for ensuring the satisfactory implementation of the various schemes of agricultural production and the achievement of the plan targets. We feel that it is high time that the fullest non-official co-operation is enlisted as a permanent arrangement at all levels—State—District—Taluk or Block level—in conducting the Grow More Food campaign. Some attempt is already being made to secure the co-operation of villagers by the formation of village agricultural associations for enlisting the services of the villagers in propagating the improved agricultural practices advocated by the Agricultural Department and in distributing improved seeds, etc. According to the Administration Report of the Agricultural Department for the year 1957-58 there were 15,002 village agricultural associations functioning in as many villages but it is not known how many of them are actually performing the functions expected of them and making their presence felt. If at least one multi-purpose co-operative society comes into being in each village as recommended by us to serve as a service co-operative and cater to all the cultivation needs of the local agriculturists these societies will serve the purpose which the village agricultural associations are now expected to serve. In any case such of the village agricultural associations as are now functioning efficiently may be retained and given every encouragement to continue to function. The contact between the officers of the Agricultural Department and the village agricultural associations should be much more than what is obtaining at present.

448. The Government have issued instructions that Block Development Officers should organize visits of the village leaders in the Development Blocks to neighbouring agricultural farms and other places of interest or education value in such a manner that the village leaders will be able to acquaint themselves with the latest improvements in the mode of cultivation and other extension methods adopted in the agricultural farms, etc. This is a very welcome arrangement but it is confined only to the Development Blocks. We recommend that selected batches of agriculturists not only in the Development Blocks but also in the non-Block areas should be taken at Government cost to Agricultural Research Government Farms and the farms of prize winners in

the crop competitions so that they may learn the modern techniques first hand from those who have evolved the techniques and also from those who have successfully adopted them.

449. The possibility of the Agricultural Department utilising the services of students who come out successful from the High Schools after undergoing the bifurcated course in agriculture and also the trainees of the Rural Extension Training Centres who come out after successfully completing their training and whose services are surplus to the requirements of the Rural Development Department must be explored. These persons may be employed as Fieldmen in the Agricultural Department after making them undergo a further course of suitable training in the Agricultural College, Coimbatore.

450. The vital role which the Panchayats should play in agricultural development has already been recognized and we have made a reference already to the direct and personal appeal made to the Panchayats by the Minister for Agriculture seeking their co-operation and assistance in the successful implementation of the special campaign recently launched for stepping up food production in this State. We are of the view that the Panchayat Union should provide the local leadership for implementing the agricultural plans formed for its jurisdiction and act as the local committee for agricultural development. Each Panchayat Union Council should be asked to constitute at the earliest opportunity a Committee for attending solely to the work of stepping up agricultural production within its jurisdiction under Section 53 (b) of the Madras Panchayats Act, 1958.

451. At present there is no arrangement by which the extension staff of the Agricultural Department can obtain an intimate knowledge of the improved agricultural practices tried and tested on their own lands by progressive, intelligent and enterprising agriculturists and found to be very effective in increasing yields. These practices may be applicable only to certain areas where they have been tried and have proved their worth and may not prove to be equally successful in other areas because of the peculiarities of the local soil or seasonal conditions, availability of water or the required materials, etc. Nevertheless in those areas where these cultural practices have been found to be very successful their universal adoption may lead to a very appreciable increase in production. In these areas propagation of these practices by the extension staff among the ryots will be far more purposeful and worthwhile than disseminating the routine propaganda material which may only be of academic interest to the local ryots.

452. For example certain local strains may be much more hardy and disease and drought resistant and much better yielders than the strains known to and propagated by the Agricultural Department. Certain kinds of green manure may be more suitable for

an area than others. In certain areas where tank bed silt is available the dosage of its application to the soil and the exact proportion in which it should be mixed with other kinds of manures before the mixture is applied to the soil may be known only to a few intelligent and persevering ryots and it is very necessary to gather and publicise this knowledge among other ryots in the area. Such progressive ryots may also be able to give many a tip in the matter of preparation of seed beds, raising seedlings, extent of watering, time of sowing, time and dosage of manuring, etc., arrived at by them after long experience as peculiarly suitable for their localities. Their co-operation should be sought in disseminating these tips among the entire agricultural population in these localities.

453. We are particularly having in mind the prize-winners in the crop competitions. Every year throws up a few individuals who have obtained spectacular yields on their lands entered in the crop competitions. They hit the headlines briefly which is usually at the time of the public function at which the prizes they have won are awarded to them and they generally lapse into oblivion thereafter. We feel that the services of these prize-winners should be enlisted in making available to their fellow ryots the methods adopted by them in achieving their prize winning yields. Mere exhortation to them to do this as an act of public service by means of an occasional speech or a solitary contribution to the *Mezhi chelvam* will not suffice. We should ensure their enthusiastic day to day co-operation with the Agricultural Department in publicising improved agricultural practices and this can be done only by giving them a place and a status in the scheme of things.

454. Our recommendation therefore is that there should be at the headquarters of each District Agricultural Officer a District Agricultural Advisory Council. There should be on each such Council all the legislators of that area, all the prize-winners in the crop competitions of that area and the more well-known among the progressive agriculturists of the locality. The District Agricultural Officer should convene the meetings of the Council for his district at least once a quarter. At these meetings there should be a review of the extension material being put across to the ryots in the area. Suggestions made by the Council for revising this material should be considered dispassionately. Such of them as are found to be *prima facie* suitable should be adopted straightaway by the District Agricultural Officer after due intimation to the Deputy Director of Agriculture concerned and the Joint Director of Agriculture (Extension). The others should be scrutinized speedily and their worth tested in the Departmental Farms and Research Stations or on ryots' lands in the locality if this is possible and the results of such scrutiny placed before a subsequent meeting of the Council. The suggestion under scrutiny may be adopted if

the results of the scrutiny are favourable. If the results are otherwise the suggestion may be rejected with the consent of the Council. If the members of the Council are against its rejection the District Agricultural Officer should refer the matter to the Director of Agriculture.

455. We desire that the members of the District Agricultural Advisory Councils should be associated in an Advisory capacity with the working of the Agricultural Research Stations and State Seed Farms in their respective areas. They should be invited to visit and inspect the working of these institutions periodically and record their impressions. Their advice should be sought as to how the functioning of these institutions could be improved and made to serve local needs better. They should be consulted as to the specific problems on which applied research work should be undertaken in the Agricultural Research Stations in their respective areas. They should also be invited to inspect the Demonstration Plots laid by the Agricultural Department in their areas and make suggestions for their improvement.

456. In pursuance of a recommendation made by the Committee on Agricultural Education the Government have constituted a State Agricultural Extension Council with the following members for the very useful purpose of co-ordinating research and linking it in some manner with extension :—

- (1) Director of Agriculture (Chairman).
- (2) Joint Director of Agriculture (Inspection and General).
- (3) All Research Specialists.
- (4) Joint Director of Agriculture (Planning and Development).
- (5) Principal, Agricultural College.
- (6) Regional Deputy Directors.
- (7) A representative of the Development Commissioner (one of the Deputy Development Commissioners).
- (8) A representative of the Director of Animal Husbandry.
- (9) Four practical agriculturists at the rate of 1 for each circle of a Deputy Director of Agriculture.
- (10) Dean and Ex-officio Additional Director of Agriculture, Coimbatore (Secretary until Extension Specialist is appointed).
- * (11) Principal of the Agricultural Training College; and
- * (12) Extension Specialist.

We consider that this Council will not suffice and that in addition to it there should be at the State level a State Agricultural Advisory Board, similar to the State Live Stock Improvement Board, the

* When appointed.

State Fisheries Advisory Board, etc., consisting of top ranking officers connected with the agricultural development of the State and practical agriculturists of State-wide reputation. Such a Board will help Government in studying the agricultural situation in the State from time to time, in reviewing the progress of schemes for stepping up agricultural production, in revising them suitably whenever necessary, in re-orienting periodically the working of the Research and Extension Wings of the State Agricultural Department to be in tune with changing requirements and ensuring proper co-ordination between the Agriculture, Food Production, Irrigation and Community Development Departments.

457. The Minister for Agriculture should be the Chairman of this Board and the Director of Agriculture its Secretary. On the official side its members should be the Secretary to Government, Food and Agriculture Department, the Commissioner of Food Production, the Additional Development Commissioner, the Chief Engineer for Irrigation, the Registrar of Co-operative Societies and the Dean and Ex-officio Additional Director of Agriculture, Agricultural College and Research Institute, Coimbatore. The non-official members whose number may be six or seven need not be nominated on any strictly regional basis. Care should, however, be taken to see that representation is given to areas growing sugarcane, cotton and groundnut also. All the non-official members should be practical, progressive agriculturists of standing and influence who can speak with authority on behalf of their brother agriculturists and give advice to the Government on questions coming up before the Board in the light of their own personal experience. The Board should have the power to request the presence at any of its meetings of all those officers of the Government who are concerned with particular subjects coming up for discussion at that meeting. The Board should meet at least twice a year. It may meet oftener, if necessary. Its meetings should as far as possible be held in rotation in the various agricultural regions in the State.

CHAPTER XX.

ADMINISTRATIVE ORGANIZATION.

458. The Director of Agriculture is the head of the Agricultural Department. He is assisted by the Dean of the Agricultural College and Research Institute and Ex-officio Additional Director of Agriculture, Coimbatore, who is in charge of agricultural education and the direction and co-ordination of agricultural research in the entire State but subject to the overall control of the Director of Agriculture. It has been left to the Director to specify the powers of the Dean and decide the type of files on which the Dean can pass final orders. The Government have ordered that all

correspondence with the Government shall be only by the Director of Agriculture. Thus the ultimate responsibility for the proper conduct of work in all branches of his department without any exception is that of the Director and he shares this responsibility with no one else.

459. The Director of Agriculture is also assisted by five Joint Directors of Agriculture. One is in charge of inspection work. Another (who has the assistance of the Crop Development Officers for the development of individual crops like sugarcane, cotton and oilseeds) is in charge of the Plan schemes. The third is in charge of the State Seed Farms. The fourth is for attending to agricultural extension work in the Development Blocks and the fifth [who is assisted by the Deputy Director (Drilling) in regard to the work relating to the maintenance of bore-well sets which was transferred sometime ago from the Industries Department to the Agricultural Department and by the Agricultural Engineer in regard to the work relating to soil conservation] is in charge of the entire engineering activities of the Agricultural Department. The Director has also the assistance of a State Marketing Officer in respect of the marketing activities of his department and of an Agricultural Information Officer for attending to work relating to publicity and propaganda. There are also a few other officers attached to the office of the Director of Agriculture who are in charge of office administration, accounts, etc.

460. The State has been divided into four regions each of which is in charge of a Deputy Director of Agriculture. Each region consists of two to four revenue districts or five to seven agricultural districts most of which are much smaller than the revenue districts. Each agricultural district is under a District Agricultural Officer. Till recently an agricultural district was as large as a revenue district. But due to the very great expansion in the activities of the Agricultural Department it became necessary to bifurcate for the purposes of the Agricultural Department all the revenue districts except the Nilgiris and Kanyakumari which on account of their comparatively smaller size could be managed each by one District Agricultural Officer. In all the other revenue districts there are now two agricultural districts each under a District Agricultural Officer of its own with the exception of Tanjore district which has been split up into four agricultural districts and consequently there are four District Agricultural Officers in that district.

461. The Deputy Director of Agriculture has under his control the District Agricultural Officers and the Assistant Agricultural Engineers employed for district and inspection work in his region. All the Agricultural Research Stations and Research Centres (excepting the Breeding Stations at the Agricultural College and Research Institute, Coimbatore), are under the administrative control of the Deputy Director of Agriculture in whose region they are situated.

Every Deputy Director of Agriculture is responsible for the general administration of, and for the discipline and inspection, audit and verification of stores in, all the offices in his region. He is also responsible for the achievement of the targets of additional production and agricultural improvement set for his region. Each Deputy Director of Agriculture has a Seed Development Officer under him for assisting him in increasing the area under improved seeds. The Seed Development Officer inspects the State Seed Farms in his jurisdiction periodically. He assists the District Agricultural Officers concerned in drawing up the cropping programme for these State Seed Farms and the seed multiplication programme for their jurisdictions both of which have to be approved by the Deputy Director.

462. Under each District Agricultural Officer there are Agricultural Demonstrators generally at the rate of one for every two or three firkas. Each Agricultural Demonstrator has an agricultural depot attached to him in which the requirements of the agriculturists such as implements, seeds and pesticides are stocked and sold. Under each Agricultural Demonstrator there are one or two Fieldmen and three or four demonstration maistries. This is the set up in the areas outside the Development Blocks. In the Development Blocks the set up is practically the same with the exception that the Agricultural Demonstrator is called the Extension Officer for Agriculture and that he is assisted not only by Fieldmen and Demonstration Maistries but also by the Gramasevaks. The District Agricultural Officer is completely responsible for the agricultural work in the entire area under him including the Development Blocks.

463. In addition to the Agricultural Department two other departments also are concerned with the execution of food production schemes. The Commissioner of Food Production who is a Member of the Board of Revenue exercises a general supervision over the whole of the Food Production Programme and in addition to this he is also the sole authority for the execution of the Special Minor Irrigation Programme and the schemes relating to distribution of fertilisers. The Chief Engineer for Irrigation is in charge of the major irrigation schemes and a specified part of the minor irrigation programme, the rest of which is attended to by the Superintending Engineer (Food Production) who is under the Commissioner of Food Production. The Director of Agriculture implements the rest of the food production programme.

464. Co-ordination of the work of these several agencies is done at a higher level. The progress of all schemes relating to agriculture, food production and minor irrigation are reviewed periodically at a special session of the State Development Committee which consists of the Chief Minister and all the Ministers. At the Secretariat level the Food and Agriculture Department now deals with

agriculture, minor irrigation and all other subjects connected with food and agricultural production, the only exceptions being 'major irrigation' which is dealt with by the Public Works Department and 'co-operation' which is dealt with by the Industries, Labour and Co-operation Department.

465. Though no effort is now spared by the agencies engaged in stepping up agricultural production their efforts will be fully effective only when the programme of community development is implemented throughout the State because there is a co-ordination of the work of all the nation-building departments in the Development Blocks. Ever since the Sixth Development Commissioners' Conference held at Mussorie passed a resolution in April 1957 for the launching of a special drive for stepping up agricultural production in the Community Development and National Extension Service areas it has come to be well-recognized that agricultural development is the main plank in the community development programme. (So far more than half the State has been brought within the purview of this programme.) Further, more money is available for expenditure on schemes of agricultural production in the Block areas than in the non-Block areas because in the Block areas over and above the sums that will be spent in those areas from out of the funds provided in the budgets of the departments like the Agriculture Department additional sums are provided in the Block budgets for expenditure exclusively in those areas. It is very necessary that there should be the utmost co-ordination in the implementation of the food production programme by the several agencies in the Development Blocks. Full responsibility for this should be specifically assumed by the Commissioner of Food Production who already exercises a general supervision over the food production programme in the entire State.

466. It is not enough if co-ordination is sought to be imposed and enforced from the top. It should be built up from the bottom. During the year 1957-58 four regional conferences were held each for a group of districts for the purpose of infusing into the various departments engaged in agricultural development in the Development Blocks a team spirit which was very essential but which was found to be sorely lacking. These conferences each of which was presided over by the Minister for Agriculture and was attended not only by the Secretaries to Government and the Heads of Departments concerned but also by the Collectors, the District Agricultural Officers, Block Development Officers and some representative Extension Officers for Agriculture and Gramasevaks of the districts concerned achieved the objective which they had in view in a very large measure. There was progressively a better understanding and a feeling of oneness among the officers of the various departments from the highest level down to the lowest level when they were brought together round the conference table and ready to discuss freely and frankly the defects, drawbacks and bottlenecks which

had to be surmounted. We wish this excellent arrangement had been continued during the year 1958-59 also. Apparently it was not continued as it was perhaps felt that the desired amount of co-ordination of thought and action had been brought about. But effecting co-ordination at various levels and between different departments which are apt to view things at times through blinkers is a continuous process. We therefore recommend that the system of holding regional co-ordination conferences should be revived.

467. At present there is a provision of rupees fifty thousand for expenditure on agriculture and animal husbandry during a period of five years in the schematic budget for a Stage I Development Block and a similar provision in the schematic budget for a Stage II Block. In addition there is a provision of Rs. 3.40 lakhs in the schematic budget of a Stage I Block and a provision of rupees eighty-five thousand in the schematic budget of a Stage II Block under the heads 'irrigation' and 'reclamation (including soil conservation, contour bunding, etc.)'. Out of these amounts which are for the entire period of five years in each case rupees three lakhs in the case of Stage I Blocks and rupees seventy-five thousand in the case of Stage II Blocks are meant for the grant of loans. These loan provisions can also be utilised for productive schemes connected with agriculture including rural electrification. We consider that the present provision for agriculture and animal husbandry in the schematic budgets of Stage I and Stage II Development Blocks is very inadequate and that it should be increased substantially.

468. The non-official Members of the Committee heard complaints in some Blocks that the Block provision for expenditure on animal husbandry and agricultural extension had been diverted to other heads of expenditure particularly for expenditure on the construction of buildings. In some other blocks the actual expenditure incurred on agricultural extension was very much below the provision in the budget. Such complaints are not likely to be heard in future because the Government have since issued very definite instructions to the effect that the non-loan provision of Rs. 50,000 that has been made in the schematic budget of Stage I and Stage II Blocks for a period of five years in each case for expenditure under the heads 'agriculture' and 'animal husbandry' cannot under any circumstances be diverted to any other head of expenditure and has to be utilized only for purposes connected with agriculture and animal husbandry. The Government have even gone one step further and have made it clear that the diversion of funds from any other non-loan head to the heads of 'agriculture' and 'animal husbandry' is not only permitted but also considered desirable.

469. In order to ensure that the funds available for expenditure on purposes connected with agriculture and animal husbandry are fully utilized the Government have drawn up a minimum programme of agricultural improvement and livestock development

in the Development Blocks specifying the various items of expenditure and the allocation of the total provision between them and have communicated this minimum programme for the information and guidance of all concerned. The highlights of this minimum programme are—

(a) Each Gramasevak should lay out at least three demonstration plots every year in each village in his jurisdiction;

(b) one Demonstration Farm should be set up in each Gramasevak's circle;

* (c) the giving of a subsidy of 30 per cent in respect of distribution of green manure seeds over and above the 20 per cent subsidy now being given by the Agricultural Department;

* (d) supply of vegetable seeds and fruit seedlings at half cost;

* (e) supply of pesticides at half cost and free supply of pesticides in the case of sudden outbreak of pest attack in an epidemic form which is sudden enough to warrant free supply; and

* (f) supply of agricultural implements at half cost to agriculturists.

470. Another complaint that was made to the non-official Members of the Committee in more than one Block visited by them was about the frequent transfers of the Block staff. It was also complained that one post or other in the Block remained vacant for long periods. We hope that at least in future no post in a Block will be allowed to be vacant for any appreciable length of time and that a ban on frequent transfers of the Block staff will be imposed and strictly enforced. If the Block staff are to do good work they should not be disturbed frequently but should be allowed to stay sufficiently long in each place in order to know the place well, get acquainted with the local problems and become quite conversant with the local conditions.

471. The control of the Collector over the Block Development Officer should be made real and effective. The category of gazetted Block Development Officers should be abolished and in future there should be only one category of Block Development Officers, all of them being non-gazetted Block Development Officers under the control of the Collector. The Collector should be made the appointing authority for the Block Development Officers. If the Government feel that the recruitment of Block Development Officers should not be left entirely to the Collector and that the Government should have a say in the selection of Block Development Officers they may continue to select persons for being appointed as Block Development Officers. They may draw up a panel of names of persons fit to be appointed as Block Development Officers for each district and the Collector of each district

* Up to specified financial limits in each case.

may be empowered to appoint Block Development Officers from out of such a panel of names for his district. The Collector should also be empowered to make all postings and transfers within his district and should also have the power to grant leave to the Block Development Officers in his district. He should also in addition have the power of imposing punishments on Block Development Officers other than major punishments such as reduction to lower rank in the seniority list or to lower post or time scale, compulsory retirement, removal from service and dismissal.

472. Many of the powers and functions in regard to the Block Development programme now being exercised by the Government (for example on the accounting and audit side) may conveniently and with advantage be delegated to the Collectors. Such a delegation will reduce the work load in the Secretariat which need not concern itself at its high level with comparatively trivial matters particularly as the Block Development organization has grown considerably and would expand further in the next few years.

473. The present vagueness as regards the functions of the Agricultural Department staff and the Block staff in respect of the agricultural programme in the Development Blocks should be removed. The implementation of all technical work under the agricultural programme should be the sole responsibility of the District Agricultural Officer. In respect of items of work for which expert knowledge is not necessary the District Agricultural Officer should not be held responsible, but the Block Development Officer should assume complete responsibility. The functions of each category of officers should be defined precisely so that it should be possible to pin down the responsibility if anything goes wrong and if the work does not progress as per schedule. For instance in regard to the work relating to seed multiplication and distribution the District Agricultural Officer should be held responsible for the proper running of the State Seed Farms, the Extension Officer for Agriculture should be held responsible for the proper selection of village seed farms and their proper functioning and the Gramasevak should be held responsible for arranging for the proper utilisation of the entire quantity of good quality seeds multiplied in the village seed farms. The Block Development Officers should have a say in the determination of the kinds, varieties and quantities of seeds that are produced every year in the State Seed Farms and multiplied in the village seed farms for distribution in the Development Blocks.

474. It should be ensured that the Block Development Officer pays adequate attention to the implementation of the agricultural programme. The level of performance of the Block Development Officer in implementing the agricultural programme in the Block should be made the criterion for assessing his efficiency and inefficient Block Development Officers should be weeded out periodically. The District Heads of the various Departments should

suitably instruct the Block Development Officer as to the manner in which the work of the respective departments should be conducted and they should suggest remedies for the difficulties brought to their notice by the Block Development Officer. In order to induce the Block Development Officer to take a more active interest in the implementation of the agricultural programme each Block Development Officer should be asked to develop by his personal attention and effort one selected village in his Block as a model village. This village will serve as a model for the Gramasevaks and agriculturists of the other villages in the Block.

475. We consider that all the Gramasevaks in each Development Block should not be one hundred per cent multi-purpose workers as at present. They should be broadly classified into two groups, namely "production" and "amenities". The Gramasevaks coming under the "production group" should attend to the work relating to agriculture, animal husbandry and co-operation and the Gramasevaks coming under the "amenities group" should attend to the rest of the Block Development programme. The division of the Gramasevaks between the two groups should be roughly equal.

476. At present one Fieldman can be employed in each Development Block after obtaining prior sanction to work directly under the Extension Officer for Agriculture of attending to certain specified items of work. There is also provision for the employment of a Fieldman in lieu of a lower division clerk to be in charge of the agricultural depot in each Block. At present four Demonstration Maistries are being employed in some of the old Blocks and two Demonstration Maistries are being sanctioned for each new Block. These Demonstration Maistries are being employed for attending to the following items of work which are considered to require specialised training:—

- (a) Laying out manure pits;
- (b) drying seeds in the depots;
- (c) supervising planting, roguing, harvesting and threshing of seed farm plants;
- (d) keeping implements, sprayers, etc., in good condition;
- (e) budding, grafting and pruning fruit plants; and
- (f) demonstration of the use of labour saving implements.

Instructions have however been issued to the effect that the number of Demonstration Maistries should be progressively reduced from year to year and that with effect from the year 1961-62 there should be no Demonstration Maistry in any Block and that all the above items of work should be got done by the Gramasevaks themselves. We consider that in the interests of stepping up agricultural production it will not be desirable to abolish the posts of Demonstration Maistries in the Development Blocks. Two such posts should therefore be continued in each Development Block.

477. Some workable arrangement should be made for assessing and periodically reviewing the progress of food production work in each Development Block at Block and Village levels. A suitable form should be devised which should show the ultimate target as also the target for the particular year and the progress made up-to-date and during the period under report. A register containing this information should be maintained.

CHAPTER XXI.

THE PRICE FACTOR.

478. The greatest incentive to the agriculturists to go all out and increase the yields in their lands to the utmost extent is to assure them of a reasonable price for their produce. At present this may not be an urgent problem because the prices now ruling for agricultural produce are not unattractive. But there have been occasions in the past when a downward trend in the prices of agricultural produce had a depressing effect on agricultural production and such occasions may well arise again in the future. On such occasions the agriculturist is very diffident to make any appreciable investment by way of application of fertilisers, adoption of plant protection measures, etc., because he is not quite certain whether the return he will get from the produce will enable him to get back at least what he has invested. Only in case the agriculturist is assured of a minimum monetary return even on such occasions can he be expected to make such investments in his land as will produce the maximum possible yield. Hence in the interests of stepping up agricultural production there can be no two opinion regarding the desirability of Government adopting a price support policy and guaranteeing a minimum price to the agriculturist for his produce.

479. The Foodgrains Enquiry Committee which reported to the Government of India in 1957 went into this question at considerable length. It said:

"We consider that to ensure a level of prices which would provide the necessary incentive to the producer with due regard to the interests of the consumer and the maintenance of a reasonable cost structure in the country it is essential to set up an organisation and machinery for co-ordinated formulation of measures to be taken from time to time to this end."

It recommended the setting up of—

- (1) a high-powered authority called the 'Price Stabilisation Board' composed of representatives of the Ministries of Food and Agriculture, Finance, Commerce and Industry and Railways, the

Planning Commission and the Reserve Bank of India, with a Chairman of the status of a Secretary to the Government of India, for the formulation of the policy for price stabilization in general and determining the programme for enforcing it from time to time; and

(2) the establishment of a suitable organization called the 'Foodgrains Stabilization Organization' to execute that part of the policy and programme framed by the high-powered authority as may relate specifically to purchase and sale operations in the field of foodgrains. The Committee considered that the Price Stabilization Board should examine not only food prices as such but also the prices of all consumer and producer goods, for example, cloth, oil-cakes, fertilizers, iron and steel, etc., study the various margins charged at different stages before sale to the cultivator and make appropriate suggestions. These recommendations of the Foodgrains Enquiry Committee have not yet been implemented by the Government of India.

480. In 1955, the Government of India announced their intention to purchase Jowar (cholam), Bajra (cumbu) and Maize in those areas where the prices of these commodities declined below specified levels. As regards rice, the Government of India stated initially that the then decline in the price of rice did not justify Government purchase but subsequently they agreed to Government purchase of only coarse varieties of paddy and rice. The Government of Madras decided that paddy alone need be purchased under the price support scheme but by the time the details for implementing such a scheme were finalized the prices of paddy and rice in that State had risen well above the economic levels and hence it became unnecessary for the Government to actually implement the price support scheme.

481. The difficulties inherent in any system of price support under which the Government have to guarantee minimum prices for agricultural produce can be gauged from the following quotation from the report of the Foodgrains Enquiry Committee:—

"It has been suggested to us by a number of witnesses that maximum prices should be announced every season when price trends are inflationary and Government should take powers to requisition stocks whenever prices go beyond these levels. At the same time, for allaying fears of the farmers that prices may be depressed as a result of zones, cordons and other Government action, minimum prices should be also fixed at which Government should be prepared to buy whatever quantity is offered. These prices should be varied from season to season in the light of various factors, e.g., trends of costs, incomes, price parties. We agree that various relevant factors, e.g., cost of production of the concerned foodgrains and competing crops, cost of living of the agriculturist and industrial labour, relative movements in prices of food crops and cash crops and in incomes of agricultural and non-agricultural workers may be examined. In the light of all this information and in consultation with the Central Food Advisory Council, the range of prices within which the Foodgrains Stabilization Organization may carry on its operations may be determined every year and from time to time by

the Price Stabilization Board. It is, however, important that no single formula should be announced or relied upon. While a number of formulae may be taken into account, we recognize that the final decision would have to be taken by the Board on a somewhat *ad hoc* basis, particularly owing to the importance of prospective price trends in any assessment of the reasonable prices which might guide the operations of the Organization, for no formula can satisfactorily reflect the prospective position. It has, indeed, been the experience of many countries that no formula can fully cover all contingencies. On the other hand, adoption of a particular formula makes the price policies so rigid that it becomes very difficult to introduce any flexibility even when broader considerations require it."

The chief difficulty is the determination fairly accurately of the cost of production of the principal food and commercial crops.

482. In our view, the following are the principal difficulties which will be encountered in deciding what should be the fair price for any particular foodgrain like rice. Firstly, the cost of production of rice varies from place to place. Preliminary enquiries undertaken in different districts in the State have shown that the cost of production of rice varies greatly from district to district, and even in the same district it depends very much on the source of irrigation. Since the price of rice is ultimately decided on an All-India basis, it will be necessary to know the cost of production in different parts in India before a tentative price can be recommended. Secondly, an important factor in the cost of production is the wages paid to agricultural labour. This payment is sometimes made in cash but more often in kind which may be in the form of foodgrains or in other forms. The actual assessment of the real wage paid for agricultural labour is a task even more difficult than assessing the cost of production of an agricultural commodity. Further, this also has to be considered on an All-India basis. Thirdly, the price of rice is governed to some extent by the price level of commercial crops like cotton, sugarcane or groundnuts. The prices of these are decided by numerous factors operating in a world market. Anyway, the manner in which the law of supply and demand operates in determining the price of rice is considerably different from the manner in which it operates in the case of industrial raw materials. Lastly, the price of rice is determined to a great extent by the ability of the consumer to pay. In a poor country, the consumers can put up only with a low price level and this factor has obviously been operating in the market all along and it is difficult to assess the extent to which it functions.

483. But whatever be the difficulties in assessing the cost of production, there is no doubt that some idea of the actual cost, however approximate it may be, will be very useful. In the present

context, when the prices of all the principal foodgrains are being controlled by statute, it is imperative that we should have before us at least a rough idea of the cost of production even though that may not be the ultimate deciding factor which fixes the price level. This fact has been repeatedly brought home by the Madras State Food Advisory Committee who have desired that the Government should undertake an enquiry by experts on the cost of production in the different districts. We feel that such a limited enquiry confined to one State alone may not be adequate. We, therefore, recommend that suitable steps may be taken to see that the Government of India constitute an appropriate Expert Committee to go into the question of the cost of production of the principal agricultural commodities, particularly foodgrains.

CHAPTER XXII.

ESTIMATING OUTTURN OF CROPS.

(a) TRADITIONAL METHOD.

484. Estimates of outturn of crops other than rice, cholam, cumbu and ragi at present given in the Season and Crop Report are worked out on the basis of the traditional method which is briefly explained below.

485. Estimates of production are obtained as a product of two factors, viz., (1) area and (2) yield per acre. The second factor is being obtained from (a) Normal yield per acre and (b) Seasonal or Condition Factor, a statistical figure expressing the outturn as a percentage to the normal yield per acre taken as 100.

486. So far as area is concerned, these are figures based on complete area enumeration for a major part of the State, recorded by the karnams in the village accounts after due inspection of crops every month.

487. The second factor entering into the calculation of estimates of production is the yield per acre. This is derived, as already stated, as a product of the normal yield per acre and the Seasonal or Condition Factor. Figures of normal yield per acre for the district as a whole adopted are those fixed some years ago by the Director of Agriculture, on the basis of results of crop-cutting experiments, the yield in Government farms, the local knowledge of Agricultural Officers and the results of comparison of the figures

of yield with the figures of net exports and estimates of consumption. The Condition Factor is at present derived from the anna estimates of outturn reported by the Revenue department. The anna outturn figures are recorded on the assumption that a 12 anna crop represents a normal crop or 100. Village Account No. 1-A shows the area under different crops and their estimated produce. Based on the figures of anna outturn recorded in the adangal, the estimated produce is grouped into different ranges of anna outturn such as 13-16 annas, 12 annas, 8-11 annas, 4-7 annas and 0-3 annas. The area under the crops under each of these different ranges is consolidated for the firka, taluk and district at each stage. In the Department of Statistics a weighted average anna outturn for the district is worked out with reference to the figures of area furnished under different ranges of anna outturn. The weighted average anna outturn is then converted into a percentage figure on the assumption that a 12-anna outturn represents 100. This percentage figure is the uncorrected Condition Factor for the crop.

488 Experience has shown that reporting authorities have a tendency to under-estimate the outturn of a crop. A formula is therefore adopted to correct this bias and to obtain a "Correcting Factor" known as "Stuart's Correcting Factor" named after a former Director of Agriculture who evolved it. The principle underlying this factor is that the average Condition Factor over a long series of years should be 100 by the very definition. If the condition factors reported for a crop for a district be C_1, C_2, C_{n-1} for $n-1$ years, the Stuart's Correcting Factor— K_n to be adopted in the n th year is

$$K_n = \frac{100 \times (n-1)}{C_1 + C_2 + C_3 + \dots + C_{n-1}}$$

It will be seen from the formula that the Correcting Factor is revised every year with the addition of C_n, C_{n+1} , etc. If the Condition Factor reported in the n th year be C_n , the corrected Seasonal Factor for that year is $C_n \times K_n$.

489. This corrected Seasonal Factor is then modulated where necessary taking into account the actual rainfall during the year as compared with the normal, the reports of the District Agricultural Officers on the condition of the crops, damage by insects, pests, etc.

490. Having fixed the Seasonal (Condition) Factor, the yield per acre attained in a particular year is calculated as the product of the normal yield per acre and the Seasonal Factor, divided by 100. The total production is then calculated as the product of the area under the crop and the yield per acre.

(b) CROP SAMPLING METHOD.

491. The traditional method of estimating production of crops based on the three factors, viz., area, normal yield and seasonal factor is often the target of criticism on account of the subjective element involved. While the estimates of area can be taken as reasonably accurate, the normal yield and seasonal factor are largely subjected to personal bias. In order to arrive at the yield figures objectively, crop sampling surveys based on the random sampling technique are carried out. At present crop sampling surveys for the estimation of average yield and total production are conducted in this State in respect of the following food crops :—

(1) Paddy—

- (i) Paddy, I crop.
- (ii) Paddy, II crop.
- (iii) Paddy, III crop.

(2) Millets—

- (i) Irrigated and unirrigated cholam.
- (ii) Irrigated and unirrigated cumbu.
- (iii) Irrigated and unirrigated ragi.

492. The plan adopted for the surveys is the stratified plan of multi-stage random sampling, the taluks being the strata. The village is the primary unit of sampling and the field the secondary unit. A patch of 1 cent in extent within the field is the ultimate unit. Two fields are selected for experiment in each of the villages chosen for the survey. The selection of villages, fields therein and plots within the fields is made randomly at each stage. A minimum sample strength for the State (i.e., the total number of villages where the experiments are to be conducted) is decided on for a desired degree of accuracy and the sample strength is distributed by districts according to the intensity of cultivation. Generally, the sample strength is so fixed that the final estimates of yield are obtained within 2 per cent sampling error for the State and 5 per cent sampling error for each district.

493. The crop from the one cent plot is harvested, dried and weighed accurately by the field staff and the data are furnished to the Director of Statistics. The method of estimation of average yield from the plot yields is briefly indicated below.

494. The plot yields obtained from the various villages in the taluks of a district are tabulated and a simple average yield is first worked out for each taluk. The district average yield is then calculated as the weighted average of the taluk yields, the weights

being the acreage under the crop in the different taluks. From the district average yields, the average yield for the State as a whole is worked out on similar lines. It is a weighed average of the district yields, the weights being the area under the crop in the individual districts as per the final forecast report. The total outturn is then obtained as the product of the average yield per acre and the area as per the final forecast report. These production figures based on the forecast report are revised subsequently when final area figures as per Season and Crop Report for that year become available.

495. Separate estimates of average yield and production are in the first instance framed in respect of each category of crop, viz., irrigated and unirrigated in the case of millets and paddy first, second and third crops and these estimates are pooled to obtain the average yield of each crop.

496. Under this method of estimating the yield the number of one cent plots chosen on the random sampling basis for conducting crop cutting experiments seems to be far too low. The Yardsticks Sub-Committee which considered this matter suggested that the Director of Statistics might be asked to obtain for the next two years 3 sets of independent estimates of crop yields by the random sampling method for the paddy crop alone so that the estimates might be compared with each other in order to verify the efficacy of the present method of estimating the yield. We accept this suggestion and recommend that three sets of independent estimates of crop yields by the random sampling method may be obtained for the next two years for the paddy crop alone in order to compare them with each other with a view to verify the efficacy of the present method of estimating the yield.

(c) YARD STICKS.

497. Indian Agriculture is still a gamble on the rains. The difference between a good season and an unfavourable one is a drop in production of about 10 lakhs tons or about one fifth of the annual production. In view of this it is impossible to make any useful comparison between the actual yields in different years with a view to assess the achievements of the various items in the food production programme. It is also impossible to ascertain the actual increase in production for which each of these items such as minor irrigation, seeds or fertilisers can take the credit separately by field verification as the yield is the net result of a combination of various measures. The technique of assessment of food production schemes therefore consists of estimating the effort put in terms of units such as so many tons in the cases of seeds and fertilisers, so many numbers in the cases of wells, pumpsets, etc., the acreage covered by these units and the resultant additional production by making use of what are called 'yardsticks'.

498. Yardsticks are therefore a device to measure the success of the Grow More Food Programme from year to year. At best they are estimates but they are fairly reliable estimates. The yardsticks adopted in this State have been evolved from actual crop cutting experiments in representative sample plots. Nevertheless the yardsticks cannot indicate the exact result as the actual production is dependent on several factors. It cannot also be taken that the results of operation of two or more schemes will be the sum total of the respective yardsticks as their effect is overlapping. However, in spite of their drawbacks the yardsticks are still the most useful basis for formulating estimates of the results of individual schemes.

499. The food production programme consists of—

(1) Permanent works schemes, i.e., Major Irrigation Projects, Minor Irrigation Schemes, Land Reclamation and Development Schemes, etc.

(2) Recurring supplies schemes—supply of fertilisers, seeds, compost, etc.

(3) Other schemes—Plant protection and Improved agricultural practices—(Japanese method of cultivation, etc.).

500. The State target is a composite target which is a sum total of the targets under the various schemes comprised in the above groups. Under the Second Five-Year Plan, the targets of food production are fixed in terms of "Production potential" which generally means the net addition to the production expected in a year over the previous year. Hence, the 'production potential' for 1956-57 will be the increase in production in that year over that in 1955-56 and for 1957-58 the increase over 1956-57 and so on. In the annual programme for a State, the physical items of work to be taken up e.g., number of wells, tanks, etc., proposed to be constructed under minor irrigation, acreage of land to be reclaimed or developed, quantities of seeds or fertilisers to be distributed are determined in advance. These form part of the food production programme for the year and these physical quantities or works are called 'Units'. In order to arrive at the production potential likely to be created by implementing a particular scheme, the units are multiplied by the yardstick. The yardstick is the expected contribution each unit is likely to make to the production potential. Thus it is estimated that a filter point well can irrigate 10 acres in a year and an acre of land brought under irrigation will give an additional yield of 1,120 lb. of rice. These estimates have been evolved as a result of experiments repeated every year.

501. The yardsticks are constantly kept under review and such changes as are found to be necessary are made from time to time. The yardsticks that are now in force and the changes which have just been made in them and which changes will take effect from the year 1960-61 are indicated below :—

Serial number and name of scheme.	Unit.	Acreage.	Additional production.
(1)	(2)	(3)	(4)
1 Lift irrigation (hiring)	Existing units of 290 oil engines owned by the Agricultural Department.	Actual area irrigated.	1/3 ton of rice per acre of area actually benefited.
2 Lift irrigation (Hire Purchase Scheme) —			
(a) Oil engines	1	8 acres.	1/2 ton of rice per acre.
(b) Electric motors	1	5 "	Do.
3 River Pumping Scheme	1	100 "	8/9 ton of rice per acre.
4 Open Wells Scheme	1	1 "	1/2 ton of rice per acre.
5 Filter point wells	1	10 "	Do.
6 Tube wells	1	20 "	Do.
7 Special Minor Irrigation Programme	1	Actual area to be benefited under the work.	1/8 ton of rice for existing lands which are already included in the ayacut of the tank which is improved and half a ton of rice per acre on land newly brought under irrigation.
8 Desilting-cum-reclamation of irrigation tanks	..	..	1/2 a ton of rice per acre of ayacut gap bridged and 1/4 ton per acre of foreshore lands reclaimed.
9 Tractor (Hiring)	Existing units of 142 tractors owned by the department.	..	Virgin land 1/4th ton — per acre Current fallows — 1/10th ton of rice per acre.

Serial number and name of scheme (1)	Unit. (2)	Acreage (3)	Additional production (4)
10 Tractor (Hire Purchase Scheme) ..	1	200 acres of current fallows and 200 acres of virgin lands.	Virgin land and $\frac{1}{10}$ th ton per acre. Current follows— $\frac{1}{10}$ th ton of rice per acre.
11 Soil conservation ..	1	May vary according to the nature of individual schemes.	Hills— $\frac{4}{5}$ th ton of potatoes per acre. Plains— $\frac{1}{20}$ th ton of—paddy per acre.
12 Ammonium sulphate ..	1 ton	15 acres ..	2 tons of rice per ton of ammonium sulphate.
13 Urea ..	Do.	63 acres ..	$4\frac{1}{2}$ tons of rice per ton of urea.
14 Ammonium sulphate nitrate ..	Do.	36 acres ..	$2\frac{1}{2}$ tons of rice per ton of ammonium sulphate nitrate.
15 Super phosphate ..	Do.	15 acres ..	$\frac{5}{6}$ th ton of rice per ton of superphosphate. Since changed as one ton of rice per ton of super phosphate.
16 Urban compost and all allied compost schemes ..	5 tons	1 acre ..	$\frac{1}{40}$ th ton of rice per ton of compost applied or $\frac{1}{8}$ th ton of rice per acre benefited. Since changed as $\frac{1}{20}$ th ton of rice per ton of compost applied.
17 Green manure ..	1 ton	150 acres	223 tons of rice per ton of green manure seeds. Since changed as 15 tons of rice per ton of green manure seeds.
18 Improved seeds of paddy ..	Do.	45 acres ..	224 lb. of rice per acre or $\frac{1}{10}$ th ton of rice per acre or $4\frac{1}{2}$ tons of rice per ton of seeds.
19 Do. ..	Do.	150 acres	8.47 ton of millets per ton of seeds.
20 Control of pests and diseases of crops ..	..	..	1 maund of rice per acre.

502. In regard to work schemes, the increased acreage resulting from the works is not merely for the particular year but is a permanent addition to the area under irrigation as compared with the previous year and the production from the increased area will be the production potential for that year. In the case of supply schemes, such as the distribution of improved seeds, fertilisers and manures, etc., during a year; the total quantity proposed to be distributed during the year is multiplied by the yardstick for the scheme and this gives the gross production potential. But unlike in the case of works schemes mentioned above, the benefit from supply schemes usually does not extend beyond one year and so only the excess quantities of manures, fertilisers, etc., distributed during a particular year over the quantities distributed in the previous year would contribute to additional production. So in order to assess the production potential of supply schemes in any year over the previous year, the quantities distributed during the previous year are subtracted from the quantities proposed to be distributed during the current year and this gives the net additional units in the year and from this the net production potential is calculated by applying the yardsticks. For instance, if 60,000 tons of ammonium sulphate are proposed to be distributed in the current year as against 50,000 tons distributed in the previous year, the production potential during the current year over the previous year would be calculated on the basis of 10,000 tons (i.e., 60,000 tons *minus* 50,000 tons). The assessment of achievement of additional food production follows similar lines and is based on the units actually achieved.

503. It may be noted that the estimates of food production potential assume normal seasonal conditions, i.e., no allowance is made for any adverse effect of the season. All that is calculated is the result in terms of additional food production of the achievement of a certain number of units under the schemes. The actual yield will, of course, vary with the season apart from its being dependent on other factors like the quality of the soil, crops cultivated and the agricultural practices. The actual production of foodgrains in the State in a year was formerly being worked out taking into account three factors, viz., the area, the yield per acre (based on experiments in Government farms and local knowledge) and the seasonal factor. This method has now been replaced by

adopting the results of the crop cutting experiments conducted on the stratified random sampling technique during the last few years on paddy and other crops and the production statistics from 1955-56 are based on the results of crop cutting surveys. According to this method, the actual production of foodgrains and the additional food production during the last two years have been as follows :—

Year.	Total production (rice and millets).	Additional production increase over the previous year.
1955-56	44.22	..
1956-57	46.79	2.57
1957-58	49.20	2.41

504. An investigation was made recently to see whether the estimates of food production formulated in respect of the Food Production programme by adopting the production potential method bear any correlation to the actual production statistics and whether the variations could be accounted for. The following statement compares the figures of achievement of additional production of foodgrains during 1956-57 and 1957-58 worked out on the basis of the production potential method with the actual additional production according to production statistics :—

Serial number and head of development.	Production of food grains (net) according to yard sticks.		Potential of food grains according to yard sticks.
	1956-57.	1957-58.	
1 Major irrigation	0.16	0.34	
2 Minor irrigation	0.11	0.14	
3 Land reclamation	0.05	0.03	
4 Fertilizers and manures	1.35	0.64	
5 Improve seeds	0.42	0.98	
6 Soil conservation	0.01	0.01	
7 Plant protection	0.10	0.15	
	2.20	2.29	
Actual additional production according to production statistics.	2.57	2.41	

505. There is a fair approximation between the two sets of figures in the case of both the years. We recommend that such a comparison between the production potential of foodgrains according to the yardsticks and the actual production recorded by the Director of Statistics should be made for every year in future and that in those cases where there is a wide disparity between the two figures the reasons for this should be investigated and if it is found that the disparity is due to one or more of the yardsticks being unrealistic they may be suitably revised.

506. As regards commercial crops we have examined the question as to how the increase in production under each head of development is now being assessed, what the yardsticks are, on what basis they have been fixed and whether they are realistic. No yardsticks can be fixed at present in respect of crops other than sugarcane, cotton and oilseeds as we are informed that adequate basic experimental data have not been accumulated in respect of individual items of improvement recommended by the Agricultural Department. It is necessary that such data should be collected in respect of the remaining important commercial crops also so that realistic yardsticks may be determined in respect of each of these crops.

507. As regards sugarcane the question of assessing the effects of various improved agronomic practices on the level of production for sugarcane was considered at the meeting of the Indian Central Sugarcane Committee held in April 1958. At this meeting the decision reached was that the adoption of rigid yardsticks might not be quite feasible for individual items of development. However, with a view to provide a uniform basis for estimating the increased production of sugarcane resulting from the adoption of items of development popularised under the Sugarcane Development Scheme, the Joint Director of Agriculture (Planning and Development) has suggested the adoption of the following yardsticks in consultation with the Sugarcane Specialist and Cane Development Officers who have intimate knowledge of conditions of sugarcane growing in this State and in other sugarcane growing States in the country and who are also well acquainted with the results of various agronomic experiments carried out on this crop during the past three decades :—

Item.	Yard stick.
(a) Preparation of land	1 ton per acre.
(b) Planting of selected seeds	1½ tons per acre.
(c) Optimum manuring	3 tons per acre.
(d) Proper irrigation and drainage	2 tons per acre.
(e) Plant protection	1 ton per acre.

We recommend that the above yardsticks may be adopted and that they may be revised to the extent necessary in the light of the actual experience gained during the next two years.

508. In the case of cotton we have examined not only the yardsticks but also the seed rate now adopted. The seed rate is a very variable factor depending largely on the method of sowing, conditions of soil moisture, etc. The actual method of sowing adopted, such as, dibbling, sowing broadcast, covering and sowing with seed drill affects the quantity of seeds used. We are told

using only 8 lb. seed while there are other cases where the ryots use as much as 25 lb. of seed per acre for broadcast sowing. However, for all practical purposes the Agricultural Department has fixed certain uniform seed rates as the optimum for adoption and these seed rates are propagated by the department among the cotton growers. On the advice of the Yardsticks Sub-Committee, we recommend that the following revised seed rates may be adopted in future :—

Variety of cotton.	Existing seed rate (per acre).	Revised seed rate (per acre).
Karunganni (Rainfed)	14 lb.	15 lb.
MCU. I (Irrigated winter)	20 lb.	No change.
MCU. I (Rainfed winter)	25 lb.	20 lb.
MCU. II (Irrigated summer)	20 lb.	No change.
P. 216 F. (Irrigated summer)	20 lb.	Do.

509. As regards yardsticks we recommend on the advice of the Yardsticks Sub-Committee that the following revised yardsticks may be adopted :—

	Existing yard stick (lint per acre in terms of bales of 392 lbs. each).	Revised yard stick (lint per acre in terms of bales of 392 lbs. each).
I. Extensive cultivation—		
(a) Reclamation of fallow lands ..	1/4 bale.	1/3 bale.
(b) Growing of cotton in the place of other crops ..	1/4 bale.	2/5 bale.
(c) Double cropping	1/2 bale.	5/8 bale.
II. Intensive cultivation :—		
(a) Inter-cropping	1/8 bale.	No change.
(b) Distribution of improved seeds ..	1/25 bale.	Do.
(c) Application of fertilisers	1/8 bale.	1/10 bale.
(d) Improved cultivation	1/80 bale.	1/20 bale.
(e) Plant protection	1/80 bale.	1/20 bale.

510. In the case of oilseeds the following are the yardsticks that are now being adopted :—

Groundnut—

Use of improved strains—168 lb. per acre.

Intensive cultivation including plant protection—1/10 ton per acre.

Extension of area—280 lb. or 5/40 ton per acre.

Gingelly—

Use of improved strains—56 lb. per acre.

Intensive cultivation including plant protection—1/20 ton acre.

Extension of area—280 lb. or 5/40 ton per acre.

Castor—

Use of improved strains—1/20 ton per acre.

Intensive cultivation including plant protection—1/20 ton per acre.

Extension of area—336 lb. or 3/20 ton per acre.

We consider that the existing yardsticks need not be revised.

511. In all cases where a revised yardstick is adopted, the extra yield should be given in the year in which the revised yardstick is introduced both according to the old yardstick and the revised yardstick in all reports and statistical returns. We recommend that as in the case of foodgrains the yardsticks for commercial crops also should be constantly kept under review. Whenever an appreciable variation between the extra yield as calculated by the adoption of the yardsticks and the extra yield actually recorded and reported by the Director of Statistics is found, the reason for this should be investigated and action taken to revise the yardsticks suitably if this is found to be necessary in order to make them realistic.

CHAPTER XXIII.

THIRD PLAN PROSPECTS.

512. We propose to discuss in this concluding Chapter of our report the targets for increased production that may be fixed for achievement in this State during the Third Plan period. Public opinion in the entire country is now unanimous that agricultural development should be given top priority in the third Plan. As observed by Sri Ajit Prasad Jain, Union Minister for Food and Agriculture, "In formulating the Second Plan we failed to give proper place to agriculture and we are paying heavily for it. While framing the Third Plan we cannot afford to repeat that mistake."* In view of this we can rest assured that there will be no limitation of finance for implementing schemes for stepping up food production during the Third Plan period.

513. At the end of the First Five-Year Plan, viz., 1955-56, which was a normal year the production of foodgrains in this State was about 44 lakhs tons. According to an official assessment the actual increase that it has been possible to effect during the first three years of the Second Plan is about 5 lakhs tons. On the assumption that the production will increase by another 4 lakhs tons during the last two years of the Second Plan we can expect that the total production of foodgrains in a normal year would have been stepped up from 44 lakhs tons to 53 lakhs tons by the end of the Second Plan period. This figure falls short of the target by nearly 4 lakhs tons, the short-fall being mainly due to shortage of chemical fertilisers.

514. Viewed from the point of view of the consumption requirements the State was definitely deficit in foodgrains at the beginning of the First Plan. Towards the end of the First Plan there was a marginal surplus of about 1 lakh tons, as shown by the figures of inter-State movements of foodgrains. At the end of the Second Plan it is expected that there will be a surplus of

* In his preface to the note on "Essentials of an Agricultural Production Programme in India" by Dr. F. W. Parker.

about 3 lakhs tons in a favourable year. But if the seasonal conditions are adverse, there will be a deficit of about 5 to 7 lakhs tons. The aim of the Third Plan should be to establish self-sufficiency even in an adverse year allowing at the same time for and annual increase in the per-capita consumption by about 2 per cent on the assumption that the annual increase in population will be about 2 per cent as also for a safety margin. We should therefore aim at the achievement of at least an additional production of about 20 lakhs tons which will represent roughly a 38 per cent increase in production. Such an increase in production is certainly possible if the different aspects of the food production programme are intensified in the light of the recommendations made by us in this report. The manner in which the different items in the food production programme can contribute to the building up of a total target of about 20 lakhs tons of increased production is indicated below.

515. *Major and medium irrigation.*—It is unlikely that the Parambikulam-Aliyar Project will be completed by the end of the Second Plan period. In any case the additional area of 2.5 lakhs acres which this scheme is to irrigate can receive water only during the Third Plan period. In addition to this project fifteen new projects are understood to have been tentatively proposed for execution during the Third Plan period. The new area to be irrigated by these schemes, all of which may be expected to be finished before the end of the Third Plan period, is estimated to be 99,458 lakhs acres or nearly 1 lakh acres. Adding this figure to the 2.5 lakhs acres to be irrigated by the Parambikulam-Aliyar Project the total extra area that will be brought under irrigation during the Third Plan period will be 3.5 lakhs acres. At the rate of 1/2 ton per acre the total food production potential that can be created works out to 1.75 lakhs tons. In addition if credit is taken for the improvement of field drainage mainly in the deltas which will yield an additional 20,000 tons at 1/5 ton per acre over one lakh acres and economies in the use of water (improvement of duty) in respect of 20,000 acres which will yield an additional 10,000 tons at 1/2 ton per acre the total food production potential that can be created will be 2.05 lakhs tons. The programme also includes provision for field bothies for irrigable lands under existing and new projects.

516. *Minor irrigation.*—(i) In the book entitled “A Critical Survey of the Food Production Programme in the Madras State” by Sri P. P. I. Vaidyanathan, Bar.-at-law, I.C.S., an attempt has been made to work out the date by which the saturation point in minor irrigation may be expected to be reached in this State. The number of tanks which still remained to be taken up under the Grow More Food Programme was estimated at 6,630 made up of 6,250 Revenue tanks and 380 Public Works tanks. On the

basis that the average cost of repairing a Public Works tank is Rs. 20,000 and the average cost of repairing a Revenue tank is Rs. 12,000, the cost of repairing and bringing to an optimum condition the 6,630 tanks referred to above would be about Rs. 8.26 crores. It was estimated that this would provide sufficient work for a period of 13 years ending with the last year of the Fourth Five-Year Plan period assuming that the organization in charge of restoration of tanks is continued on the present scale and that the funds available will also remain unchanged. During the First Five-Year Plan period for an outlay of Rs. 290 lakhs the food production potential created was 88,000 tons. As tanks giving generally a larger return for the investment have already been taken up, the return in the form of food production potential that could be created in future would be 20 per cent less than what was obtaining in the First Plan period. Based upon this assumption, for the investment of 826 lakhs the increased food production potential that could be created would be 2,02,000 tons. Out of this programme an expenditure of about Rs. 226 lakhs can be expected to be completed by the end of the Second Plan period leaving a balance of Rs. 6 crores, the programme in respect of which can be undertaken during the Third Five-Year Plan period. Proportionately this programme will increase food production by 1,50,000 tons. This programme includes provision for field irrigation bothies and field irrigation schemes.

(ii) *Desilting-cum-reclamation of tanks.*—The Chief Engineer for Irrigation has reported that for the outlay provided in the Second Plan the area that will be benefited is 10,726 acres by way of bridging the gap in ayacut and 2,474 acres by way of bringing foreshore lands under cultivation. Elsewhere in our report we have recommended that only the present rate of progress in implementing the scheme should be continued in view of the fact that it is still in an experimental stage and that the scope of the scheme should be extended only after the works already undertaken under it definitely prove to be useful. In the light of this recommendation the targets that can be fixed are 20,000 acres by way of bridging the gap in ayacut and 4,000 acres by way of bringing foreshore lands under cultivation during the Third Plan period. On the basis of 1/2 ton per acre of bridged ayacut and 1/4 ton of foreshore land cultivation the extra food production potential that can be created works out to 0.11 lakh tons.

517. *Lift irrigation.*—(i) *Ordinary open wells.*—The Government have sanctioned the sinking of 2,750 wells during the years 1958-59 and 1959-60. There should be a much larger rate of progress during the Third Plan period. The target may be fixed therefore as 25,000 wells at the rate of 5,000 wells per year. At

the rate of one acre per well and $\frac{1}{2}$ ton of additional production per acre, the extra food production potential that can be created works out to 0.13 lakh tons.

(ii) *Tube-wells, artesian wells and sub-artesian wells.*—

Three hundred tube-wells have been fixed as the target during the Second Plan period but the scheme has not been implemented pending the examination of the results of the Ground-water Exploration Project. These results will become available definitely soon and in addition the Government are participating in a Second Ground-water Exploration Project which the Government of India are undertaking shortly. So a target of 100 deep tube-wells and 500 artesian and sub-artesian wells may be fixed for the Third Plan period. At the rate of 50 acres per well and $\frac{1}{2}$ ton per acre the additional food production potential that can be created works out to 0.15 lakh tons.

(iii) *Filter-point tube-wells.*—The target for the Second Plan is 600 filter-points per year. This target may be adopted for the Third Plan also. On the basis of 10 acres per filter-point and $\frac{1}{2}$ ton per acre the total food production potential that can be created works out to 0.15 lakh tons.

(iv) *River pumping.*—The same target as was fixed for the Second Plan period, viz., 6 units per year may be fixed for the Third Plan also. On the basis of 100 acres per unit and 8/9 ton per acre the total food production potential that can be expected to be created works out to 0.03 lakh tons.

(v) *Hire-Purchase Scheme for oil engines and electric motor pumpsets.*—The target for the year 1958-59 is 175 oil engines and 475 electric motors. We have recommended that this scheme should be intensified. It has been suggested above that the number of extra open wells to be sunk during the Third Plan period should be 25,000. Hence for the Third Plan period there should be at least 20,000 pumpsets (both oil engine and electric motor). This number will provide for the installation of pumpsets in 10,000 out of 25,000 new wells to be constructed, as well as in an equal number of wells that are already existing. The bulk of them must be electric motor pumpsets because they are more popular and also because in view of the progressive increase in rural electrification there will be increasing demand only for electric motors. On the basis that each oil engine will irrigate 5 acres and each electric motor will irrigate 5 acres, the average acreage covered by each pumpset may be taken as 6 acres and on the basis of an extra production of $\frac{1}{2}$ ton per acre the total food production potential that can be created works out to 0.60 lak tons.

518. *Improved seeds.*—Although it is expected that the entire paddy area in this State would have been covered with improved

strains by the end of the Second Plan period, an additional coverage of 10 lakhs acres may be expected during the Third Plan period by way of—

(a) release of improved strains suitable for areas for which no suitable strains have been evolved so far, viz., saline areas, swamp and deep water areas and semi-dry and dry areas, and

(b) extension of the cultivated area as a result of land reclamation measures.

At the rate of 1/10 ton per acre, the additional food production potential that can be created works out to 1.00 lakh tons.

As regards millets, 25 per cent of the total millet acreage in this State had been brought under improved millet strains by the end of the First Plan period. It is expected that by the end of the First Plan period. It is expected that by the end of the Second Plan period the area under improved millet strains would be about 50 per cent of the total area under millets which is estimated to be 56 lakhs ares. The remaining half of this area, viz., 28 lakhs acres has to be covered during the Third Plan period. But it is understood that the Millets and Pulses Specialist has reported that improved strains have not yet been evolved for 16 lakhs acres out of these 28 lakhs acres. So it will be possible to cover only the balance area, viz., 12 lakhs acres during the Third Plan period with improved strains. On the basis that each acre under improved seeds will yield an extra 50 lb. the additional food production potential that can be expected works out to 0.40 lakh tons. At present seed multiplication at the secondary stage is done by selected agriculturists in village seed farms and the seeds multiplied are exchanged by them with their brother agriculturists. During the Third Five-Year Plan it is expected that the entire work of secondary seed multiplication in the village seed farms would be undertaken by co-operatives. The seeds so multiplied should be supplied to agriculturists under the supervision of the Government. The cost of such a scheme works out to fifty naye paise per acre.

519. *Manures*—(i) *Chemical fertilizers*—(a) *Nitrogenous fertilizers.*—It is expected that the irrigated paddy area would have risen to 60 lakhs acres during the Third Plan period. At the rate of 150 lb. of ammonium sulphate per acre, the requirements of these 60 lakhs acres work out to 4 lakhs tons. By the end of the Second Plan it is expected that the consumption of nitrogenous fertilizers for foodgrains in terms of ammonium sulphate would be about $1\frac{1}{2}$ lakhs tons. So the consumption of nitrogenous fertilizers in terms of ammonium sulphate can be stepped up during the Third Plan by $2\frac{3}{4}$ lakhs tons. The additional food production potential that can be created by these $2\frac{3}{4}$ lakhs tons is 5.50 lakhs tons at the rate of 2 tons of grain per acre per one ton of ammonium sulphate.

(b) *Super-phosphate*.—On the basis that one ton of super-phosphate will cover 15 acres the total requirement of the 60 lakhs acres of irrigated paddy works out to 4 lakhs tons. By the end of the Second Plan period it is expected that the consumption of super-phosphate for foodgrains would be 0.70 lakh tons. Hence the consumption of super-phosphate by foodgrains crops can be stepped up during the Third Plan period by 3.25 lakhs tons. In actual practice, it is likely that such a high target might not be wholly achieved and the target may be fixed at 2.5 lakhs tons. According to the latest yardstick of 1 ton of grain per 1 ton of super-phosphate, the additional food production potential that can be expected to be created works out to 2.50 lakhs tons.

(ii) *Green manure*.—By the end of the Second Plan period 30 lakhs acres of irrigated paddy area would have been covered by green manures. The remaining 30 lakhs acres of irrigated paddy area can be covered during the Third Plan period. On the basis that one acre will yield 1/10 ton more as a result of green manuring, the extra food production potential that can be expected works out to 3.00 lakhs tons.

(iii) *Urban compost*.—By the end of the Second Plan period the production of urban compost would have been stepped up to 4 lakhs tons. The Joint Director of Agriculture (Planning and Development) considers that only an additional production of 2 lakhs tons can be achieved during the Third Plan period. On the basis that 1 ton of compost will yield an additional 1/20 ton of foodgrains, that extra additional food production potential works out to 0.10 lakh tons.

(iv) *Rural compost*.—The total number of Development Blocks to be established in this State is 360. Out of this number, it is expected that according to the present programme of establishing Development Blocks 211 Blocks would have come into existence by the end of the Second Plan period. The remaining 149 Blocks will be started during the Third Plan period. We should add to this, the 61 Blocks that are to be started in the last year of the Second Plan period because these Blocks would commence functioning in right earnest only from the beginning of the Third Plan period. Hence the effective number of new Blocks that should be taken into consideration for all practical purposes for working out targets for the Third Plan period is 149 plus 61, i.e., 210 Blocks. The target fixed for each Block is 8,000 tons of rural compost. On this basis the additional rural compost production by the 210 Development Blocks works out to 16.8 lakhs tons. On an average compost contains 0.5 per cent nitrogen and so 1 ton of compost will give an additional production of 1/20 ton of foodgrains. On this basis 16.8 lakhs tons of compost should lead to an additional production of 0.84 lakh tons.

(v) *Night-soil compost*.—By the end of the Second Plan period it is expected that the total production of night-soil compost will be 1.5 lakhs tons. An extra production of 3 lakhs tons may be fixed for the Third Plan period. On the basis adopted for the Rural Compost Scheme, the extra food production potential that can be created works out to 0.16 tons.

520. *Land development*—(i) *Tractor hiring and hire-purchase*.—The number of tractors to be distributed under the Tractor hiring and hire-purchase schemes should be at least 500 during the Third Plan period. It is estimated that each tractor will serve an area of 200 acres of "current fallows" and 200 acres of "virgin land". Thus the target in terms of acres during the Third Plan period will be 1 lakh acres of "current fallows" and 1 lakh acres of "virgin land". At the rate of 1/10 tons for "current fallows" and 1/4th ton for "virgin land" the total food production potential that can be expected works out to 0.35 lakh tons.

(ii) *Soil conservation*.—The target fixed for the Second Plan period is 62,000 acres. In view of the fact that soil conservation work is proposed to be intensified during the Third Plan period under a new piece of legislation that is being enacted the target for the Third Plan period may be fixed as 3 lakh acres. According to the yardstick of 1/20 ton per acre, the extra food production potential that can be created works out to 0.15 lakh tons.

521. *Plant protection*.—By the end of the Second Plan period the benefit of plant protection measures would be available for 7.5 lakhs acres. Another area of 22.5 lakh acres may be covered during the Third Plan period. According to the yardstick of 1 maund per acre, the extra food production potential that can be created works out to 0.82 lakh tons.

522. *Improved cultural practices (Japanese method)*.—It is expected that by the end of the Second Plan period 25 lakhs of acres would have been covered by the Japanese method. Another 25 lakhs acres can be covered during the Third Plan period. According to the yardstick of 90 lb. per acre, the extra food production potential works out to 0.90 lakh tons.

523. Summarising our proposals in the previous paragraphs the additional targets of food production for the Third Plan suggested by us are—

	LAKH TONS.
I. Major and medium irrigation (including drainage schemes)	2.05
II. Minor irrigation—	
(i) Special Minor Irrigation Programme (including minor field bothies and field drainage channels)	1.50
(ii) Desilting-cum-reclamation of tanks ...	0.11

III. Lift irrigation—					
(i) Ordinary open wells ...	...	...	...	...	0.13
(ii) Tube-wells ...	...	...	...	...	0.15
(iii) Filter-point Tube-wells ...	...	...	...	...	0.15
(iv) River pumping ...	...	...	...	...	0.03
(v) Hire-Purchase Scheme for oil-engines and electric motor pumpsets ...	...	...	...	...	0.60
IV. Improved seeds—					
(i) Paddy ...	...	...	...	...	1.00
(ii) Millets ...	...	...	...	...	0.40
V. Manures—					
(i) Chemical fertilizers—					
(a) Nitrogenous fertilizers in terms of Ammonium Sulphate—Paddy ...	...	...	...	...	5.50
(b) Super phosphate—paddy only ...	...	...	...	...	2.50
(ii) Green manure ...	...	...	...	...	3.00
(iii) Urban compost ...	...	...	...	...	0.10
(iv) Rural compost ...	...	...	...	...	0.84
(v) Nightsoil compost ...	...	...	...	...	0.16
VI. Land development—					
(i) Tractor hiring and hire-purchase ...	...	...	...	...	0.35
(ii) Soil conservation ...	...	...	...	...	0.15
VII. Plant protection ...	...	...	...	...	0.82
VIII. Improved cultural practices ...	...	...	...	...	0.90
Total ...					20.44

524. A statement showing the estimated cost for achieving the targets of increased production suggested by us above is appended (Appendix IX). The total investment needed for an additional production of 20 lakhs tons of foodgrains is of the order of 74 crore of rupees.

CHAPTER XXIV

CONCLUSION

525. We entered on our task with a certain amount of diffidence as the ground to be traversed by us was one which had already been covered by many others before us more than once. But as our enquiry progressed we found that it was really worthwhile and useful and that there were several items of work in the programme of stepping up agricultural production in respect of which we could give suggestions for obtaining better results. We thank the Government for having given us this opportunity, which we greatly value, to be of some little service to the agricultural development of our State. Though all of us were already fairly well acquainted with the conditions under which the age-old occupation of agriculture is carried on in the several districts in this State still the present opportunity enabled us to make that acquaintance more intimate. Conditions in the rural areas are now changing so fast that one has to keep himself abreast of these changing conditions before he can indulge in any criticism or venture to give any suggestion. Only those who go round the country-side often and see things for themselves can have an adequate idea of how much has been done and is still being done for agricultural development. Though we have adverted to the need for greater publicity in the appropriate place in our report, we would like to reiterate here that the concessions given and the facilities provided by the Government to improve and modernise agriculture should receive much greater publicity among the agriculturists than is the case at present. We trust that the several recommendations made by us in this report would be accepted and implemented by the Government speedily.

526. We have deliberately confined our report to the immediate practical problems of the cultivator and the solutions to these problems, and have carefully avoided traversing the much wider fields of social, economic and agrarian policy. These have no doubt their part to play in increasing agricultural production; but we felt that the solution of the practical problems is more urgent. A brief note given by Sri A. R. Venkatachari to the Committee covering some of these aspects is appended to this report (Appendix No. X).

527. Our thanks are due to those associations and members of the public who responded to our request and sent their suggestions to us in writing. We particularly thank those members of the Rajya Sabha, the Lok Sabha, the Madras Legislative Council and the Madras Legislative Assembly who took the trouble of writing to us conveying their suggestions. We also express our thanks to such of the legislators and other non-officials of each district who had the kindness to meet us in the course of our tours in their

respective districts. They enabled us to learn first-hand the difficulties with which the local agriculturists were faced and they also gave us valuable suggestions for overcoming those difficulties.

528. Our thanks are also due to the Collectors of all the districts and the officers of the Agricultural Department who had made excellent arrangements for the Committee's tours. By their willing co-operation they made it possible for the Non-official Members of the Committee to see and bear much more than they would have normally been able to do during the limited time at their disposal at each place which they visited. We also thank the officers of the Revenue, Public Works (all branches), Agriculture, Co-operation and other allied departments who served as co-opted members of the various Sub-Committees constituted by us and rendered yeoman service to us.

529. Lastly, we have great pleasure to place on record our deep appreciation of the very valuable services of Sri V. Vasudevan, our Secretary, who did not spare himself in the discharge of his arduous duties. We also desire to record our appreciation of the very hard work which our two stenographers turned out ungrudgingly.

M. BHAKTAVATSALAM,
Chairman.

R. A. GOPALASWAMY,
Member.

P. P. I. VAIDYANATHAN,
Member.

A. VENKATESAN,
Member.

A. R. VENKATACHARI,
Member.

V. K. PALANISWAMY GOUNDER,
Member.

M. G. SANKER,
Member.

V. S. THYAGARAJA MUDALIAR,
Member.

V. VASUDEVAN,
Secretary.

SUMMARY OF RECOMMENDATIONS.

(a) MAJOR AND MEDIUM IRRIGATION.

1. The surplus waters that are now being allowed to go to waste to the sea down the rivers in the neighbouring States of Kerala and Andhra Pradesh should be diverted to this State as quickly as possible with the willing co-operation of the Governments of those States.

[Paragraph 34.]

2. In the case of existing anicuts and channels which have silted up heavily to crest levels suitable action should be taken to restore the old conditions of supply as early as possible.

[Paragraph 57.]

3. Specific soil conservation measures such as, contour trenches, contour bunds and accessory works should be adopted in the water-shed areas to prevent silting up of tanks and channels in the catchment basins.

[Paragraph 35.]

4. A systematic survey of all jungle streams in this State should be conducted with a view to harness their flood waters either by building reservoirs or by constructing diversion weirs and channels leading to the existing storage tanks in all cases where it is worthwhile doing so taking into account the quantity of water that can be impounded and utilised thereby and the cost involved.

[Paragraph 35.]

5. A scheme the object of which is to conduct experiments to obtain definite results regarding the optimum quantities of water and the optimum intervals between irrigations to obtain the maximum yield from one acre of land and to get the maximum return from one cubic foot of water which is said to be already under the consideration of the Government should be sanctioned and implemented at once. If for any reason this scheme, for which financial assistance from the Indian Council of Agricultural Research is expected, could not be implemented at once at least a more modest scheme should be drawn up at once and implemented by the State Government entirely at their cost at the Agricultural Research Station, Aduthurai. Simultaneously at cultivation trials with paddy crop grown under varying frequencies of irrigation and with varying quantities of water should be conducted at the Paddy Breeding Station, Coimbatore, with a view to determine the minimum quantity of water required for irrigating the paddy crop.

[Paragraph 40.]

6. Suitable schemes should be formulated (a) for utilizing fully the drainage waters in several of the irrigated areas with a view to effect improvement in the duty of water, and (b) for relieving the immersion of large areas under rice which now get water-logged.

[Paragraphs 41 and 42.]

(b) MINOR IRRIGATION.

7. While implementing the Special Minor Irrigation Programme the highest priority should be given to the repair and restoration of tanks in ex-estate areas particularly those in the Ramanathapuram district which are in need of immediate attention. As all of them cannot be attended to at once in view of the limited technical staff available the following order of priority should be observed in repairing and restoring them :—

- (a) Tanks which have an immediate food production value,
- (b) tanks in the case of which the gap between the registered ayacut as per the latest settlement figures and the actual ayacut is wide, and
- (c) the remaining tanks.

The pace of repair and restoration of these tanks should be accelerated as soon as the position in regard to the availability of requisite technical personnel improves. Meanwhile facilities for training requisite additional technical personnel should be stepped up.

[Paragraph 56.]

8. In order to actually restore the original ayacut of each tank or in other words in order to make the original ayacut effective the work of repair and restoration of tanks should also cover the repair and restoration of the supply channels, the field bothies and the sluices of the tanks in the case of all Government sources of irrigation including those in the ex-estate areas. It should be ensured that the supply channels are in proper condition to fill the tank up to its full capacity to feed the original ayacut, the field bothies exist down to the individual holdings and the sluices are in good working order and fitted with shutters which are in good working condition and which are provided with locking arrangements. If necessary, the lands required for repairing and improving the tank and for providing it with the supply channels that it needs and for providing the individual holdings with the field bothies which they require should be acquired. The feasibility of providing a sump in front of the sluice so that water can be baled into the sluice when the tank gets dry should be examined in the case of each tank.

[Paragraph 57.]

9. The maintenance and silt clearance of supply channels may be left to be attended to by the Panchayats or Panchayat Union Councils trusting that they will take advantage of the enabling provisions in Section 85 of the Madras Panchayats Act, 1958. In cases where the Panchayat or Panchayat Union Council concerned does not take up this work on account of its disinclination to levy a fee to meet the cost of the work the Government themselves should collect the fee and hand over the collections to the Panchayat or Panchayat Union Council concerned for executing the

work. In those cases where the Panchayat or Panchayat Union Council is not only not willing to collect the levy but also not willing to undertake the work of maintenance and silt clearance of supply channels and irrigation channels the Government themselves should execute the work in addition to collecting the levy with the proceeds of which they should reimburse themselves of the expenditure incurred by them.

[Paragraphs 60 to 62.]

10. A beginning may be made in the matter of entrusting to the Block Agency the execution and maintenance of minor irrigation work in the Development Blocks. For the present it will suffice if the maintenance of the tanks and other irrigation sources which are now in charge of the Revenue Department and the execution and maintenance of small irrigation schemes of purely local interest for which standards have already been laid down are entrusted to the Block Agency provided competent technical personnel is available in the Blocks.

[Paragraph 59.]

11. In order to obviate avoidable delay, prior approval of the estimates by the Collector concerned should not be insisted upon in the case of works executed by the Public Works Department. The Chief Engineer and the Superintending Engineers of the Public Works Department should be authorized to accord sanction to the estimates for works, proceed with the execution of the works and then seek the *ex-post facto* approval of the Collector concerned.

[Paragraph 58.]

12. The present arrangement under which the Chief Engineer for Irrigation is in charge of major irrigation sources and the Revenue Department is in charge of small irrigation sources while the Food Production Engineering Branch headed by the Superintending Engineer (Food Production) who is under the control of the Board of Revenue (Food Production) is in charge of renovation of tanks which have been neglected for a long time is working satisfactorily and may be allowed to continue.

[Paragraphs 63 to 65.]

13. The evaluation already initiated by the Committee in respect of a certain number of tanks for finding out the benefits in actual practice of the Special Minor Irrigation Programme should be continued in a more comprehensive way with a view to assess the benefits derived from implementing the entire Special Minor Irrigation Programme.

[Paragraph 55.]

14. As the scheme for the desilting-cum-reclamation of irrigation tanks is still in the trial stage it may be continued at the present pace. The results of the works already executed and now

being executed under it should be carefully watched and if it is found that these results are encouraging enough the pace of implementation of the scheme should be accelerated.

[Paragraph 70.]

(c) LIFT IRRIGATION.

15. The scope of the revived Well Subsidy Scheme is very limited. The subsidy for digging wells should not be confined only to those wells dug under this scheme with the help of loans granted under it. Subsidy at the same rate and subject to the same conditions should also be given for new wells dug with the help of the other Government loans such as takkavi loans. The scheme as it stands now may not prove of much assistance to the ryots in many areas in this State like the Coimbatore district and the Sattur and Srivilliputtur taluks of the Ramanathapuram district. The loan ceiling may therefore be raised to Rs. 2,000 of which Rs. 500 may be a subsidy in specified areas.

[Paragraph 78.]

16. The Filter Points Scheme should be continued and intensified. Particular attention should be devoted to the sinking of tube wells and filter points in the vicinity of tanks and canals. In order to encourage the ryots to sink filter-point tube wells a subsidy of 25 per cent is now allowed in the Development Blocks. A similar subsidy subject to a maximum of Rs. 250 per well should be given for sinking filter point tube wells and bore wells in the non-Block areas also.

[Paragraph 90.]

17. An examination of the potentialities for ground water development by sinking tube wells and filter points should be made immediately in respect of the entire State on the basis of the past boring records and the performance of the existing tube well pumps and filter point pumps. The geological and economic aspects should be investigated simultaneously. If on the basis of this examination a more comprehensive survey is found to be called for it should be undertaken. Meanwhile the possibility of launching a scheme for sinking tube wells each of which will be capable of irrigating about 100 acres of paddy land in compact areas, which should be selected on the basis of the report of the results of the first Groundwater Exploration Project conducted in this State by the Government of India should be investigated and such a scheme should be implemented very soon if it is found to be feasible and promising.

[Paragraphs 91 and 92.]

18. The Government of India should be requested to undertake in this State a much larger programme under the proposed second Groundwater Exploration Project than was done in the first Project. Schemes for utilizing the water from the wells sunk under the Groundwater Exploration Projects should be drawn up and finalised sufficiently early so that the water can be put to real use immediately the wells are handed over to the State Government.

[Paragraph 92.]

19. The scope for further expansion of the artesian well sinking programme in the South Arcot and Tiruchirappalli districts should be explored.

[Paragraph 93.]

20. The boring equipment now with the Agricultural Department is inadequate and should be improved. Some of the hand boring sets now with the Agricultural Department may be got converted into mechanised sets in the Agricultural Engineering Workshop as an experiment. More ordinary and rotary types of drills may be acquired by the Agricultural Department both for departmental use and for hiring out to agriculturists.

[Paragraph 93.]

21. The River Pumping Scheme should be continued. The existing river pumping units should be transferred to the control of co-operatives which are prepared to take them over and run them. Such of them which could not be transferred to the control of co-operatives should be maintained and run by the Government themselves. Further units should also be started as per the target fixed for achievement under the Second Plan period but they should be located only in those areas where the loss on account of running them will be the minimum. As far as possible they should be run as community river pumping units by the existing co-operatives or by co-operatives specially formed for the purpose. They should be run by the Government themselves only if it is not possible to entrust their working to co-operatives.

[Paragraph 97.]

22. The Hiring scheme for pumpsets should be wound up and all the pumpsets now in the Agricultural Department should be disposed of by sale at book value preferably to co-operatives. If any of the pumpsets are not taken over by the co-operatives at book value they may be offered for sale at book value to agriculturists from whom the sale price may be collected in suitable instalments, the number of which may be determined by the Agricultural Department. If agriculturists are not forthcoming to purchase the pumpsets at book value they may be sold in public auction to co-operatives.

[Paragraph 103.]

23. The Hire Purchase Scheme for pumpsets should not only be continued but also intensified. The centage now charged by the Agricultural Department for servicing the pumpsets distributed under the scheme may be waived. The co-operative agency should also be utilized for implementing the scheme on more or less the same terms on which it is now being run by the Government. The Government should attend to the inspection and servicing not only of those pumpsets which are distributed by them direct under the scheme but also of those pumpsets that may be distributed under the scheme by the co-operatives. The existing arrangement for the

supply of pumpsets under the Hire Purchase Scheme should be so revised as to give complete discretion to the ryots in the matter of choosing the pumpset.

[Paragraphs 107 and 108.]

(d) LAND DEVELOPMENT.

24. The Government have ordered that all the 63 wheel-type tractors owned by the Agricultural Department should be disposed of. The Tractor Hiring Scheme may be continued with those wheel type tractors which the Director of Agriculture has not yet disposed of. The scheme may be wound up gradually as and when those tractors are either disposed of or become entirely unservicable. Meanwhile the possibility of utilizing these wheel-type tractors for other agricultural operations like harvesting, threshing, inter-cultivation, etc., should be tried in the various Agricultural Research Stations.

[Paragraph 120.]

25. All the track or chain type of tractors with the Agricultural Department which are already equipped with bulldozers or which can be so equipped should be retained and the Tractor Hiring Scheme in respect of them should be continued. In view of the need for accelerating the pace of land reclamation work the number of this type of tractors owned by the Agricultural Department should be increased to the extent necessary to meet the demand for them in full.

[Paragraphs 121 and 137.]

26. The Hire Purchase Scheme for tractors should not only be continued and effectively implemented but its scope should also be expanded providing for supply under it every year of as many tractors as are applied for. The Government of India should be prevailed upon to permit the import of an adequate number of tractors each year to meet the demand from the ryots in full along with a suitable complement of spare parts which should represent the requirements of the imported tractors for a period of eight years. The Government of India may also be requested to implement a manufacturing programme designed to make the country self-sufficient in regard to its requirements of track type tractors in the near future.

[Paragraph 127.]

27. The benefits of the Hire Purchase Scheme for tractors should be extended to sugar factories also provided each factory undertakes to let out the tractors acquired by it under the Hire Purchase Scheme to the cane-growers in that area for 50 per cent of the working hours of each tractor. The existing Tractor Hire Purchase Scheme itself need not be made applicable to sugar factories but a separate new scheme may be launched in respect of them.

[Paragraph 273.]

28. Immediate arrangements should be made to import adequate quantities of fast moving spare parts required both by the Government-owned tractors and private-owned tractors in the State. The Government of Madras should move the Government of India in the matter at once.

[Paragraph 122.]

29. There should be three mobile tractor workshops for attending to repairs and servicing of not only the Government-owned tractors but also of all the tractors owned by private parties collecting charges for the services rendered based on the "no loss no profit" principle.

[Paragraph 123.]

30. The tractors and trailers used solely for the owners' personal agricultural purposes should be exempted from taxation under the Madras Motor Vehicles Taxation Act. No tax under this Act should be levied on tractors and trailers owned by the Agricultural Department.

[Paragraph 124.]

31. The progress so far made in the implementation of the Madras Land Utilization Order is very poor. A Special Officer of the status of a Collector with requisite subordinate staff should therefore be appointed to attend solely to this work. This special staff should take up the districts one by one tackling the more promising and more important districts first and concentrating their efforts in one district at a time.

[Paragraph 144.]

32. The Government should take up with the Commissioner for Hindu Religious and Charitable Endowments the question of appointing two two-man teams each consisting of an officer drawn from the Agricultural Department and another from the Public Works (Irrigation Department). These officers should be full-time officers and the two teams should be asked to make a survey of the lands belonging to the Hindu Religious and Charitable institutions in the State and draw up schemes within a specified time limit for putting them to the best possible use from the point of view of agricultural production.

[Paragraph 148.]

33. The lands belonging to the Hindu Religious and Charitable institutions are now being leased out to the highest bidder in an auction which is held by each institution in respect of its lands every year. The auction-lessees being unnecessary intermediaries between the institutions concerned and the tenants cultivating their lands should be eliminated.

[Paragraph 149.]

(c) IMPROVED SEEDS.

34. The work of seed multiplication at the primary stage in the State Seed Farms should be undertaken by the Government themselves even though they may have to incur some loss on this account as it is of paramount importance to ensure the quality of the primary seeds released for further multiplication in the secondary stage.

[Paragraph 164.]

35. In order to reduce the number of State Seed Farms and thereby ensure a more effective and closer supervision of the farms and with a view to effect savings in the overhead charges all the existing State Seed Farms should be expanded into 75 to 100 acre farms each of which should be managed by the same scale of staff as has now been sanctioned for a 50-acre farm. All State Seed Farms that may have to be started in future should be only 75 to 100 acre farms.

[Paragraph 166.]

36. Every step should be taken to keep down the total outlay on the State Seed Farms to the minimum. One suggestion that has been made is that assessed waste lands and porambokes which are satisfactory and suitable from the point of view of assured irrigation, fertility of the soil, etc., may be used for locating the State Seed Farms wherever such lands are available. These lands may be dry lands grown with rain-fed dry crops situated on the off-side of irrigation canals where water is not usually allowed. After such lands are selected the Government should allow irrigation water to these lands from the irrigation canals as a special case in the interests of seed multiplication. An assiduous search for selecting such lands should be made immediately. Every effort should be made to locate the new State Seed Farms that may have to be started mainly on such lands.

[Paragraph 165.]

37. In order to improve the efficiency of the State Seed Farms and with a view to induce capable hands to stick to the jobs of Farm Managers and take an active interest in their work it is absolutely necessary to give a bonus to each Farm Manager which should have a relation to the profit earned by the Farm during the period of his stewardship. A Detailed scheme in this regard should be drawn up by the Director of Agriculture. The scheme should provide for the grant of bonus not only to the Farm Managers but also to the other staff of the State Seed Farms.

[Paragraph 167.]

38. No separate State Seed Farm acreage is necessary for sugarcane. The requirements of sugarcane setts by the sugarcane growers may continue to be produced and distributed under the Sugarcane Development Scheme as hitherto.

[Paragraph 177.]

39. Nucleus seeds of sugarcane should be arranged to be raised in selected quarantine centres. The popular varieties like CO. 419, CO. 449 and CO. 527 may be raised in the first instance. Nucleus seeds should be supplied in the first instance to the factory farms and to prominent cultivators free of transport cost and at subsidized price levels to serve as primary seed centres. The primary seed centres should multiply and spread the seed material.

[Paragraph 177.]

40. Efforts should be made to cover at least 90,000 acres of new area with improved strains of cotton every year.

[Paragraph 179.]

41. In view of the high seed rate in the case of groundnut there should be a tertiary stage of multiplication. Multiplication at the secondary and tertiary stages should be attended to as far as possible by co-operatives, which should be specially set up for the purpose. The Government should continue to undertake the supply of primary seeds of the required quality for multiplication in the secondary stage. In addition they should buy the secondary seeds of the required quality from the co-operatives and from selected secondary seed farm ryots and sell them for multiplication in the tertiary stage to co-operatives and ryots selected for the purpose.

[Paragraph 182.]

42. The Government should make arrangements for the supply of quality seed material to cover 1.25 lakhs acres under groundnut every year. In view of the high seed rate the Government cannot produce all the primary seeds required in State Seed Farms. They should, however, endeavour to produce a quantity of at least 500 tons of primary groundnut seeds in their own State Seed Farms, the remaining quantity of primary seed being left to be produced by selected ryots whose holdings are located in favourable localities as hitherto.

[Paragraph 183.]

43. No separate State Seed Farms are necessary to produce the required quantity of primary seeds of gingelly and castor, as these can be raised either as mixed or off-season crops in the State Seed Farms intended for the production of paddy and groundnuts.

[Paragraph 185.]

44. It will suffice if there are 70 State Seed Farms of 25 acres each for paddy and millets and 140 State Seed Farms of 25 acres each for cotton, groundnut and millets or 210 State Seed Farms of 25 acres each in all. These 210 State Seed Farms will between themselves provide a State Seed Farm acreage of 3,000 acres for paddy, 1,500 acres for millets, 2,000 acres for cotton and 2,000 acres for groundnut.

[Paragraph 187.]

45. Tapioca should be included in the State Seed Farm Programme particularly in the Salem and Kanyakumari districts for raising cuttings of improved varieties of tapioca for supply to ryots.

[Paragraph 508.]

46. For some years to come it will be absolutely necessary to import seed potatoes of Great Scot and other similar varieties until the State attains self-sufficiency in regard to its good quality potato seed requirements.

[Paragraph 311.]

47. The subsidy of 25 nP per bag of 160 lb. for meeting incidental charges and 12 nP per bag of 160 lb. towards sealing charges now being given to village seed farm ryots should be continued. There is no case for enhancing it at present.

[Paragraph 170.]

48. Greater vigilance than is now in evidence is necessary on the part of the field staff of the Agricultural Department and the Block staff in order to ensure that the expected quantity of village seed farm seeds is actually supplied by the village seed farm ryots to their brother ryots.

[Paragraph 171.]

49. There would be better results if co-operatives are started to undertake the seed multiplication and distribution work in each Development Block in an integrated manner. The Agricultural Banks may be persuaded to take up this work wherever they exist. In other places co-operatives may be started for the purpose. They should obtain their primary seed requirements from the State Seed Farms and take over the work that is now being done by the village seed farms.

[Paragraph 172.]

50. In the Tiruppur area of the Coimbatore district the entire quantity of cotton seeds multiplied in the fourth and fifth stages is obtained through the Tiruppur Cotton Seed Farm Growers' Association, while in the Coimbatore area the Agricultural Department is obtaining its requirements of cotton seeds for distribution to ryots through nominated merchants. The Agricultural Department should either introduce the Tiruppur system in the Coimbatore area also or if this is not possible, try to increase the quantity obtained from the Tiruppur Cotton Seed Farm Growers' Association and correspondingly reduce the quantity obtained from the nominated merchants until a stage is reached when purchase from private individual merchants is entirely eliminated.

[Paragraph 181.]

51. A procedure for ensuring the quality of groundnut seeds supplied to the ryots for sowing should be prescribed and this should be

adopted wherever this is possible. Seed material of approved quality should be made available to growers in sealed bags at not more than 10 per cent of the local market rate. Where co-operatives or selected seed farm ryots come forward to produce the seed material of groundnut of the quality prescribed by the Agricultural Department they should be encouraged by payment of a handsome subsidy even up to 25 per cent of the cost of local seeds under the scheme for sealing bags. The subsidy should be shared equally by the Central and State Governments.

[Paragraph 184.]

52. The Agricultural Department should itself use and also advise the growers to use alkathene bags or alkathene-lined bags for bagging gingelly seed material.

[Paragraph 186.]

(f) SOIL ANALYSIS.

53. A systematic survey of the soil in all the regions of this State should be conducted by the Agricultural Department starting from the predominantly rice areas of this State with a view to draw up a detailed soil map of the State. Linked with this survey there should also be an agronomical survey of the entire State.

[Paragraph 420.]

54. The solitary soil testing laboratory at Coimbatore is not enough. At least three more soil testing laboratories should be established and they should be located at Madras, Aduthurai and Madurai.

[Paragraph 199.]

55. In addition to the three extra soil testing laboratories the establishment of which has been suggested in recommendation 54 above, a soil testing laboratory should be established in each sugar factory area the expenditure being met from the Sugarcane Cess Fund.

[Paragraph 272.]

(g) CHEMICAL FERTILISERS.

56. The present anomalous position in which the Government are on the one hand propagating the use of chemical fertilisers for stepping up agricultural production while on the other hand they are unable to meet the increasing demand for chemical fertilisers created by their own propaganda on account of shortage of stocks should be ended as soon as possible. More fertiliser factories should therefore be established and they should be distributed throughout the country in such a manner that no difficulty will arise in the matter of transporting the stocks by road or rail from the factories to the consuming areas.

57. The distribution of chemical fertilisers through co-operative alone should be the ideal to be aimed at. Already co-operatives are having the monopoly of distribution of nitrogenous fertilisers in the Development Blocks. They should be persuaded to take over the distribution of superphosphate, potash and manure mixtures also in the Development Blocks so that they may be given the monopoly for the distribution of these commodities also in the Development Blocks. In the Non-Block areas also co-operatives should be given the monopoly for the distribution of chemical fertilisers as soon as enough co-operatives to handle the entire requirements of nitrogenous fertilisers, superphosphate, potash and other manure mixtures in these areas are formed and begin to function.

[Paragraph 225.]

58. More co-operative manure mixing societies should be started as quickly as possible and they should be given adequate quotas of straight fertilisers.

[Paragraph 224.]

59. Adequate steps should be taken to ensure that chemical fertilisers are made available to agriculturists at the proper time. Each distributor of chemical fertilisers whether it is a co-operative or a private dealer should draw up sufficiently in advance an estimate of the quantity required for distribution by it during the next cultivation season based upon the experience of previous years. The distributor should on the basis of this estimate place a firm indent on the Collector sufficiently in advance of the time at which supplies are required for distribution to the ryots. The distributor should also specify in the indent the date or dates by which the quantity should be supplied for distribution to ryots. Subject to availability of stocks the Collector should see that the quantities indented for by the distributor are made available to him by the date specified in the indent. The sale price should also be fixed and communicated to the distributor at the time when the supply is made to him in order to avoid any delay in the sales being effected to ryots by the distributor after supplies are received by him.

[Paragraph 226.]

60. All applications for loans under the Intensive Manuring Loan Scheme should be collected six months ahead of the cultivation season and sanction accorded after necessary enquiry so as to enable the ryot to obtain his requirements of manure under the scheme at the proper time with the help of the loan.

[Paragraph 222.]

61. Loans under the Intensive Manuring Loan Scheme should be given also to the landless cultivating tenants and shrotriamdars on the security of the crops to be raised by them.

[Paragraph 222.]

62. The present practice of reserving a portion of the chemical fertiliser quota for each district for those who obtain their requirements with the help of the loan given under the Intensive Manuring Loan Scheme should be continued as the quantity so reserved represents only a fraction of the total quantity available for distribution. However, the Collectors should be asked to apportion the stocks available from time to time judiciously in such a manner that at no time cash sales have to be entirely suspended.

[Paragraph 223.]

63. While Agricultural Banks, Village Co-operative Societies and Co-operative Marketing Societies are distributing chemical fertilisers, the District Co-operative Supply and Marketing Societies also are distributing chemical fertilisers side by side through their own depots in all areas. Such direct distribution of chemical fertilisers by the District Co-operative Supply and Marketing Societies and similar institutions having a district-wide jurisdiction through their own depots is undesirable and should be stopped except in places where the local co-operative society is unable to take up this work.

[Paragraph 227.]

64. Registered cane growers attached to a sugar factory should be supplied their requirements of chemical fertilisers through that factory. A bulk allotment should be made to each sugar factory calculated on the basis of the supplies to which its registered cane growers are entitled according to the principle adopted for distribution of the available supplies to the various categories of consumers in the several areas in the State. The supply to the factories should be made on credit and the value collected during the crushing season, interest being charged at the usual rates for the period from the date of supply to the date of payment of the value. In its turn the sugar factory should supply the fertilisers on credit to registered cane growers charging interest and collecting the value at the time the grower supplies his cane to the factory by deducting the amount recoverable from the price payable to the grower for his cane.

[Paragraph 271.]

(h) GREEN MANURE.

65. As the chief reason for the slow progress in the development of green manure is the inadequate supply of green manure seeds special steps should be taken to increase their supply. The Forest Department should sow sesbania and glyricidia seeds in large patches of forest lands which should total up to not less than 2,000 acres to begin with and allow the plants to grow to seed. The Forest Department should collect the seeds through authorized agents or by utilising the services of the staff of the

Agricultural Department for sale to ryots either direct or through the Agricultural Department whichever alternative is preferred by the Agricultural Department.

[Paragraph 231.]

66. The existing concessions in the matter of removal of green manure leaves from the Government reserved forests should be continued and liberalised wherever possible.

[Paragraph 232.]

67. In the village forests which the Forest Department is now developing sufficient prominence should be given for growing green manure plants, shrubs and trees. The Agricultural Department should advise the Forest Department in respect of the species suitable for each area.

[Paragraph 232.]

68. The Forest Department should grow green manure plants, shrubs and trees on the fringes of reserved forests which adjoin villages and make available the green manure leaves to the ryots of those villages.

[Paragraph 232.]

69. Ryots should be allowed to plant green manure plants, shrubs and trees on the canal, channel, river, tank and road porambokes in charge of the Revenue, Public Works and Highways Departments on permits issued by the Departments concerned subject to such conditions as may be specified by them in consultation with the Agricultural Department.

[Paragraph 232.]

70. Water may be specially supplied (wherever it can be supplied) from Government irrigation sources for raising and irrigating green manure crops without undue restrictions. The areas on which such crops are grown should be carefully surveyed. The correctness of the recording in the village cultivation accounts of the extent of green manure cultivation should be ensured.

[Paragraph 232.]

71. Lascars of the Public Works Department may be given a suitable cash incentive in order to induce them to grow green manure plants, shrubs and trees on the banks of the Public Works Department canals and channels. The payment should not be made merely on the basis of the number of plants, etc., planted but it should be only on the basis of the number of plants, etc., that survive for a specified period, the rules in this regard being drawn up by the Public Works Department in consultation with the Agricultural Department. A similar cash incentive subject to the same conditions may be given to road gang workers of the Highways Department and to village officers in order to induce them to grow green manure plants, shrubs and trees on the road margins and in the porambokes in their charge respectively.

[Paragraph 232.]

72. Ryots should be persuaded to grow green manure as a pure crop on those lands which are classified in the Season and Crop Report as "current fallows", "other fallows" and "cultivable wastes" both for application of the resultant green manure direct to the land and for preparation of compost. Ryots should be advised to reserve 10 per cent of the area grown by them for the collection of green manure seeds. As an incentive the Government may announce that there will be a remission of kist for such cultivation. The Agricultural Department should purchase the seeds produced by the ryots at a price fixed and announced by it sufficiently in advance.

[Paragraph 232.]

73. A prize of the value of Rs. 1,000 should be instituted in each district and awarded to that individual who produces the best yield of green manure per acre in that district. Similar prizes of the value of Rs. 500 and Rs. 250 should be awarded to the prize winners at taluk and village levels respectively in each district. Inter-village competitions should be held in each district in green manure production and prizes should be awarded to that village in each district which raises green manure over the largest area. The prize may be in the shape of development works, viz., roads, schools, dispensaries, etc., or such other item of work which would be of common benefit to all the villagers as the villagers may determine to the tune of Rs. 10,000. The prize winning village may also be given free the green manure seeds required for the entire village for sowing in the next season.

[Paragraph 232.]

74. The sale price for the green manure seeds sold by the Agricultural Department should not vary for each consignment. On the other hand a flat rate inclusive of subsidy should be fixed for sale of green manure seeds by the Agricultural Department for each year and this sale price should be worked out and announced sufficiently in advance of the cultivation season.

[Paragraph 232.]

(i) COMPOST AND FARMYARD MANURE.

75. While the present level of compost and green manure production is only about 25 per cent of the requirements on a safe estimate the target for compost production which is now fixed is far too low. A revised target should be fixed aiming at a production which should be calculated at the rate of 10 tons of compost per acre per annum for irrigated crops and 2 tons of compost per acre per annum for rain-fed areas growing dry crops. An intensive drive should be launched to achieve this revised target. The work of compost development should be stepped up both in the Development Blocks and in the Non-Blocks areas, additional staff

being employed where necessary. Village-wise targets should be fixed for compost development and scrupulously adhered to and the progress of their achievement watched periodically.

[Paragraph 258.]

76. Each ryot cultivating dry crops should be advised to set apart a portion of his land—say 4 to 5 per cent—for cultivation of green manure as a pure crop in the regular crop season. If there are no wells the land and the crop may be cut before the end of the rains and before the flowering stage and composted with rain-water collected in a pit. The compost so made should be supplied to the field in the following season.

[Paragraph 259.]

77. The Forest Department should provide space in the fringes of the reserved forests to ryots of the neighbouring villages for constructing their own compost pits. The Department may collect a nominal fee from the ryots per pit of specified dimensions.

[Paragraph 259.]

78. The feasibility of bringing within the easy reach of the average ryot the cattle dung gas plants that are now being used in a very few places in the State should be investigated. The cattle dung gas plant not only permits the use of cattle dung as fuel after its conversion into methane gas but it also at the same time enables the use of the cattle dung sludge ejected by the gas plant as manure without any reduction in its manurial properties. The Government should offer to give financial assistance for the setting up of 1,000 of these plants in the shape of 50 per cent of the cost as a subsidy and the remaining 50 per cent as a loan. In all municipal conservancy yards and in the Madhavaram Milk Colony the authorities concerned should be asked to instal cattle dung gas plants for the utilisation of the dung obtained by them for conversion into gas for being put to useful purposes so that the ryots in the neighbouring places can be taken to see the working of these cattle-dung gas plants with a view to induce them to instal such plants in their own farmsteads.

[Paragraph 260.]

(j) OTHER MANURES.

79. The export of oil cakes outside the country should be carefully regulated so as to ensure that enough supplies are made available for use within the country both as cattle food and as manure.

[Paragraph 261.]

80. The use of fish meal as manure after processing should be popularised with a view to its utilisation to the fullest extent possible in the coastal areas of the State.

[Paragraph 262.]

81. As bone-meal and hoof meal are two of the best sources of phosphate their export to other countries should be banned.

[Paragraph 263.]

82. Flaying centres equipped with bone-meal digestors should be opened on a co-operative basis in large numbers at the rate of at least one for every group of two or three Development Blocks with a view to provide sufficient quantity of bone-meal for application to crops. The feasibility of recovering all by-products from bone material on a factory basis should be investigated as the production cost of bone-meal can be considerably reduced if the manufacture of gelatine and other by-products is undertaken by the bone crushing industry in this country.

[Paragraph 265.]

(k) PLANT PROTECTION.

83. Production of pesticides and fungicides within the country should be increased with a view to attain self-sufficiency in these essential commodities in the shortest possible time.

[Paragraph 329.]

84. The present arrangement under which pesticides and fungicides are sold at 50 per cent of the cost price only in those areas which are declared as pest-affected by the District Agricultural Officer concerned is neither conducive to the prompt treatment of the affected crops as soon as the pest or disease which has to be combated manifests itself nor is it advantageous to those who desire to treat their crops with pesticides and fungicides as a prophylactic measure. Pesticides and fungicides should therefore be sold at a concessional rate in all areas throughout the year.

[Paragraph 328.]

85. There should be four mobile pest control units at the rate of one under each Deputy Director of Agriculture.

[Paragraph 332.]

86. In order to enable the agriculturists to obtain their requirements of pesticides and fungicides more conveniently all co-operatives which are selling chemical fertilizers should be asked to stock and sell pesticides and fungicides also. Co-operatives should be persuaded to take to the distribution of pesticides and fungicides in an increasing measure. They should be made to step up their turnover progressively and ultimately take over the entire distribution of pesticides and fungicides in the State.

[Paragraph 330.]

87. The concession under which sprayers and dusters are sold to the ryots at 50 per cent of the cost price should be extended to the co-operatives also.

[Paragraph 331.]

88. With a view to increase the availability of hand sprayers and dusters their manufacture in large numbers should be undertaken under the Small-scale Industries Scheme.

[Paragraph 331.]

(l) IMPROVED IMPLEMENTS.

89. The Industries Department and the other Government Departments which have the necessary facilities and are in a position to help should assist in the task of making available to the agriculturists the implements needed by them in adequate quantities. Some of the Government workshops of the various Government departments particularly those belonging to the Agriculture, Industries and Public Works Departments which have a surplus capacity should take up the fabrication of agricultural implements. A list of the agricultural implements that should be fabricated should be furnished to the Departments concerned by the Agricultural Department. Some of the irrigation workshops in the Public Works Department which may have become surplus to the requirements of that Department may be taken over by the Agricultural Department for the fabrication of agricultural implements.

[Paragraph 338.]

90. A system of quality control of agricultural implements fabricated in the State should be introduced. The Agricultural Department should inspect and give a certificate regarding the quality and performance of the agricultural implements produced and sold by the private firms and co-operatives so that the agriculturists may know which are the private firms and co-operatives whom they should approach for agricultural implements of approved quality.

[Paragraph 329.]

(m) ELECTRICITY FOR AGRICULTURAL PURPOSES.

91. The Government should give a subsidy to the State Electricity Board in order to enable it to supply electricity for agricultural purposes to new areas in the under-developed and backward areas of the State expecting only the normal 10 per cent return from the beneficiaries and without demanding the special guarantee. Even in the well-developed areas of the State it is understood that if the upper limit of the special guarantee which is at present Rs. 50 per H.P. is reduced a larger number of ryots will come forward to take up electric supply. To the extent that this maximum limit is reduced the Government will have to give a subsidy to the State Electricity Board to reimburse to it the loss that will be incurred thereby. The Government should consider by how much it would be feasible and desirable to reduce the upper limit of the special guarantee in the well-developed areas.

[Paragraph 346.]

(n) AGRICULTURAL CREDIT.

92. The pace of development of co-operative credit should be further accelerated.

[Paragraph 371.]

93. There should be only one agency for the disbursement of all kinds of loans required by the agriculturists and this agency should be the co-operative agency. The Co-operative Department has already made a start in this direction by launching its Full Finance Scheme in selected areas in the State. This scheme should be extended to all the Development Blocks in the State immediately and to all other areas in the State as soon as possible and in any event by the end of the Third Plan period.

[Paragraph 372.]

94. The Agricultural Department should however continue to disburse the loans now granted by its under the scheme for development of fruit production. It should also disburse loans in those cases where it is considered desirable that it should exercise supervision over the proper utilisation of the loans and also in those cases where it has to provide any kinds of materials to the agriculturists under the loan scheme.

[Paragraph 373.]

95. In order to ensure that the co-operatives do play a much bigger role than at present in agricultural development the basic policy which the Government should adopt should be that all Government aids to the agriculturists should be made available only through co-operatives. This policy should be implemented progressively taking into account the availability of the required number of co-operatives. A Development Block should be taken as the unit for implementing this policy and for extending it from stage to stage. With a view to ensure the expeditious implementation of this policy a definite date should be fixed for a group of Development Blocks according to a phased programme for bringing this policy into force in those Development Blocks. Due publicity for the dates so fixed should be given well in advance and it should be announced that on and from the date fixed for each Block all takkavi, medium and short term loans will be discontinued in that Block.

[Paragraph 384.]

96. The objective which the Government should have before them should be to set up at least one multi-purpose co-operative society in each village to serve as a service co-operative to the local agriculturists and to cater to all their cultivation needs like fertilisers, seeds, credit, etc.

[Paragraph 385.]

97. One of the Standing Committees of the new Panchayat Union Council should undertake the work of co-ordinating the

activities of the agricultural multi-purpose co-operative societies within its jurisdiction and ensure that all of them are treated alike in the matter of financial assistance, allotment of quotas, etc.

[Paragraph 387.]

98. The Government have ordered that in the areas in which the Full Finance Scheme is working no takkavi loans should be granted. The Full Finance Scheme will meet only the short-term and medium-term credit needs of the agriculturists. As regards the long term credit the loans given by the land mortgage banks alone will not be adequate. Long-term takkavi loans should therefore be continued to be granted even in the Full Finance Scheme areas for purposes of land improvement.

[Paragraph 374.]

99. At present there is some avoidable delay in the sanctioning of short-term loans to the ryots for agricultural purposes which are granted at the beginning of the fasli year and generally recovered at the end of the fasli year. This delay is caused by the verification of the credit-worthiness of the applicant, etc., after his application is received. In order to avoid this delay a credit card should be issued to any member of a co-operative society who applies for it furnishing therein all the necessary details on the basis of which loans are now sanctioned and for ascertaining which there is now delay in the disposal of the loan applications. Whatever enquiries are necessary should be made and this credit card should be issued to the ryot in the off-season that is before the cultivation season starts so that his loan application can be disposed of when it is made on the basis of the particulars contained in the credit card without any elaborate enquiry. The credit card should be revalidated at the end of every year in case the co-operative society concerned desires that this should be done. The Revenue Department which issues the credit card may collect a reasonable fee for this service, the amount collected being disbursed to the village officers who prepare the credit cards as an honorarium.

[Paragraph 378.]

100. Short term loans to the required extent should be granted by the co-operatives on the security of the crops raised to landless cultivating tenants, marginal cultivators, sub-marginal cultivators, etc. The loans that are at present being made available to these categories of borrowers is negligible because of the risk involved in lending to them. The Government should therefore give a guarantee to the financing banks agreeing to make good one-half of the loss if any incurred by them in those cases in which the short term loans given by them on the security of the crops raised to landless cultivating tenants, etc., become irrecoverable on account of failure of crops due to unexpected causes like pest-attacks, drought, etc. The remaining one-half of the loss should be borne by the financing banks themselves so that they too may have an interest in keeping down the loss to the absolute unavoidable minimum.

[Paragraph 382.]

101. The agricultural credit provided by the Government and the co-operatives to the agriculturists should be based upon the extent of lands and not the individual. In other words there should be only an acre limit to the loans given and not an individual limit. The amount of loan to which a person is eligible should be worked out as so many rupees per acre of land cultivated and this rate per acre should be fixed differently for different crops taking into account the cost of production of the crop concerned. The maximum number of acres in respect of which loans at this acre rate can be given to an individual should be fixed.

[Paragraph 383.]

102. The arrangement proposed in the case of disbursement of loans under the Intensive Manuring Loan Scheme namely utilising the co-operatives as agents for the purpose should be adopted in all other similar cases where co-operatives are called upon to undertake service functions. In other words this arrangement may also apply to all new kinds of loans and services that are transferred to the co-operatives from the Government Departments which are now administering them.

[Paragraph 386.]

(o) CO-OPERATIVE FARMING.

103. The Commissioner of Food Production should be designated as the authority for implementing all co-operative farming schemes. All orders and instructions which the Government may have to issue in respect of such schemes should be addressed to the Commissioner of Food Production who should carry them out with the assistance of the Registrar of Co-operative Societies and the Director of Agriculture. The Commissioner of Food Production should be included as a member in the Madras State Co-operative Farming Board which should be re-constituted in the light of the latest developments.

[Paragraph 409.]

104. Co-operative Tenant Farming Societies should be formed wherever there are large compact contiguous blocks of lands belonging to the Hindu religious and charitable institutions rendering the formation of such societies a practical proposition.

[Paragraph 150.]

(p) COMMERCIAL CROPS.

105. The reasons for the poor progress so far in achieving the target of additional production of sugarcane during the Second Plan period should be investigated and special steps taken to achieve the Plan target in full by the end of the year 1960-61.

[Paragraphs 25 and 270.]

106. As the progress made so far in achieving the targets of additional production for cotton fixed for the Second Plan period

is poor, very vigorous measures should be taken to achieve the plan target in full during the remaining two years of the Second Plan period.

[Paragraphs 25 and 298.]

107. At the present rate of progress the Plan target for increased production of oilseeds during the Second Plan period cannot be achieved in full. Every endeavour should therefore be made to accelerate the pace of progress and step up the total production to 11 lakhs tons by the end of the Second Plan period.

[Paragraph 26.]

108. The target for the increased production of irrigated groundnut should be stepped up to the extent possible.

[Paragraph 278.]

109. A special drive should be launched for coastal planting of coconut palms particularly in the districts of Tanjore and Ramanathapuram.

[Paragraph 286.]

110. The knowledge gained by the officer of the Agricultural Department who was deputed some time ago to Ceylon to undergo training in the improved methods of cultivating and curing tobacco that are being adopted at Jaffna should be utilized to improve the cultural and curing operations of the tobacco crop in this State.

[Paragraph 301.]

111. The incentives and encouragement to tobacco growers given under the tobacco development scheme now in operation in the Kanyakumari district should be given to the tobacco growers in the other districts also and a comprehensive tobacco development scheme covering the entire State should be launched very soon.

[Paragraph 302.]

112. The possibility of raising the target of increased acreage under cashew fixed for achievement by the end of the Second Plan period both in the case of forest areas and non-forest areas should be explored.

[Paragraph 307.]

113. Steps should be taken to meet the entire credit requirements of the potato growers of the Nilgiris district through the Co-operative agency with a view to enable them to market their entire produce through the Nilgiris Co-operative Marketing Society and obtain better prices for their produce.

[Paragraph 309.]

114. Steps should be taken to increase the production of fruits to as high a level as possible.

[Paragraph 315.]

115. An orchard-cum-nursery and horticultural research centre should be established at the Sathanur Reservoir Project dam site taking advantage of the facilities available there for this purpose. The possibility of setting up similar orchard-cum-nurseries and research centres in the other irrigation dam sites should be investigated.

[Paragraph 315.]

116. Care should be taken to propagate the cultivation of those varieties of nutritious fruits which are already popular with the masses and the prices of which will be within the reach of the common man and also those varieties of fruits for developing which the conditions in this State are very favourable. For instance greater attention should be paid to the development of grapes because the yield of grapes in South India is the highest in the whole world and nowhere else in the world does the grapevine yield two crops per year as in South India.

[Paragraph 316.]

117. Steps should be taken to even out the supply of fresh fruits throughout the year or during the greater portion of the year to the extent possible. For example, off-season mangoes are thriving well in the Government Fruit Farm, Cape Comorin. The reasons for this should be studied and propagated among the fruit growers so that they can even out their production and maintain supplies to the market for a much longer period that is the case at present.

[Paragraph 317.]

118. The canning of fruits and the extraction and preservation of fruit juices should be encouraged by giving all the necessary facilities and incentives for carrying on the business on a cottage industry basis in the homes of the orchard owners in the producing areas and for starting fruit growers' co-operatives in those areas to enable the setting up of small plants for canning and for extraction and bottling of fruit juices and for assisting the fruit growers to market their produce without the interference of intermediaries.

[Paragraph 317.]

119. The forest lands in the Thengumarahada area in the Nilgiris district which are said to be the best and most suitable area for cocoa cultivation in the whole of India may be leased out to the agriculturists who come forward to raise cocoa plantations.

[Paragraph 318.]

(g) AGRICULTURAL RESEARCH.

120. Fundamental research should be accorded a prominent place in the current and future research programmes of the Agricultural Department. The head of every one of the research sections should be given at least one assistant and necessary additional laboratory

or field equipment and facilities and he should be asked to undertake mainly basic or fundamental research while continuing to be responsible for guiding the subordinates in applied research

[Paragraph 416.]

121. Highest priority should be given to rice research. The various suggestions for intensifying rice research made by Sri A. R. Venkatachari should be examined by the Research Council and steps should be taken to implement as many of them as possible.

[Paragraphs 416 and 422.]

122. The Agricultural Department should take up even now necessary steps for evolving suitable paddy strains which will respond well to doses of ammonium sulphate higher than the maximum dose of 30 lb. of nitrogen per acre now recommended by the Department, so that these strains can be released by the time the supply position of chemical fertilizers eases.

[Paragraph 417.]

123. An experimental scheme for the use of chemical fertilizers by applying them to the sub-soil in pellet form with a view to effect economy in the use of chemical fertilizers should be taken up for immediate implementation. One of the objectives of this scheme should be how to produce pellets at a cheap cost which will be within the reach of the average agriculturist in this State.

[Paragraph 417.]

124. Drought resistant strains should be developed for supply to those areas where the soil has a low moisture content for prolonged periods. It is understood that at present the work of developing such strains is confined to paddy. Drought resistant strains should be evolved for other crops also.

[Paragraph 418.]

125. In order to see that this State is not perpetually deficit in regard to its requirements of pulses as at present research work on pulses should be intensified and improved strains and varieties of pulses largely consumed in this State which are capable of catching the fancy of the agriculturists and inducing them to bring increased areas under pulses adopting the improved strains should be evolved. The present arrangement under which there is only one Crop Specialist for both millets and pulses put together is not satisfactory. The separate post of Pulses Specialist which was abolished some time ago should therefore be revived forthwith for tackling problems relating to pulses exclusively.

[Paragraph 419.]

126. Discretion should be given to persons of the position and status of Farm Managers to conduct observation trials and pilot trials on their own initiative without waiting for the approval of

those above them. A report should however be sent by the subordinate official concerned to the Research Council as soon as each such item of work is started.

[Paragraph 421.]

127. The considerable volume of unanalysed data having a bearing on the question of correlation of the seasonal conditions and the level of agricultural production for several successive years which are said to be available with the Agricultural Meteorologist, Agricultural College and Research Institute, Coimbatore, should be studied expeditiously with a view to examine the possibility of obtaining useful results from them if they are found to be adequate or to collect further data on scientific basis to the extent necessary.

[Paragraph 423.]

(r) AGRICULTURAL EXTENSION.

128. Adequate publicity should be given both by the Agricultural Department and by the other Departments concerned regarding all the concessions that have been extended by them to the agriculturists. Adequate publicity should be given to these concessions by the Information and Publicity Department also through the District Publicity Officers in those districts in which such posts are in existence. In addition to the existing methods for giving publicity these concessions should also be published by the beat of 'tom tom' in the villages by the Agricultural Department so that the illiterate masses who form the vast majority of the agricultural population will come to know of them and take advantage of them if they are eligible.

[Paragraph 433.]

129. Special publicity is necessary for the several concessions available to the agriculturists for producing and using green manures in their own lands or in porambokes or in other areas and the methods of collecting and composting all wastes. These should be compiled in a booklet in Tamil using simple language and distributed either free of cost or at a nominal cost in the villages.

[Paragraph 433.]

130. The project sites like those of the Bhavanisagar and Sathanur Projects to which agriculturists from far and near go for sight-seeing are some of the best places for carrying on agricultural propaganda about the improved techniques advocated by the Agricultural Department. Hence arrangements should be made immediately by the Agriculture and Public Works Departments to display at the Project Information Office in each project site charts, models, photographs, posters, etc., of the Agricultural Department and sell or distribute free of cost as the case may be, pamphlets and other extension literature of the Agricultural Department to the agriculturists visiting the project sites.

[Paragraph 434.]

131. The Information Officer of the Agricultural Department should periodically inspect posters and other publicity materials produced in all the Rural Extension Training Centres in the State, select such of them as he finds to be worthy of reproduction on a large scale, have the required number of copies made and distribute them at the rate of at least one copy for each Gramasevak for use in extension work.

[Paragraph 435.]

132. Documentary films in colour should be taken by the Agricultural Department in consultation with the Information and Publicity Department depicting the improved cultural practices advocated by the Agricultural Department weaving them round simple and appropriate stories. A prize scheme should be instituted in order to attract the best talent for preparing the script for these films.

[Paragraph 436.]

133. The Agricultural Department should continue to attach very great importance to the laying of demonstration plots and bring home to the ryots the benefits which they can derive by the results achieved in individual research programmes or schemes of the Agricultural Department by demonstrating these results on the fields of selected ryots in representative areas in the State.

[Paragraph 441.]

134. The units for judging adopted in the crop competitions should be at least 25 cents plots.

[Paragraph 445.]

135. The conditions under which spectacular yields are obtained by the prize-winners and other competitors in the crop competitions relating to rice and millets and the methods adopted by them to get these record yields should be closely investigated and the relevant data analysed fully in each case and studied with a view to isolate the useful features for general adoption.

[Paragraph 446.]

136. The contact between the officers of the Agricultural Department and the Village Agricultural Associations should be much more than what is obtaining at present.

[Paragraph 447.]

137. Selected batches of agriculturists not only in the Development Blocks but also in the non-Blocks areas should be taken at Government cost to Agricultural Research Stations, Government Farms and the farms of the prize-winners in the crop competitions so that they may learn the modern technique first hand from those who have evolved the techniques and also from those who have successfully adopted them.

[Paragraph 448.]

138. The Panchayat Union should provide the local leadership for implementing the agricultural plans formed for its jurisdiction and act as the local committee for agricultural development. Each Panchayat Union Council should be asked to constitute at the earliest opportunity a committee for attending solely to the work of stepping up agricultural production within its jurisdiction under Section 53 (b) of the Madras Panchayats Act, 1958.

[Paragraph 450.]

139. There should be at the headquarters of each District Agricultural Officer a District Agricultural Advisory Council. There should be on each such Council all the legislators of that area, all the prize-winners in the crop competitions in that area and the more well-known among the progressive agriculturists of the locality. The District Agricultural Officer should convene the meetings of the Council for his district at least once a quarter. At these meetings there should be a review of the extension material being put across to the ryots in the area.

[Paragraph 454.]

140. The members of the District Agricultural Advisory Councils should be associated in an advisory capacity with the working of the Agricultural Research Stations and State Seed Farms in their respective areas. They should also be invited to inspect the demonstration plots laid by the Agricultural Department in their areas and make suggestions for their improvement.

[Paragraph 455.]

141. There should be at the State level a State Agricultural Advisory Board similar to the State Livestock Improvement Board, the State Fisheries Advisory Board, etc., consisting of top ranking officers connected with agricultural development in the State and practical agriculturists of state-wide reputation under the chairmanship of the Minister for Agriculture. This Board will help the Government in studying the existing agricultural situation in the State from time to time, in reviewing the progress made in implementing the schemes for stepping up agricultural production, in revising them suitably whenever necessary, in re-orienting periodically the working of the research and extension wings of the State Agricultural Department to be in tune with the changing requirements and in ensuring proper co-ordination between the Agriculture, Food Production, Irrigation and Community Development Departments.

[Paragraphs 456 and 457.]

(s) ADMINISTRATIVE ORGANISATION.

142. It is very necessary, that there should be the utmost co-ordination in the implementation of the food production programme by the several agencies in the Development Blocks. Full responsibility for this should be specifically assumed by the

Commissioner of Food Production who already exercises a general supervision over the food production programme in the entire State.

[Paragraph 465.]

143. Many of the powers and functions in regard to the Block Development programme now being exercised by the Government may conveniently and with advantage be delegated to the Collector as such a delegation will reduce the work-load in the Secretariat which need not concern itself at its high level with comparatively trivial matters particularly as the Block Development organisation has grown considerably and will expand further in the next few years.

[Paragraph 472.]

144. The system of holding periodical regional co-ordination conferences of the officers of the various departments connected with agricultural development in the Development Blocks should be revived.

[Paragraph 466.]

145. The present provision for agriculture and animal husbandry in the schematic budgets of State I and Stage II Development Blocks is very inadequate and should be increased substantially.

[Paragraph 467.]

146. The control of the Collector over the Block Development Officer should be made real and effective. The category of gazetted Block Development Officers should be abolished and in future there should be only one category of Block Development Officers all of them being non-gazetted Block Development Officers under the control of the Collector. The Collector should be made the appointing authority for the Block Development Officers. The Collector should also be empowered to make all postings and transfers of Block Development Officers within his district and also have the power to grant leave to the Block Development Officers in his district. He should also in addition have the power of imposing punishments other than major punishments.

[Paragraph 471.]

147. The present vagueness as regards the functions of the Agricultural Department staff and the Block staff in respect of the agricultural programme in the Development Blocks should be removed. The implementation of all technical work under the agricultural programme should be the sole responsibility of the District Agricultural Officer. In respect of items of work for which expert knowledge is not necessary the District Agricultural Officer should not be held responsible but the Block Development Officer should assume complete responsibility.

[Paragraph 473.]

148. The level of performance of the Block Development Officer in implementing the agricultural programme in the Block should be made the criterion for assessing his efficiency and inefficient Block Development Officers should be weeded out periodically.

[Paragraph 474.]

149. In order to induce the Block Development Officers to take a more active interest in the implementation of the agricultural programme each Block Development Officer should be asked to develop by his personal attention and effort one selected village in his Block as a model village.

[Paragraph 474.]

150. All the Gramasevaks in each Development Block should not be one hundred per cent multi-purpose workers as at present. They should be broadly classified into two roughly equal groups namely "production group" and "amenities group". The gramasevaks coming under the "production group" should attend to the work relating to agriculture, animal husbandry and co-operation and the gramasevaks coming under the "amenities group" should attend to the rest of the Block Development Programme.

[Paragraph 475.]

151. In the interests of stepping up agricultural production it will not be desirable to abolish the posts of Demonstration Maistries in the Development Blocks. Two such posts should therefore be continued in each Development Block.

[Paragraph 476.]

152. Some workable arrangement should be made for assessing and periodically reviewing the progress of food production work in each Development Block at Block and village levels.

[Paragraph 477.]

153. The possibility of the Agricultural Department utilising the services of the students who come out successful from the High schools after undergoing the bifurcated course in agriculture and also the trainees of the Rural Extension Training Centres who come out after successfully completing the training and whose services are surplus to the requirements of the Rural Development Department must be explored. These persons may be employed as Fieldmen in the Agricultural Department after making them undergo a further course of suitable training in the Agricultural College, Coimbatore.

[Paragraph 449.]

(t) THIRD PLAN.

154. The achievement of an additional production of about 20 lakhs tons of foodgrains which will represent roughly a 38 per cent

increase in production should be fixed as the target for the Third Five-Year Plan.

[Paragraph 574.]

(u) MISCELLANEOUS.

155. As the wave-shape method of paddy cultivation adopted by the authorities of the Sri Aurobinda Ashram, Pondicherry, in their lands has some promise, the Agricultural Department should try it in representative regions in this State on representative plots of land for a few crop seasons and find out which of its features are worthy of adoption and inclusion in the Japanese method of paddy cultivation propagated by the department.

[Paragraph 358.]

156. Three sets of independent estimates of crop yields by the random sampling method may be obtained for the next two years for the paddy crop alone in order to compare them with each other with a view to verify the efficacy of the present method of estimating the yield of the paddy crop.

[Paragraph 496.]

157. The yardsticks suggested for sugarcane, the revised seed rates for cotton and the revised yardsticks for cotton suggested in paragraphs 507 to 509 of the report may be adopted. The present yardsticks for oilseeds may be continued to be adopted without any change. Steps may be taken to determine realistic yardsticks in the case of important commercial crops other than cotton, sugarcane and oilseeds.

[Paragraphs 506 to 510.]

158. Both in the case of foodgrains and commercial crops the yardsticks that are adopted should be kept constantly under review. Whenever an appreciable variation between the extra yield as calculated by the adoption of the yardsticks and the extra yield actually recorded and reported by the Director of Statistics is noticed, the reason for this should be investigated and if it is found that the disparity is due to one or more of the yardsticks being unrealistic they should be suitably revised. In all cases where a revised yardstick is adopted, the extra yield should be given in the year in which the revised yardstick is introduced both according to the old yardstick and the revised yardstick, in all reports and statistical returns.

[Paragraphs 505 and 511.]

159. Suitable steps may be taken to see that the Government of India constitute an Expert Committee to go into the question of the cost of production of the principal agricultural commodities, particularly foodgrains.

[Paragraph 483.]

APPENDIX I.

LIST OF MEMBERS OF THE PUBLIC AND ASSOCIATIONS FROM WHOM SUGGESTIONS WERE RECEIVED BY THE COMMITTEE.

- 1 Dr. T. V. Aiyaswamy, M.B.B.S., Tiruvarur, Tanjore district.
- 2 Sri V. G. Alagusundaram, Member, Taluk Congress Committee, Madapuram, Karunganni P.O., Nagapattinam, Tanjore district.
- 3 Sri Balwant Singh, No. 35, Rajpur Road, Delhi.
- 4 Sri C. K. N. S. Bhaskaran, Valavanur, South Arcot district.
- 5 Sri B. K. S. Chowdhry, L.T.C. (Bom.), President, Panchayat Board, Melkalathur, Munnal Railway Station (via) Arkonam, North Arcot district.
- 6 Sri R. Kandaswamy Mooppanar, B.A., B.L., President, Mirasdars' Association, Kumbakonam, Tanjore district.
- 7 Sri A. S. Kuppaswamy, B.A., B.L., Advocate, No. 10, Sripuram, Tirunelveli.
- 8 Sri R. B. Lakshmiratan, "Ammanivasam", Tirukalukundram, Chingleput district.
- 9 Sri A. Nageswara Ayyar, B.E., retired Additional Consulting Engineer, Government of India, No. 36/2, Harrington Road, Madras-30.
- 10 Sri K. P. Nataraja Dikshadar, Member, District Irrigation Committee, Coimbatore.
- 11 Sri S. V. Parthasarathy, Chief Cane Officer, The Tiru Arooran Sugars, Limited, Vadapathimangalam, Tanjore district.
- 12 Sri A. Ponnappa Naidu, Secretary, South Arcot District Congress Committee.
- 13 Sri C. K. N. S. Ramasubbu, Valavanur, South Arcot district.
- 14 Sri C. Ramaswamy Mudaliar, President, Panchayat Board, Chunampet (via) Madurantakam, Chingleput district.
- 15 Sri T. Ramaswamy Naicker, Alangulam Post (via) Sivakasi, Ramanathapuram district.
- 16 Sri D. V. Rao, retired Chief Engineer, Hyderabad (Deccan).
- 17 Sri R. Renganathan, President, Kodaganallur Panchayat, Kallur Post, Tirunelveli district.
- 18 Sri T. V. Sivakolundu, 'Bagdad House', No. 4, Patel Road, Madras.
- 19 Sri O. Srinivasa Reddiar, Kalayampoondi, Chingleput district.
- 20 Sri S. Srividoss, Ex-M.L.A., Karumbattur, Kottaram P.O., Kanyakumari district.
- 21 Sri P. S. Subbaiah, Kumanpudur, Thovalai P.O. (via) Nagercoil, Kanyakumari district.
- 22 Sri V. T. Subbiah Mudaliar, retired Headquarters Deputy Director of Agriculture, Melapalayam East street, Ambasamudram, Tirunelveli district.
- 23 Sri N. Veeraraghavulu Naidu, Siruvallikuppam, South Arcot district.

- 24 The Tindivanam Taluk Agriculturists' Association, Tindivanam, South Arcot district.
- 25 Ryots of Pichanatham and Ongapadi villages, North Arcot district.
- 26 Ryots of Lalapet village, Wallajah taluk, North Arcot district.
- 27 Pattadars of Seevaram village, Brahmadesam Post, North Arcot district.
- 28 Ryots of Papankuzhi village, Sriperumbudur taluk, Chingleput district.
- 29 Ryots of Vayalur, Ammaiappanur, Karavai, Noonampoondi, Nadupattu, Ullampakkam, etc., villages, Uttiramerur sub-taluk, Chingleput district.
- 30 Secretary, Coimbatore District Agriculturists' Association, Guanambikai Mills P.O., Coimbatore.
- 31 Madurai District Fruit Growers' Association, Pattiveeranpatti, Madurai district.
- 32 President and members of the Naduvalur Panchayat, Attur taluk, Salem district.
- 33 Mirasdars of Pazhankulam village, Alathur vattam, Arantangi taluk, Tanjore district.
- 34 Agriculturists' Association, Vettakaraniruppu, Nagapattinam taluk, Tanjore district.
- 35 Tenants and small holders of Kondathur and Kadiramangalam villages in Tanjore district.
- 36 President, District Ryotwari Landowners' Association, Tirunelveli.

APPENDIX II.

LIST OF LEGISLATORS WHO COMMUNICATED THEIR SUGGESTIONS TO THE COMMITTEE IN WRITING.

- 1 Sri T. S. Avinashilingam Chettiar, Member, Rajya Sabha.
- 2 Sri M. Ayyakannu, Member, Lok Sabha.
- 3 Sri T. Ganapathi, Member, Lok Sabha.
- 4 Sri P. Thanulingam Nadar, Member, Lok Sabha.
- 5 Sri K. M. Desikar, M.L.C.
- 6 Sri M. Ethirajulu, M.L.C.
- 7 Sri T. Purushotham, M.L.C.
- 8 Sri V. V. Ramaswamy, M.L.C.
- 9 Sri R. Krishnaswami Naidu, M.L.A.
- 10 Sri N. S. Ramalingam, M.L.A.
- 11 Sri S. Ramaswamy Thevar, M.L.A.
- 12 Sri R. Srinivasa Iyer, M.L.A.
- 13 Sri K. R. Viswanathan, M.L.A.

APPENDIX III.

LIST OF DEVELOPMENT BLOCKS, AGRICULTURAL RESEARCH STATIONS, ETC., VISITED BY ONE OR MORE NON-OFFICIAL MEMBERS OF THE COMMITTEE.

- 1 Agastheeswaram Development Block, Kanyakumari district.
- 2 Kumbakonam Development Block, Tanjore district.
- 3 Pattukkottai Development Block, Tanjore district.
- 4 Virudhunagar Development Block, Ramanathapuram district.
- 5 Kalayarkoil Development Block, Ramanathapuram district.
- 6 Gangavalli Development Block, Salem district.
- 7 Kinathukadavu Development Block, Coimbatore district.
- 8 Tiruppur Development Block, Coimbatore district.
- 9 K. V. Kuppam Development Block, North Arcot district.
- 10 Polur Development Block, North Arcot district.
- 11 Thuringapuram Development Block, North Arcot district.
- 12 Minjur Development Block, Chingleput district.
- 13 Madurantakam Development Block, Chingleput district.
- 14 Sriperumbudur Development Block, Chingleput district.
- 15 Poonamallee Development Block, Chingleput district.
- 16 Manur Development Block, Tirunelveli district.
- 17 Agricultural College and Research Institute, the Central Farm, the College Orchard and the various Research Sections and Breeding Stations at Coimbatore.
- 18 Agricultural Research Station, Aduthurai, Tanjore district.
- 19 Agricultural Research Station, Pattukkottai, Tanjore district.
- 20 Agricultural Research Station, Ambasamudram, Tirunelveli district.
- 21 Agricultural Research Station, Tindivanam, South Arcot district.
- 22 Agricultural Research Station, Koilpatti, Tirunelveli district.
- 23 Agricultural Research Station, Bhavanisagar, Coimbatore district.
- 24 Agricultural Research Station, Tirurkuppam, Chingleput district.
- 25 Agricultural Demonstration Farm, Anuppampattu, Chingleput district.
- 26 Central Sugarcane Research Station, Cuddalore, South Arcot district.
- 27 Sugarcane Research Station, Gudiyattam, North Arcot district.
- 28 Central Sugarcane Breeding Station, Coimbatore.
- 29 Central Banana Research Station, Aduthurai, Tanjore district.
- 30 Coconut Research Station, Veppamkulam, Tanjore district.
- 31 Groundnut Research Station, Pollachi, Coimbatore district.
- 32 Government Fruit Farm, Cape Comorin, Kanyakumari district.
- 33 Model Orchard-cum-Nursery, Periakulam, Madurai district.

- 34 Department of Agriculture, Annamalai University, Annamalai-nagar, South Arcot district.
- 35 Reziere and Highland Agricultural Farms and the Usteri Land Reclamation Centre and Vegetable Farm of Sri Aurobindo Ashram, Pondicherry.
- 36 Agricultural, Livestock and Poultry Development Farm of the Church of South India, Katpadi, North Arcot district.
- 37 State Seed Farm, Tirupathisaram, Kanyakumari district.
- 38 State Seed Farm, Vandarayanpattu, South Arcot district.
- 39 State Seed Farm, Nimmely-Tippiakudi, Tanjore district.
- 40 State Seed Farm, Kondathur, Tanjore district.
- 41 State Seed Farm, Veppamkulam, Tanjore district.
- 42 State Seed Farm, Anayampatti, Salem district.
- 43 State Seed Farm, Tirukambuliur, Tiruchirappalli district.
- 44 State Seed Farm, Ooratchikottai-Bhavani, Coimbatore district.
- 45 State Seed Farm, Pongalur, Coimbatore district.
- 46 State Seed Farm, Oothukottai, Chingleput district.
- 47 State Seed Farm, Nazarathpet, Chingleput district.
- 48 District Livestock Farm (and the State Seed Farm attached to it), Orthanad, Tanjore district.
- 49 Institute of Veterinary Preventive Medicine, Ranipet, North Arcot district.
- 50 Municipal Compost Yard, Nagercoil, Kanyakumari district.
- 51 Municipal Compost Yard, Cuddalore, South Arcot district.
- 52 Municipal Compost Yard, Tanjore, Tanjore district.
- 53 Municipal Compost Yard, Madurai, Madurai district.
- 54 Community Compost Yard, Papankuli village, Sriperumbudur, Chingleput district.
- 55 Community Compost Yard, Sarvodayapuram, Kanyakumari district.
- 56 Community Compost Yard, Veeravanallur, Tirunelveli district.
- 57 Community Compost Yard, Orathur, South Arcot district.
- 58 Community Compost Yard, Mudalacheri village, Tanjore district.
- 59 Community Compost Yard, M. Pudupatti village near Rajapalayam, Ramanathapuram district.
- 60 Community Compost Yard, Naduvalur village, Salem district.
- 61 Community Compost Yard of the Melacheval Panchayat Board, Tirunelveli district.
- 62 Compost Yard of the Cheranmahadevi Panchayat Board, Tirunelveli district.
- 63 Municipal Sewage Farm, Madurai, Madurai district.
- 64 Sri Varadarajaswamy Co-operative Tenant Farming Society, Melakallur, Tirunelveli district.
- 65 Allur Co-operative Lift Irrigation Society, Allur, South Arcot district.

- 66 Valandur Co-operative Joint Farming Society, Valandur, Madurai district.
- 67 Nadhagoundanpudur Co-operative Joint Farming Society, Coimbatore district.
- 68 Thengumarahada Co-operative Farming Society, Thengumarahada, Nilgiris district.
- 69 Nilgiris Co-operative Marketing Society, Limited, Ootacamund.
- 70 Sriperumbudur Taluk Co-operative Marketing Society, Nazarathpet, Chingleput district.
- 71 Agricultural Bank, Chittode, Coimbatore district.
- 72 Casuarina, coconut, etc., plantations of the Tirupugalur Agneeswaraswami Devasthanam, Porakudi, Tanjore district.
- 73 Manimuthar Project.
- 74 Vaigai Project.
- 75 Periyar Project.
- 76 Lower Bhavani Project.
- 77 Sathanur Project.
- 78 Irrigation Research Laboratory, Poondi, Chingleput district.
- 79 Gandhiniketan, T. Kallupatti, Madurai district.
- 80 Gandhigram, Madurai district.
- 81 Rural Extension Training Centre, T. Kallupatti, Madurai district.
- 82 Rural Extension Training Centre, Koilpatti, Tirunelveli district.
- 83 Rural Extension Training Centre, Gandhigram, Madurai district.
- 84 A Sago Factory, Salem Town.
- 85 Sugar Factory of the Deccan Sugar and Abkari Company, Limited, Pugalur, Tiruchirappalli district.
- 86 Sugar Factory of the Cauvery Sugars and Chemicals, Limited, Pettaivaithalai, Tiruchirappalli district.
- 87 Sugar Factory of the Tiru Arooran Sugars, Limited, Vadapathimangalam, Tanjore district.
- 88 Super-phosphate Factory of Messrs. Parry & Company, Ranipet, North Arcot district.
- 89 Government Reserved Forests, Top Slip, Anamallais, Coimbatore district.
- 90 Cashew plantations in Mailapore Reserved Forests, Chingleput district.
- 91 Soil Conservation Works, Ketty Valley, Nilgiris district.
- 92 Soil Conservation Works, Tiruvallur Development Block, Chingleput district.
- 93 Soil Conservation Works at Mukundarajapuram, Lalapet, Pichanatham and Ongapadi villages and on the slopes of the Madhanur Hills in the North Arcot district.

APPENDIX IV.

LIST OF LEGISLATORS WHOM THE NON-OFFICIAL MEMBERS OF THE COMMITTEE MET IN THE COURSE OF THEIR TOURS AND FROM WHOM THEY RECEIVED SUGGESTIONS.

- 1 Sri P. S. Rajagopal Naidu, Member, Rajya Sabha.
- 2 Sri R. Kanakasabai, Member, Lok Sabha.
- 3 Sri C. Nanjappan, Member, Lok Sabha.
- 4 Sri N. Annamalai Pillai, M.L.O.
- 5 Sri T. V. Devaraja Mudaliar, M.L.O.
- 6 Sri K. M. Desikar, M.L.O.
- 7 Sri T. Joghee Gounder, M.L.C.
- 8 Sri P. S. Krishnaswami Ayyangar, M.L.C.
- 9 Sri T. M. Narayanaswamy Pillai, M.L.O.
- 10 Sri V. V. Ramaswamy, M.L.O.
- 11 Sri M. Seshachariar, M.L.C.
- 12 Sri M. V. Sudarsanam Naidu, M.L.C.
- 13 Sri V. M. Surendraram, M.L.O.
- 14 Sri D. S. Authimoolam, M.L.A.
- 15 Sri R. Chidambara Bharathi, M.L.A.
- 16 Sri G. G. Gurumurthi, M.L.A.
- 17 Srimathi Kamalambuja Ammal, M.L.A.
- 18 Sri M. Kandaswamy Kandar, M.L.A.
- 19 Sri R. Krishnaswamy Naidu, M.L.A.
- 20 Sri B. K. Linga Gowder, M.L.A.
- 21 Sri N. Mahalingam, M.L.A.
- 22 Sri V. S. Manickasundaram, M.L.A.
- 23 Sri K. Marappa Goundar, M.L.A.
- 24 Sri S. Nagaraja Monigar, M.L.A.
- 25 Sri K. R. Nallasivam, M.L.A.
- 26 Sri C. G. Narayanaswamy Naidu, M.L.A.
- 27 Sri K. P. Palaniswamy, M.L.A.
- 28 Sri K. G. Palaniswamy Gounder, M.L.A.
- 29 Sri K. Periannan, M.L.A.
- 30 Sri M. P. Periaswamy, M.L.A.
- 31 Sri S. Ramaswamy Naidu, M.L.A.
- 32 Sri T. Sampath, M.L.A.
- 33 Sri V. Sankaran, M.L.A.
- 34 Sri M. S. Selvarajan, M.L.A.
- 35 Sri A. Senapathy Gounder, M.L.A.
- 36 Sri R. Srinivasa Iyer, M.L.A.
- 37 Sri A. R. Subbiah Mudaliar, M.L.A.
- 38 Sri M. P. Subramaniam, M.L.A.

- 39 Sri K. S. Subramania Gounder, M.L.A.
- 40 Sri S. Thangavelu, M.L.A.
- 41 Sri M. D. Thyagaraja Pillai, M.L.A.
- 42 Sri A. Vedarathnam Pillai, M.L.A.
- 43 Sri O. Venkatasubba Reddiar, M.L.A.
- 44 Sri K. R. Viswanathan, M.L.A.

APPENDIX V.

LIST OF MEMBERS OF THE SUB-COMMITTEES CONSTITUTED BY THE COMMITTEE.

1. Seed Sub-Committee—
 - (i) Secretary to Government, Food and Agriculture Department. Official Member.
 - (ii) Sri V. K. Palaniswamy Gounder, Non-official, Member. M. L. C.
 - (iii) Joint Director of Agriculture (Seed Co-opted Member. Farms).
2. Manures Sub-Committee—
 - (i) Director of Agriculture Official Member.
 - (ii) Sri M. G. Sankar, M.L.A. Non-official Members.
 - (iii) Sri A. R. Venkatachari Co-opted Member.
 - (iv) Compost Development Officer Co-opted Member.
3. Minor Irrigation Sub-Committee—
 - (i) Commissioner of Food Production Official Member.
 - (ii) Sri A. R. Venkatachari Non-official Members.
 - (iii) Sri V. K. Palaniswamy Gounder, M. L. C. Non-official Members.
 - (iv) Chief Engineer for irrigation Co-opted Member.
 - (v) Special Chief Engineer, Parambikulam-Aliyar Project. Co-opted Member.
 - (vi) Superintending Engineer (Food Production). Co-opted Member.
 - (vii) Joint Director of Agriculture (Inspection and General). Co-opted Member.
4. Administrative Organization Sub-Committee—
 - (i) Commissioner of Food Production Official Members.
 - (ii) Secretary to Government, Food and Agriculture Department. Official Members.
 - (iii) Director of Agriculture Non-official Member.
 - (iv) Sri V. S. Thyagaraja Mudaliar Non-official Member.
 - (v) Additional Development Commissioner Co-opted Member.
5. Lift Irrigation and Agricultural Machinery Sub-Committee—
 - (i) Director of Agriculture Official Member.
 - (ii) Sri V. S. Thyagaraja Mudaliar Non-official Member.
 - (iii) Agricultural Engineer Co-opted Member.

6. Yard-sticks Sub-Committee—

- (i) Secretary to Government, Food and Agriculture Department. **Official Member.**
- (ii) Sri M. G. Sanker, M.L.A. **Non-official Member.**
- (iii) Director of Statistics }
- (iv) Joint Director of Agriculture (Planning and Development). } **Co-opted Members.**

7. Commercial Crops Sub-Committee—

- (i) Sri V. K. Palaniswamy Gounder, M.L.C. } **Non-official Members.**
- (ii) Sri V. S. Thyagaraja Mudaliar }
- (iii) Joint Director of Agriculture (Planning and Development). } **Co-opted Member.**

8. Agricultural Credit Sub-Committee—

- (i) Director of Agriculture **Official Member.**
- (ii) Sri V. S. Thyagaraja Mudaliar }
- (iii) Sri M. G. Sanker, M.L.A. } **Non-official Members.**
- (iv) Additional Secretary, Board of Revenue. } **Co-opted Members**
- (v) Registrar of Co-operative Societies .. }

9. Research Sub-Committee—

- (i) Secretary to Government, Food and Agriculture Department. **Official Member.**
- (ii) Sri A. R. Venkatachari }
- (iii) Sri V. K. Palaniswamy Gounder, M.L.C. } **Non-official Members.**
- (iv) Dean, Agricultural College and Research Institute and Ex-Officio Additional Director of Agriculture. } **Co-opted Member.**

10. Miscellaneous Subjects Sub-Committee—

- (i) Secretary to Government, Food and Agriculture Department. } **Official Members.**
- (ii) Director of Agriculture }
- (iii) Sri A. R. Venkatachari } **Non-official Members.**
- (iv) Sri V. S. Thyagaraja Mudaliar }
- (v) Secretary, Board of Revenue (Food Production). } **Co-opted Member.**

APPENDIX VI.

A NOTE ON MANURIAL SCHEDULES FOR THE MORE IMPORTANT CROPS PRESENTED BY THE MADRAS STATE AGRICULTURAL DEPARTMENT BEFORE THE ALL-INDIA SEMINAR ON DEVELOPMENT OF LOCAL MANURIAL RESOURCES HELD IN MADRAS IN JANUARY 1959.

(Vide paragraph 193 of the Report.)

Except perhaps in the case of paddy, sugarcane, and potato, sufficient data are not available from the experiments carried out at the Agricultural Research Stations to warrant making definite N-P-K recommendations to ryots in respect of other crops. The results of fertilizer demonstrations in cultivators' fields provide some additional data. Printed reports for 1954 and 1955 only are available and during

this period the trials were confined mainly to cereals. Cash crops have been tackled in subsequent seasons and useful data may be expected in the near future after statistical examination of the yield data by the Indian Council of Agricultural Research. It has also to be remembered that with the accumulation of more knowledge and experience, the manurial schedules have to be revised periodically. The above data and experience, the experiments conducted by 'Potascheme' and ryots' experience have been freely drawn upon in making the following recommendations:—

Irrigated cereals (paddy, cholam, ragi and cumbu).—Departmental experiments have shown that basal dressing of 2,000 to 4,000 lb. of green manure or green leaf, 30 lb. N in two doses, and 30 lb. P. 205 per acre has so far been the general departmental recommendation for cereals. Winners in crop competitions have reported the use of much higher levels of N but balanced with P205 and K20. Till recent years it was considered that the response of cereals to potash was poor and the use of potassic fertilizers was not warranted. One type of demonstration on cultivators' fields in which 14-7-0N-P moisture was used alone at 30 and 45 lb.-N per acre and also 30 lb. K20 gave nearly as good results as 45 lb.-N. It has also been noticed that in Tanjore and other important paddy growing areas some progressive ryots have taken to the use of potassic fertilizers which helps to minimise lodging and confers to some extent vigour to resist diseases.

The following manurial schedule is therefore recommended:—

(a) *Paddy.*—30 lb. P205 applied preferably by placement at the time of last ploughing. 30 lb. K20 before planting and 30 lb. to 45 lb.-N per acre in two doses, first before planting and the second 3 to 4 weeks after planting depending on the duration of the crop. The higher level of N is to be used only if improved and blast resistant strains are planted.

Or

259 to 375 lb. of standard mixture 1, or standard mixture 2, half at planting and half 3 to 4 weeks later.

(b) *Maize.*—45 to 60 lb.-N, 30 lb. P205 and 30 lb. K20 per acre; or 375 to 500 lb. of standard mixture 1 or 2 in two doses, one before planting and the other 4 weeks after planting.

(c) *Sugarcane.*—150 to 300 lb. of N, depending upon locality 60 lb. P205 and 60 lb. K20 or standard mixture 1 or 2 at 1,250 to 2,240 lb. per acre in 3 split doses—at planting, 6-8 weeks later and at the final earthing up. 300 lb. N level for South Arcot and 150 to 200 lb. for other areas.

Departmental experiments have shown that organic N (oil-cakes) and chemical N in the ratio of 2:1 gives the best results and the response to phosphates and potash has been very poor. In view of the fact that even in normal times organic N is more than twice as costly as chemical N and the present price of groundnut cake (Rs. 340 per ton) is prohibitive, it is obviously not economical to adopt this procedure. The manurial schedule recommended at the beginning may be tried and the position reviewed at the next Seminar.

(d) *Cotton*—(1) *Rainfed*.—20 lb. N and 80 lb. P205 per acre or 150 lb. of standard mixture 1.

(2) *Irrigated*.—45 to 60 lb. N, 30 lb. P205 plus 80 lb. K20 per acre or 375 to 500 lb. of standard mixture 2 in two instalments half before sowing and half at first weeding.

(e) *Chillies, onions, tobacco (country), vegetables and fruit trees*.—Same as under (d) (2) above for irrigated cotton.

(f) *Banana*.—80 to 120 lb. N, 45 to 60 lb. P205 and 60 lb. K20 per acre or 800 to 1,200 lb. of standard mixture 2 in 3 split doses—1/3 at planting, 1/3 two months later and the remaining 1/3 5 to 6 months after planting.

(g) *Coconut*.—0.5 to 0.75 lb. N, 0.5–0.75 lb. P205 and 1 lb. K20 per mature tree per year, for trees 5 years and below of age of the full dose and for trees 6–8 years of age 1/2 the full dose.

(h) *Arccanut*.—Half the dosages given above for coconut.

(i) *Tapioca, sweet potato, turmeric, ginger, yams and other root crops*.—45 to 60 lb. N, 45 lb. P205 and 45 lb. K20 per acre or 375 to 500 lb. of standard mixture 3 in two instalments—at planting and at first weeding.

(j) *Groundnut*—(1) *Irrigated*.—15 lb. N, 30 lb. P205 and 30 lb. K20 per acre or 200 to 300 lb. of standard mixture 3.

(2) *Rainfed*.—150 lb. of standard mixture 3.

(k) *Potato in the hills*.—The so-called 'Nanjanad mixture' has been recommended by the Agricultural Department. It contains 500 lb. of groundnut cake, 350 lb. steamed bone meal, 200 lb. ammonium sulphate, 336 lb. concentrated super and 224 lb. potassium sulphate per ton of mixture. The application of 1,600 per acre to supply 80 lb. N, 200 lb. P205 and 110 lb. K20 has been recommended. Concentrated super is not available and steamed bone meal is too costly. The latter has been replaced partly by ordinary bonemeal and partly by ground rock phosphate. A number of Government approved mixing firms are marketing their own mixtures more or less conforming to the formula 6-13-6. It is also a fact that potato growing ryots in the Nilgiris invariably use fertilizer mixtures.

The application of standard mixture No. 4 at 1,200 lb. per acre is recommended. The extension staff may be asked to report every year and sufficiently in advance of the next seminar on how the manurial schedules recommended have worked and what modifications are necessary.

			N	P 205	K
Standard Mixture	1	..	12.0 (10.5)	6 (3.0)	..
Do.	2	..	12.0 (10.5)	6 (3.0)	..
Do.	3	..	6.0 (4.5)	6 (3.0)	12.0
Do.	4	..	6.0 (4.5)	12 (6.0)	6.0

APPENDIX VII.

LIST OF AGRICULTURAL RESEARCH STATIONS, GOVERNMENT FARMS, ETC., IN THIS STATE.

- 1 Central Farm, Coimbatore.
- 2 Agricultural Research Station, Aduthurai, Tanjore district.
- 3 Agricultural Research Station, Bhavanisagar, Coimbatore district.
- 4 Agricultural Research Station, Koilpatti, Tirunelveli district.
- 5 Agricultural Research Station, Nanjanad, The Nilgiris.
- 6 Agricultural Research Station, Palur, South Arcot district.
- 7 Agricultural Research Station, Paramakudi, Ramanathapuram district.
- 8 Agricultural Research Station, Pattukkottai, Tanjore district.
- 9 Agricultural Research Station, Tindivanam, South Arcot district.
- 10 Agricultural Demonstration Farm, Sathyamangalam, Coimbatore district.
- 11 Agricultural Demonstration Farm, Anuppampattu, Chingleput district.
- 12 Paddy Breeding Station, Coimbatore.
- 13 Rice Research Station, Tirurkuppam, Chingleput district.
- 14 Rice Research Station, Ambasamudram, Tirunelveli district.
- 15 Millet Breeding Station, Coimbatore.
- 16 Central Sugarcane Research Station, Cuddalore, South Arcot district.
- 17 Sugarcane Research Station, Gudiyatham, North Arcot district.
- 18 Sugarcane Research Station, Kumaramangalam, Tiruchirappalli district.
- 19 Sugarcane Zonal Farm, Vadapathimangalam, Tanjore district.
- 20 Sugarcane Zonal Farm, Pandyarajapuram, Madurai district.
- 21 Cotton Breeding Station, Coimbatore.
- 22 Groundnut Research Station, Pollachi, Coimbatore district.
- 23 Coconut Research Station, Veppamkulam, Tanjore district.
- 24 Multicrop Fruit Research Station, Periyakulam, Madurai district.
- 25 Central Banana Research Station, Aduthurai, Tanjore district.
- 26 College Orchard, Coimbatore.
- 27 Model Orchard-cum-Nursery, Thimmapuram, Salem district.
- 28 Model Orchard-cum-Nursery, Periyakulam, Madurai district.
- 29 Model Orchard-cum-Nursery, Coonoor, The Nilgiris.
- 30 Pomological Station, Coonoor, The Nilgiris.
- 31 Fruit Farm, Kallar, The Nilgiris.
- 32 Fruit Farm, Cape Comorin, Kanyakumari district.
- 33 Fruit Farm, Burliar, The Nilgiris.
- 34 Sim's Park, Coonoor, The Nilgiris.
- 35 Government Botanical Gardens, Coimbatore.
- 36 Government Botanical Gardens, Ootacamund, The Nilgiris.

APPENDIX VIII.

NOTE ON AGRICULTURAL RESEARCH AND ITS UTILIZATION TOWARDS INCREASE
OF AGRICULTURAL PRODUCTION BY SRI A. R. VENKATACHARI.

(Vide paragraph 422 of the Report.)

At the outset, I wish to make it clear that the subject of this note is so vast and complex and the time to study is so short that in the very nature of things it is neither full nor complete. Whatever opinions have been expressed and suggestions made here or during my meetings with the various authorities in the College and Institute should, therefore, be regarded not as final or conclusive, but as first impressions subject to modifications on closer and more extended observation and study.

2. The study being limited to the more urgent and important problems of production, I approach the subject on the basis of priorities. Our most pressing problem at the head of all with the highest priority is that of increase in production of foodgrains, rice in particular. Even millets, the alternative food of people in this State is in a sense not as important as rice as with the rising standard of living, the food habits of people have been changing and are reflected in a shift from millets to rice. The problem of rice is very acute as sufficient quantities are not produced in the country or even outside it so that even imports are not possible. Next to rice, are pulses the main supplement to a rice diet. Large quantities of these are imported from areas outside the State. We are also getting large quantities of cotton, some of it also from foreign countries. A shift in the demand from coarser to finer cloth has created the problem of producing more and more cotton of the finer grades. Many more articles may be added to this short list of priorities such as for example animal and other products of high nutritive value like milk and fruits, essential raw products of agriculture for our fast expanding industries and others having a large foreign exchange value. Oil seeds also pose important problems but they are relatively less important.

3. Dealing with rice, our most urgent problem, it has not been solved in terms of self-sufficiency in the worst drought year; and only when the overall position is one of sufficiency in such year, we shall have a sizable surplus to meet the needs of a growing population and also for some export in other years. An increase of the order of 50 to 75 per cent over the present level of production in an average year would appear necessary in the next 3 to 5 years. Doubling it would place us in a comfortable position. In the matter of pulses and cotton, the problems can be solved for a time by imports within the country except in the matter of finer grades of cotton. A build up of their production is also urgent though not so urgent as rice.

4. The prospects for increase of rice production appear to lie in two directions—

- (a) by increasing the acre yields of rice; and
- (b) developing new water sources and economising the use of irrigation water so that more rainfed dry areas under rice may be given better irrigation facilities.

It is with the first of these methods and the use of Agricultural Research to this end that this note is concerned.

5. Till about the forties of the present century the rice problem was not in the forefront of Agricultural Production. Small quantities imported from other countries met the needs of people; but with World War No. II stoppage of imports and a succession of bad seasons and a rapidly growing population, the demand soon outstepped the supplies available and the problem has since become acute.

6. The part Agricultural Research has so far played in finding a solution to this problem of increased acre yields of rice is well known. The extended use of better and high yielding strains of rice and use of green manure and chemical fertilizers like ammonium sulphate and superphosphate have achieved significant results. Production all round has gone up, in some cases almost to the limit that there is no further response to these measures, in still greater quantities than used at present. In large areas like those in Cauvery Delta, which has the largest area under rice, the best acre-yields rarely exceed 3,000 lb. per acre, though even this has been reported to have been built up from about 1,800 lb., quite a few years ago. The average is very low about 1,800 lb. much below in some of the other areas in our own State. It is far lower than obtained in the other rice areas of the world. It is nevertheless a matter of some gratification that acre yields of Madras State are quite high compared with other States of India.

7. A vigorous drive on the same lines that is now going on is extremely urgent and called for and will no doubt add to the production, but it is well to remember that if a Research Station produces 3,000 lb. per acre on an average, the production by an average farmer with his various limitations and frailties will not in practice exceed perhaps on the same type of land some 2,000 lb. per acre. The whole delta average might as a result go up by, say 20 per cent to 25 per cent, in about three years but not to 50 or 75 per cent and still higher later in the Third Five-Year Plan as the situation calls for.

8. It is in this context, that we have to consider the particularly disquieting feature that the response to increased quantities of manures and fertilisers is in some places at least not satisfactory. Obviously, therefore, other steps must be considered as to how best production can be stepped up whether in research stations or farmer's fields. The immediate goal should be to raise the acre yields to about 5,000 to 6,000 lb. per acre over fairly large areas so that the same methods adopted by the average farmer may help to raise the Cauvery delta average in the course of a few years to 2,500 to 3,000 lb. Our largest area under rice is in Cauvery Delta and if the problem is solved there, it means a large addition to our rice stocks. This does not mean that the measures to be devised should not simultaneously be applied to other rice growing areas in the State.

9. A multipronged attack seems to me to be necessary if any speedy and effective solution to our most urgent rice problem is to be found. It is with this background that I approach the problem of utilising the results of past and current research and its potentialities for the future.

10. The first step to be taken is to see what past research can do for us. A great deal of useful work has been done in breeding new varieties and introducing them over large areas. The process of

breeding and evolving a new strain is, however, a slow process, taking many years and there is no easy way to speeding it up. While this process must go on and continue to give us better and better strains, it is my impression that we cannot look to any large and spectacular additions in this field in the next few years. I am saying this subject to correction.

11. A study of Dr. K. Ramiah's classical book on "Rice" and the work carried out at some of the rice research stations and colleges and laboratories raises a hope that if some of the agronomic and manurial experiments tried and found useful at one time, but not pursued for some reason or other are revived and carried out on a large scale, significant and speedy results may be attained. Also a study of the elements that have enabled progressive farmers to obtain very high yield of rice in some of their holdings and secure prizes should add more arrows to our quiver in this multipronged attack. It is well to remember while a small contribution of any one idea may not be significant, a collective application of several of these small ones may give quite large and significant results.

12. I shall illustrate these by a few examples—

(i) In Ramiah's book on page 46, it is stated that "in both ADT3, 100-days crop and GEB 24—a five-month's crop, dibbled (rice) plots (only possible where water can be had early in season) gave twice the yield of transplanted plots. Similar results have been obtained in other parts of India and even outside India. If this dibbling of rice can be done on a field scale, the increase in yield that might be obtained is enormous. Dibbling in puddle (in lines) is what should be aimed at."

(ii) Soaking the paddy seeds in nutrient solution like tribasic potassium phosphate has shown large increases up to 39 per cent in pot culture experiments and about 18 per cent under field conditions—vide pages 258-259 of Madras Agricultural Journal—45 (7)-1958. Ramiah and his co-workers got in 1952 yield increases of 15 to 22 per cent. Even with 8 per cent increase, the monetary return is about Rs. 19 per acre. Soaking or smearing with cow-dung and urine appears to have been tried but the results may require further examination.

(iii) Results of raising green manure crop on a basal dressing of super-phosphate are considered generally satisfactory. Sri Albert Howard in his book *Agricultural Testament*, page 88, says that "a small dressing of Farm Yard Manure just before the green crop is sown has the effect of stimulating growth and nodular development in a remarkable way. The green crop when turned in decays much faster than when this manuring is omitted. This is particularly advantageous in heavy black soils. Use of phosphates and potash, is also definitely recommended for producing a large increase of green material. Nitrogenous fertilisers in small doses for leguminous crops helps better formation of nodules and for non-leguminous crops larger doses would appear necessary (Frankonski—Russion)."

(iv) Besides ammonium sulphate and super-phosphate, the use of potash in the form of potassium sulphate might help particularly if the winter crop of paddy were subject to diseases and pests as use

of potassium seems to reduce tendency to lodge and counteract effects of low temperature and insufficient sunlight. Application of fertilisers in split doses has been found to be effective. Their use in solutions with irrigation water would be a new line of work though reported as tried in China successfully.

(v) The use of magnesium sulphate at 40 lb. per acre along with green manure has been found in some experiments to increase the yields by about 20 per cent in plots in pots and about 18 per cent in fields in Aduthurai. Trace elements have yielded significant increase in pot experiments. The presence of magnesium carbonate in some areas in Salem might in my view part account for high yields of rice in this area. Trace elements have yielded significant increases in pot experiments.

(vi) The experiments on ridging paddy plants have yielded some results though not considered significant. In Arobindo Ashramam, Pondicherry, along with wave method and wider planting, ridging or banking the paddy crop has been done with increase in yields. No fertilisers like ammonium sulphate have been used on this farm. Again sugarcane is raised in deltas on low even submersible lands with heavy clay successfully by ridging and ditching and with good manuring, large yields of cane have been obtained (also plantains). The results of these practices raise hopes that rice grown in similar conditions with intermittent irrigation might produce better crop, provided a proper balance between irrigation and aeration of soil is secured to suit soil and crop varietal conditions, the puddled soil not being allowed to crack. The weeding under these conditions should be done with the Japanese inter-cultivator, planting being done in lines. The results of intermittent watering of rice crop and economies in water-supply achieved as a result will be found on page 50 of Mr. Ramiah's book on Rice. An yield of 4,000 lb. per acre was obtained.

(vii) The ordinary varieties of rice benefit by good aeration of soil. Though the growth of algae in a rice field worked under swamp conditions supplies some of the needs of a rice crop, it is not clear that the full requirements for a maximum yield of rice are provided. Rice fields with optimum conditions of drainage generally give high yields.

(viii) A rainless summer resulting in deep and wide cracking of heavy soils is always followed by a good rice crop and good yields even when no manure is applied (see page 20—K. Ramiah's book on Rice). This is probably the result of good tilth of soil, aeration and fixing possibly of atmospheric nitrogen through causes not yet well understood. For nearly analogous reasons, fallowing of lands results in heavier yields in succeeding crops.

13. For future research, some experiments of a fundamental nature appear necessary. A study of limiting factors in rice production in soils which do not respond to certain fertilizers and high doses of others usefully employed elsewhere is necessary and urgent. The study of mineral nutrition of rice plant, the pattern of its uptake during its growth from seed to harvest the soil chemistry of swamp soils with the determination of the optimum needs of water and air needed by the plant and soil are all most urgent. It is understood that since the classical researches of Messrs. Harrison & Iyer (1916) no further work has been done in Coimbatore on soil gases on rice swamp lands. Unless these fundamental, physiological, soil, manurial, irrigation and

aeration studies are done in respect of rice, no great progress can be made. Not all the measures now in use and listed under paragraph 11 above or other similar ones will help to solve fully the overwhelming rice problem. Research in these directions should be stepped up and completed against a set time-limit—say two years. The matter is so important, that I would postpone, if necessary, other items of research to find the staff and equipment for this most important work.

14. With these in the background, I discussed with the Dean, the Principal and the Paddy Specialist at Coimbatore some proposals for immediate and future work on rice.

15. The annexure enclosed lists in general outline some of the experiments suggested to be taken up, the details being left to the section heads in the appropriate departments of research.

16. I feel that in order to get speedy results, some of the ideas set out in this note, the annexure and also others should be experimented with also in farmer's fields and other suitable places. To this end, I may also take such action as may appear to me to be desirable.

17. Though I have some ideas about future research on other crops and departments, I do not propose to elaborate them at present, lest the all important rice problem might in the attempts to cover a larger ground get clouded. They are not in my opinion as urgent as those relating to rice.

ANNEXURE.

Part A—Suggestions in regard to rice crop experiments with a view to augment production.

1. Trial of good drought resistant varieties under wet irrigated conditions with controlled supply of water, the total amount being about 36 inches of water inclusive of rainfall. If experiments are successful the idea is to substitute drought resistant varieties for wet land varieties which use about inches of water without affecting acre yields and quality of rice.

2. To develop non-lodging characteristics in rice crop through application of potash or silica elements in fertilisers.

(The object is to produce stiffer straw and rice plant so that it would not lodge and give better yields of rice.)

3. (a) Fertilisers like ammonium sulphate give a deep green colour to foliage and large vegetative growth. This vegetative growth is believed to depress yields of rice crop as yields from plants with a more balanced colour and growth, generally, gives better results. Increase of available phosphate, potash and other elements in the form of mixed balanced fertilisers may be indicated. This should be done on the basis of a comparative study. Tissue analyses of rice plants with (1) a large vegetative growth and intense green colour and poor yields and (2) moderate growth with yellow colour and high yields, at different stages of growth will throw light on this.

(b) The use of split doses of mixed fertilisers with different compositions according to stage of crop growth and varying nature of tissue analysis may be indicated.

(c) To begin with simple experiments may be done immediately based on past experience but after basic and fundamental experiments suggested in Part B are carried out and results obtained, the scope of these may be enlarged.

(Object.—To increase rice crop yield by improved fertiliser technique.)

4. The use of ammonium sulphate in split doses particularly just before flowering when the plant takes a great deal of nitrogen may be tried. Phosphate sprays may help grain formation and setting and may be an additional variation in this experiment.

5. Deep water paddy produces under certain conditions a good crop. Its algae and oxygenating mechanism or varietal characteristic is possibly superior to ordinary varieties of paddy. On the analogy of experiment (i) drought resistant variety in wet condition, the study of deep water varieties under ordinary wet conditions may be made and (ii) also the algae of the deep water crop may be introduced into ordinary wet land with one most common ordinary varieties and comparative studies made.

6. Green manure (sesbania) may be grown on land to which (a) no manure is applied, (b) super-phosphate is applied, (c) cow-dung farm-yard manure applied and (d) both super and cow-dung manure applied. Comparison of the nitrogen, phosphate and potash contents in the plant just before flowering made. A high seed rate of 60 lb. and close growth should be aimed at. (Potash may be also added in later experiments.)

(Object.—Assess the benefits of manuring green manure crop and to test the usefulness of manuring in part rice fields through manured green manure crop and thereby reduce manurial doses and increase rice yields.)

7. Cultivation of rice crop may be done as in the case of sugarcane. The rice seedlings should be planted in shallow depressions and banked up as the plant grows in height. Watering should be carefully controlled (vide illustration in the pamphlet issued on wave method of cultivation, Pondicherry Ashramam). The spacing between rows should be the minimum consistent with banking and ridging. The ridging and weeding should be done by use of Japanese type of inter-cultivator. The seeds should be presoaked in tribasic potassium phosphate before being sown in seed-beds and green manure grown on farm-yard manure being sown in seed-beds and green manure grown on farm-yard manure dressing at 10 cart-loads per acre should be applied to land before puddling; subsequent irrigation should be controlled and limited to the needs of crop but such as not to allow the soil to crack.

8. Same as experiment (7) with sprouted seeds presoaked in tribasic potassium phosphate solution dibbled at the same intervals as a transplanted crop—vide page 46—Mr. Ramiah's book on rice.

(Object.—To increase rice crop yields by the dibbling method, vide paragraph 11 (i) of the covering note. This would be only suitable where water is available early in the season in sufficient quantities for puddling.)

9. Application of potassium sulphate and phosphate in—

(a) Sprays and (b) soil applications to disease or pest-affected winter crop of paddy. If there is time, it may be done on any blast affected crop now in the fields in the way personally explained.

(Object.—To minimise loss of crop by diseases and pests.)

10. The palatability of stiff straw varieties to the animal stock—
(a) without treatment and (b) with pretreatment may be tried. A variety of paddy in which the paddy does not lie flat on ground on lodging but only leans to an extent not affecting the grain formation and setting properties may be tried and the characteristic related to tissue analysis of plant and introduced in other varieties by adjusting the fertiliser manuring schedules to the extent practicable.

(Object.—To get the advantages of better yields by non-lodging in lodging varieties.)

11. Pot culture experiments using tribasic potassium phosphate soaked seeds to be carried out in pots placed on field bunds using field soils and the same irrigation water as used in the fields, field tests to be laid out with controls by way of unsoaked seeds. The use of seeds or seedlings or both is left to the experimenter.

12. (1) Result of application of copper sulphate, (2) zinc sulphate and (3) magnesium sulphate and any others as manurial elements in suitable doses may be studied in observational plots (in pot culture experiments using the same soils and water if possible) along with economies.

13. Analyses of irrigation and drainage water may be made and continuously studied in as many experiments as possible.

14. As regards experiments already in progress, priority should be given to agronomic and cultural experiments which would have the results of raising yields of rice crop. Those experiments in which the rice yields are of an order less than 2,500 lb. per acre should be accorded low priority.

15. Economics of all trials 1 to 11 (costs of cultivation and profit margins omitting overheads) may be studied simultaneously in all the field experiments.

Part B—Fundamental Research.

Experiments—Experiment 1—(i) Pot Culture Experiments.—Three or more pot culture experiments laid out as below: (i) In one pot, material like well washed and dried coarse sand and gravel (as for hydroponics) may be laid and a rice crop like Co.25 raised and fed with nutrient solution (like Knop's solution) at suitable intervals. Analyses of the solution in the pot once in three days to be made to determine the uptake by the plant of all analysable mineral elements in the solution and a graphical plot for each element made of the weekly analyses results. A solution level gauge and a drainage cock to enable drainage at a controlled rate should be provided for the pot.

(ii) In a second pot, the field soil on which the same rice crop is raised in bulk trials may be placed and same irrigation water as in the field used. There will be a drainage layer at the bottom of the pot and there will also be a water level indicator and a drainage cock; drainage and irrigation controlled as necessary.

(iii) Same as (ii) except that the plant will be grown under submerged condition of soil as in an ordinary rice field.

(iv) Observational trials on bulk trial plot of the same variety under ordinary conditions and plant tissue analyses of the plant from time to time and soil analyses of the field both before and after the crop made.

(v) In experiments (i) to (iii), analysis of plant tissue may not be possible at weekly intervals as the number of plants may not be adequate but such as is possible and in any case at the end of the season should be made. Soils in experiments (ii) and (iii) should be made both before commencing the experiment and at the end of it.

(vi) Records of the quantities and analysis of irrigation water, drainage water may be kept in experiments (i) to (iv) so that the quantities and quality of these waters and the total losses may be assessed. The weekly heights of crop should be also recored to get an idea of the rates of growth.

(vii) Evaporation losses may be studied comparatively by the open pan method in pans placed by the side of pots. Records of temperature, humidity, rainfall and any other useful and necessary data like crop growth heights, tillering, yields of grain and straw may be kept. The experiments should be done in the open in the same conditions of light and temperature and experiments (ii) and (iii) preferably on field bunds, adjoining bulk plots in experiment (iv).

(viii) The Plant Physiologist and Paddy Specialist should be closely associated in the above experiments and any others also as may be found necessary.

(ix) An equipment for testing (quantitatively and qualitatively) for all elements including trace elements is most urgent and sanction for this should be obtained and installed at the earliest possible date. Lack of facilities for determining these will greatly reduce the value of these experiments.

Experiment 2.—(i) Separate experiments may be done by Agricultural Meteorology Section in Pot cultures, using the same variety of paddy and soils as in experiment I and starting at the same time to study the yields of rice with different degrees of soil moisture—namely 40 per cent, 50 per cent, 60 per cent, 70 per cent, 80 per cent, 90 per cent, 100 per cent (110 per cent submerged condition as in case of rice in the field). Manurial and agronomic treatment as in case of experiment I (iv). Records of quantities of water used and drained to be kept, as also temperature and humidity records of crop growth heights, tillering, yields. The pot, is to be left in the open as in field conditions.

(ii) Experiments in open pans for evaporation of water with and without oil films and cetyl alcohol (any other similar substances) under (a) conditions of no or gentle wind, (b) under wind conditions say up to 10 miles per hour. The effect of wind on the different type of films and of agitation of surface by other causes of a kind likely to occur in nature may be examined and studied.

(iii) If these experiments require co-ordination of Plant Physiologist or others, this may be given.

Part C.

(1) It is felt that as speed is the essence of the problem, these experiments should be carried out mostly by re-arranging existing staff and by improvisations. When significant results are obtained, expansion of research on conventional lines can be made.

(2) Equipment and staff for *complete* mineral analyses including trace elements is most urgent and while the existing facilities should be re-arranged to this end, a full and completely new equipment should be obtained with the least possible delay. This is a matter of topmost priority.

(3) The experiments may be started in the Navarai season itself if possible; specially in case of pot experiments.

(4) If this scheme of experiments does not give any significant results, all the resources of science and personnel *may still have to be applied* in pursuit of similar studies until the problem is solved.

APPENDIX IX.

STATEMENT SHOWING THE ESTIMATED COST FOR ACHIEVING THE PROPOSED TARGETS OF INCREASED FOOD PRODUCTION IN THE THIRD PLAN—VIDE PARAGRAPH 524 OF THE REPORT.

Name of the scheme.	Units.	Total cost.	Provision in Second Plan.
(1)	(2)	(3)	(4)
(RUPEES IN LAKHS.)			
I. Major and Medium Irrigation.	..	5,058 *	1,234
II. Minor Irrigation Schemes—			
(1) Special Minor Irrigation Programme.	5,000 tank works.	600	195
(2) Desilting-cum-Reclamation of Irrigation Tanks Scheme.	20,000 acres of gap in the registered ayacut and 4,000 acres of fore shore lands.	100	50
III. Lift Irrigation Schemes—			
(a) Ordinary Open Wells.	25,000 wells (25,000 acres).	250	93
(b) Tubewells Scheme.	100 tubewells and 500 artesian wells and sub-artesian wells.	90	46
(c) Filter Point Wells.	3,000 filter point wells.	80	48
(d) River Pumping Scheme.	30 centres	4	3
(e) Hiring of oil engines.	Existing 290 oil engines (no additional units to be purchased).	5	3
(f) Hire Purchase Scheme for oil engines and electric motors.	15,000 electric motors.	375	Nil.
	5,000 oil engines.	— 45	
		330	
IV. Land Development—			
(i) Tractor Hiring.	142 tractors 72 —52	20	17
(ii) Tractor Hire Purchase Scheme.	351 tractors 72 —22	50	Nil.
(iii) Soil Conservation.	3 lakhs acres.	485	100

* Includes provision of rupees fifty lakhs for improvement of field distributory channels, rupees one crore for improvement of field drainage over one lakh acres and rupees twenty lakhs for improvement of duty on water over 20,000 acres.

Name of the scheme.	Units.	Total cost.	Provision in Second Plan.
(1)	(2)	(3)	(4)
(RUPEES IN LAKHS.)			
V. Distribution of Chemical Fertilisers.—			
VI. Distribution of improved seeds of paddy and millets.	Paddy 10 lakhs acres (24,000 tons of seeds). Millets 12 lakhs acres (8,000 tons of seeds).	75	7
VII. Manures:—			
(i) Urban Compost	2 lakhs tons of additional production of compost.	65	23
(ii) Scheme for the development of local manurial resources	210 Blocks	30	10
(iii) Scheme for development of night-soil compost in Bigger Panchayats.	1,000 Panchayats. ..	20	26
(iv) Pilot Scheme for the development of night-soil compost in smaller villages.	300 villages	10	4
(v) Distribution of green-manure seeds.	40,000	30	2
VIII. Plant Protection:—			
(a) Supply of pesticides sprayers and dusters	.. ..	166	13
(b) Destruction of rats	.. ..	1	0.4
IX. Japanese method of paddy cultivation.	25 lakhs acres	10	4
		7,288	1,878.4
Add provision under 'Agricultural Research (for research on food crops).	..	100	
		7,388	

APPENDIX X.

A NOTE BY SRI A. R. VENKATACHARI.

(Vide paragraph 526 of the Report.)

1. The Committee's report deals with the several issues arising in connection with agricultural production in a comprehensive manner and it will therefore appear that there is little to add to it. Nevertheless, I consider it will be useful to supplement it in some ways. The views expressed here are however my personal views.

2. Agricultural production is a vast subject including as it does, production of food, commercial, fruit, fodder crops and even green-manure and the grasses. All are necessary but not equally important. Our State problem is the food problem and rice is the key

crop to its solution. One is apt to lose sight of this amidst multifarious activities that good agriculture calls for. Recently, a Ford Foundation team in its report to Government of India has emphasised the need to pay special attention to food crops and increase their output very considerably by intensive cultivation methods. The Prime Minister of India has time and again been calling for increased production of food. The phenomenal increase of population over years will with the existing deficit in foodstuffs make the position far more difficult than what it is to-day and lead to acute political problems. We must have rice, wheat, millets and other food crops in ample measure, no matter what other crops we grow and in what quantities. Next to food, we want industrial development to raise the standard of living of the masses. This needs some commercial crops. For example, cotton in large quantity is needed for the mills to make cloth for India's millions. There are other crops needed by factories of which large numbers are being put up some with foreign collaboration every day. The interests of all these crops are watched by different crop committees and their production is promoted with the help of cesses levied for their development and research. There is no committee solely for rice, wheat or millets, though the national food problem is closely associated with these crops. It would appear that an effective authority should be set up to watch the rice crop production solely and promote speedy measures for its research and development and this authority should have ample funds for this purpose.

3. The rice yields in Madras State though about the highest in India are nevertheless low compared to Japan and Italy. The State average per acre of irrigated rice is about 1,200 lb., while it is possibly about 3,000 lb. in Japan. Recently, China starting from a low level of rice production has reported amazingly high yields. The State Agricultural Research Stations have achieved an average of about 2,000 lb. of rice per acre. The prize winners in State competitions have reached a peak figure of 6,000 lb. of rice per acre—all this by known and approved methods. It is however to be noted that lands of the type of research stations and prize winning farms run by scientific men and leading farmers do not represent the average land or average farmer in rice areas. While it is true that there is scope for a sizeable increase by the application of these methods, it would not be right to stop with them. The rice problem is so heavily with us that we should grow a surplus quantity of rice even in bad seasons on an area growing smaller every year and keep well abreast of the population needs till a solution for this is also found. The reduction in rice area is necessary to find more room for commercial crops needed for industrial development. All this calls for forward thinking.

4. In Chapter XVIII of the Committee's report some research experiments (applied and fundamental) have been proposed. My feeling is that rice plant problem has only been comprehended in parts and what is known about it is much less than what is to be found about it. It is generally assumed that given good seeds, good manures, adequate supplies of water and a good farmer, production will take care of itself. This is only true up to a point and true more of good and well drained lands than of average ones. In raising a good crop, sun's heat and light, air, water, carbon, nitrogen, and

minerals of different kinds are needed in addition to good seed and soil. A correct balance of all factors relative to the several growth stages of the crop is needed. Good seed and manure alone will not give the best results if surface and subsoil drainage is defective; or if air or water is not available according to the needs of the crop production will be low. The requirements of minerals are also known to vary with the growth stages of the crop. For instance, it came to my notice (after I had prepared Appendix VIII to the report on research) that drainage plays an important part, that the rice crop grows best under semi-wet conditions in the early stages, and submerged conditions in the later stages when the crop is flowering and setting grain and that iron in the soil plays a controlling part in these later stages in determining the yields. Further, for the same levels of manuring, the yields can vary enormously between favourable and adverse conditions as regards water and air supply. I mention these only to show that our present knowledge about rice has to be supplemented a great deal. I shall possibly say more about this later.

5. If only research is greatly intensified and made to cover a wider and comprehensive range than is provided for in Chapter XVIII, can results of real and practical value be obtained and applied to effect large increases in production securing at the same time economies in the use of water and all this is called for because we are at close grips with an inexorable problem of continuing rice deficits relative to a fast growing population.

6. A word about increased production possible by extension of cultivation to new areas. The potentialities of this method are discussed in Chapter VIII of the report. Though the area is nearly 3.5 million acres of cultivable waste and other fallows, the possibilities of development are limited to what is or can be covered by irrigation schemes. The State as a whole is deficient in water resources and all such water resources that could be developed have been nearly fully-developed. Some of these lands are possibly not fit for cultivation because of soil considerations. So their value should not be over-rated. There is some small scope for soil conservation schemes and measures to conserve rainfall in some areas.

7. The report deals with several aids to increase agricultural production. They are quite a large number and when most of these aids are given in full measure, they should help considerably to increase production. There are some inevitable limitations as in the case of fertilizers and manures, water-supply and agricultural credit; for more fertilizers we depend on greater imports or new factories; for organic manures, on development and conservation of rural leaf resources, crop and other wastes over large areas for direct application to wet land rice or compost for both rice and dry crops; for water we have to depend on its conservation and economies in the use of it as fresh sources are limited. Agricultural credit has to be viewed in the context of total credit needs of farmers for all purposes. Agricultural credit however liberal and well directed for the purposes of crop production cannot but leave him in a needy state and affect his efficiency as a farmer. The State co-operative or banking institutions cannot produce all the finances needed by him for all purposes and

besides they have to be regulated with reference to repayment capacity of the farmer. This problem can only be partly solved. However, taken by and large, the several aids to the farmers proposed are all very valuable and should produce useful results.

8. In spite of all that is given by way of aids, there will be still obstacles to production imaginary or real. A few of these may be mentioned.

9. It is sometimes thought that the smallness of the farmer's holding is affecting production. This is more imaginary than real so far as rice is concerned. Given water and all necessary aids and agricultural credit, with average industry, there is nothing that a farmer cannot do to produce a large rice crop. Japan with a large number of small holdings (as is inevitable in a thickly populated country) produces more rice per acre than America (with its sparse population) with its large holdings and mechanised agriculture on rice lands. Under Indian wet land rice and population conditions, mechanised agriculture is unthinkable and even if feasible will mean loss of employment to rural folk who cannot as yet be absorbed in urban industrial establishments.

10. The system of land tenures may be regarded as a handicap to production. Due to attempts to accord a measure of social justice, a system of crop sharing has been in use. The farmer if he is an owner and cultivator gets the full fruits of his ownership and work on his land but if he is only an owner or a tenant, he gets in majority of cases a 40 per cent or 60 per cent share respectively of the produce. The divided nature of the interests between the two and the psychological reaction it induces, may be a depressing factor in production. This is not a real hindrance as in most cases, it can be got over by educating the tenant to do his best as he gets the major share of the increase in production.

11. There is quite a large school of thought which considers that the proposed land ceilings will depress production when all our attempts are to increase it. The policy of land ceilings is apparently sought to be justified as a measure of social justice considered necessary to avoid more serious political consequences. It is thought that work will be provided to landless labourers and those who get employment with or without ownership will add to the number of contented people. This is only partially true. Where land is left waste by large landholders now affected by ceilings and land has a high production potential, production and employment opportunities will improve with the imposition of ceilings. But a way will have to be found to settle the very difficult problems of compensation to owners and distribution of land released by the imposition of ceilings without creating a new class of discontented people among those classes of landless labourers who do not get a piece of land in the distribution. In view of the small extent of utilisable land relative to the number of landless labourers, there will be possibly more discontent than real satisfaction that the measure will evoke. The owners whose lands are taken away will add to the number of the discontented lot. As to production there will be no increase in production when the land released by the application of the ceiling is already under

effective cultivation, nor will more employment be available as a result of its release. Where the land is not under cultivation and has a high production potential, the result of its distribution to landless labourer, if accompanied by all necessary aids like seed, manure and credit and provision of water facilities at State cost, the outlook for production may be favourable, but still for maximum production additional incentives will be needed as will be shown later under co-operative farming. If land reclamation and improvement problems are involved, there will be no immediate gains to production. The balance of advantage appears to lie in restricting the scope of this measure only to lands not actually under cultivation.

12. Next is co-operative farming. This is to be organized on a voluntary basis and rightly so. It is the only possible way in a free country with a democratic set-up. Let us see where this voluntary co-operative farming will work successfully. The strongest motive in human nature in the present day conditions is the profit motive and this applies to every person whether he is a landless labourer working for wages or a landholder or tenant cultivating his land. Besides the satisfaction of the profit motive, additional incentives by way of ownership or tenancy and rights to a major part of the fruits of one's own labour are needed to people (in case of land) to attain a high level of agricultural production. Most people are not prepared even for wages to work solely for others where land is concerned. So long as these incentives can be maintained and several aids to cultivation provided by the State through service co-operatives, there will be no additional inducement to the owner or tenant cultivator to opt voluntarily for co-operative farming in exchange for daily wages (with a share in the pooled crop at the end of the season). Besides the option involves for him a loss of social status, and identity relative to his land with no right to work on it. His feeling all the time will be that the land is not producing as much as he would have produced by his personal work on it and the pooling will not help him; and he has besides to pay for the expenses and overheads of the society all of which will tend to reduce the divisible profits.

13. The case of landless labourers relative to co-operative farming may now be considered. These men are generally organized as members of a co-operative farming society to develop a block newly taken over by Government (Bhoodhan or as a result of ceilings) or other Government waste land suitable for cultivation. All facilities including water facilities are then provided to the members at State cost. The members work for daily wages and the whole produce is pooled at the end of the season and after selling the part of the produce needed for working expenses and overheads, the rest is divided among the members. If the production potential of the land is low, the method may work without change; but if the potential is high, and the landless labour members have any real option, they will try each individually to get at pieces of land for themselves, and work on them for a fixed grain tenancy basis. That arrangement will be needed to provide the additional incentives of better social status, a sense of part ownership and rights to a major share of the fruits of their labour, and put them on equal terms with an owner or tenant cultivator. It is only on these terms that the maximum amount of

besides they have to be regulated with reference to repayment capacity of the farmer. This problem can only be partly solved. However, taken by and large, the several aids to the farmers proposed are all very valuable and should produce useful results.

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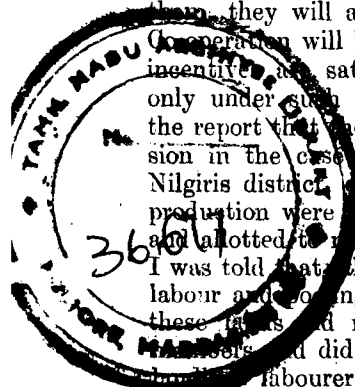
10. The system of land tenures may be regarded as a handicap to production. Due to attempts to accord a measure of social justice, a system of crop sharing has been in use. The farmer if he is an owner and cultivator gets the full fruits of his ownership and work on his land but if he is only an owner or a tenant, he gets in majority of cases a 40 per cent or 60 per cent share respectively of the produce. The divided nature of the interests between the two and the psychological reaction it induces, may be a depressing factor in production. This is not a real hindrance as in most cases, it can be got over by educating the tenant to do his best as he gets the major share of the increase in production.

11. There is quite a large school of thought which considers that the proposed land ceilings will depress production when all our attempts are to increase it. The policy of land ceilings is apparently sought to be justified as a measure of social justice considered necessary to avoid more serious political consequences. It is thought that work will be provided to landless labourers and those who get employment with or without ownership will add to the number of contented people. This is only partially true. Where land is left waste by large landholders now affected by ceilings and land has a high production potential, production and employment opportunities will improve with the imposition of ceilings. But a way will have to be found to settle the very difficult problems of compensation to owners and distribution of land released by the imposition of ceilings without creating a new class of discontented people among those classes of landless labourers who do not get a piece of land in the distribution. In view of the small extent of utilisable land relative to the number of landless labourers, there will be possibly more discontent than real satisfaction that the measure will evoke. The owners whose lands are taken away will add to the number of the discontented lot. As to production there will be no increase in production when the land released by the application of the ceiling is already under

effective cultivation, nor will more employment be available as a result of its release. Where the land is not under cultivation and has a high production potential, the result of its distribution to landless labourer, if accompanied by all necessary aids like seed, manure and credit and provision of water facilities at State cost, the outlook for production may be favourable, but still for maximum production additional incentives will be needed as will be shown later under co-operative farming. If land reclamation and improvement problems are involved, there will be no immediate gains to production. The balance of advantage appears to lie in restricting the scope of this measure only to lands not actually under cultivation.

12. Next is co-operative farming. This is to be organized on a voluntary basis and rightly so. It is the only possible way in a free country with a democratic set-up. Let us see where this voluntary co-operative farming will work successfully. The strongest motive in human nature in the present day conditions is the profit motive and this applies to every person whether he is a landless labourer working for wages or a landholder or tenant cultivating his land. Besides the satisfaction of the profit motive, additional incentives by way of ownership or tenancy and rights to a major part of the fruits of one's own labour are needed to people (in case of land) to attain a high level of agricultural production. Most people are not prepared even for wages to work solely for others where land is concerned. So long as these incentives can be maintained and several aids to cultivation provided by the State through service co-operatives, there will be no additional inducement to the owner or tenant cultivator to opt voluntarily for co-operative farming in exchange for daily wages (with a share in the pooled crop at the end of the season). Besides the option involves for him a loss of social status, and identity relative to his land with no right to work on it. His feeling all the time will be that the land is not producing as much as he would have produced by his personal work on it and the pooling will not help him; and he has besides to pay for the expenses and overheads of the society all of which will tend to reduce the divisible profits.

13. The case of landless labourers relative to co-operative farming may now be considered. These men are generally organized as members of a co-operative farming society to develop a block newly taken over by Government (Bhoodhan or as a result of ceilings) or other Government waste land suitable for cultivation. All facilities including water facilities are then provided to the members at State cost. The members work for daily wages and the whole produce is pooled at the end of the season and after selling the part of the produce needed for working expenses and overheads, the rest is divided among the members. If the production potential of the land is low, the method may work without change; but if the potential is high, and the landless labour members have any real option, they will try each individually to get at pieces of land for themselves, and work on them for a fixed grain tenancy basis. That arrangement will be needed to provide the additional incentives of better social status, a sense of part ownership and rights to a major share of the fruits of their labour, and put them on equal terms with an owner or tenant cultivator. It is only on these terms that the maximum amount of



co-operation and production will be attained. If this is denied to them, they will ask for immediate benefits by way of higher wages. Co-operation will be also voluntary only to the extent that the human incentives are satisfied. Maximum production will be also attained only under such conditions. It will be seen from Chapter XVII of the report that these very elements for success have found full expression in the case of Thengumaragada Co-operative Farming Society, Nilgiris district, where landless labourers and maximum co-operation and production were obtained only when the rice lands were parcelled out and allotted to members for personal cultivation on grain lease terms; I was told that other methods like payment of daily wages for common labour and pooling of produce with a view to sharing tried earlier on these lands did not evoke the same amount of enthusiasm in the labourers and did not produce the best results. This shows that the landless labourer is not different in his make-up than any owner farmer or tenant.

14. There is then the question of a price incentive. This incentive for production is not lacking in the present conditions as the prices of agricultural products are generally at a level higher than what they were about a year ago; but production costs are also raising. This is a matter calling for continual review and action will be needed to fix floor or ceiling prices as conditions may require so that incentives for a maximum production are maintained. Improvement in co-operative marketing facilities are also needed so that the producer may get more for his products than he is able to get at present.

15. It will now be seen in retrospect that there are things good and useful which can bring about increased production and others which may have adverse effects on production. For the best results, the profit motive and other incentives deeply ingrained in human nature whether of owners, tenant cultivators, or landless labourers should be recognized, fostered and promoted in a manner helpful to maximising production. A better distribution of the products of land will naturally be achieved when large and greatly increased production results and there will be better satisfaction all round.

16. The most immediate and essential thing is therefore to go all out as in a war effort to increase production without destroying incentives and bring about a much larger production than has been targetted for. No land which can be usefully cultivated should be allowed to lie waste. All this is to be done not only by intensification of work by the application of the older and known methods but also by newer methods to be evolved in a period of two years by research into new and unexplored fields, untrammelled by results of past research or knowledge. To this end all Government, and farmer and peoples' organizations should be geared up to a high pitch of efficiency. In the meanwhile, it may be necessary to put all facts to the people to show how the best results as regards production can only be achieved by promoting necessary incentives among producers and get peoples' co-operation for such measures of social justice and distribution as may be immediately possible without adversely affecting production. This should be the common demand for all parties as all can