

FOOD AND AGRICULTURE IN MADRAS STATE

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WITH A FOREWORD

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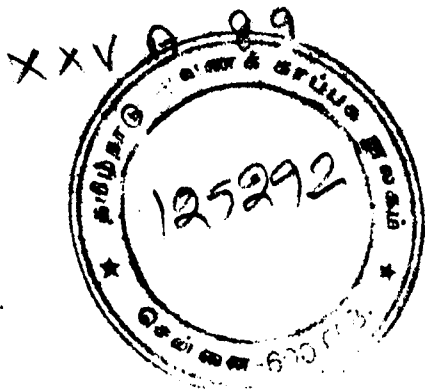
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FOREWORD

It gives me great pleasure in writing a foreword to Dr. Natarajan's book "Food and Agriculture in Madras." I need hardly say how very timely is this publication. Food is today our primary concern and a major pre-occupation. This is not as it should be. But it is a legacy of the past, a part of the country's general economic backwardness and under-developed resources. In Madras, at any rate, it is a long-dated problem; and according to the author's showing, it is at least two centuries. Recent events, in particular, Nature's acts of unkindness such as cyclone, flood and drought, have infinitely added to its complexity and intensity. I wonder whether parallel-hunters could find any precedent in modern times for the failure of monsoon in succession for the fourth year in a large number of districts, and even for the fifth year in some.

The question thus has immediate and long range bearings. No statesman can ignore one, except it be at the peril of the other and perhaps at his own and the community's. It is therefore refreshing to find that the author has written something which is more than mere topical pamphleteering. Nor is it all officialese, although lot of official material has been pressed into service. It is a painstaking and judicious study, written with a view to riveting the attention on an integrated solution of the long and the short term.

The facts of food are hardly understood or largely misunderstood. This is a real danger. No democratic administration can hope to succeed without instructed public opinion and instructed public opinion depends on the dissemination of correct facts, analysed, tested and verified. I find this is what the author has striven to do and I congratulate him on the worthy effort.

J. L. P. ROCHE-VICTORIA.

FORT ST. GEORGE,
1st February 1951.

PREFACE

Madras is one of the 28 States of the new Indian Republic; yet with an area of 126,166 square miles and a population of 56.952 millions it is large enough to compare with the United Kingdom, France or Italy. A deficit region in food supply ever since its economic history came to be authentically recorded, the State has, in recent years, developed into a highly vulnerable spot in India's food economy. Nearly one quarter of the statutorily rationed population of all India live in this State. Some of the problems discussed in the following pages therefore assume more than regional or ephemeral significance. They are basic to the entire Indian agricultural situation and seek common solutions of an enduring character.

The manuscript of this monograph was completed in August of 1950; but in the ceaseless flux and change of an anxious food crisis that ensued, events rapidly overtook figures, if not facts. This necessitated frequent revision of the statistical portions and the time-lag was well utilized thus. Then came the latest population census, raising the estimated figure of 54.29 millions on which calculations had all along been based to the figure of 56.952 millions; but by the time, the page proofs had been received and hardly much could be done by way of revision. This addition of over 2 million mouths, further widening the gap between requirements and supplies, has altered the food budget of the State appreciably to the high side. Otherwise, the analysis and arguments remain largely unaffected.

The Achievement Audit attempted in Chapter IV is based on official figures and officially assumed rates of response to the Grow More Food aids. The result is an edifice rather

imposing in dimensions. But at the time the audit was made, there was no other source or method available. Since then crop-cutting experiments based on the random sampling technique evolved by the Indian Council of Agricultural Research had been commenced on paddy and out of a total of 1,220 experiments planned, 516 had been completed by January 1951 and results had become available for 419. These were subject to a preliminary analysis. The results obtained so far indicate that, in the average, the theoretical rates of response assumed in the Three-Year Emergency Food Production Plan are not very much wide of the mark. As against the official assumption of 120 lb. of rice per acre the random sample experiments yielded a rate of 152 lb. for improved paddy; against 294 lb. of rice for green manure, we got 153 lb. and against 204 lb. of ammonium sulphate 174 lb. In other words, while the assumed rate of increase for improved paddy is an underestimate to the extent of 20 per cent of the actual as observed from experiments, it is higher by 46 per cent for green manure, and 17 per cent for chemical manure. These are but tentative results, and there still remains the equally important complementary work of enumeration of area actually covered by the Grow More Food efforts to be completed. The final results are expected by June of this year, and when they are available we will have made an achievement audit of far greater validity. In the meantime, while judgment will have to be suspended, the merit of the general approach may remain unimpaired.

The main sources for the statistics of this study are the Annual Season and Crop Report, and the official figures made available from time to time by the concerned Departments of Government. I have also made use of figures from the Customs Offices in Madras and other ports of the State. In the preparation of the Introductory chapter, I have liberally drawn

from a paper entitled "The Origin of Burmese Competition in the Madras Rice Market" contributed by me some years back to the Raja Sir Annamalai Chettiar Shashtiabdapurthi Commemoration Volume. The subject matter of the chapter on Land Utilization originally appeared in the *Hindu*, dated the 13th and 14th February 1950. Parts of this study also appeared in Tamil version in the *Dinakaran*. My thanks are due to the editors of these two dailies for their courtesy in permitting me to reproduce them with some elaboration and many minor changes.

Sri M. A. Kuttalalingam Pillai, till recently Secretary, Food and Agriculture Department, was an unfailing source of help and guidance to me. He went through the entire manuscript carefully, checked up the figures, made valuable suggestions and encouraged its publication. Sri V. S. Hejmadi, Commissioner of Food Production and ex-officio Secretary to Government also helped me with his generous criticism. I thank them both most sincerely, as also their colleagues who had contributed to whatever of value that may be found in the publication; but in doing so, I had better make it clear that their responsibility is very much limited, being mostly for the figures supplied and hardly for the conclusions drawn. I should also add that not all the views expressed in the succeeding pages are necessarily Government's.

I am deeply indebted to the Hon'ble Sri Roche-Victoria, Minister for Food for having written a foreword to this volume. I must also acknowledge the unvaried encouragement I received at the hands of the Chief Minister, Hon'ble Sri P. S. Kumaraswami Raja and the Minister for Agriculture Hon'ble Sri A. B. Shetty at different stages of the work. I owe not a little to the steady support I received from Chief Secretary Sri K. Ramunni Menon throughout.

My colleagues in the Department of Economics and Statistics, in particular Sri N. K. Adyanthaya, Statistics Authority for Industrial Statistics, Sri K. S. Sonachalam now Regional Research Officer with Government of India for Industrial Statistics and Sri Y. Sankarasubramaniam, Assistant Statistical Officer gave me their co-operation with more than official zeal. Miss T. Meenakshi and Miss B. Vathsala, Economic Investigators, helped in the preparation of the index. Superintendent Sri G. Ramanujam also acted as my stenographer and relieved me of a number of details on the routine side ; and then the draughtsmen and typists. Indeed it takes a whole lot of technicians at various levels to make any scientific undertaking a success, and I thank them all.

I am aware of the extent to which I have taxed the patience of the Superintendent, his Deputy and the rest of the Staff of the Government Press by that incurable malady to which authors often succumb—a pathetic striving after perfection. Cheerfully putting up with my manuscript vagaries and last-minute itch to make endless and minute changes, they co-operated in a magnificent manner. Sri R. Parthasarathy, Director of Information and Publicity amply proved what team spirit could do in minimising delays in the publication field.

FORT ST. GEORGE, }
5th April 1951. }

B.N.

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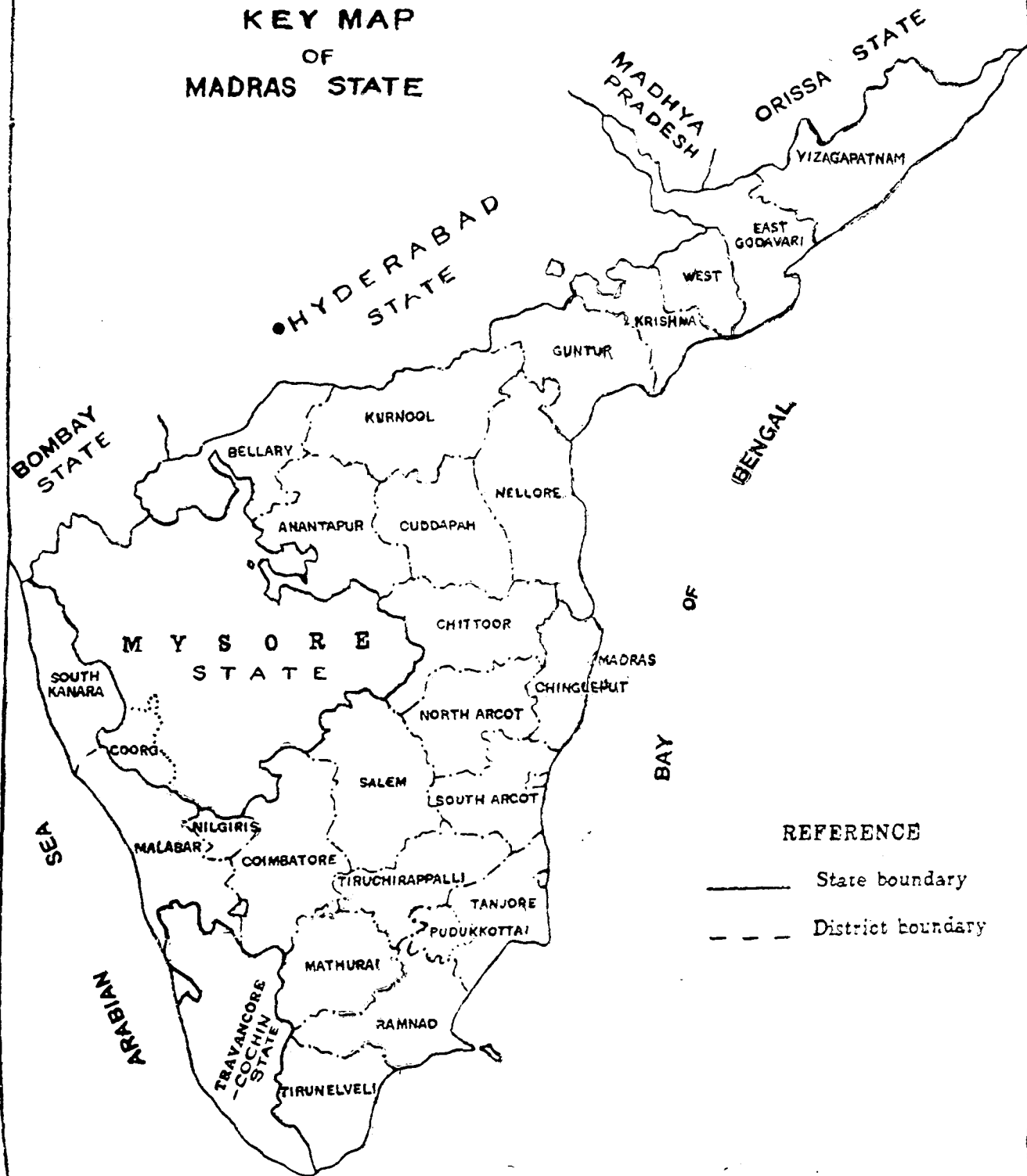
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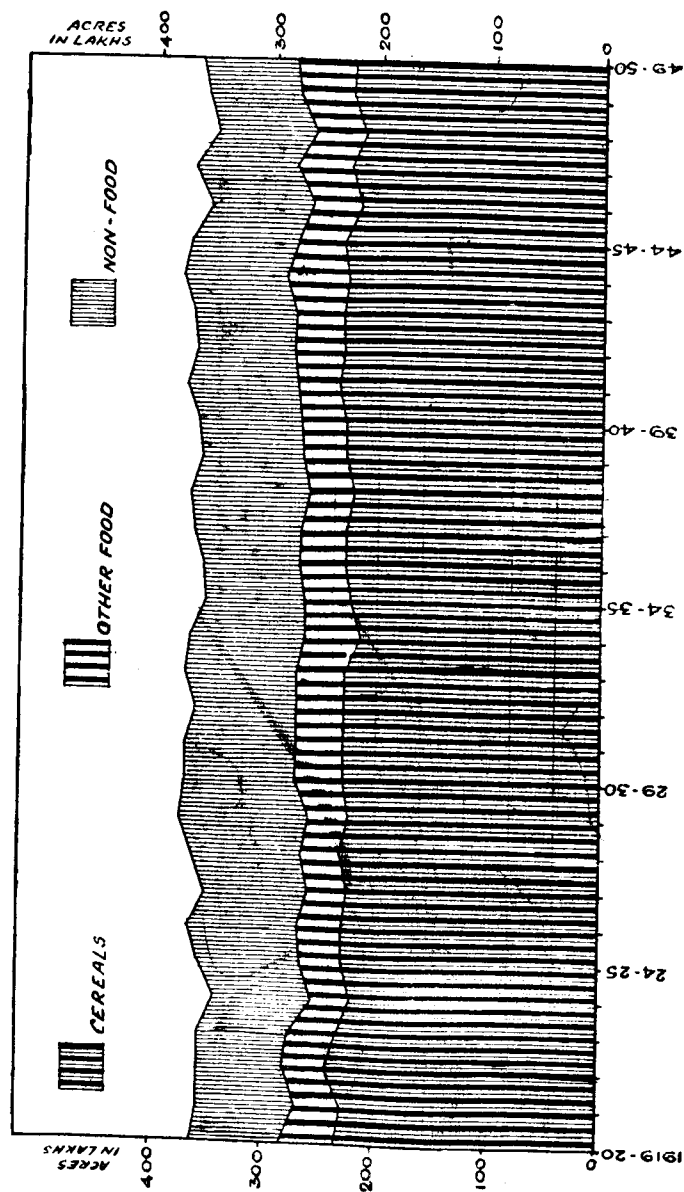
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KEY MAP OF MADRAS STATE



AREA UNDER CEREALS, OTHER FOOD CROPS, NON-FOOD CROPS (COMMERCIAL CROPS)
AND TOTAL AREA OF ALL CROPS IN MADRAS STATE, 1919-20 TO 1948-49.



FOOD AND AGRICULTURE IN MADRAS STATE

FOOD AND AGRICULTURE IN MADRAS STATE

CHAPTER I.

INTRODUCTORY.

For over two centuries now Madras State has been continuously deficit in food supply. An English writer of the mid-18th century refers to the dependence of the East Coast on imported supplies of foodgrains and its consequent vulnerability to an economic blockade :

Madras, with most other places on the Coast of Coromandel (which is in general barren and does not produce grain enough for the subsistence of its inhabitants) is obliged to be yearly supplied from the more fertile coasts of Orissa and Bengal, with vast quantities of rice, which is the chief food of the most of the people in the East Indies ; so that an Enemy that is superior at sea, may easily distress them very much, by taking the vessels laden with rice coming from the Northward. *

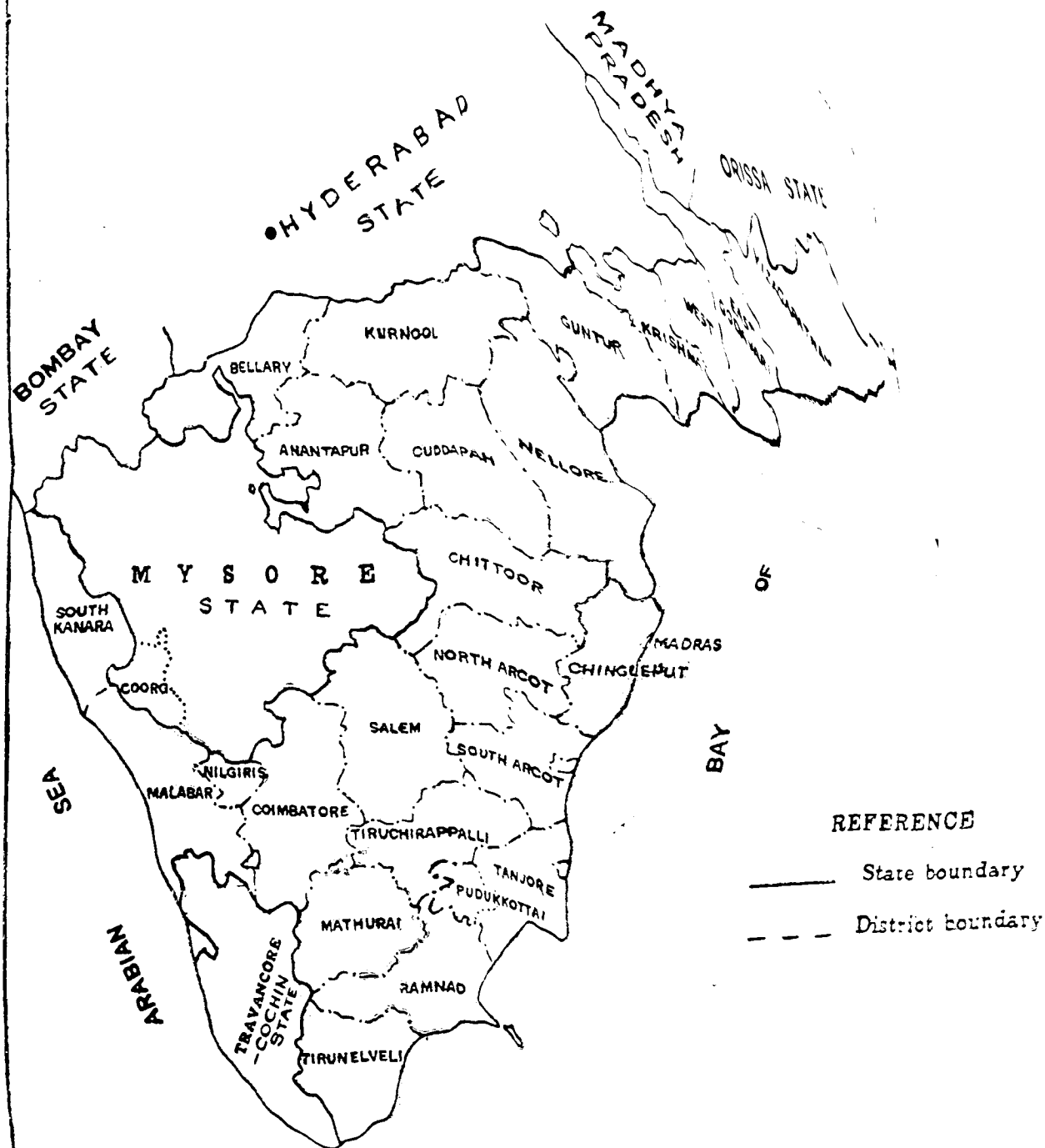
Deficit through the Decades

Among the records of the East India Company, we find statistics of imports of "rice, wheat and all other grains and pulse" from 1796-97 to 1828-29. These statistics, prepared by the elder Mill, in his capacity as the Examiner of India Correspondence, do not give import figures for rice separately ; but it is certain that the bulk consisted of rice. The following figures give the periodical averages of imports of grains in quantity and value from "the several ports of Bengal to the several ports and places on the Coromandel Coast" from 1796-97 to 1828-29. †

* Narrative of the transaction of British Squadron in the East Indies during the late war : By an Officer who served in those squadrons (1751), p. 30.

† Compiled from the Report of the Select Committee of the House of Commons, 1832, Appendix No. 109.

KEY MAP OF MADRAS STATE



Period	Years.	Average number of bags.	Average number of maunds.	Average value. Rs.
1796-97 to 1800-01	.. 5	356,189	712,378	6,93,047
1801-02 to 1805-06	.. 5	555,495	1,110,990	11,12,813
1806-07 to 1810-11	.. 5	624,916	1,249,812	13,29,812
1811-12 to 1815-16	.. 5	355,124	710,247	7,12,208
1816-17 to 1820-21	.. 5	97,732	195,464	1,95,464
1821-22 to 1825-26	.. 5	287,794	594,364	8,63,735
1826-27 to 1828-29	.. 3	39,364	78,306	1,24,523

Imports from Bengal

A closer study of the statistics shows that these imports came to meet a real want, since they had been the heaviest in years when the Presidency or parts of it were experiencing a drought or famine, as in 1806-07 and 1807-08, in 1812-13 and 1813-14 and in 1823-24 to 1825-26. The imports were primarily into the city of Madras and the districts in its vicinities such as Chingleput and North Arcot and in the north districts such as Godavari, Krishna, Visakhapatnam and Ganjam. In the south, Tanjore was functioning as a huge granary and was even exporting to Ceylon. On the West Coast, Kanara was exporting rice to Arabia and Bombay*. The Ceded districts received their supplies mainly from Mysore. The markets of Tanjore and Kanara might have met the entire internal demand, had there been an adequate development of inland communications. However, until about 1825, rice imports from Bengal were pretty regular. "A large fleet of *dhonies* regularly plied between the Coromandel Coast and Bengal conveying salt to Calcutta, returning with cargo of grain. Their chief resort was the port of Coringa from which place grain could be distributed not only throughout the Northern Circars but also throughout Hyderabad." †

* Evidence of Mr. Hodgson to the Select Committee of the House of Commons, dated May 1830.

† Henry St. G. Tucker: Memorials of India Government, p. 461. The important part played by the port of Coringa (near Cocanada) in the commercial intercourse with Burma is seen from the fact that even today Andhra labourers, from whichever part they come, are called Corangees by the Burmans.

Beginnings of Burmese Imports

In the twenties, a new stream of rice supply sprang up from Burma, which ultimately displaced Bengal as an exporter. This stream subsequently assumed such dimensions during the economic depression that prevailed in the Madras Presidency in the years 1825-54* that an analogy in respect of effects can be found only when History repeated itself in the depression that came a century later.

Rice Cultivation in Burma

The development of rice trade in Burma reads like a romance. In 1826 the Provinces of Arakan and Tenasserim were annexed by the British. At that time they were so thinly populated and undeveloped that it was seriously contemplated whether they should not be restored to the Burman king. But in the subsequent thirty years the two provinces witnessed unparalleled economic development under the aegis of British rule. †. In 1855, the value of trade of Arakan amounted to Rs. 18,76,980 and that of Tenasserim to Rs. 83,63,050. The increased production of rice found an outlet in the markets of Madras and northwards.

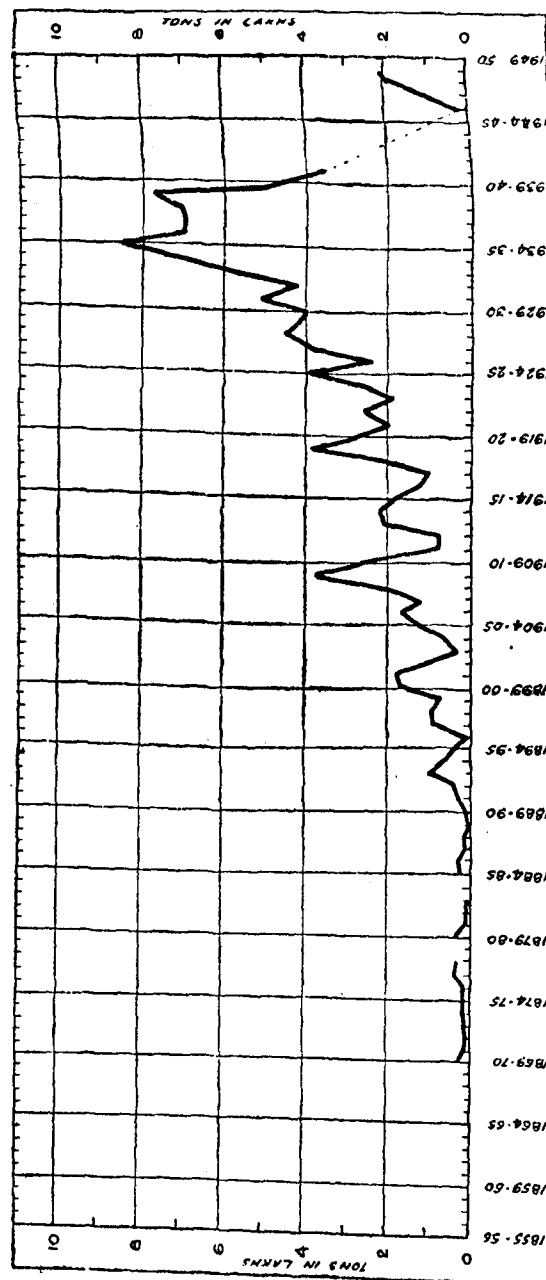
Bounty-fed Imports

The frequent famines to which the Presidency was subject in those days induced the Government to encourage this import trade, in spite of the fact that they were fast wedded to *laissez faire*. In 1824 when famine threatened the Presidency, Sir Thomas Munro, the Governor threw the official *laissez faire* policy to the winds and said that State interference was permissible when "the lives of a great

* Thomas and Natarajan: Economic Depression in the Madras Presidency, 1825-54 (Economic History Review, Volume VII, No. 1).

† Col. A. Fytche, Chief Commissioner, British Burma, and Agent to the Governor-General: Memorandum on the comparative progress of the Provinces now forming British Burma under British and Native Rule, 23rd August 1867.

Fig. 1—IMPORTS OF RICE INTO MADRAS STATE FROM BURMA



population were at stake." * He therefore recommended a reduction in the price of salt taken to Bengal on condition that the controllers of the carrying trade agreed to return with a cargo of rice. † This was in effect a bounty to the Arakan trade. Next year, finding this inadequate, he granted a direct bounty of Rs. 30 per garce of rice imported, which according to his estimate involved the Government in an expenditure of 3 to 4½ lakhs of rupees per annum. ‡ This was a temporary measure, but it no doubt introduced the thin end of Burmese competition. These preferences were repeated in 1832, as the coming famine of *Nandana year* (1833) cast its shadows before, § and verily opened the floodgates of foreign competition.

Imports Compete with Local production

Thus was it that Burmese imports which came to succour stayed to compete. Although the cheap imports were not a direct cause of the depression, they certainly contributed a great deal to keep the level of prices low and delay economic recovery unduly. During the ten years between 1833-34 and 1843-44 the total value of paddy and rice imported into Madras Presidency from Arakan was Rs. 1,08,14,248 of which Rs. 62,43,540 was the share of the six ports to the north of Madras, and Rs. 45,70,708 that of Madras. ||

In the sixty years from 1857-58 to 1917-18, the last year of World War I, imports of rice from Burma have been steadily

* Minutes of Sir Thomas Munro, 23rd January 1824. Also vide B. Natarajan—Economic Doctrines of Sir Thomas Munro, Father Carty Commemoration Volume.

† *Ibid.*

‡ *Ibid.*

§ From the Government of Madras to the Board of Revenue, Consultations, 17th December 1832.

|| Madras Government Consultations, 16th December 1846.

This position had been so completely reversed after the construction of Dowlaiswaram Anicut and the completion of the Godavari and Krishna Canal systems that in the five years ending 1947-48, the Circars had exported on an average 421,078 tons of rice to the deficit regions of the State.

		Imports.	Exports.	Net imports.
		TONS.	TONS.	TONS.
1938-39	.. .. .	634,250	264,979	+369,271
1939-40	.. .. .	838,629	289,877	+548,752
Total	..	3,386,009	1,228,143	+2,157,866
Average	..	677,202	245,629	+431,573

*Imports, exports and net imports of millets by sea and rail
into and out of Madras State.*

1935-36	.. .. .	4,678	..	+*4,678
1936-37	.. .. .	1,082	7	+ 1,075
1937-38	.. .. .	15,789	1,141	+ 14,648
1938-39	.. .. .	28,434	1,021	+ 27,423
1939-40	.. .. .	12,186	13,141	— 955
Total	...	62,169	15,310	46,859
Average	..	12,434	3,062	9,372
Total average for five years: rice and millets.		639,636	248,691	440,945

Grains and Pulses.

Average for five years		..	..	233,768
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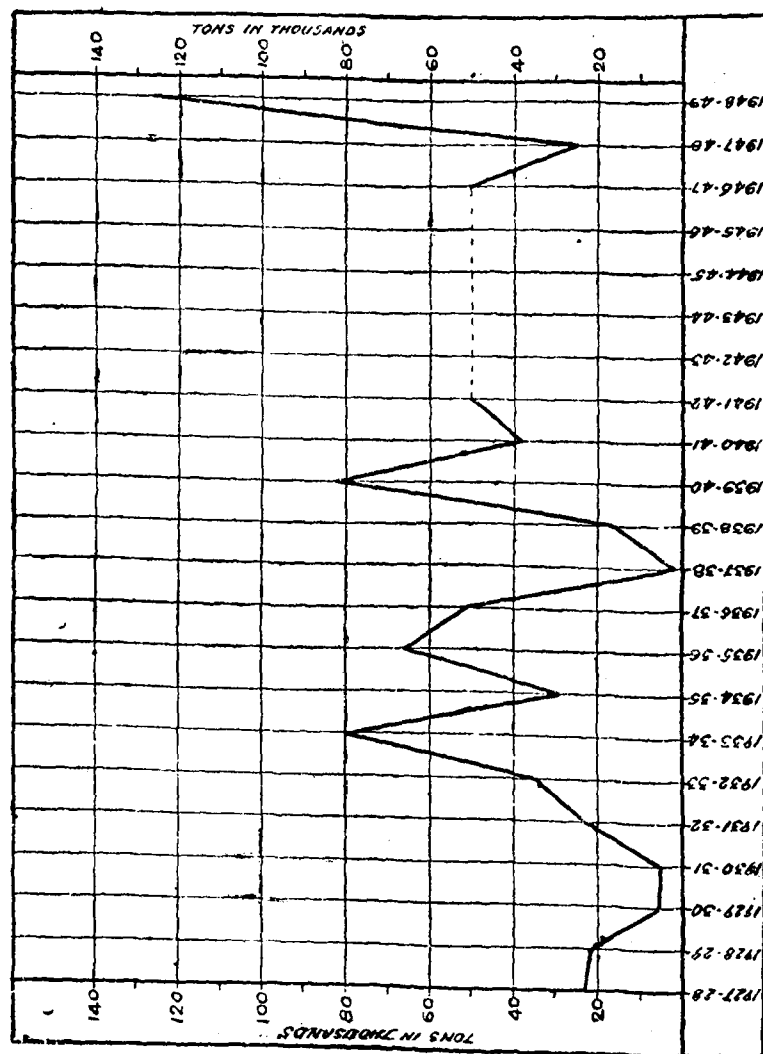
Wheat and wheat products.

Average for five years		..	..	62,446
Total average for five years: rice, millets, pulses, wheat, etc.		..	..	737,359

* Excluding railborne trade.

The annual deficit, however, is shown smaller (as 2.57 lakhs tons of rice and 0.14 lakh tons of millets) in the Basic Plan of the Government of India, vide statement next page.

Fig. 2—IMPORTS OF RICE INTO MADRAS STATE FROM THAILAND



rising. The general trend was definitely upward and it was remarkably so in some years like the late seventies, the first two years of the present century and the four years between 1908 and 1911, while in certain years, e.g., 1881-83 and 1887-1890, imports had fallen to very low levels (vide Appendix XXI and Fig. 1). However it was becoming evident that henceforward imports from Burma were to be no longer fitful in years of high prices occasioned by shortages and famines in the State, but a regular feature to fill up a permanent and widening gap in local supplies. The inter-war period of twenty years from 1918-19 to 1937-38 further confirmed this trend, so much so, on the eve of World War II the State emerged a chronically deficit region in foodgrains in general and rice in particular.

Food Position on the eve of World War II

The average gross output of rice in the State during the inter-war period (1918-1938) was about 5 million tons and millets about 3.3 million tons. When due allowance is made for seeds, there remained only about 4.8 million tons of rice and 3.3 million tons of millets or 8.1 million tons of cereals for human consumption. This was normally supplemented by annual imports, on an average, of about half-a-million tons of rice from Burma, Thailand (see Fig. 2), French Indo-China and considerable quantities of millets, pulses, wheat and wheat products from other parts of India. During the five years immediately preceding the outbreak of World War II, we find, in all, about 5 lakhs tons of foodgrains, excluding pulses, were being imported into this State annually as the following statements will show:

Imports, exports and net imports of paddy and rice by sea and rail into Madras State.

Year.	Imports.	Exports.	Net imports.
	TONS.	TONS.	TONS.
1935-36	794,878	217,659	+ 577,219.
1936-37	564,958	229,950	+ 335,008
1937-38	553,294	225,678	+ 327,616

Deficiency in Protective Foods

The deficiency in the supply of protective foods, measured by the standards set by nutrition experts, has been considerable. The normal requirements and output of the main categories of protective foods in the State are as below :

*Protective Foods—Supply and Requirements.**

Protective food.	Available supply.	Requirements per adult per diem.	Total requirements.	Deficit (—) or surplus (+).
Pulses	258,150 tons.	3 oz.	1,450,487 tons. —	1,92,337 tons.
Milk	12,123,000 cwt.	8 oz.	75,428,300 cwt. —	63,305,300 cwt.
Meat and fish ..	206,457 tons.	3 oz.	1,414,280 tons. —	1,207,823 tons.
Eggs	324,740,000	1 No.	16,895,939,060 eggs. —	16,571,199,060 eggs.
Ghee and vegetable oils.	296,994 tons.	2 oz.	942,853 tons. —	645,859 tons.
Fruits	1,967,809 tons.	3 oz.	1,414,280 tons. +	553,529 tons.
Vegetables ..	612,584 tons.	10 oz.	4,714,268 tons. —	4,101,084 tons.

* Requirements for the 1950 population on the basis of the adult equivalent of 84.08 per cent; the years to which supplies relate are given in the appropriate places in the text.

Pulses

The normal output of pulses in the State has been estimated at 258,150 tons. The requirements on the basis of 3 oz. per diem works out to 1,450,487 tons per annum leaving a deficit of 1,192,337 tons. The available supply in the State gives only 0.6 oz. per adult per diem.

Milk

The normal consumption of fresh fluid milk has been estimated at 12,123,000 cwt. per year. The requirements on the basis of 8 oz. per adult per diem works out to 75,428,300 cwt., leaving a deficit of 63,305,300 cwt. The available supply gives a rate of consumption of only 1.30 oz. per adult per diem.

Meat and fish

On the basis of the livestock census held in December 1944 it has been estimated that 2,520,716 sheep and 1,301,086 goats are available for slaughter for civilian consumption in the State. On the assumption that the average dressed

weights of meat obtained from each sheep and goat are 16 to 18 lb. and 18 to 20 lb. respectively, the quantity of meat available for consumption in the State works out to 30,166 tons. The average quantity of fish of all kinds available for consumption during the five years ending 1939-40 was 176,291 tons. The total quantity of meat and fish available for consumption in the State is 206,457 tons. The requirements of meat and fish at 3 oz. per adult per diem work out to 1,414,280 tons, resulting in a deficit of 1,207,823 tons. The available supply of meat and fish gives a rate of consumption of only 0.44 oz. per adult per diem.

Eggs

The number of eggs available for consumption in the State was estimated at 324,740,000 for the year 1944. This may be taken as the normal production of eggs available for consumption. The requirements of eggs in the State at the rate of 1 per adult per diem works out to 16,895,939,060 eggs resulting in a deficit of 16,571,199,060 eggs. The available supply of eggs gives 0.02 eggs per adult per diem.

Ghee and vegetable oils

The normal output of ghee was estimated at 36,958 tons and the normal output of vegetable ghee at 3,650 tons. The average output of groundnut oil and gingelly oil available for consumption during the five years ending 1940-41 was 184,646 tons and 37,758 tons respectively. The normal output of coconut oil was estimated at 33,632 tons. The total quantity of ghee and vegetable oils available for consumption works out to 296,994 tons. The requirements of ghee and vegetable oils at 2 oz. per adult per diem work out to 942,853 tons resulting in a deficit of 645,859 tons. The available supply gives a rate of 0.643 oz. per adult per diem.

Fruits

The most important fruits in this State are plantains, mangoes and citrus. The average area for the three years

ending 1947-48 under plantains was 162,873 acres yielding 1,161,486 tons, under mangoes 240,593 acres yielding 556,183 tons, and under citrus fruits 72,310 acres yielding 96,140 tons. The area under coconuts is estimated at 615,983 acres yielding about 154,000 tons of nuts. In the matter of fruits this State has a surplus of about 553,529 tons against the requirements of 1,414,289 tons at 3 oz. per adult per diem. The available yield affords 4.23 oz. per adult per diem.

Vegetables

The normal output of vegetables available for consumption in the State may be taken at 612,584 tons being the average of the output during the years 1939-40 and 1940-41. The requirements of vegetables at 10 oz. per adult per diem works out to 4,714,268 tons resulting in a deficit of 4,101,684 tons. The available output gives a rate of consumption at 1.32 oz. per adult per diem.

CHAPTER II.

PROCUREMENT, RATIONING AND FOOD ADMINISTRATION.

Loss of Imports and Rising Exports

Such was the magnitude of the deficit on the eve of the war. The State was consuming at the rate of 20.48 ounces per day per adult (average for the six pre-war years 1933-34 to 1938-39), but producing only at the rate of 19.31 ounces. This meant that an import of 4.69 lakhs tons would be required at the accustomed level of consumption. Now came the Japanese flare-up in the Far East. Imports of rice from Burma, Thailand and Indo-China ceased. The State was thrown on its own resources. Not only that, other Provinces and States began to draw on the precarious resources of Madras; and then there were the inexorable demands of the defence services. In the year 1941 alone, Ceylon, Travancore, Cochin, Mysore, Bombay and even Bengal had imported from Madras to the tune of nearly 3.42 lakhs tons of foodgrains or about 4.43 per cent of the State's normal output in the years between 1933-34 and 1938-39 as the statement below would show :

Exports of foodgrains from Madras State to other areas (tons).

Importing area.		1941.	1942.
Ceylon	.. ..	141,317	65,379
Bombay	.. ..	62,399	1,364
Travancore	.. ..	46,980	16,161
Cochin	.. ..	39,299	6,464
Mysore	.. ..	41,552	567
Bengal	.. ..	7,075	3,014
Other areas	.. ..	3,583	6,247
Total	.. ..	342,205	99,196

Beginnings of Control

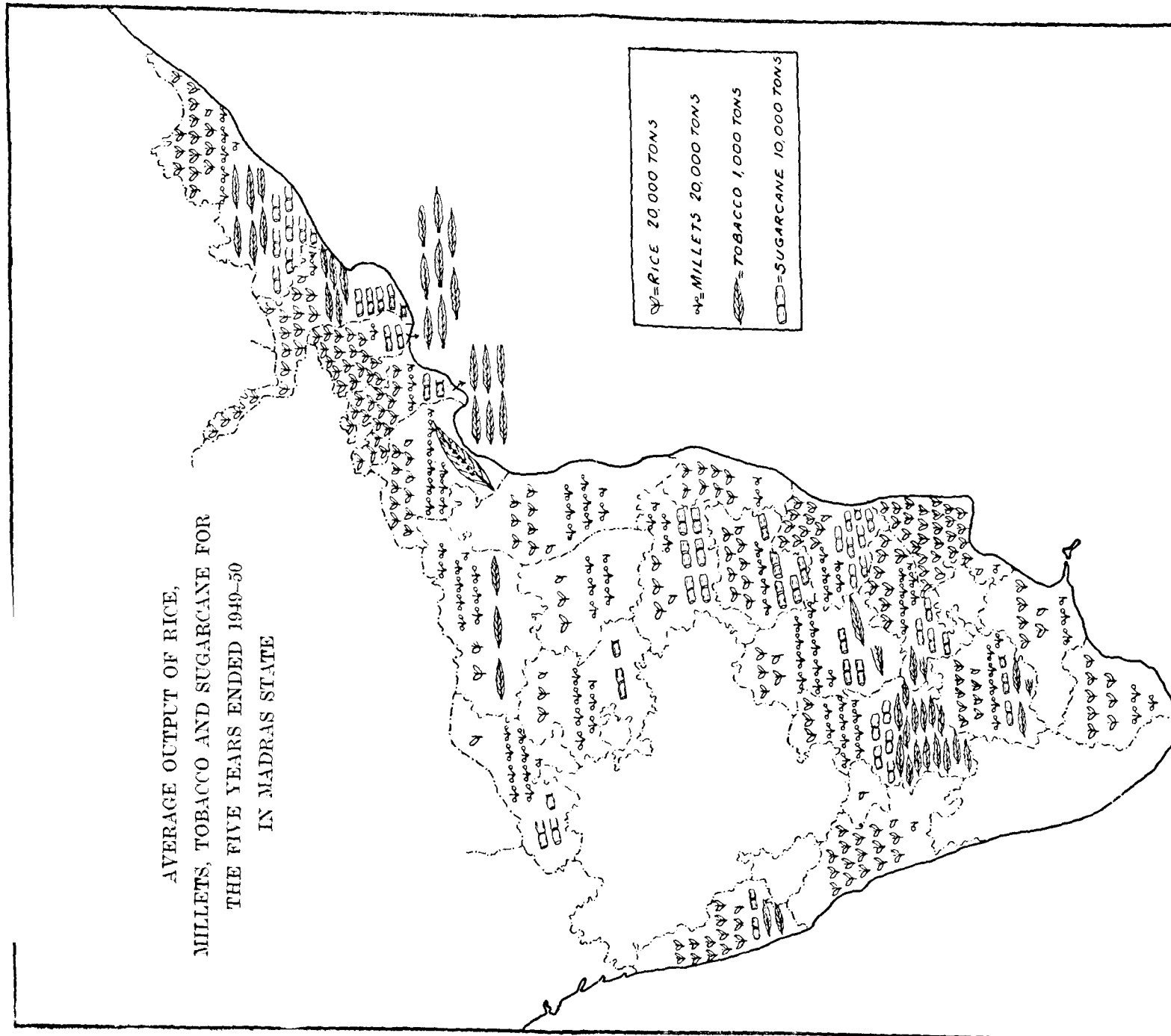
This drain on the food resources of the State could not be permitted to go on indefinitely. Government had to step

*Food supply in Madras State in the five years ending
1941-42 according to the Basic Plan.*

Year.	output.	Net imports.	Quantity available for consumption.
RICE.			
	TONS.	TONS.	TONS.
1937-38	4,850,000	327,616	5,177,616
1938-39	4,100,000	369,271	4,469,271
1939-40	4,487,000	548,752	5,015,752
1940-41	5,150,000	196,579	5,346,579
1941-42	4,955,000	— 154,783	4,800,217
Average	4,704,400	257,487	4,961,887 or 4,962,000 roundly.
MILLETS.			
	TONS.	TONS.	TONS.
1937-38	2,653,000	14,648	2,667,648
1938-39	2,761,000	27,413	2,788,413
1939-40	2,998,000	— 955	2,997,045
1940-41	3,084,000	7,898	3,091,898
1941-42	2,886,000	20,101	2,906,101
Average	2,876,400	13,821	2,890,221 or 2,890,000 roundly.
Total rice and millets available (average for the five years ending 1941-42).	7,580,800	271,308	7,852,000

This requires explanation. The Basic Plan adopted for its formula the average output plus imports of the five years from 1937-38 to 1941-42. Out of these five years, two were abnormal; the year 1938-39 was one of low domestic production without any great compensatory imports and the year 1941-42 was one of net exports rather than imports. Obviously, therefore, the Basic Plan resulted in an underestimate. The real deficit is much larger. It would be some-where near 5 lakhs tons, the average of the five years ending with 1939-40, already indicated.

AVERAGE OUTPUT OF RICE,
MILLETS, TOBACCO AND SUGARCANE FOR
THE FIVE YEARS ENDED 1949-50
IN MADRAS STATE



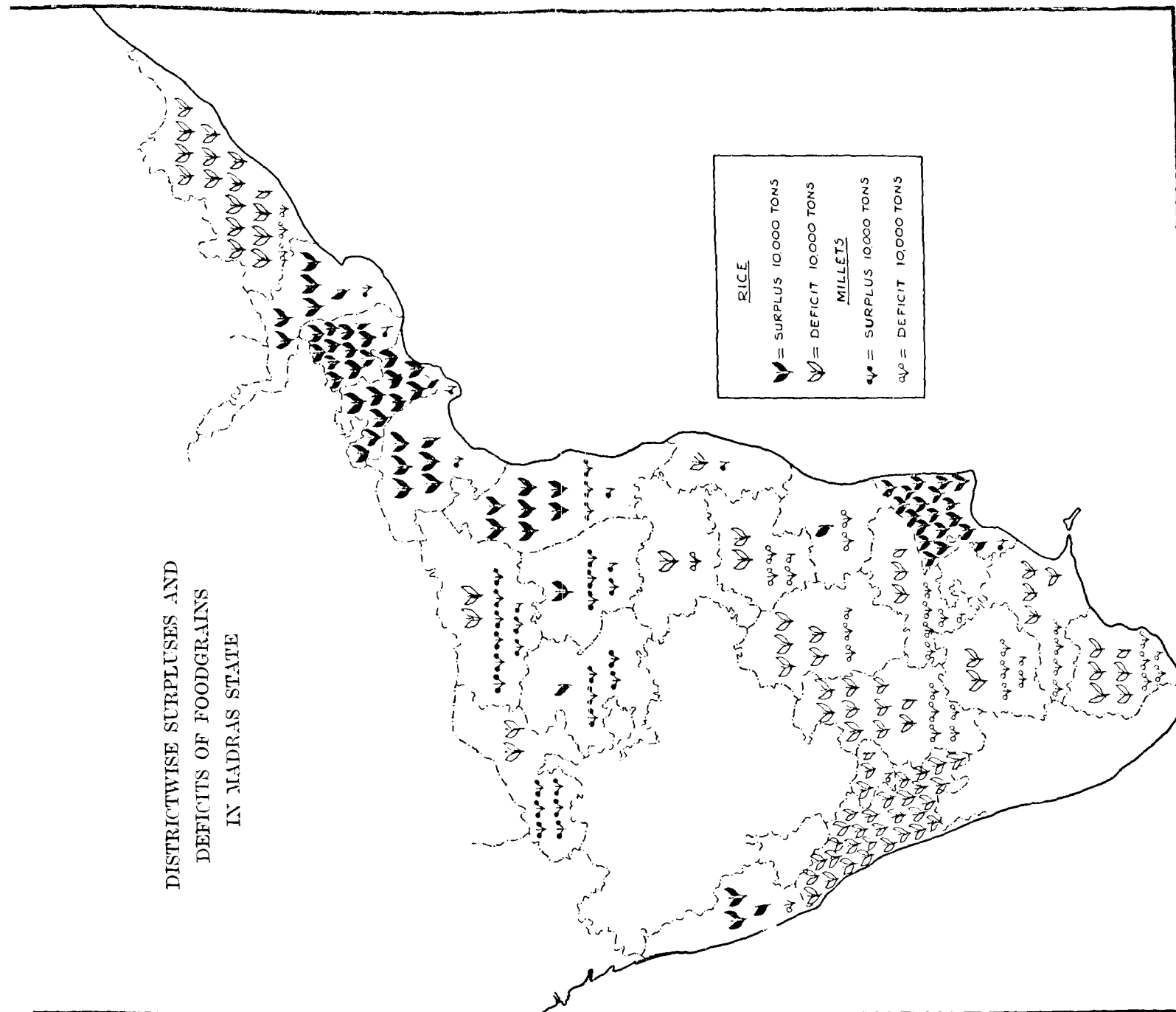
To face p. 9.

in to check exports and that marked the genesis of food control. In June 1942, export of rice outside the State was prohibited except on a permit, and export for defence services requirements was regulated by a system of quotas. This had the desired effect. From 3.42 lakhs tons in 1941, export to places outside the State fell to 0.99 lakhs tons in 1942.

But neither the permit nor the quota systems tackled the question of prices. Stocks were getting depleted and prices were soaring. A Grain Prices Enquiry Committee was constituted early in 1942. It recommended that control of prices in the foodgrains trade was essential, if risks of dislocation and chaos were to be avoided. The wholesale dealers in foodgrains were to be licensed to prevent the entry of speculators into the market. In March of the same year, a Special Officer was appointed to watch and control price trends. Later, in June, the State Government enforced the Foodgrains Control Order, promulgated by the Government of India. This Order provided for the licensing of wholesale dealers in foodgrains and submission of monthly returns of stocks held. It also empowered Government to cancel the licences of such dealers as were guilty of hoarding or black-marketing of grains and violating its other provisions.

All-India Basic Plan

Meanwhile the Foodgrains Policy Committee of the Government of India formulated its proposals for meeting the food crisis. Each State furnished the Central Government with a statement of its food budget, showing estimates of production, consumption and deficit or surplus of all foodgrains. From these budgets, the Central Food Department evolved a co-ordinated Basic Plan for the country as a whole. This plan equated the requirements of a State to its average production plus average net imports in the five years ending 1941-42. The surplus or deficit of a State in any year was the difference between the production in that year and the



To face p. 15.

requirements as estimated by this formula and was to be the basis for allocation by Centre.

Provincial Basic Plan

Working on the same principles, the State Government in turn drew up a Provincial Basic Plan, which set down the requirements of the various districts. Districts producing more than their requirements were declared surplus and those producing less, deficit. On this plan, the State Government fixed quotas to be moved from surplus to deficit districts. A statement showing the normal output of rice and dry grains in each district with estimated requirements according to the five-year formula is given below :

Statement comparing the normal output of rice in each district with the estimated requirements according to the five-year formula.

(All figures are in thousands of tons, i.e., 000 being omitted.)

District.	Estimated requirements of rice for consumption and seed on the basis of five-year formula.	Normal output.	Surplus or deficit of the figure in Col. 3 as compared with those in Col. 2.
Visakhapatnam	425	272	— 153
East Godavari	295	359	+ 64
West Godavari	225	342	+ 117
Krishna	174	280	+ 106
Guntur	161	220	+ 59
Kurnool	46	34	— 12
Bellary	34	15	— 19
Anantapur	64	62	— 2
Cuddapah	53	59	+ 6
Nellore	104	175	+ 71
Madras	117	..	— 117
Chingleput	258	251	— 7
South Arcot	260	262	+ 2
Chittoor	123	113	— 10
North Arcot	270	250	— 20
Salem	162	115	— 47
Coimbatore	147	53	— 94
Tiruchirappalli	166	176	+ 10
Tanjore	401	587	+ 186
Madurai	202	185	— 17

District.	Estimated requirements of rice for consumption and seed on the basis of five-year formula.	Normal output.	Surplus or deficit of the figure in Col. 3 as compared with those in Col. 2.
Ramanathapuram	174	143	— 31
Tirunelveli	224	172	— 52
Malabar	614	317	— 297
South Kanara	236	260	+ 24
The Nilgiris	27	3	— 24
State	4,962	4,705	— 257

Statement comparing the normal output of all dry grains (in terms of cleaned grains) with the estimated requirements according to the five-year formula.

(All figures are in thousands of tons, i.e., 000 being omitted.)

District.	Estimated requirements of dry grains for consumption.	Normal output.	Surplus or deficit.
Visakhapatnam	179	152	— 27
East Godavari	39	47	+ 8
West Godavari	14	17	+ 3
Krishna	64	66	+ 2
Guntur	203	210	+ 7
Kurnool	137	225	+ 88
Bellary	132	194	+ 62
Anantapur	122	173	+ 51
Cuddapah	114	160	+ 46
Nellore	155	189	+ 34
Madras	6	..	— 6
Chingleput	37	40	+ 3
South Arcot	148	126	— 22
Chittoor	135	126	— 9
North Arcot	141	108	— 33
Salem	297	269	— 28
Coimbatore	298	254	— 44
Tiruchirappalli	184	165	— 19
Tanjore	12	18	+ 6
Madurai	186	143	— 43
Ramanathapuram	136	100	— 36
Tirunelveli	128	84	— 44
Malabar	7	6	— 1
South Kanara	9	2	— 7
The Nilgiris	7	3	— 4
State	2,890	2,877	— 13

It will be seen that the districts of Tanjore and Tiruchirappalli in the South, and East Godavari, West Godavari, Krishna, Guntur and Nellore in the North are the main surplus areas for rice, the normal surpluses according to the five-year formula being 198,000 tons and 417,000 tons in the southern and northern regions respectively. The districts, heavily deficit in rice and millets are Malabar, Visakhapatnam, Coimbatore, Tirunelveli and Ramanathapuram. Within the State the movement of rice as well as millets is almost in the same direction—from the deltaic regions which are surplus in both rice and millets to the central, southern and western parts of the State which are generally deficit. This one way traffic, as it were, raises frequently certain difficult problems of transport.

Failure of Basic Plan—Growth of Controls

The formulation of an All-India Basic Plan and its counterpart at the provincial level with the division of the State into surplus and deficit districts inevitably brought with it the need for Governmental procurement and Governmental control over movement of foodgrains to regulate inter-district demand and supply. In the second quarter of 1943, the food position in Bengal seriously deteriorated. The sweeping advance of Japan also undermined the sense of general security. The surplus States did not release the quotas expected of them. The original Basic Plan failed. All these reacted on the food economy of Madras. In May 1943, Government issued the Foodgrain (Movement) Control Order. It prohibited the export of foodgrains outside the State and imposed a ban on inter-district movements, except on a permit. The failure of the Basic Plan precipitated a food crisis in Travancore and Cochin and an appeal came to the Government of Madras to go to their rescue. Within the State, the Ceded districts and Visakhapatnam were becoming dangerous spots with daily dwindling supplies. The Revised Basic Plan of the Government of India announced in July 1943 drastically reduced

the quotas to Madras. The State was practically thrown on its own resources. A more effective method of garnering supplies had therefore to be devised.

Automatic requisitioning

The scheme of "automatic requisitioning" was introduced in November 1943. By this, requisitioning could be ordered to the extent of 25 per cent of the melvaram or landlord's share of the long crop and 50 per cent of the short crop; holdings below 5 acres were exempted. For effective procurement, the purchase officers had to resort to requisitioning particularly in the lean months. Whenever supply position rendered it necessary, the grain purchase officers served requisitioning notices on millers or cultivators requiring them to deliver the rice or paddy. If the delivery of foodgrains did not take place on or before the prescribed date, the parties concerned were served with an acquisition order and officers proceeded to acquire the grains on Government account. Thus gradually as the food situation began to deteriorate, the grain purchase system, originally based on voluntary purchase, became compulsory in character, with its twin instruments of requisitioning and acquisition.

Procurement

The voluntary response to this scheme of procurement showed wide inter-district variations, even as there were wide inter-state variations in the matter. In 1942-43, the percentage of foodgrains requisitioned to total procurement in Tanjore was 10, against 15 in East Godavari and 17 in Guntur; in 1943-44 it was 17 per cent in Tanjore, 10 per cent in East Godavari and 15 per cent in Guntur; and in 1944-45, it was 5 per cent in Tanjore, 2 per cent in East Godavari, 6 per cent in Krishna and 33 per cent in Guntur and 20 per cent in Nellore. Acquisition was resorted to in East Godavari and Guntur districts in 1942-43 and the proportion obtained to total procurement was 1 per cent and 6.5 per cent respectively.

Whether this inter-regional variations in response are the results of certain administrative factors or of deeper sociological and economic forces, it is not proposed to examine here; but the fact was, it was continuously there and has been a vexed problem all along in the Madras Food Administration.

Looked at from the quantitative aspect, this Requisition and Acquisition phase of procurement has been a progressive success. In equating the inter-district surpluses and deficits, it has during the three years it was in force, been handling on an average foodgrains increasing from one-tenth to one-seventh of the State's output as will be shown below:

Quantity of foodgrains procured in the State from 1942-43 to 1944-45 (tons).

Year.	Total output minus requirements for seeds.	Rice output less seeds.	Quantity procured.			Per cent of (6) to (2).	Per cent procured to total output of rice.
			Rice.	Millets.	Total.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	in 000.	in 000.					
1942-43	6,954	4,414	721,164	..	721,164	10.37	16.33
1943-44	7,373	4,732	841,419	..	841,419	11.41	17.77
1944-45	7,478	4,854	1,025,216	27,472	1,052,688	14.08	21.12

Price Control

Procurement was closely intertwined with regulation of prices as well as of consumption. The end of procurement being equitable distribution of scarce supplies, prices had to be regulated by controls and consumption by rationing. The powers of requisitioning and acquisition were accordingly exercised to control prices from soaring to unreasonable heights on account of speculative buying and hoarding. Foodgrain prices in this State have been registering a gentle rise since the outbreak of war in Europe until June 1942. In the next twelve months hoarding and speculative buying became rampant and prices rose sharply. The price of second sort rice (Kumbakonam) rose from Rs. 5.42 per imperial maund in May 1942 to Rs. 7.31 in May 1943, or by 35 per cent. The

price of cholam (Bellary) recorded a steeper rise from Rs. 2.91 to Rs. 8.95 per imperial maund or by 208 per cent.

From the beginning, Government controlled the prices by fixing ceilings in surplus districts. In the surplus districts, prices of paddy and rice were fixed with reference to pre-war prices, allowing a margin for the increase in the cost of cultivation and cost of living of the agriculturists. In the deficit districts prices are fixed mainly on considerations of maintaining a parity with prices in the surplus districts which feed the deficit districts concerned.

Government however recognized the need to allow for the normal seasonal fluctuations in prices. In other words the ceiling had to be sloping rather than flat. Accordingly they devised a schedule for paddy prices which, starting with rates slightly less than ceiling at the time the main crop commenced flowing into the market, gradually rose in an upward curve touching the ceiling on the eve of the next crop. The evolution of such a flexible price system within the ambit of a control was a distinct feature of Madras System of Food Administration. This sloping price ceiling was however replaced by a flat price ceiling throughout the season when the popular Ministry assumed office, as the Ministry felt that the former worked against the interests of smaller landholders, who, having no capacity to hold out, had to sell their stocks immediately after harvest.

Quality Control

With price control also came quality control. What with procurement, acquisitioning, requisitioning and price ceilings, the foodgrains exported from surplus districts to deficit areas tended to deteriorate in quality. To prevent this, Government fixed standard specifications and ceiling prices were paid only to rice answering to such specifications. A separate inspectorate was formed to test the bran contents and quality of rice. On rice of inferior quality, a proportionate cut in price was made.

Rationing Urban

Thus, procurement, originally instituted to purchase foodgrains for export to deficit regions outside the State, was later expanded for equating inter-district surpluses and deficits within the State and to regulate prices. But it was no complete solution to a rational distribution of supplies as long as the core of the problem was short supply. With a chronic deficit of 5.74 per cent* in output and with a steady growth in population of 1.1 per cent per annum, the simple solution would have been an equal division of the cake—a proportionate cut on the consumption of the entire population. But that is the solution of equality and not equity. In a State having more than 70 per cent of the population directly or indirectly associated with agriculture, any attempt to reduce their food requirements, it was considered, would immediately react on their incentive to produce. The rural population engaged in agriculture and allied occupations was therefore to be allowed their pre-war rate of consumption undiminished. But urban rationing could come; and it came first in the city of Madras and later in 84 municipal towns in the State and in a period of ten months, by July 1944, it was complete.

* Statement showing the output, imports and consumption of foodgrains in the Madras State during the six years ending 1938-39 (tons.)

Year.	Production less seeds (all foodgrains.)	Imports (nett).	Consumption.	Percentage of imports to consumption.
1933-34	8,267,000	352,486	8,619,486	4.09
1934-35	8,689,000	558,026	9,247,026	6.03
1935-36	7,730,000	639,834	8,369,834	7.64
1936-37	7,723,000	397,625	8,120,625	4.90
1937-38	7,253,000	405,950	7,658,950	5.30
1938-39	6,611,000	461,545	7,072,545	6.53
Average	7,712,000	469,244	8,181,411	5.74

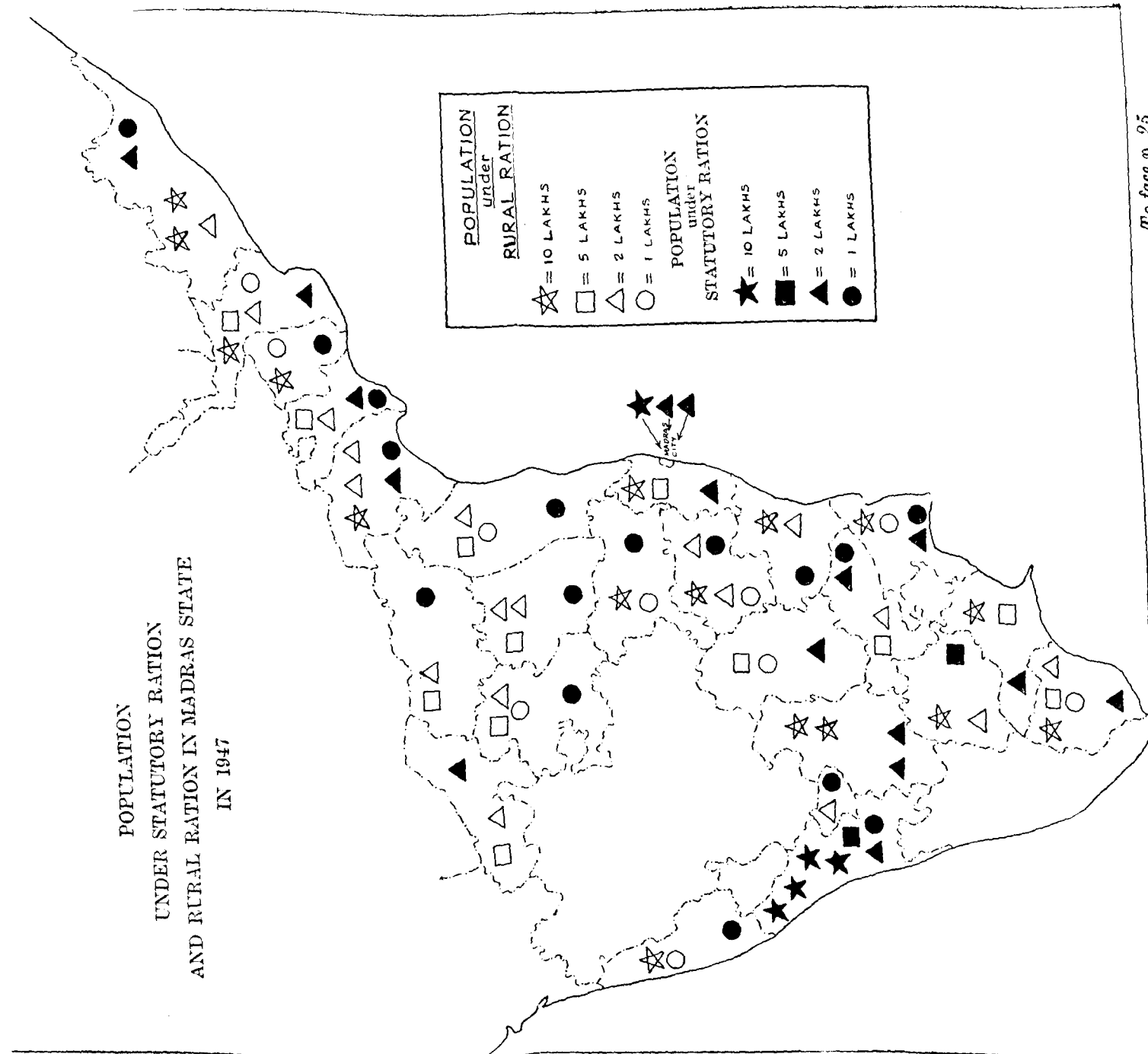
Fig. 3. RICE—TARGET AND QUANTITY PROCURED



This rationing in urban areas was but the beginning; soon conditions in deficit districts invited its extension even to rural areas. Even within the deficit districts, the propensity to hoard was seen to be higher in the surplus taluks and Government met the situation by launching in August 1943 a vigorous anti-hoarding drive to bring out stocks of rice and millets. But more serious was the position when allotments from surplus States under the Basic Plan failed to arrive, causing a great deal of general anxiety. The automatic requisitioning introduced earlier had proved but a partial success. Even the millets levy scheme, adopted early in 1944, according to which every holder, occupier, tenant, sub-tenant or lessee, who cultivated not less than 10 acres of dry or wet land with millets was required to contribute at the rate of one maund per acre, had failed to garner a sizable part of the surplus. In the districts of Bellary, Anantapur, Kurnool, Cuddapah, Salem, Coimbatore, Madurai, Ramana-thapuram, Tiruchirappalli and Tirunelveli where millets are produced and consumed in considerable quantities, the scheme aimed at securing control over the entire marketable surplus rather than what could be collected by a compulsory levy. Actually, however, between April and November 1944 the quantity that could be garnered was only of the order of 12,000 tons against a target of 100,000 tons.

Rationing Rural and Intensive Procurement

Events, however, were heading towards an extension of the rationing to rural areas, and simultaneous intensification of procuring arrangements. Just before the gathering of the main harvest (south-west monsoon) in October and November 1944, the food situation in Malabar became grave. The off-take of Malabar was at its maximum in the preceding three months of July, August and September. In these months procurement fell far below schedule in the surplus districts. Acute distress prevailed and to avert a possible crisis Government decided upon extending statutory rationing coupled



with intensive procurement to the rural areas in Malabar. The Madras Foodgrains Procurement Order which gave the necessary sanction for intensive procurement had already been promulgated in August. The entire produce of any crop of paddy, ragi, cholam, cumbu, samai, varagu and korra came under the control of Government. The producer was allowed to retain with him only so much quantity of grain as was required for his domestic consumption, seed, payment of rent, interest, wages in kind to village artisans and cultivation expenses. This system of intensive procurement at first enforced in Malabar, was later extended to the other heavily deficit districts, namely, Visakhapatnam, Tirunelveli, Ramanathapuram, Coimbatore, the Nilgiris and also to South Kanara a fairly self-sufficient district. Non-statutory rationing, known as informal rationing or rural rationing, was also simultaneously introduced in these six districts.* The entire trade in foodgrains, whether carried on by authorized private merchants, millers or co-operative societies came under Government control. This smoothened the way for monopoly procurement of foodgrains by Government, a measure even more comprehensive and thorough-going than any of the previous measures, as all the surpluses were determined at harvest time and arrangements were made for deliveries either immediately or at a later date. In Malabar, it was even more stringent, as it allowed the cultivator grains for domestic consumption and seed only and nothing for rents in kind, etc.

* The difference between statutory rationing enforced in Malabar and informal rationing introduced in the other heavily deficit districts was technical rather than real. Under the former, changes in the scale and composition of ration should be made only by Government, while under the latter could be done by Collectors. However, in practice, the Collector of Malabar was compelled by circumstances to change the ration and then get *ex-post facto* approval of Government, while the discretion of Collectors of the deficit districts to change the ration without the knowledge of Government came to be increasingly circumscribed. The former system required more registers and staff than the latter.

Food and Agriculture in Madras State

From the point of view of sheer quantity procured in 1944-45 the system was very much of a success as may be seen from the table below :—

Intensive procurement in Kharif year 1944-45 in seven districts including Malabar (tons).

Name of district.	Estimated output less seeds.		Quantity procured.		Percentage of procurement to output.	
	Rice.	Millets.	Rice.	Millets.	Rice.	Millets.
Malabar	284,600	6,320	56,896	613	19.99	9.70
Visakhapatnam ..	238,600	132,100	29,060	3,283	12.18	2.49
Coimbatore	67,790	260,770	16,207	15,866	23.91	5.95
Ramanathapuram ..	205,400	94,910	34,647	2,539	16.87	2.68
South Kanara	230,600	2,490	49,845	6	21.62	0.24
Tirunelveli	176,700	89,880	41,381	3,837	23.70	4.27
The Nilgiris	3,490	2,770	420	682	12.03	24.53
Total	1,207,180	595,250	228,956	28,826	18.97	4.51

A Critical Year, 1945-46

In the subsequent year, however, things changed; 1945-46 experienced extremely adverse seasonal conditions. The south-west monsoon was not only late but also insufficient, being 6 per cent below normal. A severe cyclone destroyed the ripening crops in the Godavari delta in the early stages of the north-east monsoon. The districts in the south and centre received but scanty rainfall, and water in the Mettur Reservoir touched a low level. The total rice output was estimated at 4,241,000 tons and millets 2,127,000 tons and on the basis of the five-year formula there was a deficit of 721,000 tons of rice and 763,000 tons of millets.

This huge deficit rendered the utmost conservation and efficient distribution of the available supplies a vital necessity. The system of intensive procurement with its counterpart of informal rationing was therefore extended to all the districts of the State within a short period of six weeks. The administrative machinery was adequately strengthened and further steps were taken to render the intensive procurement system more efficient. A rational method was evolved for fixing procurement targets in advance. A comprehensive census of production and requirements of foodgrains of all

Food and Agriculture in Madras State

agricultural families with reference to their holdings was conducted and the excess over requirements was completely procured. This improved matters. While the amount of foodgrains—rice and millets—procured in 1945-46 was about 14.3 lakhs tons, it reached the figure of 16.22 lakhs tons in 1946-47.

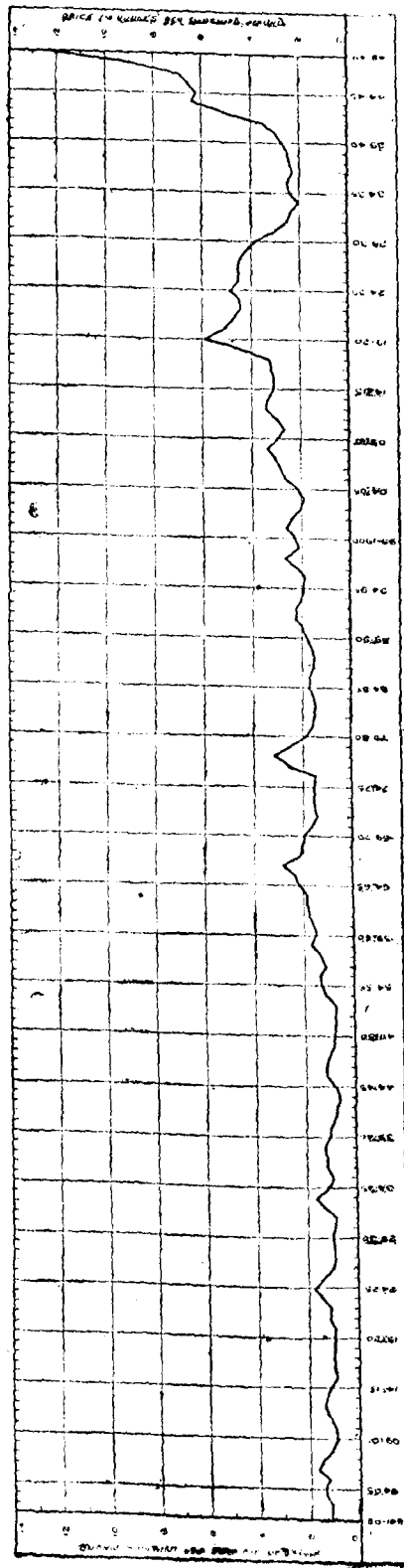
State-wide Rationing

By the middle of 1946, the entire population of the State—urban as well as rural—was put on ration of some form or other. By way of implementing the policy of the Government of India, the Madras Government reduced by stages the scale of rations in all rationing areas—urban and rural—from 1 lb. per adult per day to 12 ounces from 17th February 1946; then the rice content was reduced to 10 ounces from 2nd June and finally to 8 ounces from 4th August 1946. Other foodgrains like wheat, wheat flour, millets and later barley were also declared rationed articles. Despite the cut in rations, deficit in 1945-46 continued to be heavy and over 6 lakhs tons had to be imported.

	Production. TONS.	Consumption. TONS.	Deficit. TONS.
Rice	4,041,000	4,533,000	492,000
Millets	2,077,000	2,206,000	129,000
Total	6,118,000	6,739,000	621,000

This deficit was partly met by import of 268,612 tons of rice,—132,278 tons from overseas and the rest from other parts of the country—and 223,721 tons of wheat and 129,000 tons of millets. Certain changes in dietetic habits had also to be resorted to. The normal consumption of wheat and wheat flour in the State had been only about 5,000 tons and 2,500 tons a month. But the abnormal conditions of that year forced people to consume this and other unfamiliar grains to a much larger extent. Prices of unfamiliar grains were subsidized and considerable propaganda was done to change the dietetic tastes of the people. These

Fig. 5.—TREND OF PRICE OF RICE IN MADRAS STATE FROM 1801-02 TO 1948-49



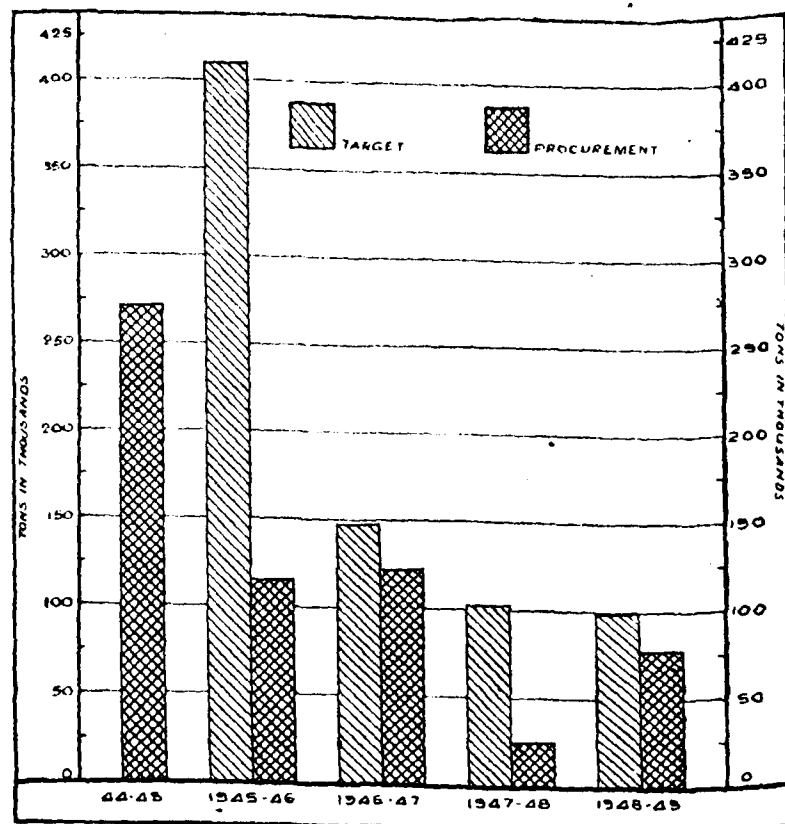
districts. The Government of India, pressed to increase their quota for this State, allotted and supplied 500,000 tons of foodgrains.

Despite all these measures taken to ensure a smooth transition from a controlled to free economy in the food sector, the deficit regions were faced with a grim shortage. Prices of foodgrains began to soar. In the derationed areas prices sharply rose : by 260 per cent at Arni within seven months, by 215 per cent at Erode within six months, by 254 per cent at Rasipur and 243 per cent at Perundurai within four months (vide Appendix XXII). To bring down the prices, relief shops were opened in the deficit areas, but they failed to check the upsurge, although without these shops things might have been worse. The number of shops opened in the various districts rose from 1,433 in March 1948 to a peak of 11,701 in August 1948 from which month it gradually declined to 9,329 in December 1948 and finally fell to 2,478 in January 1949. In August 1948, 1,086 relief shops were working in Visakhapatnam district, 982 in South Arcot district and 886 in North Arcot district and 843 in Tirunelveli district. The number of relief shops in the districts in the months from March 1948 to January 1949 is shown in the statement below. The overall ration was reduced from 10 ounces to 8 ounces in areas where rationing was still in force and from 8 ounces to 6 ounces in the derationed areas served through relief shops ; the latter reduction was however withdrawn soon after and the ration was raised to 8 ounces.

Number of relief shops opened in Madras State.

Name of district.	March 1948.	April 1948.	May 1948.	June 1948.	July 1948.
Anantapur ..	53	63	94	218	348
North Arcot ..	32	65	290	543	815
South Arcot ..	55	54	350	543	765
Bellary ..	24	25	55	294	592
Chingleput ..	87	106	310	601	724
Chittoor ..	66	74	259	433	613
Coimbatore ..	52	99	164	412	563
Cuddapah ..	76	274	269	256	359

Fig. 4. MILLETS—TARGET AND QUANTITY PROCURED



Food and Agriculture in Madras State

Name of district.	March 1948.	April 1948.	May 1948.	June 1948.	July 1948.
East Godavari ..	..	..	..	..	..
West Godavari ..	..	..	..	..	..
Guntur ..	..	..	..	..	..
Krishna ..	..	..	..	..	..
Kurnool ..	..	..	18	205	452
Madurai ..	87	87	330	480	568
Nellore ..	..	..	..	434	715
Ramanathapuram.	320	427	533	562	580
Salem ..	1	2	47	199	448
South Kanara ..	148	209	488	513	583
Tanjore ..	15	25	31	..	..
Tirunelveli ..	413	526	638	793	835
Tiruchirappalli ..	..	30	76	247	437
Visakhapatnam ..	4	4	89	796	957
Pudukkottai ..	..	..	..	..	..
Total ..	1,433	2,095	4,041	7,529	10,455

Name of district.	August 1948.	September 1948.	October 1948.	November 1948.	December 1948.	January 1949.
Anantapur ..	402	387	353	350	318	..
North Arcot ..	886	878	720	717	741	135
South Arcot ..	982	937	917	917	838	..
Bellary ..	746	654	598	594	559	..
Chingleput ..	766	740	699	704	706	..
Chittoor ..	684	630	614	612	612	582
Coimbatore ..	580	529	450	417	524	57
Cuddapah ..	399	298	291	291	274	..
East Godavari ..	..	..	..	..	..	..
West Godavari ..	..	..	..	..	..	..
Guntur ..	..	14	14	14	14	14
Krishna ..	..	..	..	..	..	..
Kurnool ..	469	415	414	414	383	..
Madurai ..	612	607	556	553	553	420
Nellore ..	745	592	561	564	566	567
Ramanathapuram.	749	741	702	705	705	80
Salem ..	474	401	320	330	330	..
South Kanara ..	604	470	295	289	222	..
Tanjore ..	..	..	..	..	..	..
Tirunelveli ..	843	702	679	592	598	..
Tiruchirappalli ..	674	469	549	553	539	444
Visakhapatnam ..	1,086	1,130	861	853	847	179
Pudukkottai ..	..	172	..	..	..	..
Total ..	11,701	10,765	9,493	9,469	9,329	2,478

Food and Agriculture in Madras State

Recontrol

Decontrol turned out to be a brief interlude. An inflationary wave swept the country and reimposition of control was deemed inevitable. At the Conference of Provincial Food Ministers held in August 1948, a decision was taken to reintroduce food controls. Intensive procurement of rice and millets throughout the State was reintroduced by the end of November 1948.

At the time the Government of India announced the reimposition of controls on foodgrains, there was practically no rationing in the whole State except in the City of Madras and the heavily deficit districts of Malabar and the Nilgiris. But by January 1949, statutory rationing was reintroduced in thirty towns in eleven districts and informal rationing in sixteen districts. Even in the upland taluks of the districts of East Godavari, West Godavari, Krishna, Guntur and Nellore—deficit pockets in surplus areas—informal rationing was introduced by the middle of January 1949. The only district that has no rationing—statutory or informal—is Tanjore, the “Granary of the South” with a population of 2,734,000 or about 5 per cent of the State.

Statutory rationing was enforced in urban areas covered by 73 municipalities and towns; to the last of them it was extended in August 1949. The population under statutory rationing had now reached the all-time high of 5,942,331 or 10.9 per cent of the State population of whom 4,476,831 are adults, 1,428,242 children and 37,258 heavy manual labourers.* The urban population under informal rationing is 35,571,187 or 65.26 per cent of the total State population. The rest of the population, about 12,993,482 or 23.84 per cent is composed of self-sufficient or surplus producers who do not depend on Government ration shops. Of the population under informal

* The ration for children is defined as one unit, for adult 2 units and for heavy manual labourers 3 units. This does not include more than four millions of rural population in Malabar which is under statutory rationing.

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together with the pinch caused by the progressive cut in the rice rations resulted in an increased consumption of wheat and wheat products of nearly 34,144 tons a month.

Statement showing the imports of wheat into Madras State between 1942-43 and 1947-48.

Year.	Imports (in tons).	Year.	Imports (in tons).
1942-43	27,970	1945-46	223,721
1943-44	39,768	1946-47	64,756
1944-45	101,834	1947-48	48,403

Yet another method tried was to augment the recovery of rice in milling. First by prohibition of double polishing and later of even single polishing of rice, Government sought to increase the rice supplies by 5 per cent quantitatively and the nutritive content appreciably. The De-husking Order, which prohibited even single polishing was however withdrawn later.

In spite of an austerity ration, increased imports and attempts at familiarization of unfamiliar grains, the food position continued to cause anxiety. Large stocks went underground and procurement was visibly hindered by the anti-social activity of middlemen. In June 1946, Government tried to eliminate them in some parts of the State by entrusting procurement and distribution to co-operative organizations. Producer-*cum*-consumer co-operative societies were organized. Those established in Malabar were comparatively successful, but in the Northern Circars, they failed to maintain the usual level of procurement. The producers themselves began to hoard. Unearthing of these hoards became the major concern of Government. Bonuses were offered for prompt deliveries of foodgrains and an additional bonus for deliveries ahead of the time-limit. The response was immediate and large stocks came out. Even then, a price-stimulus was needed, as prices of other commodities ordinarily consumed by the agriculturist had been rising. But the Central Government apprehending a spiral

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effect was opposed to any upward revision of price of rice; the only relief to rice grower was the De-husking Order which had secured an addition to the weight of rice.

Decontrol

Although the next year, 1946-47, enjoyed better seasonal conditions, the entire apparatus of price control, procurement, and rationing was continued in tact. But then came the Second Foodgrains Policy Committee, constituted by the Government of India, with its recommendations for decontrol and restoration of free market conditions. Under the direction of the Government of India, this Government abolished statutory urban rationing, informal rural rationing and intensive procurement in the deficit districts with effect from December 1947, leaving, however, the system of intensive procurement in the surplus districts untouched, lest there should be any sudden dislocation of supplies to deficit districts. Rationing too was continued in the city of Madras and in the heavily deficit districts of Malabar and the Nilgiris. With a view to meeting the demands of highly deficit pockets in the deficit districts, procurement of surplus foodgrains was effected under a new system known as the "Levy Scheme" by which Collectors were to procure from bigger ryots at an easy scale of levy, leaving with them grains adequate for consumption and other needs. Only where the bigger ryots turned out refractory, compulsory procurement was restored to.

Runaway Prices, Relief Shops and Reduction of Ration

Decontrol in this State unfortunately began under highly unfavourable auspices. The north-east monsoon of 1947-48 was a dismal failure in the Carnatic, the Central and Southern districts. The production of foodgrains for the State was estimated to be nearly 1.4 million tons short of normal requirements. The fairly normal paddy crop in the Circars was the only silver lining and procurement there had to be intensified to maintain an uninterrupted flow of supplies to deficit

rationing 21,792,040 or 39.98 per cent draw ration from Government ration shops throughout the year and the rest, if homegrown food stocks are run out. Taking them all, the total population served partially or fully through the year by statutory and informal rationing is 41.514 millions, or 76.16 per cent of the estimated population of 54.407 millions (1949-50). The total requirements to meet the rationing commitments even at the scale of 8 oz. of rice and 4 oz. of other foodgrains are of the order of 21 lakhs tons made up of 18 lakhs tons of rice and 3 lakhs tons of millets.

Seasonal Catastrophes

The year 1949-50 was marked by two unprecedented calamities. One was the cyclone that played havoc with the crops, men and property in the northern districts of the State in the month of October 1949. The other was the complete failure of the north-east monsoon which decimated the yield of foodgrains in the southern districts and produced widespread famine conditions. Consequently the estimated production of rice in this year was 38.11 lakhs tons against a normal production of 48.67 lakhs tons and that of millets 23.14 lakhs against a normal production of 26.51 lakhs tons. The combined total of rice and millets was estimated at 61.25 lakhs or 13.93 lakhs tons less than the normal production. In spite of this precipitous fall in production, procurement target was fixed at 12 lakhs tons of rice and one lakh tons of millets; even so there was a gap of 8 lakhs tons to meet fully the rationing commitments of 21 lakhs tons. Government of India had allotted 5½ lakhs tons of foodgrains, but the State Government had been pressing for an additional 2½ lakhs tons.

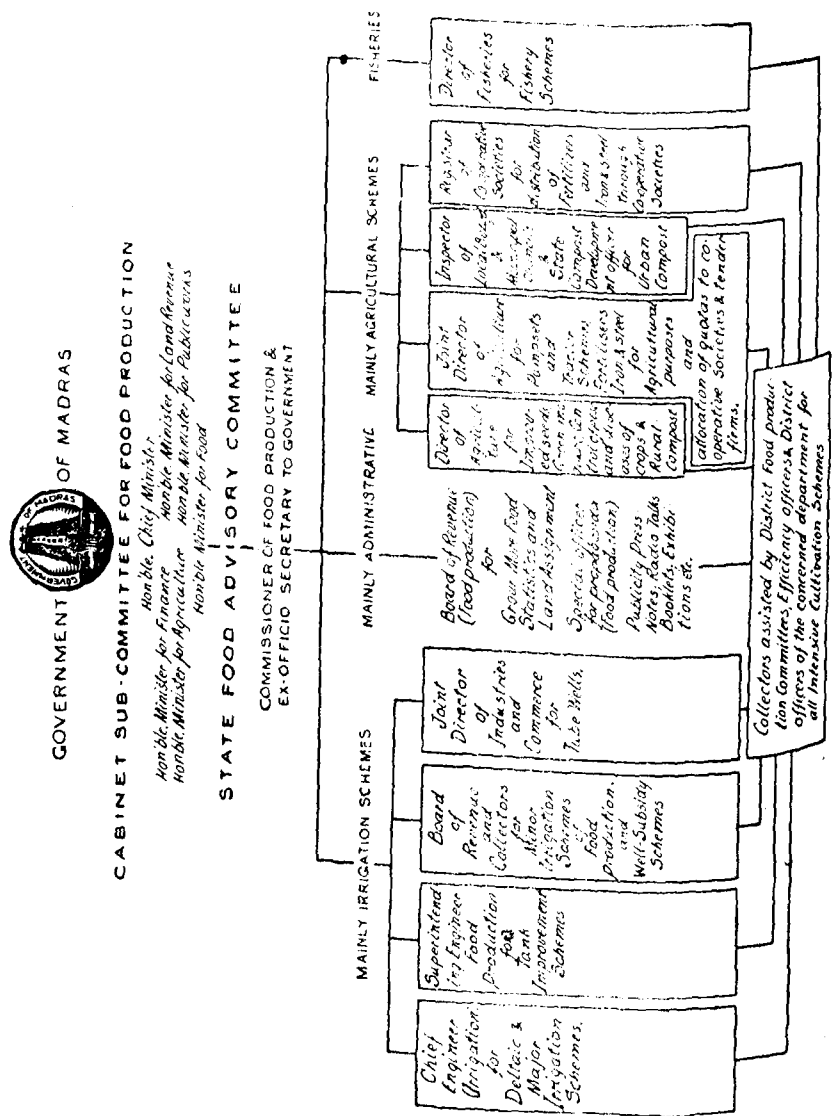
The Administrative Set-up

Early in 1942, there was only one part-time officer to watch and control the prices of foodgrains, but by 1946, the strength of the Food Administration was nearly 15,000, manning several branches like procurement, distribution, transport

and enforcement. Within five years, the newly created Department of Civil Supplies came to have an array of Supply and Ration Officers under a Commissioner, who is a Member of the Board of Revenue. A separate Food Secretariat was set up in June 1946 to which were transferred all subjects pertaining to the procurement and rationing of food, till then administered by the Development Secretariat. The maximum expansion of the Department of Civil Supplies was attained in 1946-47. In the short interlude of decontrol, the department shrank, but recontrol made it very nearly regain its former size, strength and composition.

The decision of Government of India to stop all imports of foodgrains by the end of 1951 has added spurs to the Grow More Food Campaign. The Emergency Food Plan drawn up to make each State self-sufficient in foodgrains by the target date envisaged a co-ordination of the activities of the different departments of Government engaged in stepping up food production, like Agriculture, Public Works and Revenue. To bring about this co-ordination, to regularly assess the progress of the schemes and to quicken the tempo of the campaign, the Commissioner of Civil Supplies was vested with powers over the entire Grow More Food Campaign in the State and was also designated as the Commissioner of Food Production and made ex-officio Secretary to Government. To assist him in the administration of the new functions Government sanctioned a special staff including technical personnel consisting of one Superintending Engineer and seven Executive Engineers. At the Secretariat level too, the Emergency Food Plan induced certain changes; the agricultural sections in the Development Department were transferred to the Food Department, now known as Food and Agriculture Secretariat. At the top a Cabinet Sub-Committee composed of the Chief Minister and the Ministers for Finance, Land Revenue, Agriculture, Public Works and Food has been constituted to help speedy sanction

FIG. 6 ADMINISTRATIVE SET-UP FOR FOOD PRODUCTION

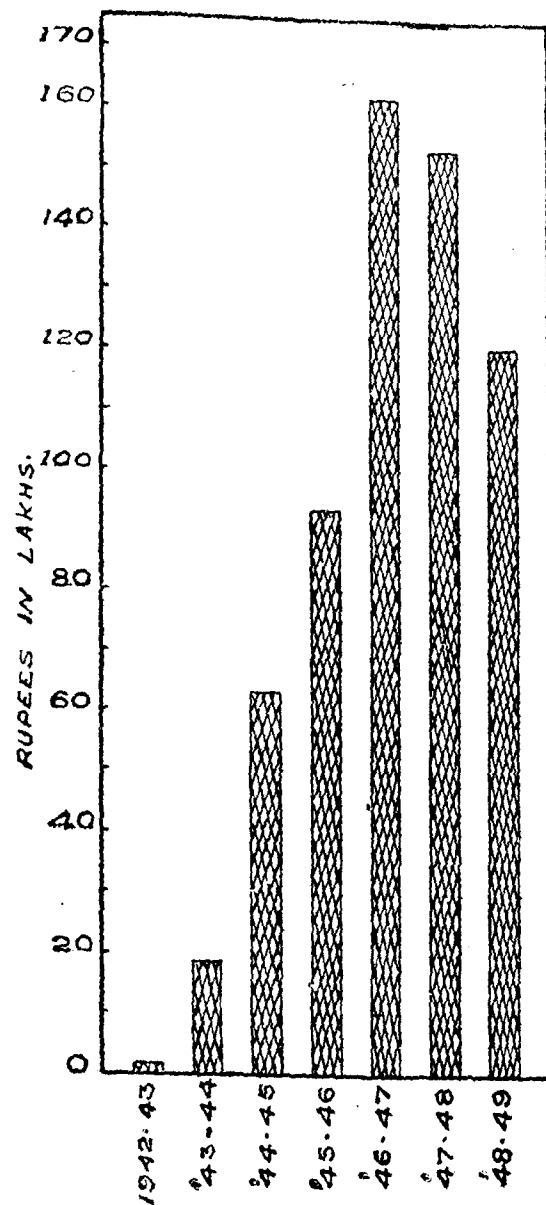


of Grow More Food Schemes, to fix targets of production of food crops in various regions of the State and to review the progress of work from time to time. The Commissioner of Food Production is the Secretary of this Cabinet Sub-Committee. The Grow More Food Schemes are submitted to the Cabinet Sub-Committee immediately after examination by the Administrative and Finance Departments. At district levels, District Food Production Committees have been set up to co-ordinate the work and watch the progress of the Grow More Food Schemes and to create enthusiasm among the public. A chart explaining the revised set-up created for the execution of Intensive Production Schemes is given in the opposite page.

Cost of Food Administration

The cost of Food Administration, which has steadily increased with the expansion of staff and extension of activities, may be grouped under three broad heads—Secretariat, Department of Civil Supplies and State Trading Activities. Expenses incurred on Food Administration at the Secretariat level could not be had separately prior to June 1946 as they had got mixed up with those of Development Secretariat; in 1947-48, they amounted to Rs. 2.09 lakhs and in 1950-51 according to the Budget Estimate will be Rs. 2,45,100. From Rs. 1.25 lakhs in 1942-43, expenditure on the Department of Civil Supplies has risen to the peak level of Rs. 118.2 lakhs in 1946-47, later declining to Rs. 91.51 lakhs in 1950-51 (Revised Estimate). The cost of the administrative personnel engaged in the State Trading Schemes has increased from Rs. 3.95 lakhs in 1943-44 to Rs. 44.39 lakhs in 1948-49. Internal audit charges rose to more than half-a lakh of rupees in 1947-48. The total expenditure on all administrative services has risen from Rs. 1.25 lakhs in 1942-43 to Rs. 118.70 lakhs in 1948-49 touching an all-time high of Rs. 161.80 lakhs in 1946-47. Statement of expenditure incurred annually on the four classes of administrative services is given below.

FIG. 7. FOOD ADMINISTRATION—COST OF ADMINISTRATIVE PERSONNEL



Cost of Administrative Personnel—Food administration.

Year.	Secretariat staff.	Establishment for Price Control—Board of Revenue (Civil Supplies).	Expenditure on Administrative Services engaged in State Trading Schemes.	Internal Audit Establishment.	Total.
	RS.	RS.	RS.	RS.	RS.
1942-43 ..	..	1,24,801	..	..	1,24,801
1943-44 ..	..	14,75,053	3,95,034	..	18,70,087
1944-45 ..	..	50,93,655	12,06,121	..	62,99,776
1945-46 ..	..	69,16,775	24,13,863	38,431	93,68,979
1946-47 ..	..	1,18,21,107	40,72,386	46,462	1,61,79,979
1946-47 ..	2,40,024	1,18,06,022	32,56,408	58,605	1,53,30,610
1947-48 ..	2,09,575	72,05,977	44,38,700	49,515	1,18,09,747
1948-49 ..	1,75,555	97,83,255	30,98,427	55,797	1,31,59,997
1949-50 ..	2,22,518	91,51,000	20,85,500	58,200	1,15,01,800
1950-51 (Revised Estimate).	2,67,100	..	..	..	..
Total ..	11,14,772	6,33,77,845	2,09,06,439	3,06,920	8,57,66,776

State Trading Schemes

Apart from restrictions and regulations, Government had to undertake positive measures like purchasing from internal or from external sources such articles of food as rice, wheat, millets, pulses, gingelly seeds, groundnut, dehydrated potatoes, sweet potatoes, sugar and jaggery. These activities are known as State Trading Schemes. The working capital required for these purchases rose from Rs. 8.22 crores in 1943-44 to Rs. 28.73 crores in 1946-47; after dropping in the next year to Rs. 24.05 crores, it rose to Rs. 30.73 crores in 1949-50. In a period of eight years the total turnover was of the order of Rs. 167.39 crores for purchases and the amount spent on distribution and storage was of the order of Rs. 2 crores. The amount spent on these transactions was recovered, though not fully, by sales.

Purchase and storage expenditure of State Trading Schemes.

Year.	Amount spent on purchase.	Amount spent on distribution and storage.	Total.
	RS.	RS.	RS.
1943-44	8,22,97,072	3,95,034	8,26,92,106
1944-45	12,86,61,636	12,06,121	12,98,67,757
1945-46	11,34,18,042	24,13,863	11,58,31,905
1946-47	28,73,55,645	40,72,386	29,14,28,031
1947-48	24,05,76,303	32,56,408	24,38,32,711
1948-49	28,52,91,673	30,53,444	28,83,45,117
1949-50	30,73,16,512	32,70,400	31,05,86,912
1950-51	22,89,81,311	23,81,500	23,13,62,811
Total	1,67,38,98,194	2,00,49,156	1,69,39,47,350

The primary objective of State Trading Schemes being equitable distribution at prices within the reach of the lower income brackets, Government have been subsidizing the sales of foodgrains and certain other food articles. The subsidy takes the shape of making good the losses incurred by the State Trading Schemes in selling goods and grains at less than cost price.* On this score, Government has spent Rs. 18.40 crores in a period of six years or about Rs. 3.05 crores per annum as the following statement will show :

* The Government of India have however undertaken to bear a share of the cost of food procurement from 1st January 1948 by paying a bonus of eight annas per maund of foodgrains procured by the State Government and by a subsidy on imported foodgrains. This subsidy was two-thirds of the cost from 1st January 1948 to 30th September 1948, but it has been raised to three-fourths from 1st October 1948. Government of Madras is expected to get nearly Rs. 6.71 crores for the calendar year 1948 as shown below :

	RS.
Rice and paddy	3,35,41,555
Maize	2,17,89,202
Milo	1,17,73,221
Total	6,71,03,478

Net expenditure incurred by Madras Government on purchase and distribution of food.
(1943-44 to 1948-49)

Year.	State Revenue (Rs. in lakhs).	Cost of Food Administration (Rs. in lakhs).	Net expenditure on purchase and distribution of food met from State Revenues (Rs. in lakhs).	Total (Rs. in lakhs).	Percentage of expenditure on Food Administration to total Revenue.
1943-44 ..	29,84.20	18.70	1.40.64	1,59.34	5.34
1944-45 ..	41,23.73	62.99	4,53.34	5,16.33	12.52
1945-46 ..	47,98.89	93.69	- 1,38.09 *	- 44.40	..
1946-47 ..	56,99.53	1,61.80	12,00.60	13,62.49	23.90
1947-48 ..	59,71.10	1,53.31	23.90	1,77.21	3.49
1948-49 ..	53,33.57	1,18.70	1,59.86	2,78.56	5.22
Total ..	2,80,11.02	6,09.19	18,40.34	24,49.53	8.74

* In this year State Trading brought in net income.

The aggregate expenditure on Food Administration comprising the expenditure on the Services and State Trading Schemes was Rs. 24.50 crores in the six years ending 1948-49 or nearly Rs. 4.08 crores per annum. This amount has been spent directly out of Public Revenues of the State.

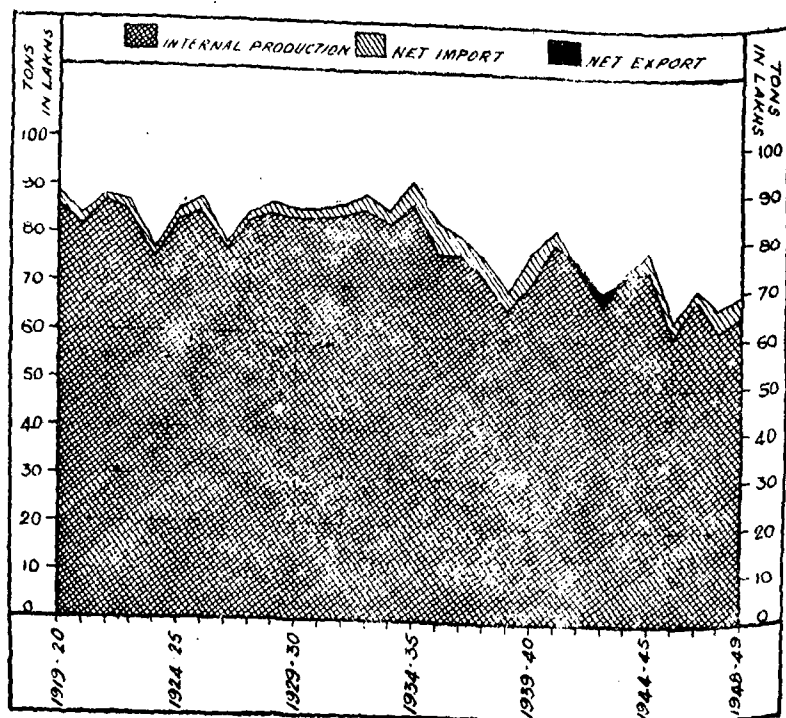
But the persistent food deficit of the State costs the State economy much more. The State has imported 2,518,000 tons of foodgrains in the seven years from 1943-44 to 1949-50 for which it has paid Rs. 119.54 crores.

Food imports into the State.

Year.	Quantity (in 000 tons).	Value in terms of import prices (Rs. in lakhs).
1943-44	143	460.5
1944-45	397	1,161.6
1945-46	302	883.7
1946-47	251	568.0
1947-48	487	3,007.7
1948-49	388	2,429.3
1949-50	550	3,443.6
Total	2,518	1,19,54.4

This amount paid in the first instant by Government has to come ultimately from the consumers. Had the State been self-sufficient in the matter of food, this great drain—on an average nearly Rs. 17.08 crores per year—would not have occurred and the saving to the State economy, though not capable of precise measurement, would have been immense indeed.

FIG. 8. OUTPUT, NET IMPORTS AND TOTAL FOOD-GRAINS AVAILABLE IN MADRAS STATE (1919-20 to 1948-49)



CHAPTER III

THE FOOD PRODUCTION DRIVE.

The food situation since 1941-42 has been complicated by unusually adverse seasonal conditions, loss of imports and natural increase in population. The rate of growth of population in this State has been 1.1 per cent per annum, which means an additional demand for about 75,000 tons of food-grains, every year. Production has been seriously affected by failure of monsoons, cyclones, etc., resulting in a progressive tightening of the belt. The total production of foodgrains declined from 7,984,000 tons in 1940-41 to 5,875,000 tons in 1949-50, one of the worst years on record :

Population, requirements and available supply of foodgrains 1938-39 to 1949-50.

Year.	Popula- tion in 000.	Produce- tion in 000 tons less seed.	Available.		Require- ments at 16 oz. in 000 tons.	Surplus (+) or deficit (-)	
			Imports in 000 tons.	Total in 000 tons.		without imports in 000 tons.	with imports in 000 tons.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1938-39 ..	48,237	6,611	402	7,073	6,610	+	463
1939-40 ..	48,823	7,215	612	7,827	6,683	+	1,144
1940-41 ..	49,342	7,984	276	8,260	6,754	+	1,506
1941-42 ..	48,890	7,591	— 68	7,523	6,823	+	700
1942-43 ..	50,444	6,954	— 207	6,747	6,905	+	158
1943-44 ..	51,004	7,373	143	7,516	6,982	+	534
1944-45 ..	51,570	7,478	397	7,875	7,059	+	816
1945-46 ..	52,142	6,113	302	6,420	7,137	—	717
1946-47 ..	52,721	6,861	251*	7,112	7,217	—	105
1947-48 ..	53,313	6,233	487*	6,720	7,298	—	578
1948-49 ..	53,846	6,470	383*	6,853	7,371	—	513
1949-50 ..	54,290	5,875	550†	6,425	7,431	—	1,006

* Imports for Kharif year furnished by the Food and Agriculture Department.

† Import allotment for 1949-50. Actual imports up to 19th August 1950 was only 294,464 tons.

The requirements of cereals for a balanced diet have been estimated variously. The Nutrition Advisory Committee of the Indian Research Fund Association puts it at 14 ounces a day for an adult and the Advisory Board of the Indian

Council of Agricultural Research at 18 ounces. Even if a mean of 16 ounces is taken, this State with its population of over 54.290 millions (calculated for 1950 from the census figures of 1941) will require 7.431 million tons of cereals.

Three Phases of Food Production

The battle for closing the gap, caused by declining production, loss of imports, growing population and higher food consumption, particularly among the lower income groups, took the shape of the now familiar Grow More Food Campaign. Launched by the Government of India in the summer of 1942, in the midst of the World War II, schemes in Madras came to be implemented from 1943. The campaign is now in its third phase. The first phase of five years from 1943-44 to 1947-48 stretched over the war and the post-war years when the tempo of the campaign had naturally to be slow due to the severe bottlenecks to production in that period. The second phase of one year 1948-49 was essentially a transitional phase. It was a prelude to the third phase when the Emergency Food Drive for the attainment of self-sufficiency in food gathered full momentum. An attempt is here made to assess separately the effects of the measures taken in the two phases and estimate the potentialities of those undertaken and contemplated in the third phase of Emergency Food Drive.

Objectives of the Grow More Food Campaign

The short-term objective of the campaign is to close the gap and accord a minimum of food supply to the population, while the long-term objective is to produce in adequate quantities of even protective foods to assure a balanced diet to the growing population.

The area of this State is about 80 million acres, of which about 30 million acres are already under food crops and the area under commercial crops has been hovering round 8 million acres. The area and production of the various crops—

food and non-food—are given in Appendices VII and VIII. The area under foodgrains, paddy and millets was 23.01 million acres or 0.4765 acre per head in 1938-39. It reached a peak of 24.129 million acres in 1943-44, but declined to 21.759 million acres or 0.40 acre per head in 1947-48. Foodgrains output has correspondingly fallen from 324.8 lb. per head in 1944-45 to 242.4 lb. per head in 1949-50. Over this period of twelve years, a slight decline in total and per capita area under foodgrains as well as in output per head has occurred as may be seen from the following table:—

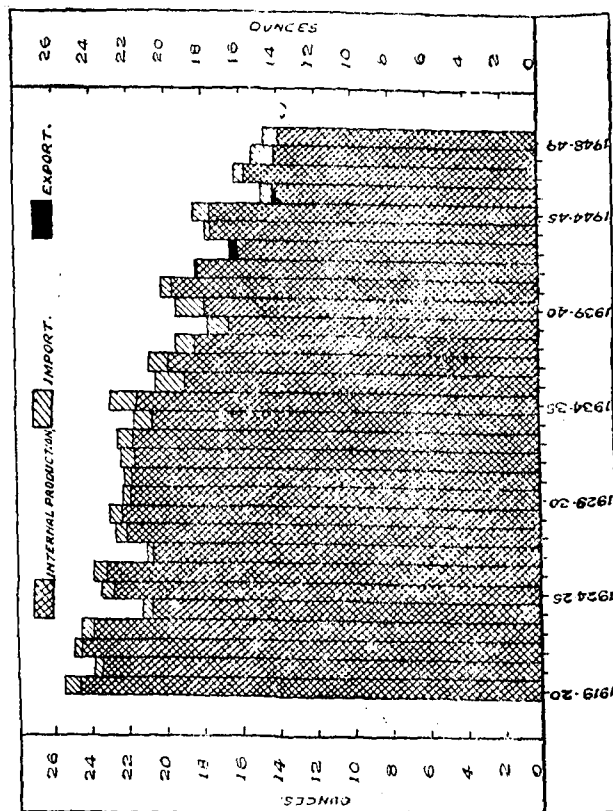
Area and output of foodgrains.

Year.	Population (000s).	Area under foodgrains.*		Output (clean grains).	
		Total (in 000 acres).	Per head (acres).	Total (in 000 acres).	Per head (lb.).
(1)	(2)	(3)	(4)	(5)	(6)
1938-39	48,287	23,010	0.4765	6,641	308.0
1939-40	48,823	23,010	0.4713	7,215	331.0
1940-41	49,342	23,343	0.4731	7,984	362.4
1941-42	49,890	23,058	0.4712	7,591	340.8
1942-43	50,444	23,477	0.4654	6,954	308.8
1943-44	51,004	24,129	0.4731	7,373	323.8
1944-45	51,570	23,304	0.4518	7,478	324.8
1945-46	52,142	21,834	0.4187	6,118	262.8
1946-47	52,721	22,087	0.4326	6,860	291.5
1947-48	53,313	31,759	0.4081	6,233	261.9
1948-49	53,846	22,805	0.4235	6,469	269.1
1949-50	54,290	22,607	0.4164	5,875	242.4

* Paddy and millets only.

The fall in area as well as output should be attributed to hazards of nature, particularly failure of monsoons. Although these data give a gloomy state of affairs, the prospects of increasing food supply are not so bleak. The area classified as cultivable waste in this province is nearly 21 million acres, or two-thirds of the present area under food crops. The scope for extensive cultivation is vast, but depends upon the speed with which irrigation facilities are provided. The execution and completion of giant irrigation works like the Ramapadasagar project, the Tungabhadra project and the Krishna-Pennar project would bring about 5.54 million acres under cultivation. But these projects will take time and belong to long-term policy.

FIG. 9. AVERAGE RATE OF PRODUCTION AND CONSUMPTION OF FOODGRAINS IN MADRAS STATE PER ADULT PER DIEM (1919-20 to 1948-49)



The short-term policy of the Grow More Food Campaign is the two-pronged drive of extensive and intensive cultivation for a rapid increase in food supply. Extension of cultivation, which depends upon irrigation and soil preparation, is assisted by the sinking of new wells, repairs and renovation of old ones, deepening of old tanks, clearance of silt from canals as well as terracing, contour bunding, contour trenching, etc. In the sphere of intensive cultivation, increased use of manures and fertilizers, improved seeds and better implements constitute the most important planks of the programme.

Grow More Food Campaign—First phase (1943-44 to 1947-48).

For production to be adequate and to keep pace with the increase of population, both extensive and intensive cultivation are equally necessary; but emphasis will have to be laid on the former for long-term and on the latter for short-term results. In the first phase attention was divided equally between the two types of cultivation.

Extensive Cultivation

Extension of cultivation was sought to be brought about mainly through land reclamation schemes, special development schemes, special measures for increasing the acreage in the river basins and project areas, soil conservation schemes, encouragement of cultivation of all available land space by the grant of general and special concessions, new irrigation works, etc. The success attendant on each of these schemes in this first phase of the campaign is examined below.

Land Reclamation and Colonization Schemes

Towards the end of 1947-48, there were 13 land colonization societies in this State. To induce the members of these societies to reclaim lands allotted to them, certain concessions were granted for manuring lands coupled with free distribution of seeds, free half-grant for the purchase of bulls and increased advances for the purchase of implements. Loans were granted

to 14 co-operative societies in 16 villages in the Cauvery-Mettur Project area for the reclamation of 1,500 acres of land. Another scheme for reclamation of 114-19 acres was undertaken at Alathur village in Tanjore district.

Special Development Schemes

Certain areas situated in malaria-ridden jungle and inhabited sparsely by backward tribes are highly fertile and their reclamation would contribute to substantial increase in food supply. Several such areas in the State have been located, while special arrangements for their development have been made only in two places, viz., Araku valley in Visakhapatnam district and Wynaad in Malabar district. The development of these areas started with the adoption of anti-malarial measures. The second consideration is the well-being of the hill tribes and local inhabitants. In Araku valley, an extent of 625 acres was taken up for cultivation, partly by the department directly and partly by a system of collective farming by the hill tribes. The latter were supplied with free cattle, seed and manure. It was proposed to close down direct cultivation by the department at the end of three years. The Wynaad Colonization Scheme covers an area of 28,000 acres and the work was carried on in two stages; adoption of anti-malarial measures and opening of an agricultural farm constituted the first stage while the question of settlement of colonists was to be taken up in the second stage. The significance of these two schemes largely lies in their experimental character. On their success depends the launching of a large number of other schemes of similar pattern.

Extension of Cultivation in Cauvery-Mettur Project Area

The entire area of 301,000 acres, which the Cauvery-Mettur Project had been intended to serve, was not fully cultivated due to lack of irrigation channels, lack of capital and scarcity of labour. A scheme was sanctioned to bring under cultivation an area of about 40,000 acres as the first instalment of the

programme for the maximum utilization of the available water-supply. By the end of March 1946 the target was exceeded and an area of 60,157 acres was cultivated of which 52,224 acres are under paddy; irrigation facilities at a cost of Rs. 1,50,000 were provided. Loans free of interest in the first year and thereafter at 3 per cent per annum were granted to ryots. Extension of cultivation was further encouraged by granting a subsidy of Rs. 10 per acre of land reclaimed. An equally good measure of success attended a second scheme with a target of 10,000 acres when an area of 16,892 acres was brought under cultivation. Another proposal to extend this project area beyond the Narasinga Cauvery and bring under cultivation an area of 15,000 acres was taken up with the issue of loans for the purchase of seeds and manures, supported by exemption of water-cess and assessment.

Soil and Water Conservation Schemes

In dry regions with scanty rainfall, there is a great urgency for conservation of water, while in tracts enjoying heavy rainfall, there is an equally great urgency for soil conservation through anti-erosion measures. To achieve both these objects, large-scale bunding operations were undertaken covering an area of 2,500 acres in certain taluks of Bellary district; and another area of 7,500 acres in Visakhapatnam district has been proposed for similar treatment.

New Irrigation Works

Apart from the major irrigation projects which would take time to yield results, 103 small irrigation works under Grow More Food Campaign at an estimated cost of Rs. 160 lakhs were undertaken. Government of India gave a subsidy of Rs. 19.26 lakhs towards an expenditure already incurred amounting to Rs. 72 lakhs. These schemes were expected to bring an area of 105,000 acres under irrigation in addition to ensuring better irrigation facilities to about 24,000 acres.

Mechanized Cultivation

Reclamation of new lands and extension of the frontiers of cultivation are arduous tasks; their completion would involve immense time and manpower. To accelerate extensive cultivation, tractors and bulldozers had been coming into greater use. There had been a heavy demand for tractors for ploughing operations, particularly from regions where dry and garden cultivation predominates. Tractors were also used to clear away the sand strewn over fields in the cycloneaffected areas of Cuddapah, Nellore and Visakhapatnam districts. According to one estimate, there is a saving of three-eighths to half in expenditure for earthworks by the adoption of machines. The Agriculture Department owned at the end of this five-year period 145 tractors and bulldozers for hiring out to agriculturists at concessional rates.

General and Special Concessions

Cultivation of unoccupied lands, adjuncts of land to Government buildings, strips of land on either side of railways, etc., featured prominently in the Grow More Food Campaign. Unoccupied lands were allowed to be cultivated either freely or at concessional rates of assessment. All lands normally reserved for public purposes, backyards and compounds of public buildings, schools, churches, hospitals, etc., were thrown open to cultivation of vegetables and other food crops.

Lands in panchayat and reserved forests, not essential to the raising of timber and fuel, were assigned to cultivation of food crops. Tank beds which remain dry for a part of the year were permitted to be cultivated. In the issue of permits to cultivate these lands, preference was given to the landless poor. Apart from concessions in water-rates and exemption from or partial assessment of these new lands, cultivators were encouraged by liberalization of the rules relating to penalties for breaches of irrigation rules and encroachment. In the case of temporary grants of land, Government also dispensed with the collection of security deposits.

Special concessions too were granted in specified tracts like the Cauvery-Mettur project area in the Tanjore and Tiruchirappalli districts, the Krishna and Godavari deltas, the Periyar delta and plantation districts. In the old delta area of the Cauvery, double-cropping had always been allowed without restriction and this right was extended to the new delta until a target of 84,000 acres was reached. In the northern deltas concession took the shape of postponement and waiving of inclusion fees, permission for second crop cultivation on lands bordering drainage and remission for five years of water rates for lands newly cultivated in Kalia-patnam project. Subject to the payment of usual charges, to encourage the raising of "*Kodai*" crop, an additional area of 10,000 acres in Periyar delta was supplied with water from Periyar lake. In the plantation districts, estate owners were temporarily granted adjacent lands for food production. A loan of Rs. 600 per acre was also granted to cultivators of potatoes.

Legislation in aid of the Campaign

Maximum utilization of all the lands available for raising food-crops was however impeded by certain legal difficulties. To remove them, three Acts were passed. One was the Madras Estates Land (Temporary Amendment) Act, 1944, which provided for the temporary assignment of ryoti lands for a period ranging from three to five years without conferring occupancy rights on the assignees. The assignment was only for the purpose of raising food-crops. The second was the Madras Irrigation Works (Repairs, Improvement and Construction) Act, 1943 (later amended in 1945), authorizing Government to carry out repairs or improvements to privately owned irrigation works or to construct a new irrigation work in any estate and to recover the cost ultimately from the owner. The third was the Madras Essential Articles Control and Requisitioning (Temporary Powers) Act, 1946, which, apart from its provisions relating to production and

distribution of foodgrains, continued the prohibition in Ceded districts of the cultivation * of mungari cotton as a pure crop or as a mixed crop with less than two rows of food-crop to one row of cotton. Government also prohibited the cultivation of Cocanada cotton in Guntur district except as a mixed crop. A bonus of Rs. 4 per acre was sanctioned wherever a mixed crop was substituted for the usual pure crop. Cultivation of Cocanada Northern, Yerrapatti, N-14, Tellapatti, Westerns, H-1, Jowari, Mungari, Bogda, K-1, Karunganni, Uppam, Tinnies and Nadam, except as a mixed crop with at least one row of horsegram or blackgram for every five lines of cotton, was also prohibited throughout the State.

Intensive Cultivation

Despite the existence of over 21 million acres of cultivable waste in this State, extension of cultivation had been limited by irrigation facilities. To meet a crisis in food schemes have to be chosen from the point of view of the quickness with which increase in food production could be achieved. To this end, nothing is comparable with methods of intensive cultivation. The manurial experiments conducted by Dr. W. Burns have clearly demonstrated that an application of 250 lb. of bonemeal and 50 lb. sulphate of ammonia per acre increases the production of rice by 128 per cent, an application of 110 lb. of bonemeal with green manure by 50 per cent; neem cake and sulphate of ammonia by 22 per cent; 40 lb. of castor-cake per acre by 33 per cent; jowar production is increased by 115 per cent with an application of 5 tons of farmyard manure per acre of land. According to Burns, improvements in the yield would be 5 per cent if cultivators' seeds are replaced by seeds of high-yielding

* Such prohibitions and restrictions had been originally imposed under the Defence of India Rules. The above Act of 1946 was passed when the Defence of India Rules expired; the orders issued under this Act were however withdrawn in 1950 by a notification, dated 27th May 1950, issued under the Central Act.

improved strains of seeds, without any additional manuring or labour. The same authority holds that production would be increased to the extent of 5 per cent by combating pests and diseases by preventive and curative methods. The selective introduction of new implements like tractors, an adequate supply of iron and steel, and ordinary implements, financial aid for carrying out agricultural operations and loans for sinking wells and making permanent improvements are important if the programme of intensive cultivation is to be successfully implemented. It is on these lines the Madras Grow More Food Campaign had been planned.

Well Subsidy Scheme

The large irrigation works belong to the long-term planning for growing more food, but wells sunk by individual cultivators in their lands improve the area under food-crops almost immediately on their completion. Prior to 1944, three well-subsidy schemes were in operation in this State of which two applied only to a few specified districts while the third was in operation in all the districts except the Nilgiris. Subsidies were granted for the construction of over 64,000 new wells and for the repair of 3,125 old wells. With effect from 1st March 1947 a New Well Subsidy Scheme came into operation in all the districts of the State except the Nilgiris and Madras. Repair of old wells was placed beyond its purview, but assistance was extended to the construction of new and repair of old tanks in the West Coast districts. A subsidy of 50 per cent of the cost of the work subject to a maximum of Rs. 300 for each well and Rs. 500 for each new or old tank was given. Under this scheme, which was in force during the year 1947-48, subsidy and loans amounting to about Rs. 165 lakhs were disbursed to ryots for about 46,500 wells and 260 new and old tanks. In 1948-49, this scheme was extended to the Nilgiris also and the subsidy was enhanced to a maximum of Rs. 500 for a new well in ordinary areas except Malabar and South Kanara districts and to

Rs. 750 for a new well in the Ceded districts and special areas in other districts. A provision of Rs. 160 lakhs was made to meet the expenditure on this scheme. A total area of 102,557 acres was brought under effective irrigation by the wells, but the entire area is not new land. To a large extent, the wells have helped to ensure water-supply to old lands and increase their productivity.

The policy of granting loans under the Land Improvement Loans Act and Agricultural Loans Act was liberalized and the rate of interest was reduced from 6 to $5\frac{1}{2}$ per cent per annum.

Manures

The five-year plan of Grow More Food Campaign of the Madras State aimed at attaining an increased output of 6.5 lakhs of tons of rice in 1951-52 of which 5.5 lakhs of tons were to be produced by means of manurial applications and improved seeds alone. This target was to be reached by the combined efforts of the departments of Agriculture, Revenue and Irrigation. The Department of Agriculture was made responsible for stepping up production by 5.5 lakhs tons while the other departments were expected to help in the production of an additional one lakh tons. The former department on which rests the heaviest burden of implementing the plan had a three-tiered programme for attaining its target. By manuring paddy crop with ammonium sulphate, it expected to increase the yield to the extent of 3 lakhs tons, by manuring with oil-cakes to the extent of 1.8 lakhs tons and by multiplication and distribution of improved seeds of paddy, another 3.55 lakhs tons of paddy. In the aggregate, the additional production would be 8.35 lakhs tons of paddy or in terms of rice 5.5 lakhs tons.

The yearly allotment of ammonium sulphate from the central pool to this State had been far short of the requirements for manuring paddy. The programme of the

Agriculture Department was to apply 50,000 tons in 1947-48, 90,000 tons in 1948-49, 100,000 tons in each of the next three years. The actual supply in 1947-48 from the central pool was only 23,000 tons. However, Government of Madras obtained about 10,000 tons from a factory in Travancore State with which they had contracted to purchase two-fifths of its production or 20,000 tons per annum, whichever is less. In the initial years, Government were not able to get any substantial quantity of fertilizers from this factory due to transport and other difficulties.

Oil-cake

It is estimated that every ton of cake applied to paddy crop would increase the yield by about one ton of paddy. In the five-year plan it was proposed to distribute about 180,000 tons for manuring the paddy crop. The work of distribution effected through the agricultural depots since 1944 was later transferred to co-operative societies. In 1947-48, 60 per cent of the oil-cake produced in the mills was purchased by Government and sold to cultivators through co-operative societies while the remaining 40 per cent was left to normal trade channels. In the four years ending June 1948, 566,650 tons of groundnut and oil-cake had been distributed as shown below :

			TONS.
July 1944—June 1945	..	..	57,320
July 1945—June 1946	..	..	113,285
July 1946—June 1947	..	..	235,000
July 1947—June 1948	..	..	161,051

In 1948 when selling seeds became more profitable than selling oil and cake after crushing, the supply of groundnut cake steeply fell.

In the sale of these manures through the Agriculture Department, Government spent about Rs. 12.26 lakhs in 1946-47 as subsidy by meeting all the overhead charges up

to 10 per cent of the cost and the entire administrative charges. In order to remove the phosphorous deficiency of the soil in the paddy areas, and to popularize the use of phosphatic manures, Government undertook a scheme costing Rs. 24,000 for a period of two years for distributing to ryots at half the cost price 100 tons of super-phosphate for 400 acres in Tanjore, Krishna, Guntur and Godavari districts and the Periyar tract.

Green Manure

With a view to encouraging the use of green leaf manure Government reduced the rate for removal of green leaf manure from reserved forests by 50 per cent. In most districts dead leaves and leaf-mould could be collected from reserved forests on payment of a seigniorage rate of 4 annas per cart-load.

Compost-making

Two officers and a corps of 68 Sanitary Inspectors trained in the methods of compost-making are engaged in the execution of this scheme. The scheme operates in two sectors, one in rural areas and the other in 90 urban areas (58 municipalities and 32 panchayat boards). The statistics of production and distribution of compost are tabulated below :

<i>Compost-making in rural and urban areas.</i>					
Year.				Quantity produced.	Quantity distributed.
<i>Municipalities and Panchayat Boards.</i>					
				TONS.	TONS.
1946	..	..	..	80,340	56,360
1947	..	..	..	101,500	78,980
1948	..	..	..	104,920	50,600
<i>Rural Compost-making.</i>					
1945-46	..	..	..	17,393	13,774
1946-47	..	..	..	4,688 pits.	4,688 pits.
1947-48	..	..	..	7,460 tons.	5,660 tons.

Improved Seeds

Multiplication and distribution of high-yielding strains of seeds are the most important of the activities of the Agriculture Department. In the five-year plan, use of improved strains of seeds is expected to yield an additional 3.55 lakhs tons of paddy in the last year of the plan, 1951-52. The department has evolved a number of improved strains—139 in paddy, 51 in millets, 5 in pulses, 9 in oil-seeds, 4 in sugarcane, and 9 in cotton. Experiments conducted in Government farms have shown that the percentage increase in the yields of grains evolved and distributed by the department are 15 to 20 per cent for paddy, 10 to 20 per cent for millets and 20 to 25 per cent for oil-seeds.

A comprehensive scheme in the five-year plan for multiplication and distribution of improved seeds of paddy, millets, pulses, groundnut and green manure crop is estimated to cost Rs. 35.86 lakhs. Great importance is attached to this scheme as it is believed that if the entire cultivation of food crops is done with improved varieties of seeds, the State would attain self-sufficiency in food, without the help of any other scheme.

A large-scale multiplication of the high-yielding strains of seeds was brought about by running what are known as "Primary Seed Farms" in the districts. A limited quantity of the departmental strain suited to particular localities was distributed to selected cultivators. By previous agreement, cultivators of these Primary Seed Farms were to deliver the produce to the departmental officer at the prevailing price. The department would pay a premium over the market prices and roguing charges at specified rates. Every year, the department distributed about 8,000 to 12,000 tons of improved seeds for bulk sowings and the annual area under seed paddy came to about 35,000 acres. In 1947-48, 9,030 tons of paddy seeds and 101 tons of millets seeds and one ton of pulses seeds were distributed. The target fixed in the five-year

plan was to multiply seeds of high-yielding strains of paddy to serve 7.6 million acres by 1951-52. Departmental distribution of improved coconut, groundnut and gingelly seeds was also done to a limited extent (vide Appendix IX for data relating to seeds distributed, area covered, etc.).

Supply of Iron and Steel

A persistent short supply of iron and steel needed for the fabrication of agricultural implements has been seriously hindering agricultural operations. To relieve this scarcity, the State Government obtained quotas of iron and steel in bulk on permit and distributed a portion of the supplies to selected firms for the manufacture of agricultural implements for distribution to ryots through the 526 agricultural depots at fair prices. The rest of the supplies were sold to ryots and village blacksmiths directly by the Agriculture Department. The quantity of iron and steel distributed on these lines in 1947 amounted to 23,000 tons and in 1948 to 31,000 tons.

Special attention was paid to see that ordinary implements like country ploughs and shares, spades, sickles, crowbars, cattle-shoes, nails, etc. were made available to the ryot. In 1946-47, iron available with scrap merchants was allotted to 78 fabricators and the articles made were distributed at fair prices through the departmental depots.

Agricultural Engineering

A special engineering branch was added to the Agriculture Department in April 1946 to advise and help agriculturists in using modern machinery for ploughing, lifting water, etc. This branch procures electric motors, petrol pump sets, etc., to hire out or sell to farmers. The outturn of work by this branch of the department up to the end of September 1948 consisted of procurement for hire or for sale as the case may be of 4,117 electric motors, 3,049 electric motor pumps, 792 petrol pump sets, 214 diesel oil engines, 324,000 feet of

pipes, 145 tractors and 35,240 tons of iron and steel for manufacturing agricultural implements.

Production of Protective Foods

Special measures were taken to increase the output of protective foods like vegetables, milk and milk products, eggs and fish.

Vegetable Cultivation

In September 1942, Government adopted the policy of encouraging the cultivation of vegetables in the compounds of local board schools, buildings and road margins. Land revenue assessment was also dispensed with till the end of fasli 1357. Free supply of vegetable seeds up to a maximum limit of Rs. 50 per annum was made to educational institutions and expenditure on this progressively increased year after year as the following table shows :

Year.	Value of seeds distributed.
	RS.
1946-47	1,680
1947-48	5,547
1948-49	10,000

In 1947-48, a seed farm at Wellington alone produced seeds worth Rs. 10,500. About 1,200 lb. of vegetable seeds and 51,000 seedlings were distributed in 1948-49 and it is estimated that about 12,000 acres of additional area has come under vegetable cultivation. This should have stepped up production by about 17,200 tons.

Milk and Milk Products

Schemes were introduced in July 1944 for salvage of dry cows and she-buffaloes in the city of Madras. To encourage rearing of calves in the city, where they are starved to death on a large scale, a subsidy of Rs. 35 per calf was given to the owner of every calf which was alive and in a satisfactory condition at the end of nine months. Municipal councils were instructed to restrict the slaughter of milch cattle and

utilize uncultivated plots for the maintenance of dry cows. Interest-free loans were liberally granted to members of co-operative milk supply societies and unions for the purchase of milch cattle. Owners of cattle, yielding record quantities of milk, were given prizes. Cotton seeds and other cattle feed were made available at reasonable prices.

Eggs

Madras State, normally deficit in egg production, used to obtain large quantities of eggs from Travancore and Cochin; but both these States banned the export of eggs and fowls. The post of a Special Poultry Officer was created in 1944-45 to co-ordinate the various developmental schemes in the State. Two poultry development schemes one at Katpadi and the other at Mangalagiri (Tirunelveli district) were sanctioned. The Co-operative Egg Marketing Society was also subsidized.

Fisheries

Forty schemes to develop both inland and marine fisheries in this State were sanctioned. These schemes relate to various aspects of fishing industry such as conduct of local surveys, opening of demonstration farms, training of candidates in fisheries, production of smoked fish, deep-sea fishing operations, building improved types of fishing boats, provision of transport vans and ice-plants, etc.

Resume of the Grow More Food Campaign in the first phase

The Grow More Food Campaign in Madras was conducted on the extensive and intensive fronts.

ON THE EXTENSIVE FRONT.

I. (i) Land reclamation including colonization and development schemes, being long-term in character, had not crossed the experimental stage. (ii) In Cauvery and Mettur Project area as well as in Northern Deltas, appreciable progress was made in extension of cultivation. (iii) In the dry districts of Rayalaseema, soil and water conservation

schemes were making headway. (iv) New irrigation work was undertaken. (v) A small beginning was made in the use of tractors and bulldozers for terracing, surfacing and ploughing new land.

II. (i) General and special concessions in land revenue and cesses were granted to fresh cultivation in panchayat and reserve forest areas. (ii) Temporary assignment of ryoti lands for periods ranging from three to five years solely for the purpose of raising food crops was made under special Acts. (iii) Powers to carry out repairs or improvements to old and to construct new irrigation works in private estates recovering the cost ultimately from the owners were assumed. (iv) Legislation was passed to extend the cultivation of food crops by encouraging mixed cultivation with non-food crops.

III. Tenurial reforms were effected by the abolition of the zamindaris; and pending its implementation a Rent Reduction Act was put into force, scaling down the high zamindari rents to the level of ryotwari assessments. Amendment to Malabar Tenancy Act was under the active consideration of Government.

ON THE INTENSIVE FRONT.

IV. (i) The most important activity was subsidized well-sinking. Nearly 102,000 acres were given assured irrigation facilities under a scheme of subsidies for sinking of wells. (ii) The policy of granting loans for agricultural operations was liberalized and the rate of interest reduced. (iii) A vigorous drive in the direction of an intensive application of manures and chemical fertilizers was undertaken. The distribution of oil-cake was done under Government auspices; use of phosphatic manure was encouraged by grant of subsidies. Increased supply of green manure was rendered possible by relaxation of Forest Regulations. A concerted effort at compost-making was undertaken in 90 municipal and panchayat boards and in several rural areas. (iv) A large-scale multiplication of the high-yielding strains

of seeds was brought about by running 'Primary Seed Farms', in almost every village and the work progressed according to a five-year target. (v) The Agriculture Department took up the distribution of iron and steel to agriculturists. A special Agricultural Engineering Branch advised agriculturists on the use of modern machinery and procured for hire or for sale tractors, oil-engines, etc.

Grow More Food Campaign, Transitional phase, 1948-49

Between the first phase of the campaign which lasted five years and the launching of an emergency campaign of a three-year duration was a transitional phase of one year. All the main schemes of the Grow More Food Campaign were continued during this year of transition. Under the scheme of general stimulus to extensive cultivation, free assignment of land was made to the extent of 7,385 acres of which 5,571 acres were actually brought under cultivation. General and special concessions regarding land revenue collection were also continued with a view to encouraging extensive cultivation. Under the scheme of land development by mechanical cultivation, 152 tractors were at work, 11 oil-engines and 83 petrol pump-sets were sold to ryots and 1,146 electric pump sets were put into operation and 35,569 acres against a target of 40,000 acres were brought under cultivation. Contour bunding operations for soil and water conservation were continued in Visakhapatnam and Ceded districts with the help of a special Assistant Agricultural Engineer, 18 Soil Conservative Assistants and the necessary administrative staff.

Irrigation works continued to receive a high priority in the campaign for increased food production. During this year, 47 small irrigation schemes, estimated to cost Rs. 1,16,74,321 were sanctioned by Government. Expenditure actually incurred amounted to Rs. 7,17,393 and the works completed are expected to bring under irrigation about 56,000 acres of which 38,000 acres of cultivated land had so far no irrigation facilities whatsoever.

On the intensive front, compost from town refuse, made by 64 municipalities and 45 panchayats, amounted to 5,155,963 cubic feet of which 5,136,040 cubic feet or 102,721 tons were sold to ryots and applied to 20,544 acres of land. Against a target of 24,000 tons, about 20,980 tons of rural compost was made and distributed over an area of 1,178 acres.

The quotas of chemical fertilizers allotted and the quantities supplied under State Trading Schemes in this phase are shown below :

Fertilizers.	Quota. TONS.	Supplies. TONS.
Ammonium Sulphate	64,950	64,950
Ammonium Phosphate	400	400
Di-ammonium Phosphate	1,250	1,250
Super-Phosphate	6,500	5,830
Bonemeal	5,400	735
Total	78,500	73,165

Against a target of 78,500 tons of chemical fertilizers, 73,165 tons were supplied to ryots on a subsidized basis. Deducting the pre-war average quantity of 30,000 tons consumed by plantation and non-food crops from this, 43,165 tons may be assumed to have gone into the production of food crops. The quantity of groundnut-cake distributed through Agriculture Department or co-operative agency sharply declined from 161,051 tons in 1947-48 to 72,222* tons owing to the decision of Government to remove the controls over price as well as distribution from January 1949, although control over its movement within and export from the State was continued.

Production of green manure was actively assisted by the raising of about 2,584 tons of seeds from 47,817 acres of seed farms. Green manure produced with the help of these seeds was estimated to cover an area of 2,086,083 acres.

* Of this quantity 22,816 tons were sold by Department of Agriculture, 17,979 tons against bonus compensation and 31,427 by Co-operative Department.

The scheme for multiplication and distribution of improved strains of seeds made notable progress in this year as the following table will indicate :

Area of seed farms in 1948-49.

Crop.	Area of seed farms (in acres).
Paddy	41,692
Cholam	4,044
Cumbu	1,332
Ragi	2,592
Tonai	1,262
Total ..	50,922

The area under seed farms for paddy and millets rose to 50,922 acres from 34,987 acres in the previous year 1947-48, recording a rise of 50 per cent. The quantity of seed produced was 30,303 tons, sufficient to cover an area of 1,013,120 acres. Expenditure on subsidized distribution of this quantity of seeds amounted to Rs. 4,48,326.

In addition, quantities of seeds and manures were distributed free of cost to deserving ryots, entailing an expenditure of Rs. 14,071-2-0 in the case of manures and Rs. 801-10-0 in the case of seeds.

Through the departmental depots, 10,281 tons of standard steel and iron, 2,981 cart tyres, 691 axles and 430,828 fabricated articles such as ploughshares, mammaties, crowbars and buckets were supplied to ryots.

A special plant protection staff, appointed in January 1949, was engaged in the control of pests and diseases. Chemicals and insecticides were sold to ryots at one-third of their cost price. About 100,180 acres came under chemical treatment for protection of crops against pests and diseases.

Protective Foods

In the sphere of augmenting supplies of protective foods, 2,029 lb. of vegetable seeds and 6,350 maunds of seedlings were produced in Government farms and sold to ryots. Free

distribution of vegetable seeds to schools and land colonization societies accounted for an expenditure of Rs. 3,587-13-0. The scheme for increased production of vegetables in urban areas yielded about 1,900 tons of vegetables in Madras City alone. Poultry development received greater impetus in the Research Stations at Anakapalle, Samalkot, Palur, Aduthurai and Koilpatti.

In 1948-49, there was an overall improvement in the execution of the various schemes of the Grow More Food Campaign both on the extensive and intensive fronts. Improvement was striking particularly in the sphere of Well Subsidy Scheme, multiplication and distribution of improved strains of seeds, supply of chemical fertilizers ; the distribution of oil-cakes, however, suffered a set-back.

Grow More Food Campaign—Third phase, 1949 to 1952

The decision taken in March 1949 by Government of India to stop imports of all kinds of foodgrains and foodstuffs by the year 1951 marks the beginning of a new phase in our battle for food production. For about six years, the Grow More Food Campaign has been carried on with a vague desire to produce more, but without any stern determination to attain a definite target. The objectives of the campaign were indistinct, efforts unco-ordinated and enthusiasm fitful. Now the objective became clear. India's annual food production must be stepped up by four million tons and the Government of India do not propose to import any foodgrains from other countries after 1951, except under very special circumstances.

Immediately after the decision was taken, Government of India set out to devise concrete schemes for attaining the target. Intensive cultivation by the distribution of improved seeds, manures and fertilizers to areas of assured water-supply, land development by mechanical cultivation and switching over, wherever feasible, lands under non-food crops to food crops

—these are the triple means to achieve the goal of self-sufficiency by the end of 1951. It is also proposed to institute or expand the Agricultural Extension Service to carry the knowledge of new and improved farming methods to the ryot in his farmstead or field so as to educate him and enlist his enthusiastic co-operation. Ancillary to them are schemes for an adequate supply of iron, steel, cement, oil-engines, oils, electric motors, pump sets, tractors and bulldozers as well as award of prizes to enterprising cultivators. Other planks of the emergency campaign are greater concentration on the production of subsidiary foods including exploitation of marine fishery resources. Above all, the Plan rests on an effective co-ordination of the activities of all the departments—Agriculture, Public Works, Revenue, Fisheries, etc., engaged in food production; also on a concerted drive on the part of the Union and State Governments to attain the targets and adhere to time-schedules.

Emergency Food Plan

To be in conformity with the policy of Government of India, as has been already mentioned, a Cabinet Sub-Committee for Food Production was set up and Government appointed a Commissioner of Food Production to co-ordinate the diverse activities of the concerned departments. The Emergency Food Plan in Madras may be broadly classified under four heads: (1) Irrigation Schemes undertaken by Public Works Department, (2) Well Subsidy Schemes in charge of the Revenue Department, (3) Tank Improvement Scheme executed mainly by Commissioner of Food Production and (4) Food Production Schemes of Agriculture Department. This is a three-year plan with a production target of 6.81 lakhs tons, to be attained during 1951-52 at a gross cost of Rs. 13.68 crores covering an area of the order of 5.8 million acres by way of additional cultivation and intensive exploitation.

The details of expenditure in the three years, the area to be benefited and the additional output expected are shown below:

Statement showing the expenditure and progress of the various Intensive Cultivation Works under the Emergency Food Plan.

1949-50.

Particulars.	P.W.D. Irrigation Schemes.	Agricul- tural Schemes.	Wells.	Tank Improvement Scheme	Total.
Total expenditure (Rs.)	66,52,964	4,12,92,920	1,62,31,968	10,53,812	6,52,31,674
Area benefited (acres).	33,260	25,83,606	17,907	538	26,35,311
Additional production achieved as verified by Collectors (tons).	9,615	76,507	12,432	248	98,802

1950-51.

Total cost (Rs.)	*1,03,45,246	10,25,94,873	94,00,000	1,10,74,410	13,34,14,520
Net cost (Rs.)	*1,03,45,246	1,14,79,447	94,00,000	1,10,74,410	4,22,90,103
Area to be benefited (acres).	114,679	5,144,731	66,621	142,000	5,468,031
Estimated additional production (tons).	36,418	454,154½	33,310	35,500	550,382½

1951-52.

Total cost (Rs.)	*1,54,00,000	9,91,65,088	41,00,000	1,82,12,400	13,68,77,488
Net cost (Rs.)	*1,54,00,000	1,40,26,232	41,00,000	1,82,12,400	5,17,38,632
Area to be benefited (acres).	171,299	5,253,974	84,500	317,500	58,21,273
Estimated additional production (tons).	63,621	561,704	42,250	73,600	681,175

* Represents anticipated total expenditure.

Small Irrigation Works (Public Works Department)

In consultation with the Chief Engineer of Irrigation the Commissioner of Food Production, Madras, selected 231 irrigation schemes for concentrated attention during 1949-50 to 1951-52. The criterion for selection was that the schemes should be capable of being completed by 1951-52. These schemes when completed will benefit an extent of 171,299 acres.

resulting in an additional production of 63,621 tons of foodgrains. Up to the end of March 1950, 43 schemes have been completed with a potential irrigation coverage of 50,047 acres and potential output of 13,838 tons. The extent actually brought under irrigation and the additional output actually realized up to 30th June 1950 as verified by Collectors however came to 32,260 acres and 9,615 tons only. A further seventy-one schemes have been completed during the period 1st April 1950 to 31st October 1950.

Well Subsidy Scheme

Under the Well Subsidy Scheme, the target for 1949-50 was 41,000 new wells, each capable of irrigating on an average one acre. Up to the end of March 1950, 19,098 wells are reported to have been completed. The additional output estimated under the completed wells up to 30th June 1950 was 12,432 tons of foodgrains against a target of 9,549 tons. The total area to be benefited and the additional output to be realized under this scheme during 1951-52 are 84,500 acres and 42,250 tons. These are cumulative targets with reference to 1948-49 as the base year.

Tank Improvement Scheme

This scheme contemplates repairs and improvements to tanks and other minor irrigation sources both in zamindari and ryotwari areas. There are over 33,000 irrigation tanks in this State of which over 29,000 are Government tanks. As a result of siltation over a number of years many tanks, particularly in zamindari areas, have lost a considerable portion of their storage capacity and are not irrigating fully the ayacuts registered under them. Government have therefore sanctioned a scheme which is estimated to cost about Rs. 10 crores and is distributed over a period of five years. To implement the scheme, seven Executive Engineering Divisions have been formed in charge of a Superintending Engineer under the control of the Commissioner of

Food Production. The scheme was started late in the year 1949. The total number of works taken up under the Tank Improvement Scheme till the quarter ending 30th September 1950 is 3,809, which includes repairs to 1,245 sources affected by the cyclone and floods of September-October 1949. Of these 3,809 sources, investigation has been completed, and estimates prepared and sanctioned in respect of 2,175 works which include 1,046 flood-damaged works. The total amount of estimates sanctioned up to 30th September 1950 is Rs. 79,13,994 for regular Tank Improvement Works and Rs. 32,39,998 for flood-damaged works. Eighty-four regular Tank Improvement Works and 590 flood-damaged works have been completed up to the end of September 1950. The completed works are expected to benefit an additional acreage of 8,983 acres resulting in an additional output of 5,126 tons.

Agriculture Department Schemes

The main agricultural schemes are—

(1) Distribution of oil engines and electric motor pump-sets for purposes of lift irrigation either at concessional rates of hire or on hire-purchase system or direct sale to ryots by authorized dealers on the recommendation of the Agriculture Department ;

(2) Tractor reclamation ;

(3) Distribution of phosphatic fertilizers at half rates and ammonium sulphate at cost price ;

(4) Distribution of urban and rural compost ; and

(5) Distribution of improved paddy and millet seeds and green manure seeds.

A detailed analysis explaining the scope of the agricultural schemes with information regarding the area to be benefited and the additional production anticipated from them is given in Appendices X, XI and XII. Briefly it is a three-pronged

drive of intensive cultivation, land development by mechanical cultivation and adequate supply of accessories of cultivation like tractors, pumping sets, iron and steel.

The Emergency Plan lays stress on encouraging and aiding intensive cultivation only of lands with assured water-supply. Keeping this in view, Government have sanctioned in July 1950 a scheme for the concentrated distribution of about one lakh tons of chemical fertilizers in deltaic areas and tracts with assured supply of water in ten districts for maximizing the production of cereals (mainly rice). Under this scheme, ryots in the selected areas are granted interest-free loans liberally to enable them to purchase fertilizers at the beginning of the cultivating season, and the loans are recoverable only after the next main harvest, i.e., in March 1951. A special staff for the disbursement of loans has also been sanctioned.

Government have also sanctioned a scheme of village co-operatives or multi-purpose rural credit societies in seven selected districts, to begin with, with a view to associating the cultivating ryots with the food production efforts of Government and for the more efficient fulfilment of the present plan. The village co-operatives will also be responsible (1) for the efficient distribution of chemical fertilizers, manures, improved seeds, agricultural implements and iron and steel; (2) for listing out cultivable waste and fallow lands and making arrangements to bring them under cultivation; (3) for launching a special drive for increasing the output of compost manure in villages; (4) for assessing the results of the various measures adopted towards increasing food production; and (5) for making available the additional yield of foodgrains for the purpose of procurement.

A Special Officer for propaganda for Food Production has also been appointed. With a view to carrying the latest scientific knowledge of agriculture to the door of the cultivator and to educate him in better cultural practices, Government

have also sanctioned the appointment, in the first instance, of 27 honorary propagandists to form an "Extension Service" in selected deltaic districts in this State. These honorary propagandists are to be paid an honorarium of Rs. 50 per mensem to cover their travelling expenses. The honorary propagandists are charged with the responsibility of organizing a certain number of demonstration plots in cultivators' own holdings. It will be the further duty of the honorary propagandists to organize village agricultural associations, conduct exhibitions and all other types of agricultural demonstrations in co-operation with local agricultural demonstrators.

Government have also sanctioned a scheme for the starting of "Registered Model Farms", one in each taluk, throughout the State. The registered model farmers will be selected from the class of middle-sized agriculturists, and will be given fertilizers, improved seeds, agricultural implements, etc., at 75 per cent of the cost chargeable to other agriculturists. In return, they will be required to adopt the latest improved agricultural practices according to the directions of the Agriculture Department and to allow facilities to other agriculturists to visit their farms and study their working. They will also undertake to deliver the entire surplus output of cereals from their farm at controlled rates to the procurement agents appointed by Government.

In pursuance of suggestion from Government of India, Madras Government have also appointed eight Efficiency Officers of the grade of Senior Deputy Collectors whose duties include inspection of subsidy wells a work formerly being attended to by a like number of Junior Deputy Collectors. These Efficiency Officers maintain close contact with the Grow More Food works in their respective jurisdictions (two to four districts each) and watch the progress of execution of the intensive cultivation schemes

in the State. They are responsible for the assessment of results under the intensive cultivation schemes and for the linking up of the additional output with procurement.

In addition to these measures, several schemes which aim at making available additional quantities of fish for human consumption have also been recently sanctioned. The new schemes for 1950-51 are expected to result in an additional output of over 90,000 tons of fish (both fresh and salt cured).

A special scheme for sinking 101 artesian wells in the lignite area in South Arcot district, capable of irrigating 5,000 acres of land, has been sanctioned for 1950-51 at a cost of Rs. 8,08,000. If these wells are completed by 1951-52 as anticipated, there will be an additional output of about 2,500 tons of foodgrains per annum.

CHAPTER IV.

ACHIEVEMENT AUDIT OF THE GROW MORE FOOD CAMPAIGN (1943-49).

Before we proceed further, we shall pause a while to assess in quantitative terms the achievements of the measures taken so far to bring about additional food production. Madras State was probably the first to launch a vigorous campaign for increased production of food and that was as early as 1942 when imports from Burma, Thailand and Indo-China ceased. The Campaign, carried on from its inception both on intensive and extensive fronts, as has been seen in the preceding pages, started with a few schemes, but came to have more than a dozen by 1948-49. They may, for the purpose of this chapter, be broadly divided into (I) Permanent Improvement Schemes and (II) Intensive Production Schemes.

Results of Permanent Improvement Schemes

The Permanent Improvement Schemes are those on which expenditure creates permanent assets and improvements like area reclaimed, cultivated and irrigated and the benefits of which are consequently cumulative in character. These schemes consist mainly of (1) Free assignment of land, (2) Land development by mechanical cultivation, (3) Use of oil engines and petrol and electric pumpsets, (4) Small Irrigation Works and (5) Well Subsidy Schemes.

FREE ASSIGNMENT OF LAND.

The scheme of free assignment of lands to energetic and deserving ryots, landless labourers, ex-servicemen and others was the earliest to be initiated. In 1942-43 the area assigned for food production amounted to 75,576 acres and in the next year it rose to 103,472 acres. As would be expected, in subsequent years, land suitable for assignment became scarcer and the area actually assigned began sharply to taper off.

There was also a lag between the area of land assigned and that actually brought under cultivation. The additional production attributable to this scheme, together with the area cultivated is tabulated below :

Additional Output of Foodgrains attributable to Free Assignment of Land.

Year.	Area assigned (acres).	Area cultivated (acres).	Additional output (tons).		Cumulative area (acres).	Cumulative additional output (tons).	
			Under normal conditions.	Adjusted to Seasonal Factor.		Under normal conditions.	Adjusted to Seasonal Factor.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1942-43 ..	* 75,578	..	..	..	..	..	..
1943-44 ..	103,472	76,965	38,482	34,634	76,965	38,482	34,634
1944-45 ..	48,068	40,616	22,308	21,210	123,581	61,791	56,230
1945-46 ..	31,865	22,711	11,356	9,312	146,292	73,146	59,980
1946-47 ..	14,513	12,904	6,452	5,742	159,196	79,598	70,842
1947-48 ..	12,073	10,619	5,310	4,353	169,815	84,907	69,624
Total ..	285,751	169,815	84,908	75,251	675,849	337,924	291,310
Average ..	47,595	33,963	16,982	15,050	1,35,170	67,585	58,262
1948-49 ..	7,385	5,571	2,785	2,256	1,75,386	87,693	71,031
Grand total.	292,957	175,386	87,693	77,507	851,235	425,617	362,341

* Area cultivated in this year was small and no account is taken of the additional output from it.

With the land on the margin of cultivation limited, additional area brought under cultivation declined from 76,965 acres in 1943-44 to 5,571 acres in 1948-49 and correspondingly the additional output from 34,634 tons at 1,008 lb. per acre to 2,256 tons at 907 lb. per acre. The gradual decline in the area assigned each year, since 1944-45, has led to a proportionate diminution in the additional yield due to this scheme, but the cumulative yield has been steadily rising, reaching 71,031 tons in 1948-49.

LAND DEVELOPMENT BY MECHANICAL CULTIVATION.

Reclamation of new lands in inaccessible difficult terrain is an arduous task for the small cultivator. Land development is however possible on a larger scale in this State with the use of heavy tractors and bulldozers. In the early years

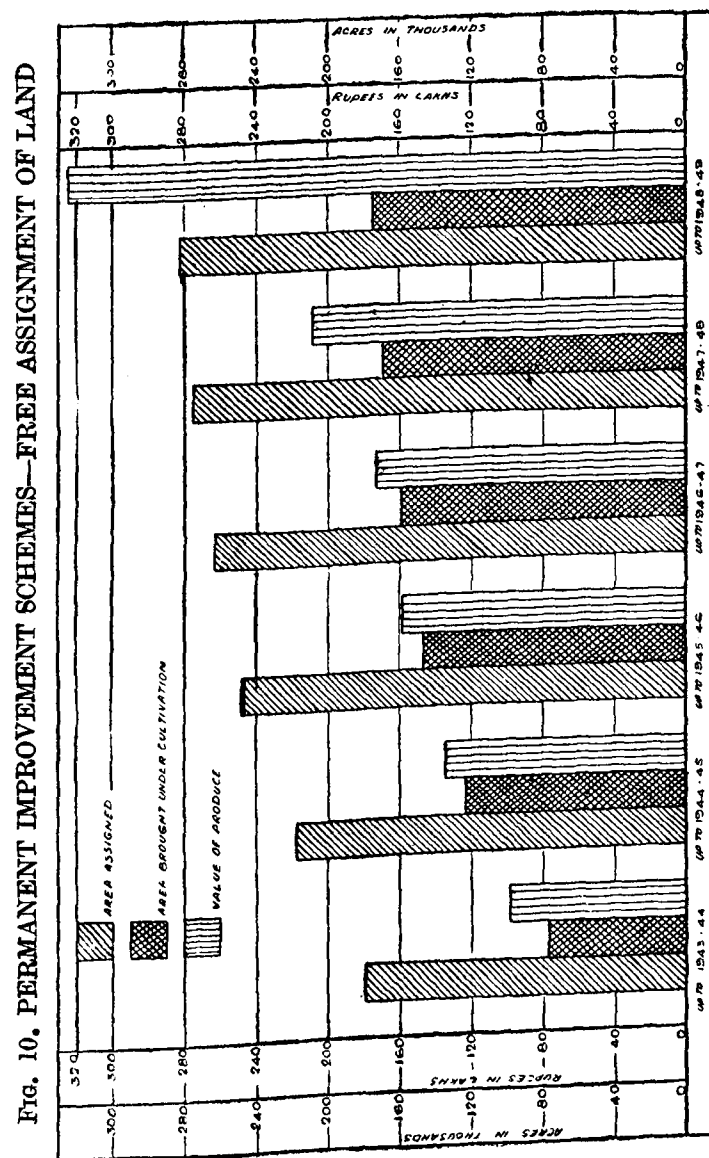


FIG. 10. PERMANENT IMPROVEMENT SCHEMES—FREE ASSIGNMENT OF LAND

of the campaign the Wynaad and Araku Valley schemes of land reclamation were launched, but they are long-term schemes and no credit is here taken for any additional output from them. From individual cultivators, there was a growing demand for tractors and bulldozers for extensive cultivation. By 1947-48 the Agriculture Department came to own 145 tractors and bulldozers for hiring out to agriculturists on concessional terms.

In 1948-49, a new scheme of land development by mechanical cultivation was undertaken. Under this scheme 152 tractors were at work and against a target of 40,000 acres, 35,600 acres were reclaimed at a cost of Rs. 7,01,041. From this area, the additional output is estimated at 7,203 tons of foodgrains, after allowance is made for the Seasonal Factor.

USE OF OIL ENGINES AND PETROL AND ELECTRIC PUMPSETS.

Government had always evinced great interest in equipping farms with modern machinery for cultivation and waterlift. A larger supply of oil engines and pumpsets however became feasible only in 1948-49. Their sale was subsidized by Government to the tune of Rs. 1,36,174 in 1948-49. Under this scheme, 11 oil engines and 83 petrol pumpsets were sold to ryots and 1,146 electric pumpsets were put into operation. The additional output due to this scheme is estimated at 2,168 tons.

SMALL IRRIGATION WORKS.

The small irrigation works received from the outset a high priority. There was always a liberal sanction of expenditure on these schemes by Government. However, the actual expenditure incurred, except in two years, lagged far behind

FIG. 11. PERMANENT IMPROVEMENT SCHEMES—LAND DEVELOPMENT BY MECHANICAL CULTIVATION IN 1948-49

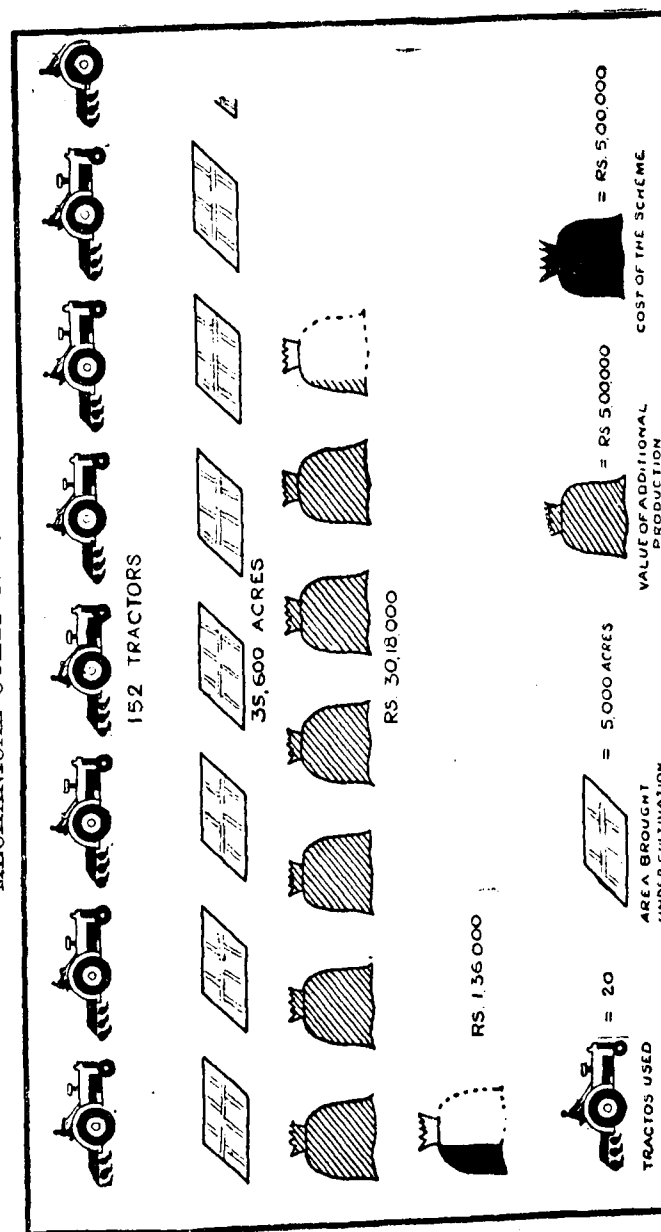
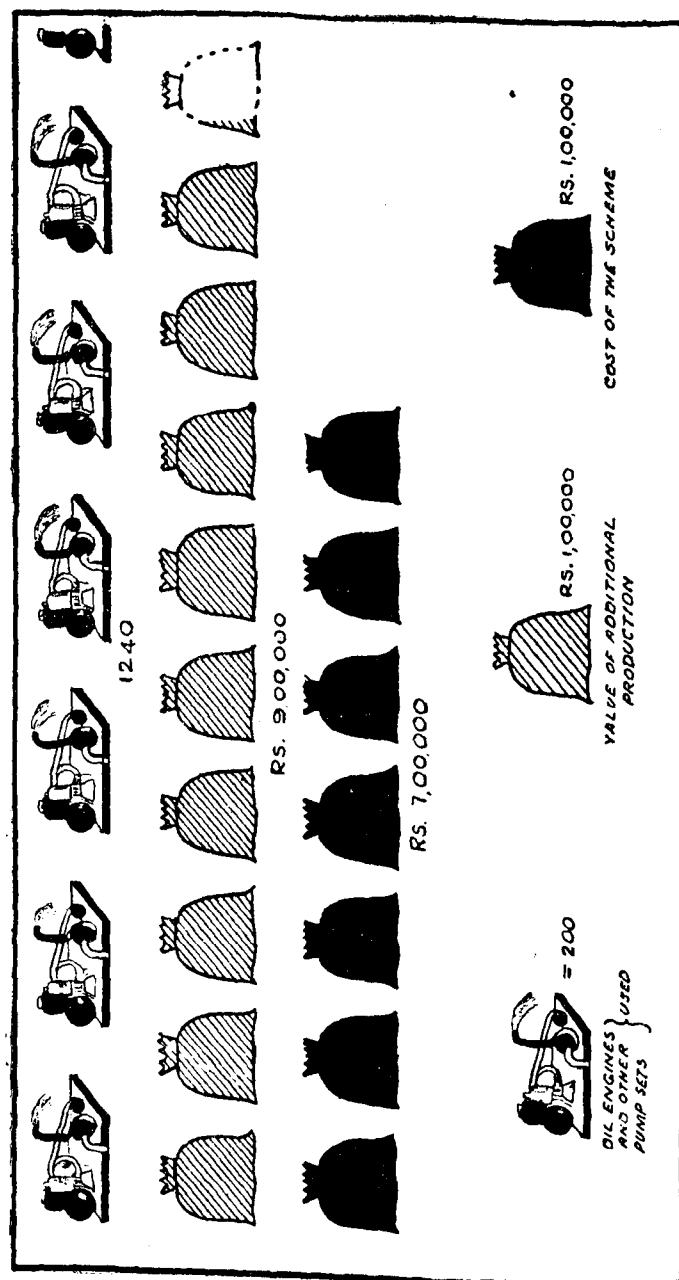


FIG. 12. PERMANENT IMPROVEMENT SCHEMES—USE OF OIL ENGINES IN 1948-49.



the amount sanctioned due to several bottlenecks (vide statement below):

Sanction and Expenditure on Small Irrigation Works (by Public Works Department only).

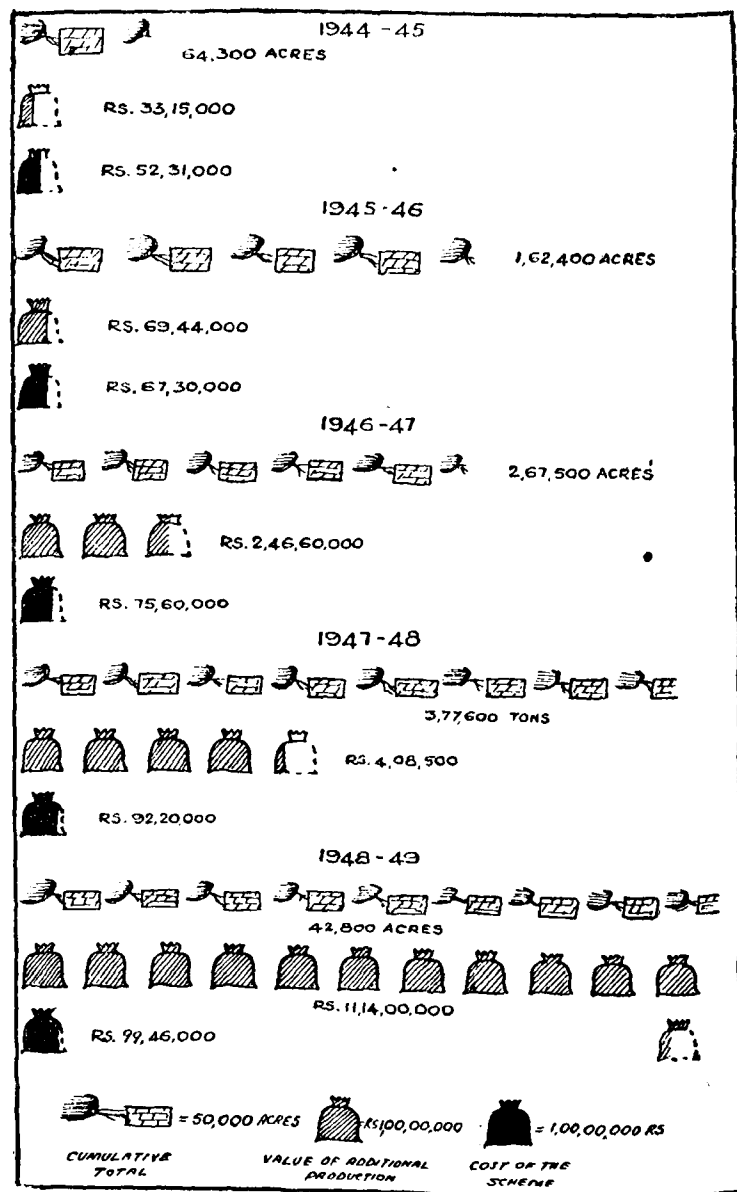
Year.	Cost of works sanctioned. RS.	Actual expenditure incurred. RS.
1943-44	42,08,108	18,69,285
1944-45	32,31,851	33,61,917
1945-46	6,73,759	14,94,370
1946-47	59,08,442	8,32,034
1947-48	67,41,000	16,60,747
Total ..	2,07,63,160	92,18,353
Average ..	41,52,632	18,43,671
1948-49 ..	1,16,74,321	7,17,393
Grand total ..	3,24,47,481	99,35,746

In addition to Public Works Department, the Revenue Department undertook on a lesser scale repair and construction of minor irrigation works; together they were responsible for bringing under irrigation 377,622 acres in the first five years. In 1948-49 an area of 50,000 acres of which 38,000 acres were virgin land were brought under irrigation and the additional output adjusted to Seasonal Factor, is estimated at 22,680 tons of foodgrains.) The results of this scheme in this period are summarized below:

Additional Output due to Small Irrigation Works (Public Works Department and Revenue Departments)

Year.	Seasonal Factor.	Area irrigated (acres).	Additional output (tons).		Cumulative average brought under irrigation.	Cumulative additional yield (tons).	
			Under normal conditions.	Adjusted to Seasonal Factor.		Under normal conditions.	Adjusted to Seasonal Factor.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1944 ..	91	64,297	15,179	13,813	64,297	15,179	13,813
1945 ..	82	98,083	10,528	16,013	162,320	34,707	28,460
1946 ..	89	105,101	78,372	69,751	267,481	113,379	109,640
1947 ..	82	110,141	66,781	54,700	377,622	179,860	147,485
Total ..		377,622	179,860	154,337	871,780	342,825	290,398
Average ..		94,406	44,965	38,584	2,17,945	85,706	72,599
1948-49 ..	81	50,000	28,000	22,680	427,622	207,860	168,367
Grand Total.	..	427,622	207,860	177,017	1,299,402	550,685	458,766

FIG. 13. PERMANENT IMPROVEMENT SCHEMES—
SMALL IRRIGATION WORKS



In the first four years of its operation, the scheme of small irrigation works is reckoned to have resulted in an average additional output of 38,584 tons against 22,680 tons in 1948-49. The total cumulative yield was 290,398 tons in the former period compared with 168,367 tons in the latter. Aggregate additional output due to this scheme, since its inception to the end of 1948-49, is estimated at 458,765 tons (vide statement above).

WELL SUBSIDY SCHEME.

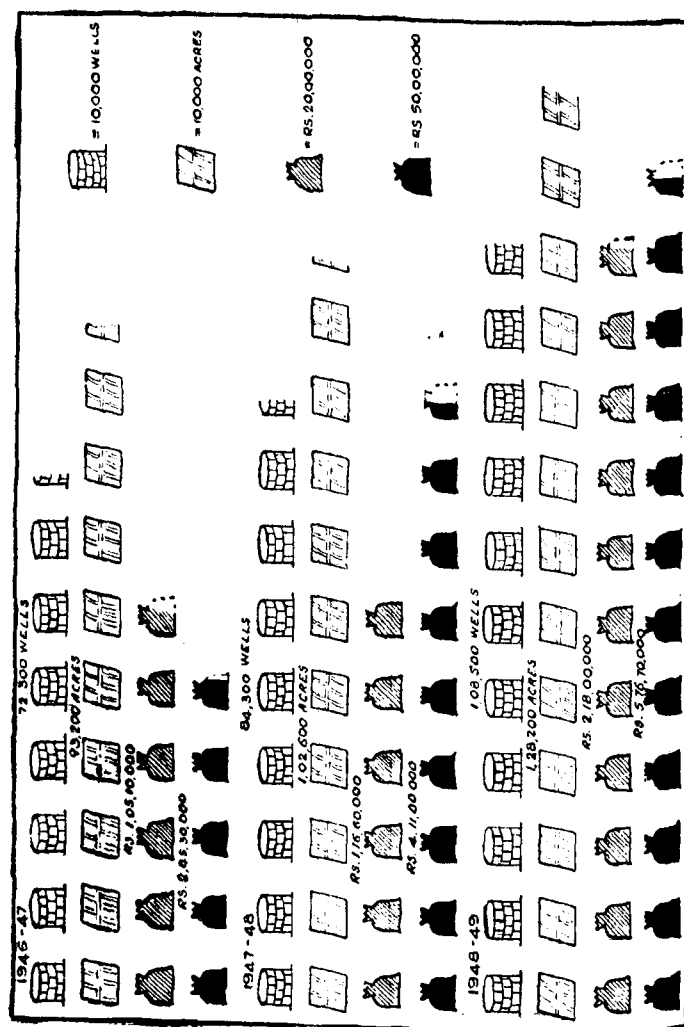
The Well Subsidy Scheme constitutes the most important of all the Permanent Improvement Schemes from the standpoint of expenditure. Of the total expenditure of Rs. 688.46 lakhs on Permanent Improvement Schemes, a sum of Rs. 580 lakhs or 84 per cent has been spent on subsidizing the sinking of wells. Disbursements reached a peak figure of Rs. 243.85 lakhs in 1946. The amount of subsidy, the number of wells subsidized and the number completed are given below :

Expenditure on Well Subsidy Schemes and the number of wells completed.

Schemes.	Amount disbursed. RS.	Number of wells subsidized.	Number of wells completed.
Old 1944 Scheme	1,40,625	594	293
Accelerated Scheme 1946	2,32,88,248	92,317	71,257
Ceded Districts Modified Scheme 1946.	10,97,477	2,490	773
New Well Subsidy Scheme 1947-48.	1,65,71,484	46,506	12,217
Total ..	4,10,97,834	1,41,907	84,540
Average ..	1,02,74,459	35,477	21,135
New Well Subsidy Scheme, 1948-49.	1,69,75,440	29,856	23,920
Grand total ..	5,80,73,274	1,71,763	1,08,460

Originally subsidy was granted for repair of old wells as well as for sinking of new ones. Since 1947-48 subsidy was confined to new wells. The subsidy for each well was raised from

FIG. 14. PERMANENT IMPROVEMENT SCHEMES—WELL SUBSIDY SCHEMES
(CUMULATIVE OUTPUT)



a maximum of Rs. 300 to Rs. 500 per well and in certain districts to Rs. 750; and in special cases like tanks in Malabar and South Kanara districts, the District Collector and the Board of Revenue have been authorized to grant subsidies up to Rs. 1,000 and Rs. 2,000 respectively.

Of the 171,763 wells subsidized, only 108,460 or 63 per cent have been completed. This is due to a variety of reasons, of which lack of supplementary finance is not the least important.

The area brought under irrigation by wells and the additional output due to this scheme are tabulated below :

Area brought under cultivation and the additional output due to Well Subsidy Scheme.

	Number of wells completed.	Area brought under irrigation (acres)	Additional output (tons).		Cumulative area. (acres)	Cumulative additional output (tons).	
			Under normal conditions.	Adjusted to Seasonal Factor.		Under normal conditions.	Adjusted to Seasonal Factor.
1944 Scheme, 1946—	293	271	174	158	271	174	158
(i) Accelerated scheme.	71,257	91,585	47,355	43,093	93,223	48,198	42,896
(ii) Ceded districts scheme 1946.	773	1,367	660	602			
New Well Subsidy Scheme 1947-48.	12,217	9,331	3,134	2,789	102,557	51,332	42,092
Total ..	84,540	102,557	51,332	46,642	108,051	59,704	51,146
Average.	21,135	25,639	12,833	11,661	49,013	24,926	21,286
New Well Subsidy Scheme 1948-49.	23,920	25,617	12,804	10,830	128,174	64,226	52,023
Grand total.	108,460	128,174	64,226	57,472	324,225	163,930	137,169

Under the accelerated scheme of 1946 the largest number of wells 72,030 (including wells in Ceded districts) had been sunk and after a sharp fall to 12,217 in 1947-48, the number of wells has risen to 23,920 in 1948-49. As more and more wells are sunk in lands suitable for well irrigation, the importance of the

Well Subsidy Scheme would naturally diminish. In 1948-49 the additional output is estimated at 10,830 tons after adjustment to Seasonal Factor.

In the first four years, average additional output was 11,661 tons against 10,830 tons in 1948-49. The total cumulative output was 85,146 tons up to 1947-48 and 1,37,169 tons up to 1948-49.

CONTOUR BUNDING.

Contour bunding operations for soil and water conservation were undertaken in Visakhapatnam and Ceded districts in the early years of the campaign. In 1948-49 this scheme was strengthened by the appointment of a Special Assistant Agricultural Engineer and 18 Soil Conservation Assistants with the necessary administrative staff. The effects of these operations are permanent but indirect, not capable of precise measurement. In the present assessment no credit is given to any additional production under this scheme.

The total expenditure on all the Permanent Improvement Schemes in the six years amounted to Rs. 688.46 lakhs (vide Appendix XIII). It has resulted in extension of cultivation to the extent of 210,995 acres of which 175,386 acres were due to the scheme of free assignment of land, 35,569 acres due to the scheme of land development by mechanical cultivation in 1948-49 alone (vide Appendix XIV). The total area brought under irrigation was 555,786 acres of which 427,622 acres were irrigated by the small irrigation works and 128,174 acres by subsidized wells (vide Appendix XIV). For the total expenditure of Rs. 6,88,46,235 incurred on these schemes the additional output is estimated at 9,67,646 tons valued at Rs. 29,73.70 lakhs (vide Appendix XV).

The average area brought under cultivation in the first five years was 33,963 acres per annum against 41,740 acres in 1948-49 (vide Appendix XIV); this increase in the latter year is mainly due to land development by mechanical methods

accounting for about 35,000 acres. The average area to which irrigation facilities were given in the four years, 1944-48, was 94,406 acres per annum against 50,000 acres in 1948-49 (vide Appendix XIV). This decline in irrigated area is mainly due to the small number of small irrigation works completed in the latter year. However, area under effective irrigation may rise in the coming years as the Tank Improvement Scheme gets into stride. The average annual expenditure in the first five years was Rs. 100.63 lakhs against Rs. 185.03 lakhs in 1948-49. The average additional output of foodgrains in the first five years was 133,371 tons against 300,792 tons in 1948-49 (vide Appendices XIII and XV).

The average value of additional output of foodgrains from these development schemes of a permanent character at the internal prices prevailing in the different years works out to Rs. 3,42.68 lakhs per annum in the first five years against Rs. 12,60.32 lakhs in 1948-49 (vide Appendix XV). The sharp increase in the value of additional output has been influenced by two factors—primarily quantity and secondarily price. Output has increased year by year as a result of the cumulative increase in the area brought under cultivation and irrigation. Price too has steadily risen. The increase in value attributable to rise in output is Rs. 8,69.09 lakhs and that due to rise in price is Rs. 48.55 lakhs. Computed in terms of import prices, the value of additional output works out to much bigger figures—Rs. 5,32.33 lakhs per annum in the first five years and Rs. 18,83.26 lakhs in 1948-49 (vide Appendix XV).

Results of Intensive Production Schemes

Intensive Production Schemes consist of (i) distribution of chemical fertilizers (ii) distribution of groundnut and other oil-cakes (iii) supply of green-manure seeds, (iv) compost-making (v) multiplication and distribution of improved seeds (vi) free distribution of manure and seeds and (vii) measures to control

pests and diseases. One common feature of these schemes is that expenditure on them has to be recurring if they are to be continuously productive of result.

CHEMICAL FERTILIZERS.

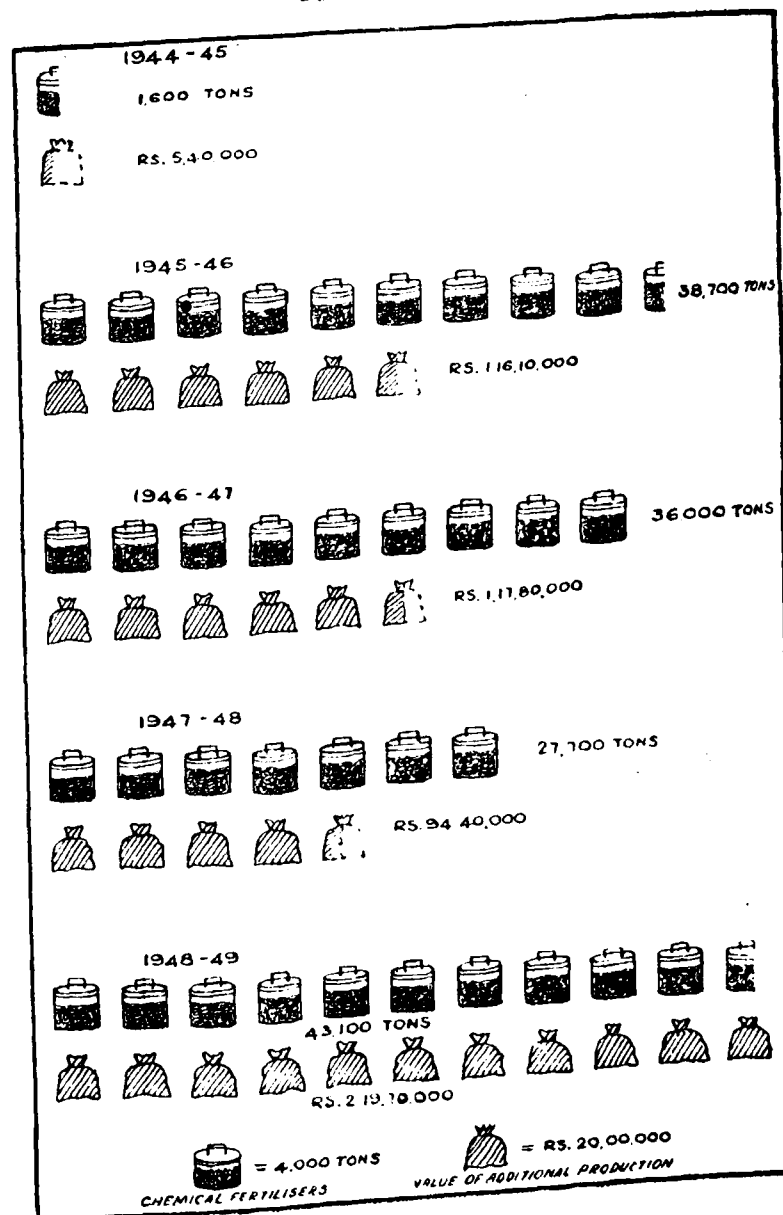
On the intensive front pride of place goes to distribution of chemical fertilizers under State Trading Schemes. Both allotment and quantity supplied have gradually increased as may be seen from the table below :

Allotment and supply of chemical fertilizers and additional output of foodgrains (tons).

Year.		Allotment.	Quantity supplied.	Quantity applied to food production.	Additional output.	
					Under normal conditions.	Adjusted to Seasonal Factor.
(1)		(2)	(3)	(4)	(5)	(6)
1944-45	.. ..	31,646	31,646	1,646	2,469	2,247
1945-46	.. ..	68,680	68,680	38,680	58,020	47,576
1946-47	.. ..	67,350	66,009	36,009	54,013	48,072
1947-48	.. ..	62,560	57,719	27,719	41,577	34,093
Total	.. ..	2,30,236	2,24,054	1,04,054	1,56,079	1,31,988
Average per year	.. ..	57,559	56,013	26,013	39,020	32,997
1948-49	.. ..	78,500	73,165	43,165	64,747	52,445
Grand total	.. ..	3,08,736	2,97,219	1,47,219	2,20,826	1,84,433

In the pre-war years the plantations in the State consumed on an average 30,000 tons of chemical fertilizers per annum. Deducting this quantity from the annual allotments, the rest may be assumed to have gone into the production of foodgrains. On the basis that application of chemical fertilizers would result in an additional food production of 1.5 times their weight, output under normal conditions has been calculated, and then adjusted to the Seasonal Factor of the year. The quantity of chemical fertilizers supplied has increased in the course of the six years, as also the additional output

FIG. 15. INTENSIVE PRODUCTION SCHEMES—CHEMICAL FERTILIZERS



However, the supply of chemical fertilizers still remains far behind the requirements of the State computed at 100,000 tons per annum.

OIL-CAKES.

(a) Groundnut-cake.

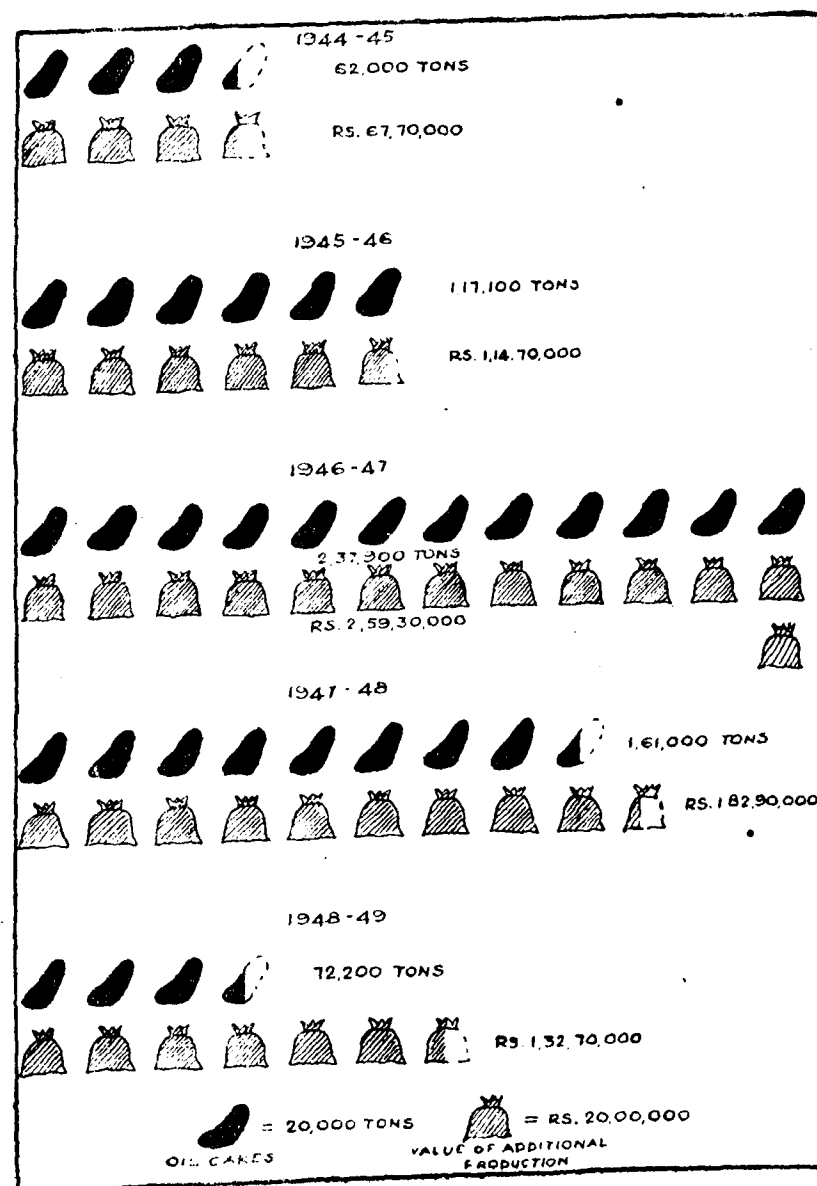
Among the organic manures, groundnut-cake holds a high place and until January 1949, distribution of groundnut-cake to agriculturists was regulated and effected through Agriculture Departmental depots or co-operative societies. The quantity distributed and the additional output attributable to this scheme are tabulated below :

Distribution of Groundnut-cake and Additional Output (tons).

Year.					Additional output.	
					Under normal conditions.	Adjusted to Seasonal Factor.
				Quantity distributed.		
1944-45	..	..	..	57,320	28,660	26,081
1945-46	..	..	..	1,13,285	56,642	46,446
1946-47	..	..	..	2,35,200	1,17,600	1,04,664
1947-48	..	..	..	1,61,051	80,526	66,031
			Total	5,66,856	2,88,428	2,43,222
Average	..	..	..	1,41,714	70,857	60,805
1948-49	..	..	..	72,222	39,111	31,680
			Grand total	6,45,078	3,22,539	2,74,902

Government have been pursuing a policy of discouraging exports of groundnuts and encouraging exports of groundnut oil with the object of retaining as much of oil-cake as possible for the State. Control over the distribution of groundnut cake had been only partial; 60 per cent of the output by millers was brought under the system of controlled distribution and the rest was allowed to go into the free market. Since January 1949, even this limited control was lifted; in the year

FIG.16. INTENSIVE PRODUCTION SCHEMES—GROUNDNUT AND OTHER OIL-CAKES



1948-49, after decontrol from January to April, appreciable quantities of groundnut-cake would have gone through normal trade channels to the raising of crops; data relating to these quantities obtained in the free market not being available, no account is taken of them in the present assessment. Additional output is estimated on the basis that it would be equivalent to half the weight of oil cakes applied, after allowing for the Seasonal Factor.

(b) *Other oil-cakes.*

Under this scheme castor oil-cake and others were also distributed in the years 1944-47. The quantity supplied and the estimated additional production are given below :

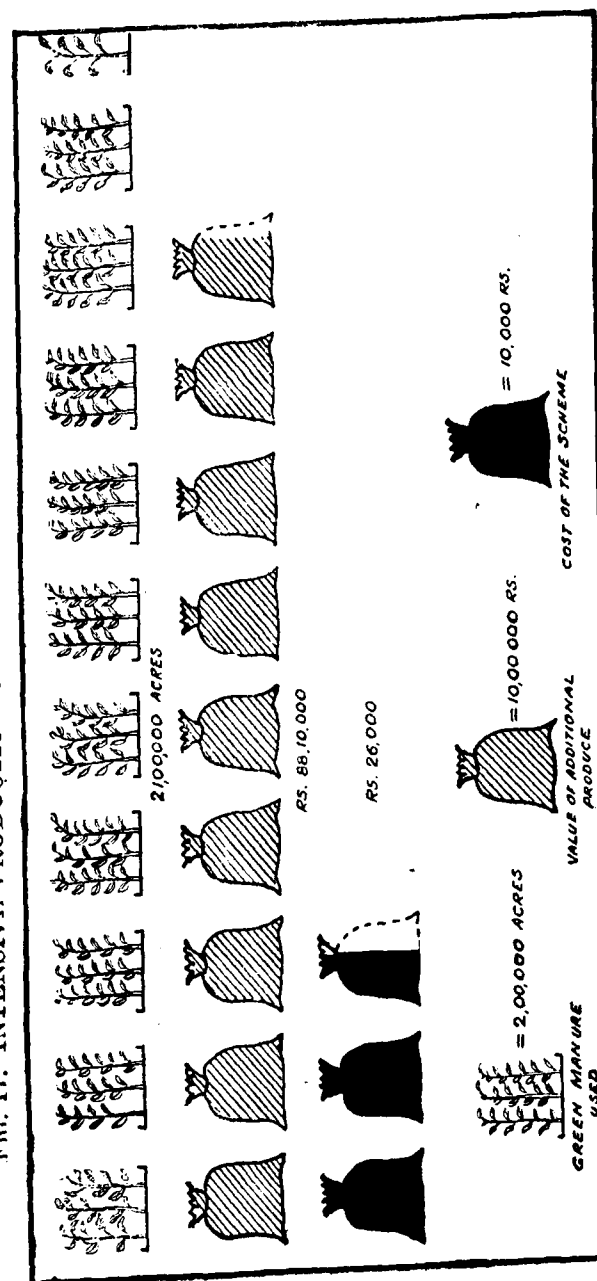
Quantity of other oil-cakes distributed and the estimated additional production (tons).

Year.					Additional output		
					Castor and other cakes.	Under normal conditions.	Adjusted to Seasonal Factor.
1944-45	..	..	..	..	4,666	2,333	2,123
1945-46	..	..	..	..	3,849	1,925	1,579
1946-47	..	..	..	..	2,664	1,332	1,185
Total	..	..	..	..	11,179	5,590	4,887

After 1946-47, castor and other oil-cakes were freed from controlled distribution.

The distribution of chemical fertilizers, groundnut and other oil-cakes was subsidized by Government to the extent of 10 per cent after meeting the entire cost of administration charges. In the four years, 1944-48, such expenditure on this scheme is estimated at Rs. 30 lakhs. For this expenditure, the additional production is estimated at 380,097 tons of foodgrains (vide Appendix XVII). In 1948-49 expenditure on chemical fertilizers alone was Rs. 4,70,482 excluding expenses incurred on the distribution of groundnut-cake up to January 1949 when it was decontrolled. The additional output due to

FIG. 17. INTENSIVE PRODUCTION SCHEMES—GREEN MANURE IN 1948-49



The quantities of compost made and distributed since 1945-46 are tabulated below :

Compost-making in urban and rural areas (tons).

Year.	In municipalities and panchayats.		In rural areas.		Total distributed.
	Prepared.	Distributed.	Prepared.	Distributed.	
(1)	(2)	(3)	(4)	(5)	(6)
1945-46	80,340	56,360	17,393	13,774	70,134
1946-47	101,500	78,980	9,376*	9,376*	88,356
1947-48	104,920	50,600	7,460	5,660	56,260
Total	286,760	185,940	34,229	28,810	214,750
Average	95,586	61,980	11,430	9,603	71,583
1948-49	108,119	102,000	20,980	20,980	122,980
Grand total ..	394,879	287,940	55,209	49,790	337,730

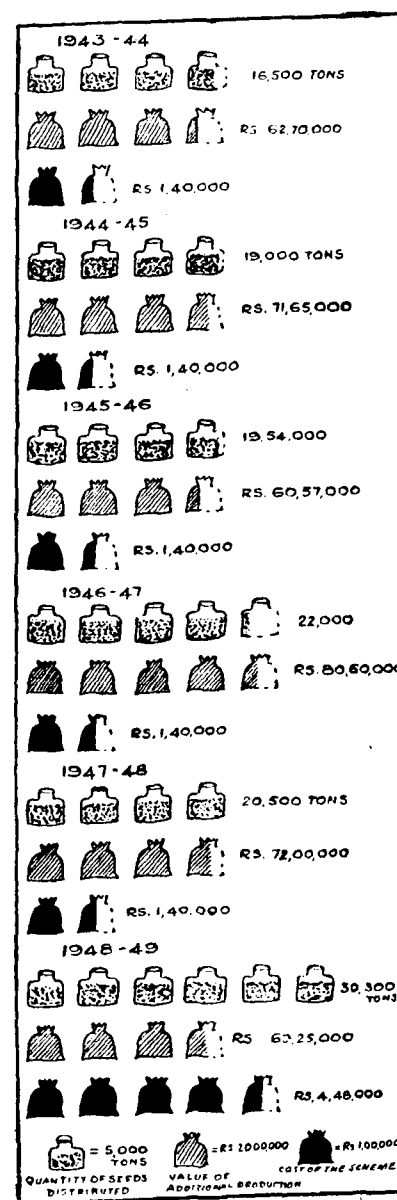
* Calculated on an average rate of 2 tons per pit of compost.

In the initial period sentimental objection to the use of town compost prevailed and all that was made was not utilized. But nothing succeeds like success and this aversion has almost disappeared now. No expenditure was incurred by Government on this scheme up to 1947-48 and no account was taken of any additional output on account of it. In 1948-49 compost-making in towns and panchayats did not entail any expenditure, but rural compost-making was encouraged by the payment of bonus to the extent of Rs. 21,000 (vide Appendix XVI). There has been an overall improvement in the preparation of urban and rural compost distribution. The average quantity of compost distributed was 71,583 tons per annum in the first three years and 122,980 tons in 1948-49. The area covered by 102,000 tons of urban compost was 20,544 acres and 24,000 tons of rural compost, 1,178 acres; and the additional output is estimated at 2,199 tons of foodgrains, after adjustment is made for the Seasonal Factor (vide Appendix XVII).

MULTIPLICATION AND DISTRIBUTION OF IMPROVED STRAINS OF SEEDS.

Multiplication and distribution of high-yielding strains of seeds is one of the most important schemes of the Grow More

FIG.19 INTENSIVE PRODUCTION SCHEMES—IMPROVED STRAINS OF SEEDS



Food Campaign. Experiments in agricultural farms have demonstrated that the additional yield from the use of improved strains of seeds would range from 10 to 20 per cent over output from ordinary seeds commonly used by ryots. There is a school of opinion which holds that concentration on this single scheme alone would wipe out the entire deficit in the food supply of this country. Evolution and multiplication of improved seeds, however, is a time-consuming process despite the fact that the percentage of area under improved seeds has been steadily increasing in recent years and that the scheme has been given a pivotal place among the intensive production measures.

In addition to improved varieties of seeds raised in Government Agricultural Farms, their large-scale multiplication is undertaken by selected ryots all over the State in patta lands described as "Primary Seed Farms". The area of seed farms, the production of improved seeds and the additional output attributable to their use have recorded a steady progress, as may be seen from the following table :

Improved strains of seeds and additional production (tons).

Year.				Area of seed farms.	Quantity of seeds produced.	Additional output	
						Under normal conditions.*	Adjusted to Seasonal Factor.
				ACRES.			
1943-44 ..	..	..	..	25,720	16,535	28,107	25,296
1944-45 ..	..	..	..	29,368	19,089	32,809	29,856
1945-46 ..	..	..	..	33,378	19,549	30,276	24,826
1946-47 ..	..	..	..	34,600	21,995	36,964	32,898
1947-48 ..	..	..	..	34,987	20,492	31,737	26,024
	Total ..			158,053	97,660	159,893	138,900
Average ..	..	..	..	31,611	19,532	31,978	27,780
1948-49 ..	..	..	..	50,922	30,303	49,870	40,395
	Grand total ..			208,975	127,965	209,763	179,295

*Calculated on the basis that 10 per cent of the normal output per acre is the additional yield and that the seed rate of paddy is 67 lb. per acre.

In the first five years, the additional output estimated to have arisen out of this scheme is computed at 138,900 tons or on an average of 27,780 tons per annum (vide Appendix XVII). Expenditure on this scheme took the form of subsidy paid for multiplication and distribution of the improved seeds. In the five years total expenditure incurred was Rs. 6,88,000 or an average annual expenditure of Rs. 1,37,600 against an expenditure of Rs. 4,48,326 in 1948-49 (vide Appendix XVI). The average additional output of foodgrains was 27,780 tons per annum in the first five years against 40,395 tons in 1948-49 (vide Appendix XVII). There has been a steady uptrend in the quantity of improved strains of seeds produced and in the additional yield due to this scheme.

FREE DISTRIBUTION OF MANURES AND SEEDS.

This is a new scheme which came into operation in 1948-49. Free distribution of manure and seeds to poor and deserving ryots entailed a cost of Rs. 14,873 (vide Appendix XVI) and is estimated to have yielded an additional output of 33 tons of foodgrains (vide Appendix XVII).

CONTROL OF PESTS AND DISEASES.

This is yet another new scheme, started in 1948-49, which promises to yield good results. A separate plant protection staff was appointed in January 1949 to take special measures to control pests and diseases. Chemicals and insecticides were sold to ryots at one-third the cost price and the total expenditure on it amounted to Rs. 1,24,121 (vide Appendix XVI). About 100,180 acres came under the treatment resulting in an estimated additional yield of 44,874 tons of foodgrains after allowance is made for the Seasonal Factor (vide Appendix XVII).

Aggregate Result of the Intensive Production Schemes.

The total expenditure on all the seven Intensive Production Schemes in the six years amounted to Rs. 47.93 lakhs. In the first year of the campaign, 1943-44,

FIG. 20. INTENSIVE PRODUCTION SCHEMES—FREE DISTRIBUTION OF SEEDS AND MANURES IN 1948-49.

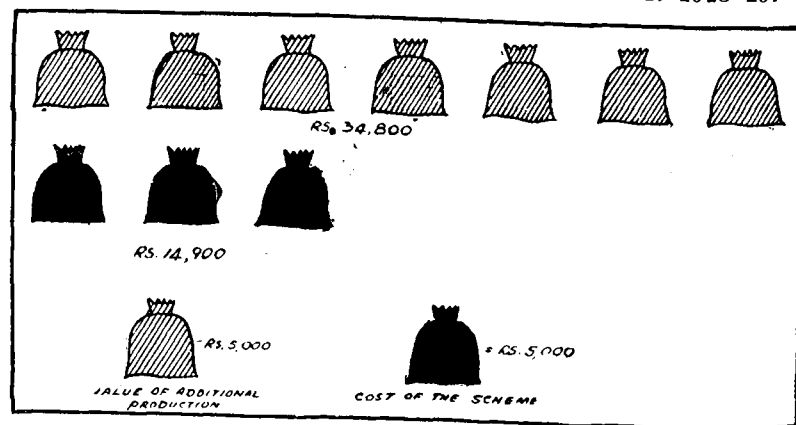
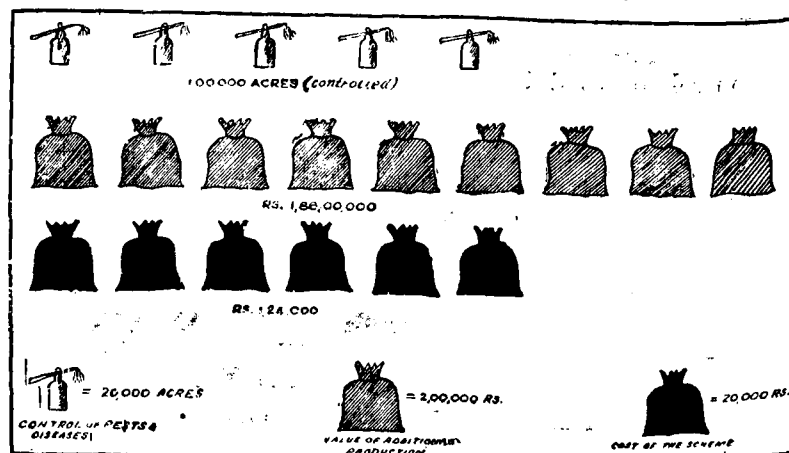


FIG. 21. INTENSIVE PRODUCTION SCHEMES—CONTROL OF PESTS AND DISEASES IN 1948-49.



the scheme for the multiplication and distribution of improved strains of seeds alone was in operation. From 1944-45 subsidized and controlled distribution of chemical fertilizers had become an important plank in the campaign, supported by distribution of groundnut and other oil-cakes. Schemes for the production of green manure and composts, though initiated in 1944-45, involved no expenditure until 1948-49 and no accounts is therefore taken of their contribution to additional output. Total expenditure on the schemes in operation in the first five years amounted to Rs. 36.88 lakhs or an average expenditure of Rs. 7.38 lakhs per annum against Rs. 11.05 lakhs in 1948-49 (vide Appendix XIX). The increase in expenditure in the latter year is mainly due to larger expenditure on the scheme for improved seeds, being almost a three-fold increase compared with the average of previous years, and an expenditure of Rs. 1.24 lakhs on the new scheme for control of pests and diseases. Another scheme of the latter year, entirely new, is free distribution of seeds and manure to poor ryots costing about Rs. 15,000. Two more schemes—green manure and compost-making—were old ones, but new in the sense that expenditure came to be incurred and credit taken for additional yield.

The additional yield due to the Intensive Production Schemes in the first phase of five years is estimated at 518,997 tons or an average of 103,799 tons per annum and 192,648 tons in the second phase of 1948-49 (vide Appendix XVII). The increase in output is mainly due to the two new schemes, control of pests and diseases accounting for about 45,000 tons and green manure for about 21,000 tons.

The total additional output due to these schemes in all the six years is estimated at 711,645 tons (vide Appendix XIX). On the basis of current internal prices in the respective years, the value of this additional output could be put down at Rs. 21,15.64 lakhs and on the basis of import prices at Rs. 30,18.1 lakhs.

Results of the Grow More Food Campaign.

The benefits of the Grow More Food Campaign may be viewed from two stand-points: from that of Government and from that of the over-all economy of the State. Expenditure incurred by Government on the Permanent Improvement Schemes and Intensive Production Schemes, the yield resulting from them separately and together and the value in terms of internal and import prices as prevalent in the various years are given in the table below:

Results of the Grow More Food Campaign in the years 1948-49.

Year.	Expenditure.	Yield.	Value of produce at	
			Internal prices.	Import prices.
(1)	(2)	(3)	(4)	(5)
<i>Permanent Improvement Schemes.</i>				
	RS.	TONS.	RS.	RS.
1943-48	5,03,16,187	666,854	17,13,38,119	26,61,66,734
Average per annum	100,63,237	133,371	3,42,67,624	5,32,33,357
1948-49	185,30,048	300,792	12,60,31,848	18,83,25,871
Total ..	6,88,46,235	967,646	29,73,79,967	45,44,92,655
<i>Intensive Production Schemes.</i>				
1943-48	36,88,000	518,997	13,08,44,927	18,12,14,225
Average per annum	7,37,600	103,799	2,61,88,085	3,62,42,845
1948-49	11,04,885	192,648	8,07,19,512	12,06,16,913
Total ..	47,92,885	711,645	21,15,64,439	30,18,31,138
Grand total ..	7,36,39,120	1,679,291	50,89,34,406	75,63,23,793
<i>Permanent Improvement schemes and Intensive Production Schemes together.</i>				
1943-48	5,40,04,127	1,185,851	30,21,83,046	44,73,81,009
Average per annum	1,08,00,837	237,170	6,04,36,609	8,94,76,202
1948-49	196,34,933	493,440	20,67,51,360	30,89,42,784
Total ..	7,36,39,120	1,679,291	50,89,34,406	75,63,23,793

Viewing the results from the Government angle, for an aggregate Government expenditure of Rs. 739.39 lakhs made up of Rs. 6.88.46 lakhs on Permanent Improvement Scheme

and Rs. 47.928 lakhs on Intensive Production Schemes, there has resulted a total estimated additional output of 1,479,291 tons composed of 767,646 tons attributable to the former and 711,645 tons to the latter.

In 1948-49 alone, the Grow More Food Campaign has involved an expenditure of Rs. 1.96.35 lakhs made up of Rs. 1.85.30 lakhs on Permanent Improvement Schemes and Rs. 11.05 lakhs on Intensive Production Schemes against an average expenditure of Rs. 1.08.00 lakhs composed of Rs. 100.63 lakhs on the former and Rs. 7.376 lakhs on the latter in the preceding five years.

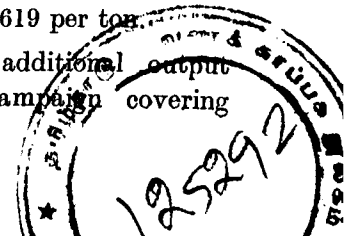
This expenditure, it has been estimated, has resulted in an additional output of 493,440 tons of which 300,792 tons are attributable to Permanent Improvement Schemes and 192,648 tons are to Intensive Production Schemes. As against this average annual additional output attributable to these two schemes in the earlier phase of the five years was 237,170 tons made up of 133,371 tons by the former and 103,799 tons by the latter. This distinct increase in the additional output in 1948-49 is no doubt largely due to the cumulative effect of the Permanent Improvement Schemes carried out in the preceding years.

The value of the additional production in 1948-49 in terms of internal prices was Rs. 20.67.51 lakhs compared with the average annual value of 6.04.366 lakhs in the years 1943-44. The rise in value, which is more than proportionate to the increase in output is due to the sharp rise in the price of foodgrains from about Rs. 250 or 277 per ton in the first year to Rs. 419 in 1948-49.

Had the Grow More Food Campaign not been launched and had the State imported all the foodgrains, estimated to have been produced by it, we would have paid Rs. 30.89.43 lakhs in 1948-49 at the high import price of Rs. 619 per ton.

The aggregate value of the entire additional output attributable to the two phases of the campaign covering

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a period of six years in all amounts to Rs. 50,89.34 lakhs in terms of the average internal prices current in the period and at least a sum of Rs. 75,63.24 lakhs in terms of import prices.

In other words but for the Grow More Food Campaign, it looks inevitable this State would have been put to the necessity of spending Rs. 75,63.24 lakhs outside by way of imports.

Viewed from the economy of the State, the agriculturists should have spent for the additional output of 14,79.291 tons, Rs. 33,92.90 lakhs (on the assumption that cost of production is two thirds of value). Expenditure by Government and the people would then be of the order of Rs. 41,29.29 lakhs and the net gain to the economy would be Rs. 9,60.05 lakhs (Rs. 50,89.34 lakhs—Rs. 41,29.29 lakhs) or Rs. 160.01 lakhs per annum. If the value of the additional output in terms of imported prices is taken, the gains to the economy of the State would be of the order of Rs. 34,33.95 lakhs (Rs. 75,63.24—41,29.29 lakhs) or Rs. 5,72.325 lakhs per annum.

At the current internal prices, prevailing in the respective years, the additional output of 1,479,291 tons of foodgrains due to Grow More Food Campaign must have fetched a price of Rs. 50,89.34 lakhs. Together with Government expenditure of Rs. 799.39 lakhs a sum of Rs. 58,25.73 lakhs had gone into the agricultural sector in a period of 6 years or Rs. 81 lakhs per month. Government expenditure alone amounts to about Rs. 10.23 lakhs per month.

In the last fifty years, never had this State experienced such adverse seasonal conditions for six consecutive years as it did in the years, 1943-44 to 1948-49. The Seasonal Factor in these years were 90, 91, 82, 89, 82 and 81 for paddy and 81, 88, 73, 73, 78 and 80 for millets. Had the monsoons been merciful, the results of the campaign would have been even more striking.

The campaign had also been handicapped in the earlier years by continued shortage in the supply of iron and steel for agricultural purposes, implements and pumpsets, diesel oils and fertilizers. As against the State's requirements of about 100,000 tons of iron and steel for the four years ending 1947, the allotment was only 36,568 tons, and actual supplies even less—about 25,551 tons only. The position with regard to fertilizers was not so bad and it has shown definite signs of improvement in 1948-49. By the end of 1952, the Fertilizer Factory at Sindri is expected to go into production and allotment to this State may be expected to meet fully the annual requirements of 100,000 tons. Scarcities experienced in the case of groundnut-cake are being eliminated by the policy of discouraging exports of groundnut kernel from the State and encouraging the export of oil, as also by the restoration of the free market for its distribution since January 1949.

Another factor that affects the results of the Grow More Food Campaign is the change in the pattern of land utilization. In the earlier years of the campaign, there was a gradual loss of acreage under millets and some gain to area under groundnuts. This trend has, however, got reversed in 1948-49. The area under millets has been recovering from 11,680,642 acres (the average of the previous five years) to 12,374,677 acres in this year and the area under groundnut has declined from 4,180,000 acres (average of the previous five years) to 3,698,830 acres in this year or by 481,170 acres. This is a positive gain to food production, but its repercussions on the supply position of oilseeds require separate investigation. The general problem of crop planning and land utilisation are discussed in subsequent chapters.

Towards a more Scientific Assessment.

The above assessment has its limitations. The method adopted for estimating additional production of any given Grow More Food measure is to multiply an assumed increase in yield per unit of the measure by the total number of units

actually distributed. For instance, in assessing the additional output from the distribution of ammonium sulphate, a certain rate of increase in yield per ton of the fertilizer is taken for granted (based on the results obtained in experimental farms) and is multiplied by the total quantity distributed. The results of such a method would be vitiated in several ways: (1) the entire quantity distributed might not have been applied to food crops; there might have been some diversion to non-food crops and in the case of oil-cakes to cattle feed, etc.; (2) the doses applied might have differed from those recommended by the Department of Agriculture; (3) the conditions of the cultivator's farm might not have been identical with those of the experimental farms; (4) there might have been a combined application of more than one Grow More Food measure, in which case the resultant effect would not necessarily be a simple addition of the individual responses to each of the measures.

In a scientific assessment, a clear knowledge of the actual acreage in receipt of Grow More Food aids is of basic importance and the rates of response on the cultivator's fields must be studied through controlled experiments. At a Conference of Government Agricultural Statisticians at Indore held in May 1950 a scheme for scientific assessment was evolved and is now tried out in the State. Details of this scheme are discussed in the next chapter.

Summary of Conclusions

To sum up the salient achievements of the Grow More Food Campaign :

(1) Additional area brought under cultivation under the scheme of land assignment depending as it does on the availability of land on the margin of cultivation has declined from 78,965 acres in 1943-44 to 5,571 acres in 1948-49, although the cumulative yield in the period has been on the upgrade rising from 34,634 tons to 71,031 tons.

(2) A new scheme of land development by mechanical cultivation was introduced in 1948-49 bringing under cultivation 35,569 acres, giving an additional output of 7,203 tons of foodgrains.

(3) A larger supply of modern machinery for cultivation and water lift became more feasible in 1948-49 than in any of the previous years and is estimated to have added 2,168 tons of foodgrains to the total output.

(4) Under the Minor Irrigation Works an area of 50,000 acres was brought under irrigation in 1948-49 against an average of 94,406 acres in the previous four years; registering a corresponding fall in the additional contribution of the year. But the decline is again more than made good by the cumulative increase in the irrigated area.

(5) The number of wells completed was 23,920 in 1948-49 against an average of 21,135 in the previous years of the campaign; the additional output put down at 10,830 tons against the annual average of 11,661 tons for the previous years.

(6) The scheme of operations for contour bunding was strengthened by the appointment of a special staff in 1948-49.

(7) There is a notable improvement in the supply of chemical fertilizers. The quantity supplied was 93,165 tons in 1948-49 against an average annual supply of 56,013 tons in the preceding years.

(8) Although in January 1949 control over the distribution of groundnut-cake was lifted, the quantity distributed in the first nine months of 1948-49 when the control was in force was 722,222 tons against an average of 141,714 tons in the previous years.

(9) A new scheme for multiplication and distribution of green manure seeds was introduced in 1948-49 under which 2,584 tons of seeds were raised to cover an area of 2.09 million acres.

(10) In 1948-49 the scheme of compost-making in rural and urban areas was taken up and at the rate of Re. 1 per ton

a bonus amount of Rs. 21,000 was paid towards rural compost-making.

(11) Under the scheme of multiplication and distribution of improved strains of seeds, steady progress was maintained. The area of seed farms rose from an average of 31,611 acres to 50,922 acres in 1948-49 and the quantity of seeds raised rose from an average of 19,532 tons in the preceding years to 30,303 tons in 1948-49.

(12) The scheme of free distribution of manure and seeds was introduced for the first time in 1948-49. Entailing a cost of Rs. 14,873, it added 33 tons to the supply of foodgrains.

(13) The scheme for control of pests and diseases was yet another measure started in 1948-49. About 100,180 acres came under treatment against diseases and pests resulting in an estimated additional yield of 44,874 tons of foodgrains.

(14) The Seasonal Factor continued to be unfavourable at 81 in 1948-49.

(15) A favourable sign in 1948-49 was the increase in the area under millets which recovered from earlier five-year average of 11,680,642 acres to 12,374,677 acres reversing the downtrend. Correspondingly the area under groundnut declined from the five-year average of 4,180,000 acres to 3,698,830 acres in 1948-49.

(16) The method of assessment so far adopted has grave limitations. A scientific method for estimating the additional output has been initiated this year.

CHAPTER V.

AGRICULTURAL STATISTICS.

Introduction

The statistical assessment of the results of the Grow More Food Campaign attempted in the preceding chapter is highly approximate; it has no claims to scientific accuracy. Its accuracy is but a function of the accuracy of the area under food crops, the area actually benefited by the Grow More Food aids, the normal yield per acre, the rate of responses assumed for various aids and the Seasonal Factor. Of these the first is fairly correct in ryotwari areas, but not so in the zamindari tracts; the normal yield calculated in 1919, over three decades ago, could not reflect the present day conditions, as it would not fully take into account the long-term changes either in methods of cultivation or in climatic conditions. Although the crop-cutting experiments conducted in more recent years by the Indian Council of Agricultural Research lend support to the accuracy of the estimates of normal yield, unless the question of normal yield is once again thoroughly examined and finally settled there will creep in some minor errors, sufficient to vitiate our conclusions. The procedure of arriving at the Seasonal Factor too has got to be refined, if estimates of output of various crops are to be fairly accurate.

This naturally leads up to a study of the present methods and the existing machinery for the collection, sifting and analysis of agricultural statistics.

Thanks to the ryotwari system of land tenure, which until the abolition of zamindaris covered nearly three-fifths of the total area of this State, and the requirements of the revenue authorities for the assessment of land revenue, a fairly elaborate system for the collection of agricultural statistics had been evolved in the early period of the British rule. As

Government wanted to have advance information on the productivity of the soil to estimate the yield of land revenue for budgetary purposes, the revenue department had devised a system of crop forecasts. This constitutes the central core of agricultural statistics. At present crop forecast reports are issued in this State for the following 22 crops: paddy, cholam, cumbu, ragi, korra, varagu, samai, maize, sugarcane, cotton, blackgram, redgram, greengram, horsegram, bengalgram, groundnut, gingelly, castor, tobacco, pepper, ginger and senna. The number of forecasts vary with the crop, ranging from as many as nine in the case of cotton to a single forecast in the case of maize, castor, horsegram and green gram.

The Agency and Method of Collection

The primary agency for the collection of agricultural statistics relating to crop forecasts is the karnam or the village accountant who records the area and outturn of crops in a register known as the *adangal*. In the ordinary course of his duties, the village accountant prepares a monthly register of cultivation in his village for the purpose of furnishing the Taluk Office with a statement of the area cultivated under each crop during the month and the preceding ones, total area cultivated under all crops, areas irrigated and un-irrigated under first crop, second crop, etc. The cumulative total of the area under cultivation is recorded for the month to which the statement relates. The areas under various crops are not recorded by the karnam after measuring every field. When the entire number or a registered subdivision of a field is cultivated, its area according to the settlement register is adopted, and wherever only a part of a number or subdivision is cultivated, the area is measured only if a charge for water has to be imposed; in all other cases, it is only estimated. The karnam also prepares a monthly abstract statement of the area under different crops and estimates the outturn of the produce, the latter being reported in terms of annas or sixteenths of a rupee—although a normal

crop is represented by an outturn of 12 annas only. The area of the crop standing at the end of the month too finds an entry in this statement and its condition is noted as good, normal, fair, poor or bad. By the twenty-fifth of every month the karnam sends the monthly cultivation account and the abstract statement to the Revenue Inspector who examines and checks the account with the Season Report to find out whether cultivation—wet and dry—has followed rainfall. On the strength of his personal observation during the month, the Revenue Inspector enters his remarks on the accuracy of the accounts, the condition and prospects of crops, etc. Both the Revenue Inspectors and Tahsildars are expected to visit select villages periodically and check the accuracy of the village accounts. The abstract statement of cultivation is then forwarded to the Taluk Office.

Each Revenue Inspector maintains for his firka, forecast registers of crops, in several sections—one for each crop. For such of the months in which forecast returns on crops from particular villages are not received in time, the area cultivated up to the end of the month is worked out. The estimate of outturn in this register however is for the whole crop sown, and not for the area actually harvested. The Revenue Inspector works out the average outturn for the firka.

For villages from which the cultivation accounts are not received in time, the Revenue Inspector frames an estimate of the area sown with reference to the area reported in the previous month, the state of season and the condition prevailing in adjacent villages and incorporates it in the report for the firka, necessary corrections being subsequently made in the registers after the receipt of actual figures. This register is forwarded to the Taluk Office so as to reach on the 28th of every month, the last date for the receipt of the forecast reports.

The Taluk Register of Crop Forecasts is prepared in the Taluk Office from the various firka registers. Here too suitable

estimates are incorporated in the accounts wherever a firka report is not received in time. After entering his own estimate of the average outturn of the taluk, the Tahsildar submits the taluk returns of crop forecast to Government on due dates, prescribed for the various crops.

Besides the taluk returns of crop forecasts, are also received reports from District Agricultural Officers, describing the nature of the season, the extent and nature (normal or otherwise) of the area sown and an estimate of the percentage outturn of crops in relation to normal. These reports are used to check or supplement the reports received from Tahsildars.

Methods of estimating Yields of Crops

The yield of a crop is governed by the acreage under the crop, the normal yield per acre and the Seasonal Factor—a ratio, expressing the relation of the crop in the field and the crop in a normal year, given in percentage. The reports of acreage under various crops received from Tahsildars are scrutinized and consolidated for each district after making due allowance for under-reporting and non-reporting. For taluks from which reports are not received in time, estimates of area are framed with reference to the area already reported in the previous forecast returns for the year, the area reported for the current month in the other taluks, the increase or decrease of the current year's figures over the corresponding figures for the previous year in the other taluks and the conditions of the season. Under-reporting of areas by Taluk Officers is corrected by increasing the reported figures suitably with reference to the percentage of increase noticed in previous years between the estimates of area reported for the final forecast reports and the actual figures of area received at the end of the year and the seasonal conditions reported during the year.

The normal yield per acre was fixed in 1919 by the Director of Agriculture for each crop for each district. His calculation

of normal yield is based on the results of crop-cutting experiments, the yield in Government farms, the local knowledge of Agricultural Officers and the results of a comparison of the figures of yield with the figures of net exports and estimates of consumption (vide Appendix VIII to the Annual Season and Crop Report of the Madras State published by the Economic Adviser).

Crop-cutting Experiments

In addition to the estimate of normal yield made in 1919, crop cutting experiments on paddy, cholam, cumbu and ragi were conducted in this State in the four years from 1936-37 to 1939-40. The experiments in 1937-38 were found to be unsatisfactory and the results were rejected. Later in the three years commencing from 1942-43, fresh experiments were carried out for irrigated and unirrigated crops separately. Fields and villages for experiments were selected first on the method of sampling. The total number of villages, say N in each district, was first divided by 250, the size of the sample fixed, and the quotient " r " obtained. If " r " was an integer, every r -th village was selected from the list of villages arranged serially for the district. If it was not an integer, the lower integer was taken and the sampling done in the same way in order to arrive at 250 villages on the whole. Each year a fresh set of villages was selected in order to make the experiments as far representative as possible of the whole district. In the selection of plots, the criterion was that they were to include "normal" "below normal," and "above normal" in such proportion as to truly reflect the actual distribution of the land in the village and to give results of normal yield per acre as close to the true normal yield as possible.

On a comparison it was seen that the estimates of yield published in the Season and Crop Report for the State as a whole agreed fairly closely with the actuals according to the results of the crop-cutting experiments so far conducted; the margin of the difference was 2.3

per cent of the actuals for 1942-43, 6.4 per cent of the actuals for 1943-44, and 2.6 per cent of the actuals for 1945-46. But if individual districts were taken, marked variations were revealed in 17 out of 72 cases in all. Obviously the normal yields fixed three decades ago have become out of date and the subjective element plays no mean part in the estimates of yield at present. The existing figures of normal yields have therefore to be revised in the light of the results of further experiments on the lines of those conducted by the Indian Council of Agricultural Research on wheat in the Punjab and the United Provinces during the year 1943-44 at the instance of the Inter-Departmental Committee on Agricultural Statistics of the Government of India. Accordingly, crop-cutting surveys based on the sampling technique evolved by the Statistical Adviser to the Indian Council of Agricultural Research and recommended by the Policy Committee on Agriculture are being conducted in this State since 1944-45.

The plan of sampling adopted for the survey is the stratified plan of random sampling with taluk as the stratum, a village as the primary unit of sampling within a taluk, a field as the sub-unit of sampling within a village and a plot of one hundredth of an acre (50 links 20 links) as the ultimate unit of sampling within a selected firka. Three fields in each village and one plot in each field are selected for the experiments.

Based on the above technique of the Indian Council of Agricultural Research, crop-cutting survey on paddy crop was conducted in the Tanjore district in 1944-45 and was extended to Tiruchirappalli and to the deltaic region comprising the districts of Visakhapatnam, East Godavari, West Godavari and Krishna. In 1946-47, experiments were conducted in fourteen principal paddy growing districts of the State and in 1947-48 in 17 districts, Madurai, Ramanathapuram and Tirunelveli having been included at the suggestion of the Indian Council of Agricultural Research. The scheme was continued in all the 17 districts in 1948-49 and in 1949-50.

Thus accurate normal yield per acre is in the process of being determined by crop-cutting surveys; and whether it be for planned production or the more ambitious purpose of evolving a scientific crop-planning, it is necessary to extend it to the other major crops. A co-ordinated scheme for conducting crop-cutting surveys on paddy, cholam, cumbu and ragi has therefore already commenced. The number of experiments being as high as 7,800, the field work will be conducted both by the Agricultural and Revenue Staff. The State will be divided into eight divisions with a Regional District Agricultural Officer in charge of each Division as on the plan below:

Headquarters.		Jurisdiction.
I. Kakinada	.. ..	Visakhapatnam, East Godavari and West Godavari.
II. Vijayavada	.. ..	Krishna, Guntur and Nellore.
III. Bellary	.. ..	Kurnool, Bellary and Anantapur.
IV. Madras	.. ..	Chingleput, Chittoor and Cuddapah.
V. Tanjore	.. ..	South Arcot, Tanjore and Tiruchirappalli.
VI. Madurai	.. ..	Madurai, Ramanathapuram and Tirunelveli.
VII. Salem	.. ..	North Arcot, Salem and Coimbatore.
VIII. Kozhikode	.. ..	South Kanara, Malabar and Nilgiris.

In this scheme, Agricultural Demonstrators will be in charge of paddy and Revenue Inspectors in charge of millets experiments. The Regional Agricultural staff will be trained first at the headquarters and they in turn will train the Agricultural Demonstrators and Revenue Inspectors in the districts.

Determination of Seasonal Factor

Seasonal Factor is based upon the anna estimates of outturn reported for the crop by the Tahsildars. A weighted average anna outturn for the whole district is worked out with reference to the anna outturns reported for the various taluks as shown below:

Let A acres be the total area under a crop in a particular period made up of a1 acres yielding 12 annas, a2 acres yielding

8 to 11 annas (average 9.5 annas), a3 acres yielding 4 to 7 annas (average 5.5 annas), etc., so that $A = a1 + a2 + a3$. The weighted average anna outturn for the whole district will be equal to

$$\frac{(a1 \times 12) + (a2 \times 9.5) + (a3 \times 5.5), \text{ etc.}}{A}$$

This weighted average outturn is converted into a percentage figure on the basis that a 12-anna outturn represents 100 per cent. This percentage is the uncorrected Seasonal Factor for the district. Experience has shown that reporting authorities have invariably a tendency to under-report the outturn of the crop and that a correction is therefore necessary for the chronic pessimism of the reporting agencies.

This is done by the adoption of a correcting factor known as "Stuart's correcting factor" which is revised from year to year. The principle underlying this correcting (named after a former Director of Agriculture who evolved this) factor is that the average of the yields per acre reported over a long period should approximate to the normal yield fixed. The average of the uncorrected Seasonal Factors reported over a long period should also be equal to 100 per cent. Thus if the actual average of the Seasonal Factors reported over a series of years is 75, the correcting factor (Stuart's correcting factor) will be $100/75$. If an uncorrected Seasonal Factor of 80 per cent is reported for a given year, the corrected Seasonal Factor will work out to $80 \times 100/75$ or 107. This correction may however occasionally yield results not in accordance with the actual seasonal conditions. The corrected Seasonal Factor is therefore examined in the light of actual conditions prevailing for the crop in the district, by taking into account the actual rainfall during the year as compared with the normal, the reports of District Agricultural Officers relating to yields and condition of the crops, damage by insects, pests, etc., and the condition of the crops as reported by Collectors in their weekly season reports, and modified, if necessary, to accord with the actual state of the season in the district.

On the basis of the estimated area in the districts, the Seasonal Factors adopted and the figures of normal yield per acre, calculated as outlined above, estimates of production of the crop are worked out for the various districts and then for the State as a whole.

Scientific Assessment

It is thus seen that the estimates of crop production at present and the Achievement Audit of the Grow More Food aids attempted in the last chapter are based on certain rough assumptions having little claim to scientific accuracy. This is particularly so in respect of the actual responses to the several Grow More Food aids. At the instance of the Indian Council of Agricultural Research, therefore, in addition to the crop-cutting experiments described above to arrive at normal yields, a scheme for assessing statistically the yield due to Grow More Food measures, viz., improved seed, manures, new irrigation works, etc., is also being tried. A certain number of "treated" fields out of those receiving Grow More Food aids under particular items and corresponding "controls" out of those not receiving Grow More Food aids in any form are selected at random and crop-cutting experiments are conducted on them both. The information recorded in the village forms will facilitate the selection of fields under the Grow More Food aids. Since the object of the scheme is to estimate the additional production under the Grow More Food aids actually applied to land, in conducting experiments on the above plan, it is necessary to select "treated fields" and their "controls" a little in advance of harvests; and as it is of interest to estimate the additional output that would have been achieved had the Grow More Food aid been applied at the rate prescribed, experiments are laid down at pre-sowing stage as well. The total number of experiments to be conducted under this scheme would be about 1,200. With the results of these experiments,

it would be possible to assess fairly accurately the additional output due to Grow More Food Schemes.

Statistical Reporting

Although the scope and utility of agricultural statistics have become apparent and special ad hoc bodies are set up or proposed to refine the basic data and standards of measurement, the general machinery for the collection of agricultural statistics remains far from perfect. The primary agency is still the village accountant whose main pre-occupation is collection of data for land revenue administration, agricultural statistics being only a by-product. In the midst of his other duties, it has been found that he is not always as careful and meticulous in the collection of statistics as is required. Any slight error at this fountain-head of information is likely to get magnified at the final stage of consolidation and tabulation of statistics for the entire State. It thus becomes imperative that an efficient system of checking up the veracity of the figures furnished by village karnams should be devised. In certain States of the Indian Union, Economics and Statistics staff are appointed at district levels to inspect villages periodically and to check effectively the figures of the village accountants. They also guide and help the latter in the correct methods of collection of statistics. In view of the growing importance of reliable agricultural statistics in economic planning, the appointment of such a staff at district level should not be further postponed.

FIG. 22. SEASONAL FACTOR FOR PADDY AND MILLETS

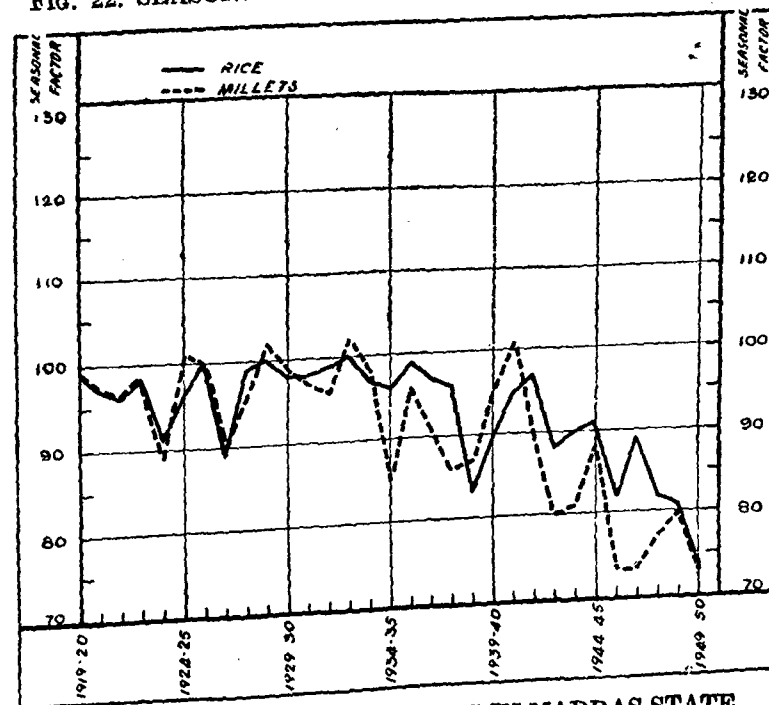
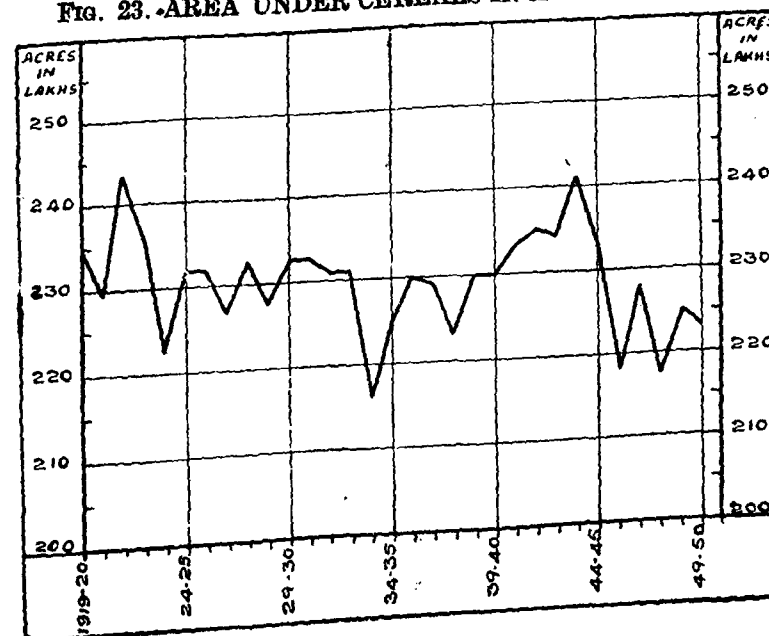


FIG. 23. AREA UNDER CEREALS IN MADRAS STATE



an anxious deficit according to another. An increase of 1 per cent in the adult equivalent will result in an increase in India's requirements to the extent of 4.77 lakhs tons.

Similarly rations too have been frequently changed and fixed differently between urban and rural areas. Estimates are made on the basis of rations ranging from 12 ounces for non-farm population to 16 ounces for farm population. Of the 347 millions (according to the latest estimate of the Census Commissioner) in the Indian Union, the farm population of 70 per cent reduced to adult equivalent would be 204 millions and the non-farm population 87.45 millions; and they would require 43.94 million tons of foodgrains at the rate of 16 ounces per adult per day for farm population and 12 ounces per adult per day for non-farm population. Government of India have estimated the gap at 4 million tons and have fixed the target at an additional production of 4 million tons by the end of 1951. If, on the basis of average consumption in interwar years in Madras, the average ration is raised to 19 ounces deemed necessary by Dr. Aykryod, the requirements of foodgrains mount up to 56.39 million tons. An overall per capita increase in the daily consumption of even one ounce would require an additional supply of 2.96 million tons per annum. The difference between the requirements on current standards of consumption (16 ounces for farm and 12 ounces for non-farm population) and on nutritional standards fixed by Dr. Aykryod is of the order of 1.245 million tons. The difference would be still greater between the highest and lowest requirements, if the numerous permutations and combinations that different adult equivalents and rationing standards are capable of, are applied to estimate requirements. However, in drawing up a programme of food production, adult equivalents and rationing standards have to be clearly defined over a period of time.

Estimates of Production and Consumption Requirements

The programme of food production in Madras is phased into three stages—the first or short-term ending in 1951, the

CHAPTER VI.

TOWARDS CROP PLANNING.

Population and Food Supply

The essential requisites of an effective food production programme are accurate estimates of production and requirements. In the preceding chapters we saw how far the existing machinery is useful in assessing the former and what improvements are needed to make it more efficient. While estimates of production are derived from three factors—area under crops, normal yield and Seasonal Factor—estimates of requirements depend on another set of three factors—population, adult equivalents and ration per adult per diem. Population grows steadily due to natural increase, though in recent years it has increased sharply due to immigration of refugees; on the other hand, the other two factors—adult equivalents and rations—are entirely dependent on the decisions taken by Government.

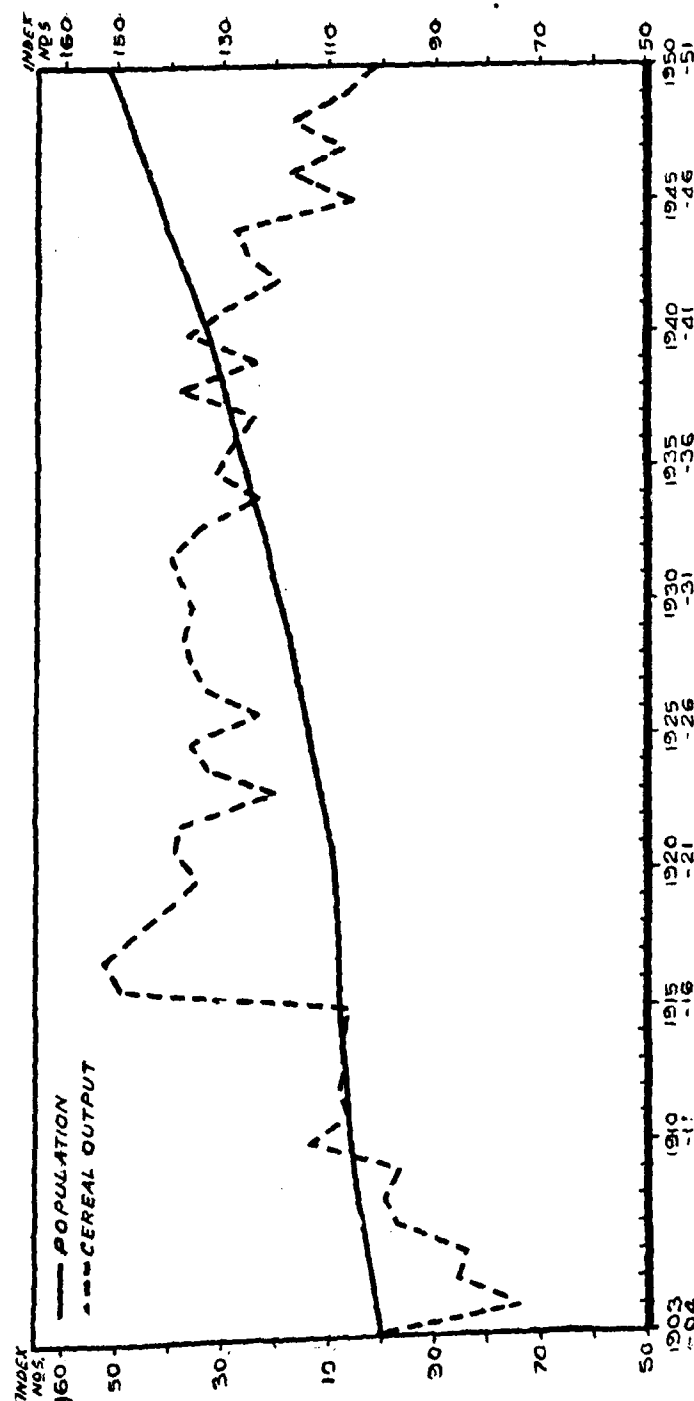
The growth of population has been estimated at 1·1 per cent for the Indian Union (exclusive of refugees) and 1·01 per cent for Madras State. This is the only factor on which there is a large measure of agreement among those who calculate the requirements of food, whereas ration and adult equivalent are differently fixed by different authorities; the latter is 66 per cent according to the United Nations (on the basis of a report of the League of Nations), 75 per cent according to Kharegat Committee * of the Indian Council of Agricultural Research, 80 per cent according to Food Statistics of India † and Dr. Aykroyd and 84·06 per cent according to Madras Government.‡ Owing to these differences in adult equivalents, a gratifying surplus according to one might well be turned into

* Report on the Development of Agriculture and Husbandry.

† Published by the Department of Food, Government of India, 1946, p. 111 foot-note (c).

‡ Based on the revised rationing standard, allowing 1 unit to children from birth to 12 years.

FIG. 24. POPULATION AND CEREAL OUTPUT IN MADRAS STATE



to face p. 118

second or mid-term in 1955 and the third or long-term in 1965. The requirements of foodgrains for an estimated population of 55·664 millions in 1951-52 will be 7·635 million tons, on the basis of adult equivalent of 84·08 per cent and of a ration of 1 lb. of adult per diem. On the same basis, the requirements in 1954-55 for an estimated population of 57·539 millions will be 7·883 million tons and in 1964-65 for an estimated population of 63·523 millions, 8·703 million tons.

At the end of the first phase, production of foodgrains will be stepped up by 5·38 lakhs, or 5·16 lakhs tons after allowing for seed requirements at 4 per cent. If the Emergency Food Production Plan succeeds in attaining its target, the total production of foodgrains in 1954-55 will reach 7·803 million tons as against the normal production of foodgrains 7·287 million tons, reckoned as the average of three normal years in the forties. As the requirements of that year are of the order of 7·635 million tons, we will be left with a small surplus of 168,000 tons of foodgrains, or 2·2 per cent of the requirements.

The mid-term plan of food production in this State has several big schemes among which irrigation plays a vital part. The Lower Bhavani Project, the Tungabhadra and 16 small irrigation works add 752,000 acres to the irrigated area of the State. The Tank Improvement Scheme is likely to provide assured irrigation to about one million acres and the well-sinking campaign will result in an additional irrigated area of about 460,000 acres. Excluding the area benefited by the Tank Improvement Scheme these schemes will bring under irrigation an area of 1·212 million acres and including the additional yield due to Tank Improvement Scheme contribute an additional production of 847,250 tons of foodgrains.

It is anticipated that the agricultural schemes would be continued with the same vigour in this phase as in the three years of the Emergency Food Production Plan. If the supply position of fertilizers and oil-cake eases, the normal requirements of 100,000 tons of fertilizers instead of the current

supplies of 70,000 tons, will be applied in 1954-55 and in the subsequent years resulting in an additional output of 45,000 tons *, and the application of 400,000 tons of oil-cakes, assuming them to be available, will yield about 150,000 tons of foodgrains †. Larger production of green manure and composts would yield an additional output of 43,000 tons and multiplication and distribution of improved seeds, an additional output of 275,000 tons ‡:

Additional output of foodgrains possible by 1954-55.

Description of schemes.	Area. ACS.	Yield. TONS.
Irrigation Works—	207,000	103,800
Lower Bhavani	300,000	150,000
Tungabhadra	245,000	122,550
Sixteen Irrigation Works (small)	459,988	139,000
Well-Subsidy Schemes	100,000 §	332,200
Tank Improvement Schemes		
Total ..	1,211,988 ||	847,25
Agricultural Schemes—		45,000
(i) Fertilizers		150,000
(ii) Oil-cakes		43,000
(iii) Green manure and composts		275,000
(iv) Improved seeds (paddy and millets)		
Total ..		513,000
Grand total ..	1,211,988	1,360,250

The agricultural schemes and irrigation schemes together are estimated to yield an additional output of 1,360,000 tons and 1,306,000 tons (less seeds at 4 per cent in 1954-55)

* Thirty thousand more tons yielding at the rate of 1·5 tons of foodgrains per ton of fertilizers.

† Four lakhs tons will yield 400,000 tons of paddy or 266,000 tons of rice, but credit is given to 150,000 tons, after allowing for an application of about 175,000 tons in the previous years.

‡ It is expected that by 1954-55, improved strains of paddy seeds will cover 5 million acres of paddy contributing an additional production of 250,000 tons at the rate of 10 per cent of normal production and millet seeds about 25,000 tons of millets.

§ Area effectively irrigated.

|| Excludes acreage benefited by the Tank Improvement Scheme.

effected over night ; it has to be done gradually year by year as more land is reclaimed and more arable land is brought under irrigation. The distribution of the new areas and the redistribution of the old areas among various crops needed to ensure a balanced diet to the population will call for a well thought-out policy of crop planning even from now on.

Subsidiary Food Production and Crop Planning

The urgency for some sort of crop planning became imperative in 1949-50 in view of the acute shortage of cotton and jute. Consequently *ad hoc* proposals for extending the area under these two crops in the Indian Union were formulated. So far as this State goes, these have resulted in an immediate switching over of 100,000 acres under foodgrains to cotton cultivation (exclusive of area in which cotton is inter-cropped with millets, chillies, etc.) on the definite assurance by the Union Government that the consequential losses in foodgrains supply would be replenished by them. In this context, the drive for increased production of subsidiary food, mainly tapioca, actively sponsored by the Union Government is of great relevance and deserves critical examination from the standpoints of a scientific system of land utilization and effective stepping up of food supply.

In all discussions of subsidiary foods, tapioca, sweet-potatoes, papaya and plantains feature prominently. An important reason for advocating their extensive cultivation is the lurking pessimism as to the feasibility of attaining self-sufficiency in food supply by the end of 1951, if cereals production alone is relied upon. Tubers are heavy yielders ; against an estimated production of one-third to half ton of rice or wheat from an acre of fairly fertile land, it is advanced that 10 to 20 tons of tapioca or $3\frac{1}{2}$ to 7 tons in dehydrated form, i.e., about seven to ten times the weight in cereals, could be raised from even ordinary lands. On this basis, it is computed that the entire all-India deficit of 3 to 4 million tons of foodgrains could be met by cultivating tapioca in one-million acres,

instead of cereals in 10 million acres. This thesis arises from a nutritional analysis that showed a diet composed of tapioca or sweet potato and some groundnut to be equivalent to cereal diet in protein and carbohydrate contents. Among the tubers, tapioca is particularly drought-resisting, and it thrives on one-third the rainfall required for paddy. Countries with a high pressure of population have usually resorted to cultivation and consumption of tubers. Tapioca is for tropics what potato is for temperate climes. The area under potato was nearly a quarter of the area under foodgrains in pre-war Germany and about one-fifth in the United Kingdom. Tapioca is described as a substantial food, specially suited to working classes. It is claimed to be a "Kalpaka-Vriksha" ; the root forms food for human beings, the leaves for silkworms (a profitable subsidiary rural occupation will incidentally be promoted) and the stem could be used for domestic heating and cooking. It is further urged that tapioca flour is a nourishing and palatable food and that it has better keeping qualities than wheat flour ; it could be mixed with atta for making *chapathis* and *pooris*.

It was these and similar arguments in favour of tapioca and other tubers that led to the appointment of the Subsidiary Food Production Committee in May 1949 with the Food Minister to Government of India as Chairman. This Committee was to find out foods capable of being raised more quickly and cheaply than cereals, but capable of supplying as much carbohydrate and proteins. In South India the Committee have initiated large-scale experiments on the best methods of sun-drying, storing, powdering and processing tubers with and without groundnut-cake. Experiments too are being conducted on the preparation of "ricina" or rice-like grains from tapioca flour.

Notwithstanding the so-called merits of producing subsidiary foods, particularly tapioca, the scheme is likely to meet with several practical difficulties. At present the area under

tapioca even in Travancore, noted for this crop, is about 500,000 acres; the average area in Madras State for the three years ending 1945-48 was 85,350 acres or 0.31 per cent and under sweet potatoes 124,438 acres or 0.45 per cent of the total area under food crops. According to all-India plan, Madras may have to double or treble her present acreage under these tubers. The crux of the problem of extension of area is the right choice of land that would not encroach upon area under foodgrains, cotton or semi-food crops like groundnuts. Outside Kerala tapioca and sweet potatoes are not very familiar crops even in South India and are definitely exotics in North India. The degree of success achieved in their cultivation in the Government agricultural farms in Meerut district and West Bengal cannot obviously apply in equal measure to cultivation in private farms. The supply of cuttings, which has to come from distant Travancore, raises another practical difficulty; multiplication and distribution of cuttings to distant parts of the country call for an efficient organization and expeditious transport. In any large-scale Government subsidized scheme offering remunerative prices for the produce, capitalists may perhaps be encouraged to cultivate tapioca, but the small cultivators may not be touched by it, as they are already utilizing their little patches of land to the maximum advantage. Much more difficult than production will be the problem of making people consume the tubers. "Ricina" is still in the laboratory stage and whether it is possible to convert on a commercial scale tapioca into rice-like grains acceptable to the bulk of the population at attractive prices is a moot point. Changes in dietetic habits are hard to introduce according to pre-determined time-schedule. Even in millet areas, rice is in greater demand now than ever before and this factor has aggravated the crisis in the supply position of rice. The imperceptible but definite change over from the "inferior" millets to "superior" rice is still going on; at this moment any attempt to substitute tubers for cereals may be an uphill task.

The success of the production of subsidiary foods hinges not only on the feasibility with which such changes in land utilization is possible and the alacrity with which agriculturists take to tuber cultivation, but also on the ease with which dietetic habits of a nation could be altered by propaganda, persuasion or fiat. It is therefore futile to rely too much on the cultivation of tubers to solve the present food crisis. In view of these obvious difficulties, the Three-year Emergency Plan of the Madras State takes little account of any additional production that might be possible due to extensive cultivation of tapioca or sweet potatoes.

Whether the cultivation of tapioca is to be undertaken on a large scale or not, the urgency for scientific crop planning is indisputable. Demand for land is ever on the upgrade. Attainment of satisfactory level of food production is not the only aim and end of land utilization. The ultimate objective must be the attainment of a balanced economy, based on adequate production of commercial crops as much as food crops to feed the growing industries of this State, without at the same time ignoring the possibilities of raising more and more crops like tobacco, cashewnuts and pepper which have high potentialities for earning foreign exchange.

All this involves a detailed study of the problem of land utilization in Madras State to which we turn in the next chapter.

CHAPTER VII.

UTILIZATION OF LAND.

The demand for land is steadily growing as population increases and standard of living rises. If the daily ration per adult is to be enhanced to 19 ounces that alone would require an additional area of about 6.0 million acres; and protective foods as already computed about 4.5 million acres. With the development of textile, vanaspati and other industries, the demand for a larger supply of cotton, oil seeds, etc., would become pressing. The situation could be tackled only by a vigorous campaign for extension of cultivation. This State has about 21 million acres or about two-third of the sown area at present classified as cultivable waste and current fallows. Time was when most of it was deemed uncultivable. But technical knowledge in the last fifty years has taken great strides. Today the bulldozer and the tractor conquer the most difficult terrain, while the D.D.T. and the anti-malarial squads the dreaded mosquito. As the process of land reclamation steadily gains momentum, the need for a scientific system of land utilization becomes ever more urgent. After the balance of payments problem became acute, a new issue has been added to the already complex economic situation—whether the production of high priced commercial crops entering into foreign trade and serving as good foreign exchange earners or contributing to decreasing our dependence on imports of certain raw materials like raw cotton and jute should not be given as high a priority as food in the agricultural planning of this country. This issue cannot be settled without a careful examination of the manner in which land has hitherto been utilized in this State.

Different Land Uses

Land has a multiplicity of uses. The pattern of its distribution among pasture, agriculture, roads, railways,

aerodromes, mining industry, commerce, residence, recreation and other uses is mainly determined by economic, social and demographic conditions. A pastoral economy makes an extensive use of land as pasture. A colonial economy finds cultivation of food and decommercial crops for export dominating its land uses. Industrial, commercial and urban uses gain priority in an industrially advanced economy. If international trade were entirely free and unhampered, a metropolitan economy may well turn all its wheat land into golf links and cricket fields and depend on imports for food and raw materials. Apart from the state of industrial development, the order of importance in the utilization of land is governed by consumption factors like the strength of the population, the per capita consumption or standard of living of the people and the quantum of net exports as well as production factors like fertility of the soil, agricultural technique, accessibility and transport facilities. In every country as a result of the interaction of these diverse factors, a hierarchy of uses for land emerges. In a dynamic, advancing economy, these factors constantly change in their intensity and induce a similar change in the hierarchy of uses. It is therefore scarcely possible to formulate principles of optimum land utilization once and for ever. They should necessarily be flexible to meet the changing needs of the economy.

Land Utilization Research

Land utilization research is still in a formative stage. Even in advanced countries, only special problems of the use of land for industries or for raising particular crops like groundnut or sugarcane have been studied. An overall assessment of land utilization, involving as it does a comprehensive study of all the aspects of national economy, has seldom been made. Literature on the subject, meagre in advanced countries, is almost lacking in India. At no time has the problem of land utilization been of greater significance than at present.

bringing up the total production of the State to 9.109 million tons against the consumption requirements of 7.883 million tons. There will accrue a surplus of 1,226,000 tons in 1954-55. This is on the assumption that all the land brought under cultivation or irrigation is utilized for food production.

The long-term plan of Food Production ending in 1964-65 will be dominated by the construction of one giant multipurpose scheme*—the Krishna-Pennar project—which will link up the two big rivers, the Krishna and the Pennar at a cost of Rs. 127 crores. Dr. Terzhagi and Dr. Savage, American Engineers of international repute, have made useful suggestions regarding its construction. It is expected to irrigate 3 million acres, mainly paddy land, by a net work of 760 miles of canals in Kurnool, Cuddapah, Chittoor, Nellore, Chingleput and South Arcot districts and is estimated to increase rice production by 1.5 million tons.

Two medium-sized projects—the Arundal dam across the Sarada river and the Anumanalanka project with an ayacut of 25,000 acres each—will also be completed, bringing the total area irrigated to 3,050,000 acres as shown below :

Irrigation Projects.

Description.	Area. ACS.	Yield. TONS.
Krishna-Pennar	3,000,000	1,500,000
Arundal Dam	25,000	12,500
Anumanalanka	25,000	12,500
	3,050,000	1,524,000

* Another giant project is the Ramapadasagar, the execution of which within this period is doubtful. The Board of International Experts on dam construction has pronounced the Ramapadasagar to be feasible although the height of the dam from the bed rock is about 430 feet. The reservoir will have a spread of 315 square miles and a capacity of 662,000 million cubic feet. This project is expected to irrigate 2.5 million acres including a second crop in the Godavari delta and a part of the Krishna delta besides ensuring steady and seasonal supply of water to the Godavari delta. In addition to flood control and river management, this huge multi-purpose project which would cost Rs. 129 crores will generate electricity the firm power being 150,000 K.W., which will be available for agricultural purposes also.

Even if the agricultural schemes do not yield more than in the second phase, the food production of the State will be stepped up by 1.524 million tons or 1,463,040 tons (less seeds at 4 per cent). The total production will be about 10.572 million tons against the requirements of 8.703 million tons. This would result in a surplus of 18.69 lakhs tons of food-grains. Such a happy position would be reached if all the new land brought under cultivation and irrigation were utilized for the production of foodgrains only. But this is an adroit "if." For, the State may stand in greater need of cotton, sugar-cane, groundnut and tobacco—some of them being industrial raw materials to feed the domestic industries and the rest good foreign exchange earners. The attainment of a balanced economy calls for a careful crop-planning to meet the needs of the times. Government of Madras have recently proposed to reserve 100,000 acres for cotton in the Tungabhadra project area. If the reservation of 100,000 acres out of the 207,000 acres of the Tungabhadra project area for the cultivation of cotton is a measure of crop planning—a scheme of crop planning has already been born in 1950.

Protective Foods and Crop Planning

The need for a proper system of crop planning and effective methods of land utilization is reinforced by the problem of augmenting the supplies of protective foods. The deficits in the various types of protective foods according to Dr. Aykroyd's nutritional standards have got to be wiped out. Within a reasonable distance of time, it will not be possible to make the State self-sufficient with regard to several protective foods. Basing our campaign on the modest ambition of (1) doubling the acreage under pulses, fruits and vegetables and (2) trebling the area under fodder, extension of cultivation should be attained to the extent of $3 + 0.76 + 1.00$ or 4.76 million acres.* This increase cannot be

* Area under	pulses in a normal year	..	3.05 million acres.
"	fruits and vegetables ..	..	0.76 " "
"	fodder	..	0.48 " "

Objectives of Land Utilization and need for Scientific Planning

Indian economy is at present under the spell of a triple shortage of food, industrial raw materials and foreign exchange. In this context, any rational utilization of land should have a threefold objective of eliminating these shortages. While the tempo of the Grow More Food Campaign directed to make the country self-sufficient in food supply by the end of 1952 is heartening, the acute shortages in the supply of cotton and jute, caused by the partition of the country, needs better recognition. An adequate supply of essential raw materials should be ensured if our established industries are not to close down, let alone our programme of rapid industrialization. To earn foreign exchange, particularly hard currency, India will have to depend mainly on her exports of select agricultural products for some years to come. The cardinal need of the hour, then, is a simultaneous augmentation in the production of foodgrains and commercial crops with great potentialities for earning foreign exchange.

But land is ever a scarce factor, and more so in an old country like India; scientific planning is an essential prerequisite to the proper distribution of the available land to diverse competing ends. Before planning could be thought of, the existing pattern of land utilization merits a careful study.

Changing Pattern of Land Utilization

An attempt is made here to analyse the changing pattern of land utilization in the State of Madras in the 15 years between 1930-31 and 1944-45 (vide Appendix I). As the years between 1944-45 and 1947-48 experienced abnormal seasonal conditions resulting in a shrinkage in the net area to the extent of about 1.5 million acres of land and as this is but a passing phase, these years have to be studied separately; otherwise the normal trend will get twisted by the figures pertaining to the abnormal years. To find out the long-term trend in the utilization of land, curves of the form $0 \log y = a + bx$ were

fitted to the figures of the area under forests, land not available for cultivation, current fallows, other uncultivated lands, net area sown, areas under food and non-food crops, and some principal crops including paddy, millets, fodder crops, cotton, sugarcane, tobacco and groundnut.

Area under Forests

Although the total area of the State has remained constant at about 79.9 million acres, the area under forests has risen from 12,753,903 acres or 15.97 per cent of the total area in 1930-31 to 13,459,625 acres or 16.84 per cent in 1944-45. This increase of about 7.05 lakhs acres is however contrary to the common belief that there has been a continuous destruction of forests. What apparently has happened is not a contraction of the forest area, but a denudation due to fellings. On the Western Ghats, Anamalais and Nilgiris there are dense tropical forests covered by valuable trees like teak, rosewood and *vengai*; elsewhere the forests are not so dense and in some areas mere scrub growth passes for forests. Forests are a valuable source of timber, firewood, fibre, lac, wax, honey, horns, husks, bones and skins of animals and green manure. They protect watersheds, they prevent land from eroding and lessen the severity of floods and the silting of rivers. They regulate climate and rainfall. So well recognized are the uses of forests that most countries have fixed 20 to 25 per cent of the total areas as the target for forests. In Madras State to reach this target, area under forests should be extended by $2\frac{1}{2}$ to 5 million acres. This is irrespective of the intensity of afforestation that should exist.

Lands not Available for Cultivation

Land required for roads, building sites, canals, tanks, parks, mining, quarrying, etc., is definitely not available for cultivation and some lands are unfit for cultivation due to physical conditions or chemical properties of the soil. The area of land not available for cultivation has declined from 15,077,661 acres or 18.88 per cent of the total area in 1930-31 to

14,217,581 or 17.79 per cent in 1944-45 or by 860,080 acres. This is mainly due to reclassification, as in the same period, area of cultivable waste has risen from 10,432,531 acres or 13.07 per cent to 11,433,633 acres or 14.3 per cent of the total area or by 1,001,102 acres. The area classified as current fallows is mainly governed by seasonal conditions and needs of rotation of crops. It has violently fluctuated from year to year, e.g., from 10,146,713 acres in 1931-32 to 9,557,872 acres in 1932-33 and from 9,498,721 acres in 1946-47 to 10,037,058 acres in 1947-48. Between 1930-31 and 1944-45, it has declined from 9,768,796 acres or 12.23 per cent to 9,289,800 acres or 11.62 per cent of the total area or by 478,996 acres.

Net Area Sown

In this period the trend curves show that there has been an increase in the areas of forests and "other uncultivated land excluding fallows" at annual average rates of 0.25 per cent and 0.83 per cent respectively. On the other hand, the areas of land not available for cultivation and current fallows have declined at annual average rates of 0.67 per cent and 0.60 per cent. The net area sown has remained more or less constant, showing a slight decline at an annual average rate of 0.02 per cent. This, however, is accompanied by the rise in the gross area under food and non-food crops from 36,603,019 acres or 45.84 per cent of the total area in 1930-31 to 36,999,372 acres or 46.29 per cent in 1944-45. This phenomenon of a stationary net area sown in the face of a population that is growing at a geometric rate of 1.01 per cent is a matter for grave concern, particularly in a country in which agricultural technique has not much advanced. In U.S.A. with advancing agricultural technique, it has been possible to raise all the food and fibres required for domestic consumption and export from a stationary acreage, in spite of a steady increase in the population between 1917 and 1931. To American conditions may apply Dr. Harold G. Moulton's dictum "it is not the surfaces that matter but

what one does with them : irrigation, pest and waste elimination, improved plant, stock-breeding, etc." But the agricultural efficiency in our country being what it is, we cannot depend too much on the intensive method, nor view with equanimity the decline—slight though it appears to be—in the net area sown at the annual average rate of 0.02 per cent. This mild drop may be due to the increasingly pronounced tendency in the last two decades for suburbs and subdivisions of towns and cities to press out upon crop land. It was to arrest this tendency that the Government of Madras proposed to introduce in May 1948, a Bill to prohibit the construction of buildings on wet lands.

Cultivation Trends during the years 1930-31 to 1944-45

The area under food crops has risen from 2,878,248 acres or 35.16 per cent of the total area in 1930-31 to 28,927,571 acres or 36.17 per cent in 1943-44. (The year 1944-45 in which the area under food crops had sharply fallen by about one million acres due to adverse factors is not suitable for comparison). The area under non-food crops has increased from 8,524,771 acres or 10.68 per cent of the total area in 1930-31 to 9,031,175 acres or 11.3 per cent in 1944-45. In this period of 15 years the trend curves show that the area under food crops has slightly increased at an annual average rate of 0.12 per cent while the area under non-food crops at 1.23 per cent. The former has risen at a lower rate than the latter in spite of the Grow More Food Campaign. There has been a greater shift towards the cultivation of non-food crops in this period.

Although some lands have specific uses, major portion of the cultivated area is on the margin and may be switched over from one crop to another. This is brought about either by Seasonal Factor or by prices. It is not difficult to divert land under paddy to sugarcane even as land under millets to groundnuts. An analysis of the changes in the distribution

of land among the principal food and commercial crops may shed some light on the causes for this paradoxical situation of a declining acreage under food crops *vis-a-vis* the food drive.

The area under paddy has increased from 10,251,608 acres or 12.84 per cent of the total area in 1930-31 to 11,013,530 acres or 13.78 per cent in 1944-45. It has increased at an annual average rate of 0.51 per cent. The area under millets has declined from 13,370,298 acres or 16.74 per cent to 12,290,969 acres or 15.38 per cent of the total area in this period; it has declined at the annual average rate of 0.16 per cent. The area under cotton has also declined from 2,035,524 acres or 2.55 per cent to 1,670,141 acres or 2.08 per cent of the total area. It has declined at an annual average rate of 0.23 per cent. Areas under sugarcane, tobacco and groundnut have increased at annual average rates of 2.26 per cent, 2.16 per cent and 2.42 per cent, respectively. The area under sugarcane has risen from 105,426 acres or 0.13 per cent to 155,596 acres or 0.19 per cent of the total area. The area under tobacco from 220,462 acres or 0.28 per cent to 328,185 acres or 0.41 per cent, and the area under groundnut from 3,521,085 acres or 4.41 per cent to 4,299,592 acres or 5.38 per cent of the total area.

Cultivation Trends during the years 1945-46 to 1949-50

A separate study has been made of the cultivation trends during the period 1945-46 to 1949-50 in view of the adverse seasonal conditions in those years. During this period the extent under forests, cultivable waste and the area not available for cultivation remained almost constant.

The net area sown fell by about 1 million acres to 30.5 million acres in 1945-46 as compared with the previous year as seasonal conditions were highly adverse. Although there was some improvement in 1946-47, this was not kept up in the following year and the net area sown declined to 30.1 million acres in 1947-48 which is the lowest attained so far. The

decrease in the net area sown synchronized with an increase in the extent under fallow lands. In 1948-49 and 1949-50 the net area sown has increased each year by half a million acres. In the year 1945-46 the acreage under current fallows increased by 489,579 acres to 9,779,379 acres. In 1947-48 the extent under current fallows recorded a maximum of 10,037,058 acres. In 1948-49 it fell by 2 lakhs acres and in 1949-50 by an additional 4 lakhs acres.

The fall in the net area sown during the period 1945-46 to 1948-49 was due mainly to a fall in the acreage under food-grains. As against an area of 11,013,530 acres in 1944-45 the area under paddy in 1945-46 was only 10,202,580 acres. Although there was some improvement in the position in 1946-47, the area stood round about 10.4 million acres in the next two years. In 1949-50 it was about 10.5 million acres. The acreage under millets declined from 12,290,969 in 1944-45 to 11,631,453 acres in 1945-46 and recorded a minimum of 11,325,258 acres in 1947-48. In 1948-49 and 1949-50 the area under millets was about 12 million acres.

The fall in the acreage under paddy and millets has been followed by a rise in the acreage under commercial crops like sugarcane, groundnut and tobacco since 1945-46. This has been mainly due to the relatively more attractive prices which they commanded. The area under sugarcane increased from 155,596 acres in 1944-45 to 160,700 acres in 1945-46 rising further to a maximum of 272,680 acres in 1947-48. After sharply falling to 175,576 acres in 1948-49, the area under sugarcane stood at 181,300 acres in 1949-50. The area under tobacco increased from 328,185 acres in 1944-45 to 363,036 acres in 1945-46. The area declined by 60,000 acres in 1946-47 and by 10,000 acres in 1947-48 but rose to 321,094 acres in 1948-49 and 345,131 acres in 1949-50. The area under groundnut which stood at 3,560,013 acres in 1943-44 rose to 4,299,592 acres in 1944-45 and remained round about 4.1 million acres during the subsequent three years. After a sudden decline to 3.65 million acres in 1948-49, the area

under groundnut has risen to 3,722,505 acres in 1949-50. There has, however, been a steady decline in the area under cotton which recorded a minimum of 1,297,647 acres in 1947-48 as against 1,670,141 acres in 1944-45 and about 2.5 million acres ten years ago. The fall in the acreage under cotton was due partly to the restrictionist measures imposed on its cultivation and partly to the comparatively low prices that prevailed for it during the period. However, the area under cotton has steadily risen in the last two years to 1,619,640 acres in 1948-49 and 1,672,107 acres in 1949-50.

Cultivation Trends during the years 1930-31 to 1948-49

The area under food crops has fallen from 28,078,248 acres or 35.16 per cent of the total in 1930-31 to 27,215,063 acres or 34.06 in 1948-49 (The year 1944-45 in which the area under food crops had sharply fallen by about one million acres due to adverse factors is again not suitable for comparison). The area under non-food crops also has fallen from 8,524,771 acres or 10.68 per cent of the total in 1930-31 to 8,186,156 acres or 10.24 per cent in 1948-49. In the entire period of 19 years the trend curves show that the area under food crops has slightly decreased at an annual average rate of 0.09 per cent while the area under non-food crops increased slightly at 0.09 per cent. The former has decreased in spite of the Grow More Food Campaign, but reckoned in terms of acreage, the shift towards the cultivation of non-food crops in this period has been of the order of 9,000 acres per annum on the average. It shall have been considerably more than this, but for the succession of bad seasons in the past few years, which have affected the acreage under both food and non-food crops.

The area under paddy has increased from 10,251,608 acres or 12.84 per cent of the total in 1930-31 to 10,329,169 acres or 12.93 per cent in 1948-49. It has increased at an annual average rate of 0.16 per cent. The area under millets has declined from 13,370,298 acres or 16.74 per cent to 12,212,678 acres or 15.29 per cent of the total area in this period; it

has declined at the annual average rate of 1.61 per cent. The area under cotton has also declined from 2,035,524 acres or 2.55 per cent to 1,619,640 acres or 2.03 per cent of the total area. Areas under sugarcane, tobacco and groundnut have increased at annual average rates of 3.68 per cent, 1.37 per cent and 1.46 per cent respectively. The area under sugarcane has risen from 105,426 acres or 0.13 per cent to 175,576 acres or 0.22 per cent of the total area. The area under tobacco from 220,462 acres or 0.28 to 321,904 acres or 0.40 per cent and the area under groundnut from 351,085 acres or 0.41 per cent to 3,650,281 acres or 4.52 per cent of the total area.

Trend of Prices of Principal Crops

The pattern of land utilization in respect of these principal crops has undergone a striking change in fifteen years. Cotton and millets have lost ground while sugarcane, tobacco and groundnut have made gains at varying rates in their respective areas. In this period since 1938-39, prices of major crops have recorded differing rates of increase. Assuming that the effects of adverse seasonal factor and bottlenecks in transportation may remain the same in the case of all the crops the only other important factor affecting land uses is price. The following statement gives the index numbers of prices of principal crops in the years between 1938-39 and 1949-50.

Indices of Prices of Principal Crops—1938-39 to 1949-50.

(Base 1938-39 = 100).

Year.	Paddy.	Cholam.	Cumbu.	Ragi.	Cotton.	Cane *	Tobacco.	Ground nut.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1938-39 ..	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1939-40 ..	109.0	108.0	109.0	116.0	130.4	103.7	98.5	121.3
1940-41 ..	121.0	109.0	111.0	117.0	124.1	64.9	103.1	105.5
1941-42 ..	144.0	123.0	121.0	126.0	155.1	64.1	106.5	115.4
1942-43 ..	209.0	217.0	220.0	226.0	198.6	158.7	117.3	222.8
1943-44 ..	259.0	320.0	308.0	326.0	305.7	189.9	244.4	353.9
1944-45 ..	253.0	284.0	291.0	317.0	211.9	154.8	379.1	300.4
1945-46 ..	267.0	285.0	289.0	322.0	233.3	185.6	332.0	317.3
1946-47 ..	282.0	301.0	300.0	330.0	275.8	257.6	341.3	415.0
1947-48 ..	374.0	381.0	387.0	409.0	279.3	203.5	467.4	573.3
1948-49 ..	500.0	487.0	525.0	565.0	406.7	194.0	580.6	638.1
1949-50 ..	425.0	406.0	384.0	425.0	455.4	366.7	445.5	681.6

* In terms of jaggery price

Effects of Prices on Land Use

The indices show varying rates of rise. The index number of price of paddy shows a steady uptrend during the whole period; but the index number of jaggery prices sagged to 64.1 per cent in 1941-42 and then rose in the following year to 158.7 or nearly 2.5 fold. In 1941-42, the area under sugarcane has also touched the lowest figure of 109,527 acres in this decade; since then the rise in the acreage has been steadily kept up. It is the sharp rise in the price of jaggery in 1942-43 that must have induced an extension of the area under sugarcane.

Up to 1942-43 prices of cholam, cumbu, ragi and groundnut have almost kept pace, but in the next two years, the price of groundnut has risen more than that of either cholam or cumbu. The index number of prices of groundnut has risen from 222.8 in 1942-43 to 353.9 in 1943-44, while that of cholam from 217 to 320 and of cumbu from 220 to 309. It is well known that the area under cholam and cumbu is suitable for the cultivation of groundnut. In 1944-45 the index number of price of the latter is higher than that of either of the former. This disparity might have induced the shift of land from millets to groundnut cultivation; and as with years divergence between the prices of groundnut on the one hand and those of cholam and cumbu on the other become wider, the momentum to this shift also became stronger.

In the case of cotton, except for a spurt in price in 1943-44, the rise has been of a lower order than that of even millets, let alone groundnut. The price of tobacco has been rising steadily from 1939-40 and at a rate relatively higher than that of any other crop, food or commercial. The index number of prices has leapt from 244.4 in 1943-44 to 379.1 in 1944-45 and the area under tobacco has risen in unison, from 238,219 acres to 328,185 acres.

Thus although the seasonal and price factors work in combination in altering the pattern of land utilization, it

will be seen that the effect of seasonal factor is more pronounced in the short term and that of prices in the long term.

Competition between Industrial and Agricultural Uses

The competition between industrial and agricultural uses for land becomes acute in all countries which have taken to industrialization. Unplanned growth of industries in urban areas sometimes cuts into the vitals of agricultural tracts. In mature industrial nations, special precautions are taken to prohibit new cities, satellite towns and suburbs from rising on agricultural land. In larger cities town-planning is specially directed to build up semi-suburban homes surrounded by patches of land, where factory workers and business and professional men raise a kitchen garden and keep chickens and even a cow by putting in a few hours of work morning and evening and materially reduce their living cost.

Short and Long-term Objectives

While the short-term objective of land utilization should remain as the elimination of the triple shortage already referred to, the long-term objective should be to raise maximum cereal food on minimum land space. This would, in turn, release a larger land area for pasture necessary to support a balanced mixed economy consisting of increased stock raising and dairy farming. This could be solved only by a scientific system of crop planning evolved on the basis of an overall examination of the present and future demand for the different types of agricultural products. It involves planning on a family scale as well. The potentialities of raising of cereals as well as adequate animal and dairy products in the family planning should dovetail into and subserve the ends of national planning. These plans however require constant adjustment. The crux of the problem of land utilization being the everchanging needs of society, the principles should necessarily be flexible.

CHAPTER VIII.

MOBILIZATION OF AGRICULTURAL RESOURCES.

The tempo of the Grow More Food Campaign in Madras State has been quickened by the Emergency Food Production Plan, although the main strategy and schemata remain in essence the same. Success in the campaign depends on effective mobilization of a number of factors, land and livestock resources, agricultural manpower, farm implements, pumpsets and machinery, manure and fertilizer resources and agricultural credit. Tenurial conditions, price policies, agricultural practices, allocation and distribution of agricultural requisites, procurement procedure, land revenue administration and efficiency of the field administrative apparatus—have all a bearing, direct and indirect, on productivity.

The campaign has now been there for the last six or seven years and although progressive improvement has been made from time to time, a lot more has to be done before agricultural mobilization could be geared to maximum productivity.

Requirements of a More Successful Well Sinking Campaign

Take, for instance, the well digging campaign. It is by far the most expensive of the Grow More Food Schemes and is also one of the earliest to have been taken up. Even at present, great faith is placed on its potentialities. Up to the end of January 1950 the total amount spent on subsidy amounted to Rs. 7,26,87,330, or more than 3·3 times spent on small irrigation works. On the other hand, the area brought under irrigation by the former was only 163,174 acres, about 15,000 acres less than that by the latter. The relatively poor results of the Well Subsidy Scheme may be attributed to two causes. Firstly, Madras Government estimate the area irrigated by wells at an average rate of one acre per well;

this is rather a conservative estimate compared with an average of 5 acres credited to each well by Government of India. Taking into consideration local conditions in Madras State, it may not be an over-estimate to credit each well with an average of 2 acres of irrigated area, in which case, the total area irrigated by subsidized wells would be reckoned as 326,343 acres. But this is only a rough and ready approximation. The actual area irrigated could be had if a proper enquiry were instituted. It is hoped that in the new schemes for a more accurate assessment of the results of the Grow More Food Campaign special investigation will be arranged to find out the actual area brought under irrigation by the well subsidy scheme. The results of such an enquiry might probably reveal a larger area under well irrigation, or alternatively reveal any abuse that might have taken place in the working of the scheme.

Secondly, there is a great disparity between the number of wells subsidized and the number of wells completed. Up to the end of 1948-49 the total disbursements as subsidy amounted to Rs. 5,80,73,274 for sinking 171,763 wells, but the number of wells completed was 108,460 or 63 per cent only. The enquiry suggested might throw light on the reasons for this lag between subsidized and completed wells. One common belief is that the subsidy has been inadequate. Although this had been raised gradually from Rs. 300 to Rs. 500 and in certain districts to Rs. 750 and in special cases to Rs. 1,000 and Rs. 2,000, the ordinary agriculturist lacks the additional financial resources to complete wells. Well-digging often becomes a costly gamble and the subsidy represents but a moiety of the total cost. At present loans under the Land Improvement Loans Act are being given to supplement the subsidy. However, it still remains difficult for ryots owning only dry lands to offer security for loans that would satisfy the provisions of the Act. Yet it is the dry tracts that stand badly in need of irrigation. The assessment of dry land is comparatively low and its multiple will

not be high enough to warrant under existing rules any sanction of loan. The market value of the dry land, too, in the absence of a well that would translate it into a garden, is low. Since assessment and market value are the two factors by which the repaying capacity of an applicant for loans is judged, the chances of those possessing only dry land getting loans are quite remote. In most cases a well makes all the difference between a barren dry tract and a fruitful garden. However enterprising and resourceful an agriculturist may be, he will not get takkavi loans, if his repaying capacity is deemed low according to the existing rules and it will be low so long as he owns only a dry land without a well. Nor will he be able to add his mite to food production. To resolve this difficulty, it is urgent to liberalize the provisions of the Agricultural Loans Act and Land Improvement Loans Act. Lending agencies like the Land Mortgage Banks should be urged to base mortgage loans on values justified by long-term earning capacity. Nor is this all. Not infrequently the ryot, who has got subsidy and loan as well, finds it difficult to complete his well due to short supply of boring sets, other implements and essential materials like cement and skilled labour; elimination of these bottlenecks is another urgent need.

A third shortcoming in the early years of the working of the Well Subsidy Scheme arose from insufficient inspection of works completed and in progress. There had been cases where old wells with cement plastering were passed off for new wells, and cases where all that was paid by the Treasury by way of subsidy did not always reach the ryot. This shortcoming was remedied by the expansion of the inspection staff in 1948-49 based on the standards in the Takkavi Manual. Most of the malpractices have now probably been eliminated. All the same the scheme still calls for supplementary credit facilities, adequate provision of scarce materials, a vigorous follow-up programme by the field staff and over-all vigilance on the part of the inspection staff.

A more effective Utilization of Free Assignments of Land.

From the inception of the Grow More Food Campaign the scheme of free assignment of land had been of great significance on the extensive front. Between 1942-43 and 1949-50, the area assigned free of cost to landless agricultural labourers, petty landholders, political sufferers, ex-servicemen and others had totalled up to 392,958 acres, of which only 175,386 acres or 44.63 per cent have been brought under cultivation. The rest, about 217,572 acres, remains yet uncultivated. It is paradoxical that land specifically assigned for food production to individuals professing eagerness to cultivate should continue to lie fallow. This might be due to a variety of causes which may be grouped under three heads (i) lands assigned may not be easily cultivable due to physical conditions, geographical situation, inaccessibility of sub-soil water, infestation of weeds, *kans* grass, etc., or virulence of malaria (ii) assignees of land might happen to belong to non-agricultural classes, ignorant of and indifferent to the best methods of land utilization and (iii) assignees might lack the necessary finance to bring it under cultivation.

Reclamation of malaria-ridden or weed-infested land may be beyond the competence of private individuals. Such lands should be assigned only to land colonization societies, land co-operatives or corporations and their reclamation is better done by mechanical methods on a large scale. Other difficulties could be overcome by a liberal provision of financial and auxiliary aids. Land assigned to poor individuals with small incomes appears to remain uncultivated—a clear case calling for financial aid. Either the policy of free assignment of land to poor ryots should be buttressed by adequate financial assistance or the policy itself should undergo modification. In a critical food situation like the present, the paramount objective of free assignment of land should be maximization of immediate productivity rather than meeting the claims of political deservedness or social justice. Lands must be given

away to those who could bring them under cultivation quickly and efficiently. If poorer sections are to be preferred, the act of free assignment should be followed by liberal grants and loans at low rates of interest. In any case the principles of social or political justice should not be allowed to over-ride the needs of efficient utilization of land for immediate food production. The cause of food production is likely to be advanced if preference is shown to experienced middle class agriculturists, possessing sufficient resources to undertake immediate cultivation of the lands assigned. Had such a principle been observed from the outset, it is possible that the area of uncultivated land would have been much less than what it is now.

Expansion of the Tank Improvement Scheme

Although in Madras State, tanks irrigate more than 3,000,000 acres or nearly one-third of the total irrigated area, several hundreds of them have been heavily silted up and in sad disrepair. It has been estimated that renovation of tanks would help provide assured irrigation to 50,000,000 acres. Yet for over six years since the Grow More Food Campaign was inaugurated, no scheme for improvement of tanks was thought of. It is only latterly, under the Emergency Food Production Plan that it has found a place at all. Even this is of limited scope, costing Rs. 12 crores, to be completed in three to five years, and resulting in an anticipated additional production of 150,000 tons of foodgrains. A more comprehensive programme of tank renovation consisting of a variety of schemes calculated to increase directly or indirectly the capacity of the 35,000 tanks and numerous *kasams* and spring channels scattered all over the State, there are grounds to believe, would be of greater effect in the mobilization of our irrigational resources. Firstly, there are the 27,000 and odd tanks in the ryotwari areas. Although it is too late in the day to attempt to deepen them all by lowering the bed, it is nevertheless a practical proposition to remove the silt, reinforce

and raise the bunds and repair the sluices. At the average rate of Rs. 3,000 per tank, this scheme would cost Rs. 8 crores. The second scheme is of a similar nature in respect of the 8,000 tanks in the "Zamindari" areas. Their condition is worse and the average cost of repair would be more, say about Rs. 4,000 per tank; the total cost of this scheme would amount to Rs. 3 crores. The third scheme, complimentary to these two, should aim at providing alternative sources of water-supply to ayacuts of mainly rainfed tanks. On a rough estimate, about 50,000 wells will have to be sunk to serve as a second line of defence against drought and failure of monsoon. On the basis of an average subsidy of Rs. 500 per well, this scheme would cost Rs. 2.5 crores. A fourth line of attack is to repair and clear the silts from thousands of canals, ponds, natural springs, *kasams*, etc., which have an ayacut of 3 lakhs of acres in the aggregate. If the silt is cleared and the springs fully tapped, thousands of acres may be brought under irrigation, in addition to providing the existing ayacut with assured irrigation. This scheme might cost Rs. 2.5 crores. The fifth set of measures should aim at converting anicuts into regulators which may provide for automatic clearance of silt at the heads of existing anicuts. It would also prevent future accumulation of silt. The cost of this scheme would be about Rs. 2 crores. Lastly, something should be done to enable storage of water up to full tank level; and this would be possible only by stopping foreshore cultivation which has been increasingly in evidence in recent years. This may be done by compulsory acquisition of patta lands in the foreshore of tanks. This would cost Rs. 1 crore by way of compensation and expenses.

It will be possible to carry out all these six parts of the Tank Improvement Scheme in six or seven years; and they would result in assured irrigation of 50 lakhs of acres instead of the present day precarious water-supply to 35 lakhs of acres by the tanks. A great merit of this programme is that its execution will not be impeded by bottlenecks of any kind.

No costly or complex machinery is required to carry out any of the schemes, nor is there any need for high calibre technical know-how. For raising the calingula, repair of sluices, deepening of kasams and ponds, construction of regulators, clearance of silt and reinforcement of bunds, the *oddars* and other tank digging castes once sufficed. About their technical knowledge and ability, C. R. Markham wrote admiringly in his Report on East India Irrigation Schemes in 1880: "Activity in this field had been so unbroken that South India came to possess an efficient corps of irrigation engineers of all times. Centuries of experience had taught the ryots and oddars an extraordinary amount of engineering skill and administrative aptitude in the management of these works. English engineers may even now learn much as regards engineering from many a half-naked maistri of the tank digging caste."* In the days of the East India Company, sappers and miners were employed for the construction of irrigation works and roads. At present, the Defence Services have their corps of sappers and miners equipped with high power machinery like heavy tractors and bulldozers. If the sappers and miners, with their modern equipment are brought to the aid of ryots and oddars in the implementation of this comprehensive Tank Improvement Programme, it may be completed in four years instead of six as envisaged here. The additional production of foodgrains, mainly of paddy, from this programme is estimated at 500,000 tons of rice.

There is also scope for a further production of more than 100,000 tons of millets in all ayacuts, where due to limited supply of water a second crop of millets, though not second crop of rice, would be possible. In the aggregate, there will be an additional production of 600,000 tons of foodgrains, or 450,000 tons more than what would accrue from the present scheme initiated in 1949-50.

* Quoted by Sri O. P. Ramaswami Reddiar in his book, "Tank Irrigation and Food Production in the Province of Madras" published by Shakti Karyalayam, Madras.

Although this abridged scheme of tank improvement has filled up a significant gap in the irrigation programme of the State, the urgency for enlarging it into a more comprehensive scheme is greater in view of the difficulties confronting the execution of giant irrigation projects like the Ramapadasagar. The tank improvement scheme is manpower-intensive rather than capital-intensive, and so is particularly suited to prevailing Indian economic conditions. Execution of the amplified scheme is easy with local manpower, skill and materials and is also essential to the conservation of the rich legacy inherited from our forebears in the form of about 35,000 tanks that would be valued at more than Rs. 350 crores in terms of present day cost of construction.

Schemes of Recurring Nature

The distribution of chemical fertilizers is contingent upon their adequate allotment by Government of India who, in turn, have to work up to import and exchange priorities. This dependence on foreign supply experienced now, will however disappear in 1952 when the Fertilizer factory at Sindri is expected to go into production. The scheme of multiplication and distribution of improved strains of seeds has shown signs of steady progress. The requisites for a more effective execution of this scheme are (1) formulation of time schedules to cover the entire crop areas with improved strains (2) closer inspection of primary seed farms raised by cultivators and (3) preservation of the purity of the strains by regular and adequate supply of pure seeds from Government farms to owners of primary seed farms.

The compost-making and green manure schemes possess vast potentialities. Only a beginning has been made so far. The number of major panchayats and municipalities making compost is 109 or 21.4 per cent, a fraction of the total number of 511 major panchayats and municipalities. This does not include 7,192 minor panchayats nor the 27,000 villages without

any panchayat. Supply of green manure may be increased phenomenally by a programme for planting quick-growing trees with a target of one tree per house in the next twelve months. The total number of houses in the State is 9.74 millions. This will mean, even at a conservative estimate, planting of about 8 million trees. By organizing a vigorous drive to implement this plan, it is possible to solve not only the green manure problem but also the fuel problem and in the long run, it would also relieve the shortage of building material required for a rural housing programme.

Incentives to Increased Output

Schemes like reclamation of waste land, extension of irrigation, distribution of fertilizers and seeds, control of pests and diseases are no doubt important for increased production. But more important than any of them and fundamentally affecting the success of all of them is the proper tuning of the human factor. Of basic significance is the need for enlisting the enthusiasm and active co-operation of the agriculturist. Expectations, as in all spheres of economic activity, serve as prime movers in the dynamics of practical agriculture. Notwithstanding the various Grow More Food Campaign Schemes, the absence of the carrot in correct proportions and at the right moment may leave the agriculturist cold and indifferent.

The human factor may be warmed up for fresh endeavour by making the prospects of profit bright; and they would become bright only under conditions of freedom, equality and security, stable costs of cultivation, minimum prices for farm produce and reasonable prices for non-agricultural consumption goods; elimination of too much administrative interference and regulation of irksome procurement procedure, etc., are also sure aids to stimulate agriculturists' interest. In short, the agriculturist requires psychological incentives in the form of healthy tenurial conditions, sound price policy and efficient administrative apparatus.

Tenurial Reform

The Zamindari Abolition Act in the State constitutes a major agrarian reform. In the erstwhile zamindari areas covering about 33,000 square miles or roughly one-quarter of the total area of the State, it has transformed millions of occupancy tenants into peasant-proprietors. The main objectives of the Act were the abolition of the concentration of land in a few hands and the hierarchy of rights together with the consequent evils of sub-infeudation. The Act has effected a wider distribution of rights in landed property and has worked towards social justice. But the change in the ownership of land and the status of the erstwhile tenants does not appear to have materially altered the level of efficiency in agriculture. In the present context of acute food deficit, the paramount objective of tenurial and labour reform should be productivity. The labourer must get enough wages to maintain a minimum standard of life, the tenant satisfactory conditions of tenure to enable him to undertake cultivation on a fairly long-term basis and the landholder, adequate returns for his investments. Human factor in agriculture embraces the land owner, tenant and landless labourer on whose combined effort depends expansion of production. With the extension of ryotwari tenure to zamindari areas, the tenancy problem has assumed a uniform complexion throughout the State. The solution of this problem calls for a scientific study of the landlord-tenant relationship in all its variations throughout the State. The recently appointed Land Revenue Reforms Enquiry Committee will go into this question and suggest measures for bringing about healthy relations between the landholder and tenant. The enquiry into agricultural wages that is being conducted by Government of India has the object of formulating a scheme of minimum wages applicable to the agricultural sector. When the results of these enquiries become available, it is hoped, the twin problems of tenancy and agricultural labour will have found satisfactory solutions.

However, a few points that should constitute the fundamental basis of any scientific approach to a sound reform of the tenurial structure may be made here. Even as there is an "agricultural ladder", there is an agricultural triangle of which the landholder, tenant and landless agricultural worker form the three arms. The interests of these three parties act and react upon one another. If the remuneration of one of the three is pitched high, that of either of the other two or both will have to be low. Wages of workers cannot rule high under a price stop decree. Rent of the landlord will not be fair and in consonance with the laws of Parity Economy*, if the share of tenant or the wage of the worker is fixed unduly high. If rent should be fair, the landholder should get say 6 per cent dividend on his investment as his confrere in Industry and Trade do, even those at the margin. If wages should be fair, they should enable the agricultural proletariat to attain the standard of living of their confrere in Industry. If the earnings of the tenants should be fair, they should not fall below the levels enjoyed by their opposite number in Industry and Trade. Any impediment in the way of ensuring such fair remuneration to the agricultural triangle is bound to result in low productivity. If it is low wage, it should be stepped up; if it is low price, it should be revised upward. In short, the objective of reconstruction of the tenurial and wage systems should be the attainment of a triangular equipoise in the agricultural sector.

The Madras Agricultural Bill

To step up the efficiency of agriculture, Government contemplated introducing legislation on the lines of the British Agriculture Act. The objects of the Madras Agricultural Bill, which was published sometime back to elicit public opinion were (1) to vest Government with power to compel owners of land to raise the crop required by the State (2) to assure landholders

* Sri O. P. Ramaswami Reddiar: *Agrarian Reforms and Parity Economy* (Government of Madras, 1948).

a fair price and a good market for their produce (3) to empower Government to prescribe and enforce reasonable standards of efficient management and good husbandry and (4) to empower Government to take charge of the land and arrange for its efficient cultivation, wherever cultivation fails to reach the prescribed minimum standard of efficiency. The proposal to introduce the Bill was a clear indication of the anxiety of Government to improve agricultural efficiency. Published at a time when the general public had been too much irritated by Government controls, the Bill failed to receive public support and had to be dropped. The abortive attempt at legislation, however, underlines the importance of efficient agriculture. If voluntary effort on the part of agriculturist is not forthcoming, sooner or later statutory compulsion may have to force the march of agriculture.

Madras Land Utilization Order, 1950

In September 1950, with a view to make the maximum utilization of all available waste and arable land in the State for food production, Government have, under the Essential Supplies (Temporary Powers) Act, 1946, issued the Madras Land Utilization Order. This order empowers the District Collector, subject to appellate control of Government, to call upon the holder of any waste or arable land, which has not been cultivated during the cultivation season immediately preceding the date of notice, to cultivate it with food crops either personally or through a lessee within a period of three months from the date of service of the notice. Food crops are defined to include all cereals, grams, pulses, vegetables and such other crops as Government may specify. Failure to comply with the notice will involve the sale by public auction of the right to cultivate the land for a period of three years. The purchaser of the right of cultivation is bound to cultivate the land with food crops and is liable to certain penalties if he fails to do so. Out of the proceeds of the auction, land revenue and other dues to Government will be deducted and the

balance will be made over to the owner of the land as compensation. This order may be said to embody the first of the objects of the Madras Agricultural Bill. This involves compulsion on a large-scale and before resorting to it, it is well that the nature and variety of disincentives militating against efficient tillage are clearly understood.

Stabilization of Prices

One of the most serious disincentives to increased productive effort in the agricultural sphere is instability of prices. Sudden precipitous fall in prices has in the past inflicted heavy losses on ryots. The Prices Sub-Committee of the Policy Committee on Agriculture, Forestry and Fisheries appointed by Government of India recommended the establishment of a Prices Determination Commission with a Bureau of Economics and Statistics under it for fixing floor and ceiling prices. They also recommended the formation of a Commodity Corporation for building a national reserve of foodgrains for enforcing prices and for meeting emergencies like famine. According to their estimate, this Corporation should have a fixed capital of Rs. 6.2 crores and a working capital of Rs. 32 crores, although its purchase and sale operations would involve only a net expenditure of Rs. 2.66 crores. This scheme, calling for big investments and a large personnel, might not be a feasible administrative and financial proposition just at present. However, with certain modifications in its set-up, it may even now prove a valuable instrument to iron out violent fluctuations in prices. Government could retain in their hands the general powers of direction and supervision and entrust the details of the open market operations to commercial and co-operative banks. The trouble and cost of building or hiring warehouses and financing the purchase and sale of foodgrains could then be shifted to private agencies, accustomed and trained to perform these functions. Though this might be a long-term remedy for instability of prices, a beginning may be made now when the

present food situation demands and several committees have recommended the need for building up buffer stocks of foodgrains to tide over spells of acute scarcity.

A Commodity Corporation on these lines may take time to yield results. The immediate problem is not one of preventing violent fluctuations in prices, but of stepping up production. Despite the various schemes of the Grow More Food Campaign, the co-operation of the ryot is not forthcoming in full measure, principally due to the fact that profit margin in the cultivation of food crops is unattractive, if not unremunerative. To secure their enthusiastic co-operation, the producer must be offered what is called "carrot" or decent profits.

Present Level of Procurement Prices

The question whether the existing level of prices yields sufficient profit margin to the grower of foodgrains is answered in two different ways by two different schools of thought. One maintains that prices of foodgrains which are abnormally high are the villain of the piece in the present inflationary situation. Constituting as foodgrains do nearly 75 per cent of the expenditure of the working class budget, high priced foodgrains have forced up the cost of living. To bring it down, prices of foodgrains should be reduced. Even a 5 per cent or 10 per cent change in the prices of foodgrains would have its "multiplier effect" on the general level of prices. No more effective and direct anti-inflationary measure could therefore be thought of than to press the prices of foodgrains down. On the other hand, the other school contends that prices are not only unattractive but also unremunerative; it argues that if the Grow More Food Campaign has not so far yielded the anticipated results, it is mainly due to the serious disincentive brought about by too low prices. This school gains support to their argument from the recent phenomenon of fairly big areas being switched over from food crops to non-food crops. In Madras State, as already shown,

alternative employment was not available, when the overall prospects of agricultural production were bleak, it continued as a sweated industry in pre-war years. In post-war years when prices of commercial crops have soared high they are a strong temptation to agriculturists to switch over from food to non-food production, soil and other conditions permitting. Unless estimates of cost of cultivation include all these factors, and price policy modified accordingly, food production is not likely to show much verve.

Finally, the computation of cost of cultivation had been and is even now based on empirical methods. Without a suitable machinery for the collection of cost data on scientific lines, it is not possible in this sphere to attain any reasonable standard of accuracy.

It is no use getting away from it on the facile and fashionable plea that cost accounting is a veritable impossibility in agriculture. Surely the science of Economics would not make such an abject abdication, when it is getting so much full with econometricians and aggregative economists.

Indices of Agricultural Prosperity

A further factor complicating the price structure in the agricultural sector is the disparity in the returns that now exists between those who raise foodgrains and those who raise commercial crops. A full-fledged price control exists now for foodgrains. It does not touch the important group of commercial crops with the exception of sugar and cotton. In so far as this group remains untouched, one of the major objectives of a comprehensive price-control policy, viz., a proper adjustment of our productive resources as between foodgrains and commercial crops is not likely to be achieved.

The foundations of rural prosperity cannot be considered stable so long as this mal-adjustment is allowed to continue. I have attempted below to study the working in practice of the agricultural price fixation policy followed in Madras State with special reference to its effects on rural prosperity.

Fig. 25.—INDEX NUMBERS OF PRICES RECEIVED BY THE FARMER

Base : 1938-39 = 100

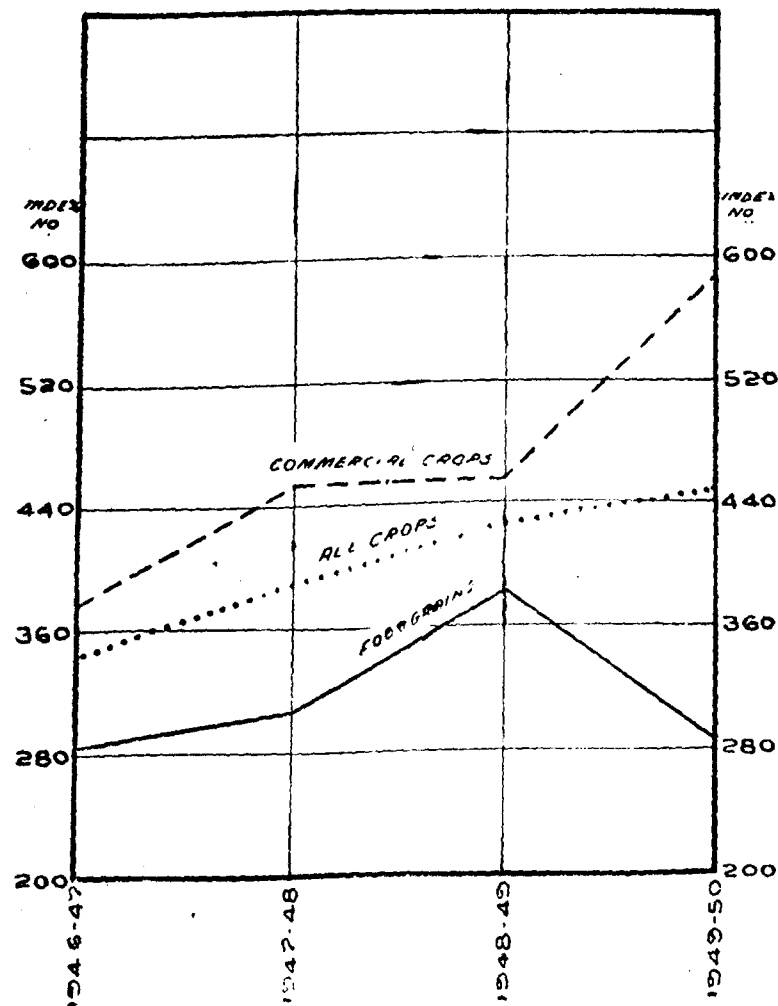
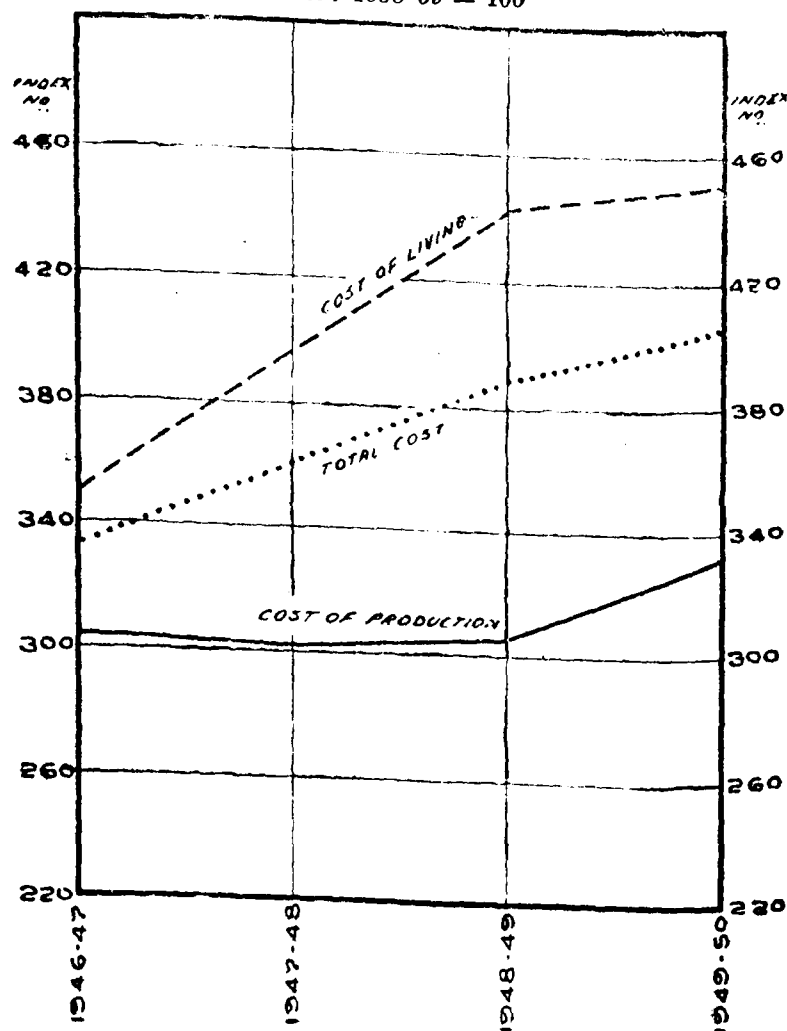


Fig. 26.—INDEX NUMBERS OF PRICES PAID BY THE FARMER

Base: 1938-39 = 100



taking the previous year in each case as base or 100. The relevant calculations are shown in Appendix XXVI. As regards the index of cost of living of the cultivator, the only figures available in this connection are the indices of rural prices which are now worked out for the following thirteen rural centres in the State, taken as representative of the rural zones in the districts noted against them.

Rural centre.	Rural areas of the district or districts represented by the centre.	
1 Adivivaram	Visakhapatnam.	
2 Thettangi	"	
3 Alamuru	East Godavari, West Godavari, Krishna, Guntur and Nellore.	
4 Madavaram	Anantapur, Bellary, Kurnool, Cuddapah and Chittoor.	
5 Puliur	North Arcot and South Arcot.	
6 Agaram	"	
7 Thulayanatham	Tiruchirappalli and Tanjore.	
8 Eriodu	Madhurai, Ramanathapuram and Tirunelveli.	
9 Gokilapuram	Madhurai, Ramanathapuram and Tirunelveli.	
10 Kinathukadavu	Coimbatore and Salem.	
11 Koduvalli	Malabar and South Kanara.	
12 Guduvancheri	Chingleput.	
13 Kunnathur	"	

These indices are available only from July 1946 onwards and the base year for their compilation is the year ended June 1936 as for the index numbers of cost of living for urban centres. Index numbers of rural prices have not been compiled

for the year 1938-39. But it may be assumed that the variations in these indices between the years 1935-36 and 1938-39 were more or less of the same order as in the index numbers of cost of living for the nearest urban centre. On this basis the index numbers for the different rural centres for 1937-39 will be as follows :—

Rural centre.	Index number.	Rural centre.	Index number.
1 Adivivaram ..	101·6	8 Eriodu ..	96·9
2 Thettangi ..	101·6	9 Gokilapuram ..	96·9
3 Alamuru ..	100·9	10 Kinathukadavu.	101·8
4 Madavaram ..	95·6	11 Koduvalli ..	102·5
5 Puliur ..	103·9	12 Guduvancheri ..	97·6
6 Agaram ..	103·9	13 Kunnathur ..	97·6
7 Thulayanathan	102·1		

The next step was to work out an index of rural prices for each of the years 1946-47 to 1949-50 for the different centres by the chain-base method and to combine the indices suitably into a weighted index of rural prices for the State as a whole, adopting for weightage in each, the rural population of the zone which is represented by the appropriate centre. The base years for the calculation of these index numbers were respectively 1938-39, 1946-47, 1947-48 and 1948-49. The method of calculation of these indices is shown in detail in Appendix XXVII. The weights used in combining the indices of cost of cultivation and cost of living of the farmer were based on the data available in economic enquiries conducted in this State in connection with the Rural Indebtedness in 1945-46 by the economist to Government. According to these enquiries, the weights on a percentage basis were 36 for cost of cultivation and 64 for cost of living for the year 1938-39, the corresponding weights for 1946-47 being 38 and 62. In working out the weighted index of the prices paid by the farmer for the year 1946-47 with the year 1938-39 as base or 100, the weights for the later year have been used. Similarly in the calculation of the index for

1947-48 the weights for 1946-47 have been used. The weights for 1947-48 were calculated by stepping up the weights for 1946-47 by the increase in the cost of production on the one hand and the cost of living of the ryot on the other as shown below :

Item.	Weights used for 1946-47.	Percentage increase (+) or decrease (—) in 1947-48 as compared with 1946-47.	Estimated weights for 1947-48.	Estimated weights on a percentage basis.
Cost of cultivation ..	38	—0·4	37·8	35
Cost of living ..	62	+13·1	70·1	65
				100

Weights for the year 1948-49 were also similarly worked out. Using the weights so calculated, indices of prices paid by the farmer were computed for the different years by the chain base method as shown below. It may be mentioned here that the adoption of the chain base method in the calculation of the indices is specially appropriate in a case like this where the weighting system is flexible. The adoption of a rigid set of weights will ignore the changes in the pattern of expenditure of the farmer which are bound to occur over a period of years.

Year.	Weights adopted.		Index of cost of production.	Index of cost of living	Weighted index of prices paid by the farmer $\frac{(4) \times (2) + (5) \times (3)}{(2) + (3)}$
	Cost of cultivation.	Cost of living.			
(1)	(2)	(3)	(4)	(5)	(6)
1946-47 ..	36	64	302·2	348·4	331·8 (Base : 1938-39).
1947-48 ..	38	62	99·5	113·4	108·1 (Base : 1946-47).
1948-49 ..	35	65	100·4	111·8	107·8 (Base : 1947-48).
1949-50 ..	34	66	110·1	101·6	104·5 (Base : 1948-49).

Parity Trends

The Parity Index has been defined as the percentage ratio of the index of prices received to index of prices paid. Making use of the indices of prices received and of prices paid already

Parity Index

One method of quantitatively assessing how price fixation of agricultural products has in practice affected the prosperity of the agriculturists is by the construction of what is known as the Parity Index. In other words if we are in a position to have an index of prices received by the farmer, and an index of prices paid by the farmer, we will be in a position to gauge the disparity between the two by dividing the index of prices received by the farmer by the index of prices paid by the farmer and multiplying the result by 100.

Of the two components of the parity index, the index of prices received by the farmer will include all the commodities which he markets and which form the main source of his income. The index of prices paid by the farmer is a composite of an index of cost of production and an index of cost of living of the ryot.

Index of Prices Received by the Farmer

This is an index of the value of commodities marketed by the farmer with reference to a certain year taken as base. For reasons which will be explained below, it has been found expedient to work out the index numbers by the chain-base method. According to this method the index calculated for any year is with reference to the previous year taken as base or 100.

The commodities which have been included in the compilation of the index of prices received by the farmer are paddy, cholam, cumbu, ragi, korra, sugarcane, groundnut gingelly, castor, cotton and tobacco, which together accounted for nearly 80 per cent of the total area under crops in the Madras State in 1938-39. In the case of each of these commodities, the marketable surplus of the producer was first estimated and this was valued at the average harvest price ruling for the crop in the year in question. The total value of the marketable surplus of the eleven crops mentioned above may be taken to represent the total receipt of the farmer by the sale of his

produce. On the basis of the value so assessed for the years 1938-39, 1946-47, 1947-48, 1948-49 and 1949-50, indices of value were calculated for the four years 1946-47 to 1949-50 taking the previous year in each case in the above series of five years as base or 100. Details relating to the calculation of the index numbers are shown in Appendix XXV.

Index of Prices paid by the Farmer

This index involves the calculation of two separate indices : (1) an index of cost of production and (2) an index of cost of living of the cultivator. The two are then combined into a weighted index of prices paid by the farmer by weighting the two indices suitably.

As regards the computation of the first of the above indices, in the absence of any systematic enquiries into cost of production of crops in this State, the figures of cost of production per acre for the crop referred to above were based as far as possible on the reports of the Director of Agriculture in the case of millets and commercial crops and on the reports of Collectors in the case of paddy. The forms used by the Director of Agriculture and by the Collectors in reporting cost of production figures are shown in Appendix XXVIII. It will be seen that there is no uniformity in the method of compilation of cost of production figures in the two cases. For instance, in one rent enters into cost of production ; in the other it does not. And in neither case do we have an idea of the size of farm or the class of farmers. Nor is it known how comprehensive the enquiries have been in each case. And it is certain that they have not been based on any recognized sampling technique. An attempt has therefore been made to supplement the data from certain results of the enquiry conducted in 1947 by the Special Officer for Land Tenures in the Madras State. The figures so arrived at were subsequently weighted by the acreage under the different crops and the total cost of production for all the crops was computed for each year. Index numbers of production costs were then calculated for the different years,

worked out, the parity indices for the different years by the chain base method work out as shown below :

Year.	Index of prices paid.	Index of prices received.	Parity Index
(1)	(2)	(3)	(4)
1946-47	331.8	333.7	100.6
1947-48	108.1	116.0	107.3
1948-49	107.8	109.2	101.3
1949-50	104.5	106.5	101.9

The index for 1946-47 has 1938-39 as base or 100 and the indices for the other years have the previous year as base or 100 in each case. The indices for 1947-48, 1948-49 and 1949-50 can also be easily worked out with 1938-39 as base or 100 making use of the following well-known property of the chain relatives. Let I 1,0 be an index for the year '1' with the year '0' as base and I 2,1 an index for the year '2' with year '1' as base. Then $I_{2,0} = I_{1,0} \times I_{2,1}$.

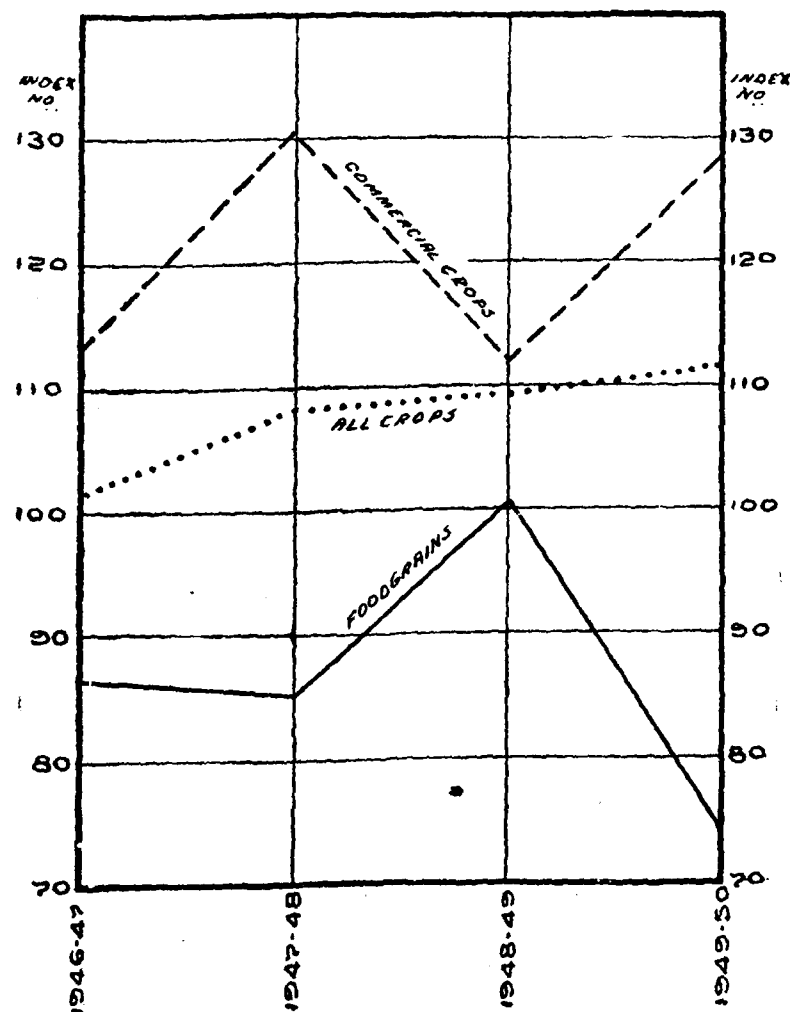
The Parity Indices worked out in this manner with the year 1938-39 as base or 100 are as follows :

Year.	Parity index worked out by the chain base method.	Parity index calculated with 1938-39 as common base or 100.
1946-47	100.6	100.6
1947-48	107.3	100.6×107.3 $\frac{100}{107.3 \times 101.3} = 107.9$
1948-49	101.3	107.9×101.3 $\frac{100}{109.3 \times 101.9} = 114.4$
1949-50	101.9	

It will be seen from the above figures that the prosperity of the farmer in Madras State has on the whole been on the increase year after year since 1946-47 when the index was barely one point higher than in 1938-39. The parity index for 1949-50 was nearly 11 per cent higher than in 1938-39. There was a pretty sharp increase in the index between 1946-47 and 1947-48 due partly to the higher prices fixed for foodgrains and partly to decontrol of foodgrains introduced about the end of 1947 which had the effect of raising their prices to

Fig. 27. PARITY INDEX NUMBERS

Base : 1938-39=100



phenomenal levels. The increase in the index since 1947-48 has not been considerable, the index having risen barely by 4 points.

Foodgrains versus Commercial Crops

It will be interesting to investigate whether all section of agriculture have been benefited by this gently rising wave of prosperity or whether it is confined only to the growers of special crops which have been fetching very high prices and were not subject to control. For this purpose, the crops have been divided into two groups, foodgrains and commercial and indices of parity have been worked out separately for each of these groups both by the chain base method and by the common base method. The results are shown in the statement below :

Year.	Index number of parity worked out by			
	Chain base method.		Common base method (1938-39)	
	Food grains.	Commer- cial crops.	Food grains.	Commer- cial crops.
(1)	(2)	(3)	(4)	(5)
1946-47	85.7	112.6	85.7	112.6
1947-48	99.0	115.4	84.8	129.9
1948-49	118.3	86.2	100.3	112.0
1949-50	73.8	114.4	73.8	128.1

A perusal of columns (4) and (5) of the above table very strikingly illustrates the disparity in agricultural prosperity between the growers of foodgrains and the growers of commercial crops. The former group has been hard hit partly by the fall in production resulting from the successive failure of monsoons and partly by the comparatively lower prices realized by them for their produce. The prosperity of the farmer growing foodgrains in the year 1948-49 was practically on a par with that in the pre-war year 1938-39. Since then there has been a sharp deterioration in prosperity, the index having fallen from 100.3 in 1948-49 to 73.8 in 1949-50. The

fall is mainly due to the sharp fall in the production of foodgrains in 1949-50 occasioned by the failure of the monsoons. The slightly lower prices fixed for foodgrains during the year have also contributed to the fall in the prosperity of the ryot in 1949-50.

The prosperity of the cultivator of commercial crops has, on the other hand, increased to a considerable extent. In the year 1946-47 the index of prosperity for the grower of commercial crops stood 12.6 points higher than in the base year 1938-39. There was then a sharp increase in the index to 129.9 in 1947-48 due mainly to the increase in the prices of commercial crops. In the following year there was a fall in the index to 112.0. The year 1949-50 again witnessed a substantial increase in the prosperity of the grower of commercial crops, thanks to the highly remunerative prices which prevailed for crops like sugarcane, groundnut and cotton.

The disparity which we have noticed in the prosperity of the growers of food and commercial crops is a serious problem and if allowed to continue unchecked, may have untoward repercussion on the progress of the Grow More Food effort. The solution to the problem lies in evolving an equitable price structure for all agricultural produce, food and commercial. It is inadvisable, however, to take any precipitate action so as to bring down the rise in the prices of commercial crops to the same level as that of foodgrains, as the growing of commercial crops is the only "second string to the bow" for many ryots who are engaged in food production. Regulation of agricultural prices should be correlated to a system of rational crop planning and this has to be evolved on an all-India basis and enforced compulsorily if need be.

Madras prices and prices in other States

That the prices in Madras State have been rather low will be apparent from a comparison with prices elsewhere in the Indian Union. Ex-village procurement prices of rice, bajra and

cholam in 15 States as they prevailed in 1948-49 are tabulated below :

Minimum procurement prices per maund (1948-49).

State	Rice			Bajra			Cholam		
	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
1 East Punjab	17	8	0	8	10	0	8	4	0
2 Uttar Pradesh	16	12	0	9	4	0	8	8	0
3 Madhya Pradesh	11	2	0	..	..	..	8	12	0
4 West Bengal	12	6	0	..	..	..	..	..	..
5 Assam	15	0	0	..	..	..	..	..	..
6 Orissa	11	6	0	7	8	0	7	8	0
7 Bihar	13	8	0	..	..	..	..	..	..
8 Bombay—									
Gujarat	12	5	0	13	0	0	12	0	0
	to								
Other districts	31	12	0						
9 Pepsu	16	2	0	11	0	0	10	0	0
10 Madhya Bharat	18	4	0	8	10	0	..	..	..
	to			8	8	0	..	..	..
	18	0	0						
11 Vindhya Pradesh	10	3	0	8	2	0	..	..	..
12 Saurashtra	36	5	4	..	..	..	..	..	..
13 Hyderabad	10	13	8	7	2	0	8	9	0
14 Mysore	13	12	0	..	..	..	7	2	0
15 Madras	11	2	5	7	13	9	7	8	9

It is important to note that among the 15 States shown in the statement, four States—Uttar Pradesh, Madhya Pradesh, Assam and Orissa—are surplus States. Yet, the procurement price of rice in Madras, Rs. 11-2-5, was lower than the price in 11 States including the surplus States. Prices in East Punjab, Uttar Pradesh, Bombay, Pepsu and Madhya Bharat were 50 per cent or more above the prices in Madras; in Saurashtra it was more than three-fold. In the current year price of rice in Madras is Rs. 15 per maund against Rs. 25 in Uttar Pradesh. This great disparity assumes vital significance when the Central Government has allotted 37,760 tons of rice from Uttar Pradesh to Madras. It means payment of Rs. 10 per maund (exclusive of transport costs) more to the Uttar Pradesh ryot than to the Madras ryot and for the entire allotment Madras will have to pay Rs. 108.94 lakhs to the other State.

Similar disparity is noticed in the case of bajra and cholam as well. Out of the 10 States for which price of bajra is available, seven States have a higher rate and in only two States—Orissa and Hyderabad—is it lower; but both these States are surplus, one according to the Gregory formula and the other according to accepted general standards. The price of cholam, Rs. 7-8-9 per maund in Madras, is the lowest, except for Mysore which again is on the same level with Orissa, a surplus State.

Thus, judged either with reference to the principles adopted for fixing fair prices or with reference to prices ruling in other States, the prices of foodgrains in Madras are low, sufficiently low as to operate as a serious disincentive, nullifying largely the inducements afforded by the Grow More Food Campaign. Removal of this impediment will undoubtedly meet not only considerations of equity and justice, but also serve to substantially increase food production.

Price Incentive in Agriculture—the Theory*

Here a little incursion into the theoretical sphere may not be out of place. There is a large volume of literary output on this aspect from a number of eminent authorities like Dr. C. S. Orwin, Professor A. W. Ashby, and Dr. J. F. W. Rowe. The League of Nations publication, *Economic Stability in Post-War World* has also dealt with it. In subsistence farming, they hold, agriculture as a “way of life” does not respond to the price mechanism and that there is a certain amount of perversity in agricultural production which the profit-motive can hardly seek to explain. But as against this, there is also the impressive work done by Dr. Murray, Miss Cohen, Mr. Cornea and Dr. L. H. Bean in correlating agricultural prices to supplies. While in agriculture it may not be possible to construct a simple Marshallian Supply Schedule, Mr. B. D. Giles in an interesting article on “Agriculture and the Price Mechanism”† has shown, that a supply

* Vide *infra* p. 198.

† Oxford Studies in the Price Mechanism, edited by T. Wilson and P. W. S. Andrews, Oxford Clarendon Press, 1951.

curve very much in the Marshallian sense can be constructed both for short and long periods, provided we correlate the relative price of a commodity to changes in acreage rather than total farm prices to total or individual farm output. The fact is that "atomistic competition, uncertainties about yield, lack of short-period control over output, appreciable time-lags, and slow short period prime costs" in agriculture lead to a certain steadiness in the volume of farm output and often creates the impression that the agriculturist is an obtuse being, unmoved by price considerations. The conclusion therefore is that there is ample evidence to show that, of the outputs which are technically possible the farmer will produce a collection very like that which yields the greatest profit, although he may never operate at the point of equilibrium. There is such a thing as a stability price in agriculture and fairly small adjustments to acreage will be made in a single year in response to quite small changes in price; but after a point, greater price changes have little immediate effect on output. On the other hand, if the price remains constant for a number of years at a level slightly higher or lower than the stability price there will be a continuing expansion or contraction of acreage. My point is that this stability price is a moving concept and cannot but be so in conditions of an all-round rising inflationary situation, and hence the need for constant adjustments. If this is what theory indicates, in the price situation as obtaining in Madras State today, one is impelled to recommend a certain measure of increase in prices of foodgrains. The scheme of crop planning suggested earlier would also derive a valid measure of theoretical sanction by this acreage—relative—price correlation analysis.

Consequences of Raising the Price of Rice by Re. 1 per maund

The fiscal consequences of a policy of revising the prices upward may be examined. Expenditure on procurement of foodgrains depends on the quantities procured which, in turn, depend upon the scope of rationing decided upon. The

average annual offtake in the last five Kharif years, 1944-45 to 1948-49, for maintaining rural rationing was 825,877 tons of rice; at the current price of Rs. 419 per ton, this quantity will cost Rs. 2,24-80 lakhs. Rationing in this State is of two parts—urban and rural. The urban areas may be classified into two categories—towns with a population of 50,000 and more and 100,000 and more. Quantities of foodgrains that should be procured to meet the requirements of rural rationing, urban rationing and both and the estimated expenditure at the current price of Rs. 419 per ton are tabulated below :

Quantity and value of foodgrains to be procured to maintain urban and rural rationing in Madras State.

Scope of rationing.	Requirements in tons.	Value at Rs. 419 per ton.	Funds required for raising the price of foodgrains by Re. 1 per maund (1 ton = 27 maunds).
			RS.
1 Rural Rationing	825,877*	34,60,42,463	2,24,80,372
2 Urban Rationing—			
(a) Covering towns with a population of 50,000 and above.	354,643	14,85,95,417	96,53,382
(b) Covering towns with a population of 100,000 and above.	174,844	7,32,59,636	47,59,254
3 1 + 2 (a)	1,180,520	49,46,37,880	3,21,33,754
4 1 + 2 (b)	1,000,721	41,93,02,099	2,72,39,628
5 Wider coverage	1,500,000	62,85,00,000	4,08,30,000

It may be seen from the statement above that if the price of foodgrains is raised by Re. 1 per maund and if 15 lakhs tons of foodgrains are procured, the additional expenditure will be Rs. 4,08-30 lakhs; it will be Rs. 3,21-34 lakhs if urban rationing for all towns with a population of 50,000 and above and the existing rural rationing are continued; if along with rural rationing, urban rationing is confined to towns of 100,000 tons and above, the same will be Rs. 272-40 lakhs; if rural rationing is abolished, and urban rationing is continued in all towns

* Average annual offtake in the five kharif years, 1944-45 to 1948-49.

with a population of 50,000 and above, additional expenditure will be Rs. 96.53 lakhs and if urban ration for towns above a population of 100,000 and above alone is maintained, it will be Rs. 47.59 lakhs. Whatever be the expenditure on procurement according to the varying scope of rationing, it may be recovered from the consumers. It would involve only a ways and means adjustment. The crux of the problem facing this proposal, from the standpoint of Central Government is whether it would not immediately push up the cost of living index. So far as the agriculturists in this State are concerned it would not, because the cost of foodgrains is excluded from the calculation of their cost of living. For maintaining statutory rationing in towns of population of 100,000 or above, the extra expenditure on account of a rise of Re. 1 per maund in the price will be Rs. 47.59 lakhs. If the consequent rise in retail price of foodgrains would force up the cost of living, it may be neutralized by converting this expenditure into a subsidy—less than Re. 0.1 per head of the population, compared with that of Rs. 3 per head in the U.K. in 1949–50. Thus the cost of living in both rural and urban areas may be maintained unaffected. This expenditure is only a fraction of what is spent on Grow More Food Campaign and may be quite worth while in view of the incentive a rise of Re. 1 in the price would give to the agriculturists; the fillip thus given may work in the short run more towards closing the gap in the food supply of the State than all the schemes of the Grow More Food Campaign and might by bringing about additional production and eventually reducing the huge administrative expenditure now incurred on Food Administration, actually prove anti-inflationary in effect, however paradoxical that might appear.

Crop Insurance

Stabilization of prices at remunerative levels and elimination of vexatious interference with the freedom of the agriculturist are essential in the short run to achieve expansion of output. In any effort to place agriculture on a prosperous

footing so as to banish food famine for ever, short and long terms plans cannot be kept separate. They should be blended to produce durable and early results.

In the context of Indian agriculture being a gamble in the monsoons, price stability does not however guarantee income security. Prices might rule high, but partial or complete failures of harvests might decimate or destroy the yield. The agriculturist requires protection from visitations of Nature—flood, drought, pests, diseases, etc., and this cannot be secured except by a comprehensive scheme of Crop Insurance. The individual cultivator wants coverage for several types of risks involved in raising, harvesting and storing crops. Insurance of crops after harvest is a relatively simple matter, but the insurance of growing crops is a more specialised business. In many European countries and the U.S.A. special risks due to hail, flood, fire, etc., are covered by insurance companies actively assisted by Governments. It was in the U.S.A. however that attempts were made for the first time to provide an “all risk” insurance to the agriculturist.

With the experience of other countries to guide us and adapting their practice to local conditions, a scheme of Crop Insurance was prepared by the author and published in April 1949 by Madras Government for eliciting public opinion. This scheme has now been amplified and revised in the light of comments received from the public, statisticians, actuaries and insurance companies.

The scheme is confined to paddy in the first instance; after some experience is gained, it may be extended to other major cereals and staple crops of the State. Statistics relating to area under paddy, irrigation facilities, seasonal factor, pests and diseases, yield, etc., were collected for all the districts over a period of 29 years from 1919–20 to 1947–48 and examined to determine the premium. In view of the great dispersion in the incidence of crop failure in the different districts disclosed, this State is divided into four fairly homogeneous

regions. On the basis of the detailed scrutiny of the statistics collected, graded rates of premium have been worked out for the different regions varying from 7 Madras measures to 43 Madras measures of paddy per acre, the average for the entire State working out to 19 Madras measures per acre.*

The risks in areas commanded by the major irrigation systems such as the Godavari, the Krishna and the Cauvery are the lowest as also the rates of the premium. The risks are greater in areas served by the small irrigation works and the tanks where the rates are higher.

It is proposed under the scheme to guarantee 75 per cent of the normal yield, the indemnity being payable in kind. The premium collected is estimated to amount to 1.60 lakhs tons of rice and it may well serve as a buffer food stock for the State. The scheme does not leave insurance to the option of the cultivator. It will be obligatory on the part of all paddy growers and its success will depend upon this aspect of compulsion. Otherwise, the policyholders will consist of entirely those subject to high incidence of risks. Insurance is a device by which losses sustained by a few are shared by many. If the Scheme is made optional, the premium rates will become unbearably heavy and the prospects of its successful working will be remote. So too if it is worked on a pilot basis, as it is a well-known axiom in insurance that the larger the coverage the smaller the overall risks.

A statutory organization on the pattern of British Public Corporations called the "Madras Crop Insurance Corporation" is to be in charge of this work. It will have staff at State, district, taluk and firka levels and firka and village advisory committees composed of picked men of calibre and with a flair for social work to assist the officers of the Corporation.

* For fuller details see "Revised Scheme of Crop Insurance for the State of Madras" by Dr. B. Natarajan (Published by the Office of the Economic Adviser to the Government of Madras).

After meeting indemnities and cost of administration, the Corporation is expected to earn a net profit of Rs. 113.32 lakhs, which may be credited to the general revenues of the State. This gain is exclusive of indirect savings of Rs. 30 lakhs per annum by way of land revenue remissions and another Rs. 10 lakhs under famine relief. The scheme also contemplates ploughing back into agriculture part of the accumulated surplus.

The Crop Insurance Scheme confers on the agricultural economy the twin boons of stability of income and security of harvests. The entire agricultural sector will reap the advantage, if it is so arranged that the premium is paid by the landholder, and the indemnity, on payment, is shared between him and the tenant. The establishment of a Crop Insurance Corporation embracing all the major crops of the State should be the ultimate objective. When it is attained, it will confer many benefits, direct and indirect, not only on the agricultural but also on the entire economy of the State. Famine and failure of crops will lose their terrors. A long-term budgeting of supply and demand of foodgrains extending over a period of years will be possible. Prices of foodgrains and other insured crops will be freed from wild oscillations. The agricultural economy of the State will be placed on an even keel. By regulating the flow and prices of essential raw materials, Crop Insurance would provide a boon to the industrial sector as well. In short, it will open up an ever-widening vista of rising prosperity in the entire national economy.

Marketing Facilities

With the relaxation of controls, procurement and compulsory levy, another problem which had always afflicted free market economy in India is likely to re-emerge. It is the problem of marketing of agricultural produce. The agriculturist should be provided facilities for getting cash for his crops according to the urgency of his needs. Payment delayed

is payment denied. At present marketing facilities are woefully inadequate. A Bill for the regulation and licensing of warehouses has been passed by the Government of Madras and it has been submitted to the Union President for assent. The object of the Act is to encourage the establishment of independent warehouses for the storage chiefly of agricultural produce. The receipts issued by the registered owners of the warehouses for the produce stored will be made transferable on endorsement and they could serve as collateral security for any loan required by the agriculturists. The Reserve Bank is willing to advance money at a low rate of interest to State and other co-operative banks for financing such loans. This measure may be expected to increase the funds available to agriculturists.

Auxiliary Aids to Agriculture

Enthusiasm to produce more could be maintained and promoted only by a steady flow of iron, steel, cement, timber, etc., required by ryots. Agricultural production will be seriously impeded by bottlenecks in their supply. As has been already noted, for the manufacture of agricultural implements, the estimated requirements of this State are of the order of 60,000 tons. But the quantity supplied was 8,664 tons in 1948 and 8,172 tons in the first three quarters of 1949. This acute short supply creates difficulties and discontent among agriculturists. The position with regard to groundnut-cake which slightly improved after the restoration of free market conditions has been strengthened by the policy of discouraging exports of groundnut kernels from the State. The supply position of chemical fertilizers is better and may become satisfactory after the Fertilizer Factory at Sindri goes into production. The area of about ten million acres under paddy in this State required three lakhs tons of improved strains of seeds at the rate of 62.5 lb. of seeds per acre. The quantity supplied in 1948-49 was only about 10 per cent. A timely and adequate supply of fertilizers, manures, improved seeds, iron and steel and the

other requisites of efficient cultivation is a *sine qua non* of a successful food campaign.

Procurement or Progressive Levy

The procedure of procurement, next to price factor, appears to have chilled the enthusiasm of the ryot. The intensive procurement scheme, with its ban on inter-district and inter-village movement of foodgrains, has been producing discontent, snowball-fashion, among ryots. Intensive procurement scheme, an attempt to suck in every surplus grain from the rural home to the godowns of Government or their authorised procurement agents, sometime results in considerable hardship and even grave injustice. Where the procurement official cannot persuade or force the more influential section of the ryots, the burden falls on the rest. There are no well-understood, clearly defined objective standards of assessing the surplus. Anything above the normal requirements is surplus and the task of convincing the lower ranks of the procurement staff about the ryots' requirements of grain for domestic consumption, rent, wages in kind, seedgrain, etc., may involve something more than presentation of agricultural facts. It is, as it were, a continuous trial of strength between official anxiety to draw out, and rural anxiety to keep back, as much as possible. And it is not always that the administrative personnel meet the ryot with an adequate knowledge of agricultural costs and practices and sympathetic understanding of his needs and conditions.

Intensive procurement empties his bin and if the year following comes to be marked by a harvest failure, it places him at the mercy of rural rationing and relief shops. The larger the quantity of foodgrains he produces, the larger the quantity procured from him. This is enough to damp the enthusiasm of even the patriotic and social-minded ryot. Intensive procurement scheme is a door-to-door survey of output and requirements, irrespective of the size of the farm.

This continual official prying into the small man's "citadel" in the new-fledged Republic is a constant source of resentment.

The quantities procured in the period 1942-43 to 1948-49 are shown in Appendix XXIII. In these years, procurement varying from 7.21 lakhs to 16.22 lakhs tons, reached a peak figure of 1,622,112 tons made up of 1,498,465 tons of rice and 123,647 tons of millets. Assuming that the existing pattern of rationing, rural and urban, would continue for some years, this State will have to procure on an average 15 lakhs tons of foodgrains to meet their rationing commitments. If this quantity has to be procured, could it not be by methods more equitable and less irksome. Instead of the intensive procurement scheme with its twin instruments of requisition and acquisition involving endless compulsion and interference with the agriculturist's activities, we could have a system of levy which contains a positive element of progression and allows of a reasonable measure of freedom to the ryot.*

A scheme of Progressive Levy should aim at the attainment of Equality of Sacrifice and elimination of vexatious interference. This involves five basic measures: (1) exemption of small landholders, (2) progression among the larger landholders, (3) differential rates for different crops and classes of land, (4) attainment of a target not below that of the existing intensive procurement scheme and (5) removal of disincentives to production.

The primary requisite for working out a scheme on these lines is statistics relating to distribution and size of wet and dry holdings in the State. At present these statistics are not directly available, but may be indirectly calculated from the classification of land revenue assessment. Such a classification of the holdings based on size with the total area of each

* On a representation from the Coimbatore District Agricultural Association, a scheme of levy is on trial in that district.

class and its percentage to the total wet and dry area is given below :

Classification of holdings, rate of levy proposed and estimates of procurement.

Extent of holdings.	Estimated percentage of area of holdings (wet) to total area (Acres).	Estimated area under paddy in holdings of size shown in column (1). Acres.	Rate of levy per acre (in maunds).	Estimate of quantity that could be procured (in maunds of paddy).
(1)	(2)	(3)	(4)	(5)
Below 1 acre ..	14.45	1,508,000	..	Nil
Between 1 and 2 acres.	11.64	1,214,000	1½	2,124,500
Between 2 and 3 acres.	3.31	972,000	2½	2,673,000
Between 3 and 5 acres.	13.75	1,435,900	5	7,179,500
Between 5 and 10 acres.	16.21	1,691,000	6½	10,709,667
Between 10 and 25 acres.	13.72	1,432,000	7½	10,740,000
Between 25 and 50 acres.	9.07	946,000	10	9,460,000
Over 50 acres ..	11.85	1,236,000	12½	15,431,250
Total ..	100	10,434,900	..	58,317,917 maunds or 2,142,500 tons of paddy or 1,414,000 tons of rice.

If the Progressive Levy is worked out as on the above scale, ryots owning less than one acre of wet land under paddy will be exempted. The rate of levy would vary from 1½ maunds of paddy per acre in holdings of one to two acres in size to 12½ maunds per acre in those of 50 acres and above. According to this progressive system of levy, the total quantity gathered will be 2,142,500 tons of paddy or 1,414,000 tons of rice. The average requirement in the last five years of extremely adverse seasonal conditions and heavy deficits had

is an argument for collection of more accurate statistics rather than for putting off action on the lines proposed. Feelings against intensive procurement are mounting up and restoration of free trade is being increasingly demanded. The Progressive Levy may well serve as the first step to get out of the strait-jacket economy that war and post-war conditions have plunged us into. It is high time that we make some earnest attempts to get out of it here and now, rather than get ourselves more and more enmeshed in its coils by letting time slip by.

CHAPTER IX.

CONCLUSION.

Summary of Conclusions

Madras had been deficit in food supply for over two centuries as the recorded history of imports and exports of foodgrains maintained from the days of the East India Company shows. This chronic deficit has been met by imports, first from Orissa and Bengal and later from Burma, Thailand and Indo-China. In the later 19th century, the construction of the Dowlaishwaram anicut, partially harnessing the waters of the Godavari transformed the Northern Circars from deep deficit pockets into highly surplus regions capable of supplying about 400,000 tons of rice to the other parts of the State. Yet the State continues to be deficit in food supply (pages 1—9).

The gap in the supply of protective foods has been wider still. Compared with normal requirements based on the nutritional standards set by Dr. Aykroyd, in the current year, the deficit in pulses is 79.75 per cent, milk 83.93 per cent, meat and fish 85.40 per cent, eggs 98.08 per cent, ghee and vegetable oils 68.50 per cent and vegetables 87.00 per cent. Government are no doubt aware of the significance of this deficiency of protective foods. It remains yet to be adequately tackled in view of the top priority now given to the production of cereals (pages 10—12).

The food crisis that developed since the Bengal Famine is being sought to be resolved by a pincer movement of the Grow More Food Campaign on the one hand and equitable distribution of the available supplies by strict procurement rationing on the other. In another respect, Madras had been most unfortunate; the elements had been hostile and by the time the Grow More Food Campaign had gained full steam, a series of adverse seasonal conditions like drought, famine and

cyclone conspired to reduce the Seasonal Factor to unplumbed depths and blighted all hopes of attaining the targets. The kharif year 1949-50 had been particularly bad, as it was the fourth in a continuous succession of bad years (pages 13-72).

But the campaign should not be dismissed as sterile as, in its absence, the food crisis would have been even more severe and several permanent schemes of development would hardly have been commenced. The results of the campaign between 1942-43 and 1948-49 could be summed up briefly :

(1) Free assignment of nearly 293,000 acres of land has led to the cultivation of 175,400 acres resulting in an additional production estimated at 362,341 tons of foodgrains. Government have not incurred any direct expenditure on this scheme of extension of cultivation.

(2) The new scheme of land development by mechanical cultivation has helped to reclaim 35,569 acres, the estimated additional production amounting to 7,203 tons of foodgrains.

(3) Under the scheme of subsidized supply of agricultural machinery, oil engines and pumpsets, over 1,100 electric pump sets have been distributed and put into operation at a cost of over Rs. 1,36,000 to Government.

(4) The scheme of small irrigation works, on which nearly Rs. 1 crore had been spent, has served to bring under irrigation over 427,000 acres, the additional production being estimated at nearly 459,000 tons of foodgrains.

(5) The Well-Subsidy Scheme, on which Rs. 580 lakhs out of Rs. 688.46 lakhs on permanent development schemes has been spent, has resulted in the sinking of 108,460 wells, capable of irrigating on a conservative estimate 128,174 acres. The total additional production is estimated at 137,169 tons of foodgrains.

(6) Anti-erosion measures, like contour bunding, are being taken, the effects of which will be considerable, but not amenable to precise statistical measurement.

(7) The long overdue scheme of improvement of over 35,000 tanks in the State has just now commenced, which completed, would provide assured irrigation to 50 million acres.

(8) Intensive Production Schemes consisting of (i) distribution of chemical fertilizers (ii) distribution of groundnut and other oil-cakes (iii) supply of green manure seeds (iv) compost-making (v) multiplication and distribution of improved seeds (vi) free distribution of manure and seed-grains and (vii) measures to control pests and diseases have been launched at different stages of the Grow More Food Campaign at a total cost of Rs. 47.93 lakhs in this period of six years, yielding an estimated total additional production of nearly 712,000 tons of foodgrains.

In short, the total expenditure on the Permanent Improvement Schemes was Rs. 688 lakhs and on Intensive Production Schemes Rs. 47.93 lakhs aggregating to Rs. 736.39 lakhs. These have resulted in estimated additional yields of 767,646 tons and 711,645 tons aggregating to 1,479,291 tons, or an average additional production of 246,548 tons per annum for an average annual expenditure of Rs. 122.73 lakhs. Calculated at the prices prevailing in the State in the various years, the value of the additional production would be Rs. 50.89 crores and at the prices of imported grains Rs. 75.73 crores. This would mean that on an average a sum of Rs. 8.48 crores by way of purchase price of this additional production had flown into the agricultural sector every year. But for the Grow More Food Campaign the State would have spent on imports of foodgrains an additional sum of Rs. 12.6 crores per annum (pages 73-107).

The above assessment has its limitations as it is based on certain assumptions such as that all the fertilizers distributed are applied to raising of food crops only. To make the assessment of the Grow More Food Campaign more accurate, a scientific scheme of "Achievement Audit" with a trained

staff of Statisticians and Officers of the Agricultural Department under the direction of the Economic Adviser has been implemented this year at the instance of the Indian Council of Agricultural Research. This scheme consists of designing and conducting a series of experiments on the ryot's fields, both at the pre-sowing and pre-harvesting stages. When the results of these experiments become available, the assessment of the Grow More Food Campaign in this State will have gained a greater measure of accuracy and reliability. With a view to assessing the normal yield of various crops, it is also proposed to undertake a co-ordinated scheme of crop-cutting surveys on paddy, cholam, cumbu and ragi, consisting of 7,800 experiments to be conducted by both the Agricultural and Revenue Staff.

Achievement audit with its definite objective is an ad hoc statistical undertaking for the duration of the Grow More Food Campaign. But agricultural statistics, comprehensive and reliable, are of fundamental importance to secure correct crop estimates and to evolve a scheme of scientific crop planning. The three requisites for collecting reliable agricultural statistics are area, yield and Seasonal Factor. Thanks to the preponderance of the ryotwari tenure and the requirements of the revenue authorities for the assessment of land revenue, a fairly elaborate system for the collection of agricultural statistics had been evolved in the early period of the British rule. The primary agency for the collection of agricultural statistics is the karnam or the village accountant. Above him is a hierarchy of Revenue Inspectors, Tahsildars and Statistical Assistants in the Collectorates from whom the stream of statistics flows to the Department of Economics and Statistics, for collation, sifting, analysis and interpretation of the primary data collected at the basic level of the village karnam (pages 108-114).

But this machinery is deficient in some respects. Firstly, the primary agency comprising the village officials is a over-

worked lot with a tendency to view crop statistics as a secondary, if not a superfluous, duty of theirs. The anna-war estimate of crop yields has no objectivity and the Stuart's Correcting factor can but partially correct the errors of estimation. All these deficiencies would be removed if Economics and Statistics staff are appointed, as in Uttar Pradesh and elsewhere, at district levels to inspect villages and effectively check the figures of the village accountants (pages 104-117).

The need for adequacy of agricultural statistics collected and analysed on scientific lines is of even greater urgency in a planned economy. Large schemes of reclamation of land and irrigation works are in progress. From the available statistics, it has been calculated that the internal production of foodgrains at the end of the Three-Year Emergency Food Production Plan will be 7.803 million tons against the consumption requirements of 7.635 million tons for the then population, on the basis of 84.08 per cent of adult equivalents, leaving a small surplus of 168,000 tons—if Seasonal Factor is fairly good. At the end of the mid-term plan—in 1954-55 when the Lower Bhavani and the Tungabhadra Projects, about 16 Small Irrigation Works (Appendix XXIV) and a part of the Tank Improvement Schemes would be completed—the total production would be 9.109 million tons against the consumption requirements of 7.883 million tons, resulting in a surplus of 1.226 million tons. At the end of the long-term plan when the giant Krishna-Pennar project and the several small irrigation works will have been completed, the total production will be of the order of 10.572 million tons against the requirements of 8.703 million tons, and the surplus will be of the order of 1.869 million tons. These estimates of production at the end of the three phases of planning presuppose that all the new land and all the irrigation facilities will be utilized solely for food production. But this is a tall order. If the economy of the State should become balanced, efforts should be made simultaneously to wipe out the deficit in the supply of

protective foods and commercial crops which sustain the industries; and care should also be taken to conserve, if not augment, the area under crops like tobacco with a high potential for earning foreign exchange. Consideration of this kind underlines the pivotal significance of crop planning in the future agricultural development of the State. And crop planning implies ampler and better statistics of high reliability (pages 118-127).

Crop planning is but a part of the greater problem of land utilization. A statistical study of land utilization since 1930-31 clearly indicates a downtrend for the area under food crops and an uptrend for commercial crops. The area under forests is only about 17 per cent, much below the normal of 20 to 25 per cent deemed essential to agricultural prosperity. The area of cultivable waste has shown a slight increase and is now nearly 11.5 million acres and the area classified as fallow is of the order of 10 million acres; with modern engineering skill and appliances like bulldozer, the scope of reclaiming waste has enormously increased; and with a vigorous irrigation policy and ampler facilities for intensive cultivation, there is a fair prospect of reducing the area of fallow land.

Land has not only a multiplicity, but also a hierarchy, of uses. A scientific system of land utilization, so much needed in an old country caught in the travails of an industrial age, should aim at proper distribution of land on a system of priorities among the numerous uses of land like building and factory sites, roads and communications, irrigation works, cultivation of food, non-food and fodder crops, large-scale co-operative or corporate farms, home gardens and small farms, animal husbandry, poultry farming and pisciculture, forests and pleasure-parks. The problem of land utilization is a thorny one, calling for considerable intensive study. But land utilization research is still in its formative stages.

Great development will have to take place in this sphere, if the scarce factor of land in an old country like India should be put to maximum use. In the present context of a triple shortage of foodgrains, industrial raw materials and foreign exchange, the short-term policy should aim at eliminating them. The long-term objective should be to raise maximum cereal food on minimum land space and release a larger area for pasture necessary to support a balanced mixed economy consisting of increased stock-raising and dairy farming. In other words what is required is a scientific system of crop planning evolved on the basis of an over-all examination of the present and future demand for the different types of agricultural produce. It involves planning on a family scale as well. The potentialities of raising cereals as well as adequate animal and dairy products in the family planning should dovetail into and subserve the ends of national planning. These plans however require constant adjustments. The crux of the problem of land utilization being the ever changing needs of society, the principles should necessarily be flexible (pages 128-139).

The over-all examination of the pattern of land utilization and formulation of a flexible policy are of basic importance in long-term planning. At present, in the face of the persistent food crisis, the Grow More Food Campaign should engage all our attention and much depends on toning it up. A few suggestions have been made to this end.

× (i) The most important reason for the slackness in the execution of the well-subsidy scheme is the smallness of the subsidy coupled with lack of technical aid and building materials. The provisions of the Land Improvement Loans Act should be liberalized so as to help owners of dry lands to get adequate loans. Lending agencies like the Land Mortgage Banks should be urged to base mortgage loans on values justified by long-term earning capacity. The bottlenecks in

the supply of boring sets and other implements and building materials should be eliminated. Lastly, more effective execution of the scheme calls for a more vigorous follow-up programme and efficient check by a field staff (pages 140-143).

(ii) A more effective utilization of the freely assigned land would be possible if adequate financial assistance is given to assignees, where they happen to be poor. In the interests of immediate and efficient utilization of land so essential to speedily stepping up of food production, preference may be shown to experienced middle-class agriculturists possessing adequate resources to undertake immediate reclamation and cultivation of the land assigned (pages 143-144).

(iii) Tank Improvement Scheme, though taken up last, is first in importance in this State. The execution of the scheme should be speeded up and amplified (pages 144-147).

(iv) The Intensive Production Schemes like multiplication and distribution of improved strains of seeds, preparation of composts, making of green manure and distribution of chemical fertilizers should adhere strictly to a time-schedule (pages 147-148).

(v) Above all, agriculturists require psychological incentives. Remunerative prices must be guaranteed, fair rent fixed to tenants and fair wages to agricultural labourers. An equipoise should be maintained in the agricultural triangle composed by the landholder, tenant and landless labourer. They are partners in the agricultural enterprise and it should be seen to that their interests do not conflict (pages 148-156).

(vi) There is also the wider problem of the disparity of prices and therefore of prosperity between growers of food crops on the one hand and growers of commercial crops on the other. The solution to this problem lies in evolving an integrated price structure for all agricultural produce, food

and commercial, correlating it to a rational crop-planning on an all-India basis to be enforced compulsorily if need be (pages 156-172).

(vii) Guaranteed prices should be reinforced by a sound system of crop insurance covering the diverse losses arising from crop failures. The scheme prepared by the author aims at beginning with paddy, and after sufficient experience is gained of its working, seeks extension to other crops (pages 172-175).

(viii) Provision of adequate marketing facilities is another need. The Act for the construction of Bonded Warehouses for the storing of agricultural produce passed by the Government is a step towards this end. It aims at providing warehouses and improving credit facilities by declaring warehouse receipts as negotiable instruments (pages 175-176).

(ix) In the distributive sphere, intensive procurement appears to have damped the enthusiasm of the agricultural population to dangerous dimensions. It has resulted in inequities, harassments and disincentives to the raising of food crops, leading to diversion of land under cereals to crops like plantains and chillies, and to non-food crops. Procurement of this type may be substituted by a Progressive Levy informed by the principle of Equality of Sacrifice and freedom from excessive interference. On an average, this State may require only 10 to 12 lakhs tons of food-grains to meet the statutory and informal rationing commitments. This amount could as well be secured from agriculturists by a system less objectionable. Such a system has been worked out here. It aims at exempting the subsistence farmers raising paddy and owning less than one acre and all growers of millets. The total millets, procured in the past five years had been only about 75,000 tons, a comparatively negligible quantity. Exempting millets from the levy scheme would also help conserve a second line of defence for ryots when their

P. S.

This monograph was completed for publication some seven months ago. Since then, events in the food situation have moved fast, some underlining the conclusions reached, and some modifying them. The year 1950-51 turned out to be much worse than anticipated; output of cereals fell below normal by 14.2 lakhs tons. Even on the basis of a 12-ounce ration for the "non-producers", the estimated gap in the food budget is of the order of 10 lakhs tons. Government of India have promised an allotment of 5 lakhs tons and for the rest, the State was thrown on its own resources.

There was only one thing Government could do to meet the critical food situation and that was to make a retreat from an over-rigid control position with as little dislocation as possible. This they sought to do in two ways: (1) de-rationing of rural areas, (2) abandonment of intensive procurement in all districts other than the surplus ones. Rural de-rationing, effected from 1st January 1951, appears to have been the first conscious attempt to get out of the control labyrinth. It served to reduce Government's rationing commitments. Total abandonment of intensive procurement in the deficit districts was its logical consequence. However, caution was still needed: while intensive procurement was retained in the surplus districts, in the self-sufficient districts of South Kanara, South Arcot, Tiruchirappalli and Madhurai, a system of Progressive Levy almost on the lines suggested in the foregoing pages took its place. This is based on acreage as well as yield in Madhurai and on acreage alone in the other districts.

Opinion has been gaining ground latterly that the Grow More Food measures have been rather diffused and that more striking results could be achieved by concentrated efforts in areas having optimum economic opportunities. This suggestion is being worked out in this State and

two blocks of 250 square miles each in the deltaic districts of East Godavari and Tanjore have been chosen for total application of aids. But even here, it is perhaps well that over-all targets are fixed and then broken down for taluk and firka ultimately reaching the individual field.

In the interval, a good deal of controversy has also raged over the question of economic incentives to the ryot. The studies made by the Reserve Bank of India have created an impression that economic incentives do not count for much in the grow more efforts. Actually it is not so. All that the enquiries say is this: "It appears desirable to minimise the use of financial subsidies and to attach more importance to the supply of essential requisites at reasonable prices to (deserving) producers".* If only adequate "supply of essential requisites at reasonable prices to deserving producers" could be secured, nothing better need be wished for. But in the existing shortages, is this not begging the question? Rationale for increased prices arose only because such supplies were not possible and the margin between costs and prices tended to vanish. Higher prices for foodgrains no doubt mean additional money. If only we know how to prime and when to stop, additional money spent on development of unutilized productive resources may actually turn out to be unimaginationary.

indefinitely without deleterious consequences on the economic and social morale of the country. Progressive levy would be a good gesture and a wholesome corrective to the psychological malaise and yet not too grave a risk to be run in the existing over-all food crisis.

Thus far on the distribution front. On the production front, an analysis of the over-all trend in the inter-war period and the areas under food and non-food crops is bound to shed some light on the real nature of the food situation in this State. In the 20 years between 1919-20 and 1938-39, food production declined from 8.882 million tons to 8.395 million tons, and allowing for seeds, from 8.632 million tons to 8.145 million tons. On the basis of an adult equivalent of 84.08 per cent, the average ration per day per adult that could be provided from internal production declined from 24.72 ounces in 1919-20 to 16.56 ounces in 1938-39. (Vide Appendix IV.) In the entire period, the average consumption per adult per day was 21.49 ounces. The average imports during that period amounted to 287,913 tons of foodgrains only. Together with imports the average consumption per adult per diem then was 22.25 ounces. Such a ration today seems to belong to a Golden Age, far beyond the grasp of our grim realities. The real cause of the crisis is the sharp fall in internal output from 8.632 million tons (less seeds) to less than 5.875 million tons in the current year. This sharp fall is the villain of the piece to which our attention should be fully directed. The decline may be attributed to shrinkage in area and fall in the Seasonal Factor. The area under foodgrains was 23,597,437 acres in 1919-20 and 22,344,000 (estimate) in 1949-50, and the Seasonal Factor was 99 for paddy, 91 for chelam, 94 for cumbu and 97 for ragi in 1919-20 while it was 73 for paddy and between 81 and 76 for millets in 1949-50. (Vide map facing page 102.) Thus the area under food crops has fallen by more than 1.24 million acres and the Seasonal Factor for paddy by 26 and

for millets by 23 to 24. These are facts which fundamentally influence food production. In the same period, the area under non-food crops has risen from 8,047,956 acres in 1919-20 to 8,529,830 acres in 1948-49.

Whilst persevering with the production efforts on the intensive front, a major objective of our food policy should be to regain the acreage under food crops, not necessarily by raiding on the area under non-food crops but by bringing new land under the plough. Attempts should then be made to maintain the acreage by judicious crop planning sustained by adequate economic incentives. The Seasonal Factor is no doubt beyond human control, but there is no room for despair. The cycle of adverse seasonal conditions will have to end. The abnormality of the last five years can have a parallel only in the conditions that prevailed in the State seven or eight decades ago. The cycle, let us hope, has turned the full circle; and the prospect is not bleak, if only, we go about the job both at the production and distribution ends wisely, diligently and boldly. Above all, what Napoleon said of war efforts might with equal force apply to production efforts; the moral is to the material as three to one.

“Behold the men that are destined to rule the earth; the three virtues, alertness, learning, and quickness of decision, leave them not.”

THE KURAL—Chapter 39—Verse 383—
(Translation by V.V.S. Ayyar.)

A Statistical Note on Price Incentives in Agriculture*

In this note, a correlation of relative price of foodgrains to acreage in Madras State is attempted for the period of 16 years from 1935-36 to 1950-51 for which the required data are fully available. The data used are: (i) Index numbers of acreage under foodgrains, (ii) Percentage ratios of the index numbers of prices of foodgrains to weighted index numbers of prices of important commercial crops, namely, cotton, groundnut, sugarcane, tobacco and gingelly and (iii) weighted seasonal factors for foodgrains. Index numbers of acreage and prices were constructed with the pre-war year 1938-'39 as base or 100. As seasonal factor is an important variable, suitable statistical technique has been applied to keep it constant so that any correlation that may exist between the other two factors may be clearly observed.

Denoting the three factors mentioned above as 'X', 'W' and 'Z' respectively, and correlating them two by two, the following co-efficients of correlation were worked out.

$$r_{xw} = 0.81$$

$$r_{xz} = 0.97$$

$$\text{and } r_{wz} = 0.68$$

The partial correlation between X and W for constant Z is $r_{xw.z} =$

$$\frac{r_{xw} - r_{xz} r_{wz}}{\sqrt{1 - r_{xz}^2} \sqrt{1 - r_{wz}^2}} = 0.8435$$

There is thus a high correlation between acreage and prices, seasonal conditions remaining the same.

The multiple regression equation connecting X, W and Z is given by the formula

$$\frac{X - \bar{X}}{\sigma_x} = - \frac{R_{xw}}{R_{xx}} \frac{W - \bar{W}}{\sigma_w} - \frac{R_{xz}}{R_{xx}} \frac{Z - \bar{Z}}{\sigma_z}$$

* Vido Supra Chapter VII, pp. 169-70.

where R_{xx} , R_{xw} and R_{xz} are the minors of the symmetrical determinant

$$\begin{vmatrix} 1 & r_{xw} & r_{xz} \\ r_{wx} & 1 & r_{wz} \\ r_{zx} & r_{zw} & 1 \end{vmatrix}$$

The above equation after substitution of the relevant values is reduced to the form.

$$X = 0.1524 Z + 0.0073 W + 83.0151$$

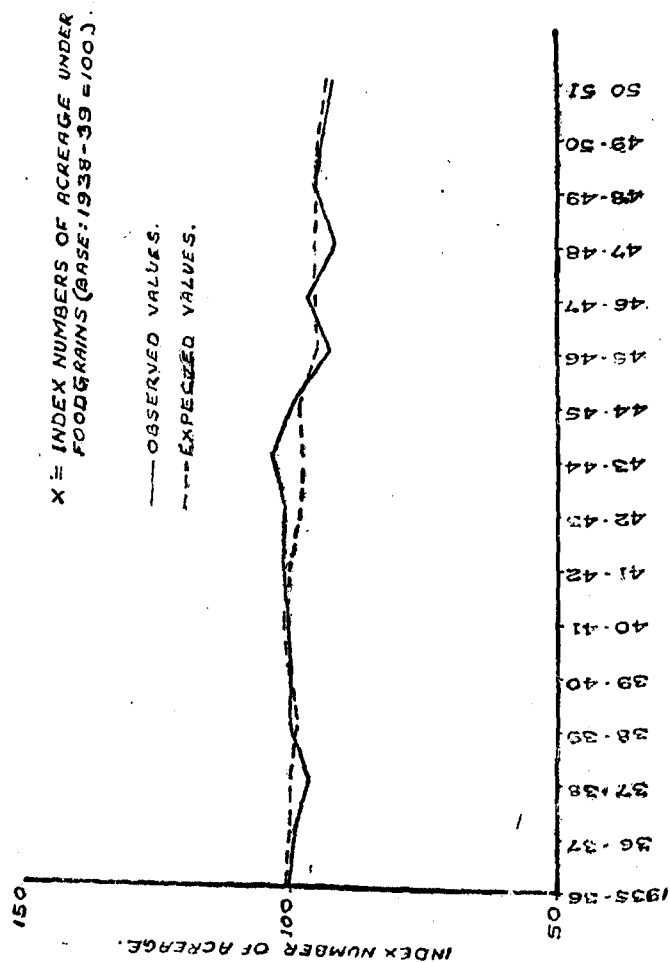
This equation gives an excellent fit to the observed data as the multiple correlation co-efficient is found to be as high as 0.99.

The correspondence between the observed and theoretical values of X as worked out from the regression equation is as follows:—

Year.	Z Seasonal Factor.	W Ratio of index numbers of prices.	Theoretical value of X.	Observed value of X.	Difference
1935-36	114.1	97.5	101.1	100.6	—0.5
1936-37	109.4	91.1	100.4	99.7	—0.7
1937-38	107.1	106.8	100.1	96.9	—3.2
1938-39	100.0	100.0	99.0	100.0	+1.0
1939-40	109.4	193.5	101.1	100.0	—1.1
1940-41	115.3	277.5	102.6	101.4	—1.2
1941-42	108.4	259.4	101.4	102.2	+0.8
1942-43	98.8	98.8	98.8	102.0	+3.2
1943-44	100.0	106.5	99.0	104.9	+5.9
1944-45	104.7	110.9	99.8	101.3	+1.5
1945-46	90.6	83.5	97.4	94.9	—2.5
1946-47	95.3	63.1	98.0	99.1	+1.1
1947-48	92.9	67.3	97.7	94.6	—3.1
1948-49	95.3	84.1	98.2	98.0	—0.2
1949-50	91.8	61.2	97.5	97.7	+0.2
1950-51	88.2	54.4	96.9	95.1	—1.8

It will be seen that the correspondence between the observed and theoretical values of X is very close. This is represented in the chart, next page.

Fig. 28. OBSERVED VALUES AND EXPECTED VALUES OF X FROM THE PREDICTION EQUATION: $X = 0.1524Z + 0.0073W + 83.0151$.



In other words, seasonal conditions remaining the same, the acreage under foodgrains responds in a very significant manner to price changes. The higher the ratio of prices of foodgrains to prices of commercial crops, the greater the response. Under normal conditions, the price incentive will operate if the prices of commercial crops are in reasonable parity with the prices of foodgrains. If on the other hand, the prices of commercial crops are disproportionately high, it will be a definite disincentive to the growth of more foodgrains. This implies the need on the one hand for a rational price policy calculated to remedy the present disequilibrium between prices of foodgrains and commercial crops and on the other for systematic crop planning in the interest of economic allocation of available agricultural resources essential for the attainment of the larger objective of a balanced economy for the country.

APPENDIX II.

Area under cereals, other food crops, non-food crops (commercial crops) and total area cultivated in Madras State (1919-20 to 1949-50).

Year. (1)	Cereals. (2) ACS.	Other food crops. (3) ACS.	Total area under food crops. (4) ACS.	Non-food crops (Commercial crops.) (5) ACS.	Total area of all crops. (6) ACS.
1919-20 ..	23,587,439	4,560,523	28,147,962	8,047,956	36,195,918
1920-21 ..	22,947,613	3,986,084	26,933,697	8,605,381	35,539,078
1921-22 ..	24,357,405	3,703,049	28,060,454	7,458,784	35,519,238
1922-23 ..	23,583,240	3,963,892	27,547,132	8,201,349	35,748,481
1923-24 ..	22,244,078	3,633,194	25,877,272	8,532,595	34,409,867
1924-25 ..	23,190,584	3,694,357	26,884,941	9,024,686	35,909,627
1925-26 ..	23,181,932	3,785,677	26,967,609	9,806,897	36,774,506
1926-27 ..	22,671,915	3,611,643	26,283,558	9,069,584	35,353,142
1927-28 ..	23,252,526	3,547,880	26,800,406	9,743,882	36,544,088
1928-29 ..	22,759,779	3,710,458	26,470,237	11,294,917	37,765,154
1929-30 ..	23,267,441	4,136,863	27,404,304	9,840,959	37,245,263
1930-31 ..	23,288,382	4,103,649	27,392,031	9,787,180	37,179,211
1931-32 ..	23,111,904	4,184,299	27,296,203	9,034,384	36,330,587
1932-33 ..	23,108,595	4,195,791	27,304,386	9,845,233	37,149,619
1933-34 ..	21,617,599	5,053,649	26,671,248	10,245,177	36,916,425
1934-35 ..	22,479,408	4,193,287	26,672,695	8,851,825	35,524,520
1935-36 ..	23,054,938	4,202,907	27,257,845	8,393,503	35,651,348
1936-37 ..	22,939,486	4,325,338	27,264,824	9,332,588	36,597,412
1937-38 ..	22,303,940	4,123,692	26,432,632	10,485,304	36,917,936
1938-39 ..	23,009,870	3,835,303	26,845,063	9,116,013	35,961,076

1939-40 ..	23,009,775	4,126,727	27,136,502	9,143,710	36,280,212
1940-41 ..	23,342,927	4,230,788	27,573,715	9,770,009	37,343,724
1941-42 ..	23,507,649	4,340,658	27,848,307	8,571,288	36,419,595
1942-43 ..	23,477,478	4,320,260	27,797,738	8,942,465	36,740,203
1943-44 ..	24,129,018	4,557,117	28,686,135	9,018,477	37,704,612
1944-45 ..	23,304,499	4,422,983	27,727,482	9,271,890	36,999,372
1945-46 ..	21,834,033	4,351,091	26,185,124	9,090,706	35,275,830
1946-47 ..	22,807,268	4,920,214	27,727,482	9,271,890	36,999,372
1947-48 ..	21,759,407	4,297,623	26,057,030	8,575,710	34,632,740
1948-49* ..	22,805,059	4,713,123	27,518,182	8,278,494	35,796,676
1949-50* ..	22,756,434	4,808,419	27,564,853	8,780,087	36,344,940

*Including merged States.

APPENDICES—TABLES

APPENDIX III.

Area under principal crops in Madras State

Year. (1)	Paddy. (2) ACS.	Millets. (3) ACS.	Fodder. (4) ACS.	Cotton. (5) ACS.	Sugarcane. (6) ACS.	Tobacco. (7) ACS.	Groundnut. (8) ACS.
1930-31	10,251,608	13,370,298	431,625	2,035,524	105,426	220,462	3,521,085
1931-32	10,111,812	13,333,616	446,728	2,198,746	106,654	246,633	2,591,209
1932-33	10,107,776	13,334,343	465,426	1,943,904	111,470	233,932	3,464,625
1933-34	10,277,867	12,673,256	465,743	2,150,182	112,209	225,644	3,729,380
1934-35	9,629,666	13,183,266	475,408	2,298,295	115,859	270,112	2,299,900
1935-36	9,796,280	13,348,978	463,468	2,664,088	121,066	279,393	2,519,965
1936-37	9,889,532	13,049,954	532,753	2,487,052	119,650	253,160	3,495,023
1937-38	10,140,831	12,163,109	413,157	2,546,438	97,965	294,232	4,657,596
1938-39	9,844,388	13,165,372	431,865	1,928,714	98,262	320,134	3,770,689
1939-40	9,884,316	13,125,459	453,533	2,196,284	137,633	307,172	3,617,600
1940-41	10,744,393	12,598,534	459,455	2,412,857	161,716	310,604	3,922,497
1941-42	10,212,422	13,295,227	388,602	2,540,996	109,527	333,880	2,784,441
1942-43	10,382,419	13,095,059	372,845	2,209,889	121,691	284,787	3,382,126
1943-44	10,925,131	13,203,887	430,705	2,187,278	154,650	238,219	3,550,013
1944-45	11,013,530	12,290,969	459,653	1,670,141	155,596	328,185	4,299,592
1945-46	10,202,580	11,631,453	463,463	1,611,338	160,700	363,036	4,165,385
1946-47	10,986,124	11,821,144	562,794	1,566,530	202,828	303,997	4,121,394
1947-48	10,434,149	11,325,258	394,144	1,297,647	272,680	293,759	4,066,880
1948-49	10,325,169	12,212,678	442,786	1,619,640	175,576	321,904	3,650,281
1949-50	10,598,646	12,157,788	481,257	1,691,001	181,386	345,344	3,767,123

I. 1930-31 to 1944-45.

II. 1945-46 to 1949-50.

APPENDIX IV.

Output, net imports, rates of consumption and per capita output of foodgrains in Madras State, during the inter-war period (1919-20 to 1938-39).

Year. (1)	Production (in terms of cleaned grain).			Production less quantity required for seed purposes. (5) TONS.
	Rice. (2) TONS.	Millets. (3) TONS.	Total food grains. (4) TONS.	
	(2)	(3)	(4)	(5)
1919-20	5,398,000	3,484,000	8,882,000	8,632,000
1920-21	4,988,000	3,461,000	8,449,000	8,199,000
1921-22	5,230,000	3,681,000	8,911,000	8,661,000
1922-23	5,232,000	3,550,000	8,782,000	8,532,000
1923-24	4,531,000	3,177,000	7,708,000	7,458,000
1924-25	4,908,000	3,639,000	8,547,000	8,297,000
1925-26	5,322,000	3,473,000	8,795,000	8,545,000
1926-27	4,742,000	3,181,000	7,923,000	7,673,000
1927-28	5,082,000	3,466,000	8,548,000	8,298,000
1928-29	5,197,000	3,510,000	8,707,000	8,457,000
1929-30	5,159,000	3,489,000	8,648,000	8,398,000
1930-31	5,376,000	3,309,000	8,685,000	8,435,000
1931-32	5,385,000	3,319,000	8,704,000	8,454,000
1932-33	5,406,000	3,431,000	8,837,000	8,587,000
1933-34	5,314,000	3,203,000	8,517,000	8,267,000
1934-35	4,981,000	3,958,000	8,939,000	8,689,000
1935-36	4,880,000	3,100,000	7,980,000	7,730,000
1936-37	4,975,000	2,998,000	7,973,000	7,723,000
1937-38	4,850,000	2,653,000	7,503,000	7,253,000
1938-39	4,100,000	2,761,000	6,861,000	6,611,000
Average	5,053,000	3,342,000	8,395,000	8,145,000

Year.	Net imports of			
	Rice. (6) TONS.	Millets. (7) TONS.	Wheat and wheat products. (8) TONS.	Total. (9) TONS.
	(6)	(7)	(8)	(9)
1919-20	239,125	3,153	23,885	259,857
1920-21	136,948	24,581	21,661	183,210
1921-22	119,536	1,065	9,844	130,445*
1922-23	179,710	1,357	21,850	192,917*
1923-24	163,861	9,199	20,405	194,165*

Output, net imports, rates of consumption and per capita output of foodgrains in Madras State, during the inter-war period (1919-20 to 1938-39)—cont.

Year.	Net imports of			
	Rice.	Millets.	Wheat and wheat products.	Total.
	(6)	(7)	(8)	(9)
	TONS.	TONS.	TONS.	TONS.
1924-25	199,060	17,036	19,169	235,265*
1925-26	206,610	10,536	21,463	238,609*
1926-27	83,922	3,177	23,543	110,642*
1927-28	193,578	9,374	29,760	232,712*
1928-29	239,979	7,093	27,647	274,719*
1929-30	98,307	1,900	56,500	156,707†
1930-31	112,053	1,900	56,500	170,453†
1931-32	224,593	1,900	56,500	282,993†
1932-33	221,704	1,900	56,500	280,104†
1933-34	298,896	19	53,571	352,486
1934-35	498,924	1,134	57,968	558,026
1935-36	577,219	4,678	57,937	639,834
1936-37	335,008	1,075	61,542	397,625
1937-38	327,616	14,648	63,686	405,950
1938-39	369,271	27,413	64,861	461,545
Average	241,296	6,877	39,740	287,913

*The figures of net imports for the years 1921-22 to 1928-29 are exclusive of rail-borne trade figures, accounts relating to which are not available. Net imports for the other years are inclusive of foreign, coastwise and rail-borne trade.

†The figures of net imports of rice for the years 1929-30 to 1932-33 have been adopted from the Sea-Borne Trade Accounts for foreign trade, and from the "Report on the Rice Production and Trade in the Madras Presidency" by C. R. Srinivasan, for coastwise and rail-borne trade. The figures of net imports of millets and wheat and wheat products have been estimated on the basis of the average net imports during the three years 1933-34 to 1935-36.

Output, net imports, rates of consumption and per capita output of foodgrains in Madras State, during the interwar period (1919-20 to 1938-39)—cont.

Year.			Total quantity of food-grains available for human consumption.	Population of the State (in terms of adults).	Average rate of consumption of food-grains, per adult per diem.	Average rate of production of food-grains, per adult per diem.
			(10)	(11)	(12)	(13)
			TONS.	TONS.	OUNCES.	OUNCES.
1919-20			8,891,857	34,287,000	25.46	24.72
1920-21			8,382,210	34,363,000	23.95	23.43
1921-22			8,791,445	34,707,000	24.87	24.50
1922-23			8,724,917	35,053,000	24.44	23.90
1922-23			8,724,917	35,053,000	21.22	20.69
1923-24			7,652,165	35,403,000	21.22	20.69
1923-24			7,652,165	35,403,000	23.43	22.79
1924-25			8,532,265	35,757,000	23.88	23.23
1924-25			8,532,265	35,757,000	23.88	23.23
1925-26			8,783,609	36,115,000	23.88	23.23
1925-26			8,783,609	36,115,000	20.95	20.66
1926-27			7,783,642	36,475,000	20.95	20.66
1926-27			7,783,642	36,475,000	22.74	22.12
1927-28			8,530,712	36,840,000	22.74	22.12
1927-28			8,530,712	36,840,000	23.04	22.32
1928-29			8,731,719	37,207,000	23.04	22.32
1928-29			8,731,719	37,207,000	22.35	21.94
1929-30			8,554,707	37,579,000	22.35	21.94
1929-30			8,554,707	37,579,000	22.26	21.82
1930-31			8,605,453	37,953,000	22.26	21.82
1930-31			8,605,453	37,953,000	22.36	21.63
1931-32			8,736,993	38,374,000	22.36	21.63
1931-32			8,736,993	38,374,000	22.44	21.73
1932-33			8,867,104	38,800,000	22.44	21.73
1932-33			8,867,104	38,800,000	21.57	20.69
1933-34			8,619,486	39,231,000	21.57	20.69
1933-34			8,619,486	39,231,000	22.89	21.51
1934-35			9,247,026	39,666,000	22.89	21.51
1934-35			9,247,026	39,666,000	20.49	18.93
1935-36			8,369,834	40,106,000	20.49	18.93
1935-36			8,369,834	40,106,000	20.79	19.77
1936-37			8,120,625	38,353,000	20.79	19.77
1936-37			8,120,625	38,353,000	19.39	18.37
1937-38			7,658,950	38,779,000	19.39	18.37
1937-38			7,658,950	38,779,000	17.71	16.56
1938-39			7,072,545	39,209,000	17.71	16.56
1938-39			7,072,545	39,209,000	22.25	21.49
Average			8,432,913	37,213,000	22.25	21.49

The figures of production and population of the State from 1919-20 to 1935-36 are inclusive of the Ganjam district which then formed part of the State. The figures from 1936-37 are exclusive of this district.

APPENDIX V.

*Seasonal Factor for principal cereals in Madras State
(1919-20 to 1949-50).*

Year.	Seasonal Factor adopted for the Madras State for			
	Paddy.	Cholam.	Cumbu.	Ragi.
1919-20	99	91	94	97
1920-21	97	91	100	99
1921-22	96	91	95	101
1922-23	98	91	97	100
1923-24	91	91	88	80
1924-25	96	95	100	100
1925-26	100	95	98	98
1926-27	89	86	93	96
1927-28	99	93	93	98
1928-29	100	99	99	102
1929-30	98	96	96	99
1930-31	98	90	98	99
1931-32	99	92	98	98
1932-33	100	96	101	102
1933-34	97	99	100	102
1934-35	96	48	84	93
1935-36	99	91	98	100
1936-37	97	86	88	98
1937-38	96	81	89	96
1938-39	83	88	82	85
1939-40	90	95	91	92
1940-41	95	98	100	96
1941-42	97	85	93	90
1942-43	88	78	82	83
1943-44	90	79	85	88
1944-45	91	89	89	87
1945-46	82	74	76	76
1946-47	89	66	77	86
1947-48	82	76	77	78
1948-49	81	81	76	80
1949-50	76	81	76	77

APPENDIX VI.

*Food Requirements of Madras State for an estimated population of 54·290 millions at
different standards of consumption*

	Adult equivalent			
	At 66 per cent. (2)	At 75 per cent. (3)	At 80 per cent. (4)	At 84 per cent. (5)
1 Population in terms of adults	35,831,000	40,718,000	43,432,000	45,847,000
2 Requirements at 1 lb. per adult per diem	5,839,000	6,620,000	7,077,000	7,438,000
3 Requirements at 12 oz. per adult per diem	4,379,000	4,965,000	5,308,000	5,579,000
4 Requirements for—				
(i) Agriculturists (70 per cent) at 1 lb.	4,087,000	4,634,000	4,954,000	5,207,000
(ii) Requirements for non-agriculturists (30 per cent) at 12 oz.	1,314,000	1,489,000	1,592,000	1,674,000
4. (i) and (ii)	5,401,000	6,123,000	6,546,000	6,881,000
(iii) Requirements for agriculturists (70 per cent) at 19 oz.	4,851,000	5,505,000	5,880,000	6,186,000
(iv) Requirements for non-agriculturists (30 per cent) at 16 oz.	1,752,000	1,985,000	2,123,000	2,231,000
4. (iii) and (iv)	6,603,000	7,490,000	8,003,000	8,417,000
5 For the total population—				
(i) At 22·25 oz. (Average consumption rate in inter-war years).	8,121,000	9,208,000	9,884,000	10,346,000
(ii) At 21·49 oz. (Average production rate in inter-war years).	7,841,000	8,891,000	9,505,000	9,989,000
(iii) At 20·47 oz. (Average consumption rate in 6 pre-war years).	7,467,000	8,467,000	9,032,000	9,513,000

APPENDIX I.

Pattern of Land Utilization in Madras State (1930-31 to 1949-50).

Year.	Details of classification of land.							Area under		
	Forests.	Not available for cultivation.	Cultivable Waste (excluding current Fallows).	Current Fallows.	Net Area Sown.	Total Area.	Food Crops.	Non-Food Crops.	Food and Non-Food Crops.*	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
				<i>I. 1930-31 to 1944-45.</i>						
1930-31	..	12,753,903	15,077,661	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	
1931-32	..	12,850,417	15,447,249	10,432,631	9,768,796	31,817,543	28,078,248	8,524,771	36,603,019	
1932-33	..	13,187,025	14,995,503	10,445,881	9,557,872	32,779,624	27,983,364	7,771,031	35,754,395	
1933-34	..	13,239,865	14,811,037	10,437,301	9,817,370	31,462,942	27,983,718	8,579,709	36,573,427	
1934-35	..	13,350,567	14,725,022	10,747,551	10,608,271	30,394,214	27,362,687	8,977,993	36,340,233	
1935-36	..	13,323,670	14,939,330	10,952,330	9,903,448	30,970,232	27,369,835	7,575,993	34,943,323	
1936-37	..	13,181,253	14,911,848	10,792,613	9,490,987	31,705,509	27,465,038	8,186,015	35,651,048	
1937-38	..	13,178,241	14,603,510	10,537,675	9,450,438	32,031,679	27,475,726	9,121,686	36,597,412	
1938-39	..	13,101,517	14,497,120	10,862,521	9,800,540	31,383,337	27,039,128	10,294,717	36,917,936	
1939-40	..	13,138,205	14,509,826	10,903,914	9,731,176	31,483,525	27,364,653	8,915,559	36,280,212	
1940-41	..	13,321,985	14,115,628	11,316,264	9,299,255	31,959,310	27,826,422	9,517,302	37,343,724	
1941-42	..	13,425,717	13,960,423	11,278,134	9,762,064	31,613,203	28,046,194	8,373,401	36,419,595	
1942-43	..	13,468,481	14,116,144	11,759,619	9,348,567	32,324,380	28,017,129	8,782,752	36,770,612	
1943-44	..	13,307,631	14,214,677	11,551,511	8,911,146	31,890,989	28,927,571	8,777,041	37,704,612	
1944-45	..	13,459,625	14,217,581	11,433,633	9,259,800	31,533,823	27,648,197	9,031,175	36,690,372	
				<i>II. 1945-46 to 1948-49.</i>						
1945-46	..	13,515,797	14,148,429	11,952,664	9,779,379	30,535,078	26,425,724	8,850,106	35,275,830	
1946-47	..	13,496,668	14,054,038	11,848,904	9,498,721	30,035,475	27,028,356	8,784,612	36,412,968	
1947-48	..	13,515,939	14,116,453	12,187,186	10,037,068	30,077,989	28,409,836	8,222,904	34,632,740	
1948-49	..	13,431,131	14,187,990	11,863,648	9,828,138	30,547,707	27,215,063	8,186,158	35,401,221	
1949-50	..	13,780,395	14,633,568	10,855,854	9,420,473	31,162,123	27,247,770	8,682,665	35,930,433	

NOTE.—The figures relate to Madras State (as reconstituted in 1935-36).

- Includes area cropped more than once.

Estimated Population and Requirements of the Madras State at different standards of consumption—cont.

6. Rate of consumption per adult per diem on the basis of the production during 1945-46 to 1949-50.

	Internal out put of foodgrains.					
	TONS.	oz.	oz.	oz.	oz.	oz.
1945-46	..	..	16.76	14.75	13.84	13.16
1946-47	..	..	6,118,000	18.80	16.55	15.52
1947-48	..	..	6,861,000	17.07	15.03	14.10
1948-49	..	..	6,233,000	17.72	15.60	14.63
1949-50	..	..	6,470,000	16.71	14.71	13.80
	..	..	5,875,000			

APPENDIX VII.

Area under Food and Commercial crops in Madras State (1938-39 to 1949-50.)

Crop.	(1)	1938-39.		1940-41.		1941-42.		1942-43.		1943-44.	
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
		ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.
<i>Food Crops.</i>											
Paddy	..	..	9,844,388	9,884,316	10,744,393	10,212,422	10,382,419	10,925,131	13,203,887	24,129,018	3,109,323
Millets	..	..	13,165,372	13,125,459	12,598,534	13,295,227	13,095,059	13,203,887	13,203,887	13,203,887	13,203,887
Total cereals	..	..	23,009,760	23,009,775	23,342,927	23,507,649	23,477,478	23,477,478	23,477,478	23,477,478	23,477,478
Pulses	..	..	2,425,685	2,691,669	2,807,264	2,915,136	2,900,384	2,900,384	2,900,384	2,900,384	2,900,384
Sugarcane	..	..	98,262	137,633	161,716	109,527	121,691	121,691	121,691	121,691	121,691
Other food crops	..	..	1,506,289	1,525,576	1,514,515	1,513,982	1,507,898	1,507,898	1,507,898	1,507,898	1,507,898
Total food crops	..	..	27,039,996	27,364,653	27,826,422	28,046,194	28,007,451	28,007,451	28,007,451	28,007,451	28,007,451
<i>Commercial Crops.</i>											
Groundnut	..	..	3,770,689	3,617,600	3,922,497	2,784,441	3,382,126	3,382,126	3,382,126	3,382,126	3,382,126
Gingelly	..	..	876,397	734,496	786,079	693,070	839,519	839,519	839,519	839,519	839,519
Castor	..	..	267,627	266,051	266,786	243,954	277,238	277,238	277,238	277,238	277,238
Coconut	..	..	585,124	608,607	598,427	596,147	598,054	598,054	598,054	598,054	598,054
Cotton	..	..	1,928,714	2,196,284	2,412,857	2,540,996	2,209,889	2,209,889	2,209,889	2,209,889	2,209,889
Tobacco	..	..	320,134	307,172	310,604	333,880	284,787	284,787	284,787	284,787	284,787
Total commercial crops.	..	..	7,748,985	7,730,210	8,297,250	7,192,488	7,591,613	7,591,613	7,591,613	7,591,613	7,591,613

Output of Food and Commercial crops in Madras State (1938-39 to 1949-50)—cont.

Crop. (1)	1944-45. (2) TONS.	1945-46. (3) TONS.	1946-47. (4) TONS.	1947-48. (5) TONS.	1948-49. (6) TONS.	1949-50. (7) TONS.
<i>Food Crops—cont.</i>						
Paddy	7,543,250	6,330,590	7,342,450	6,462,150	6,394,720	6,045,020
Millet	3,283,070	2,618,040	2,610,450	2,639,310	2,991,800	2,953,820
Total cereals ..	10,826,320	8,948,630	9,952,900	9,101,460	9,386,520	8,998,840
Pulses	285,890	223,780	253,550	243,950	261,430	261,000
Sugarcane (tons of jaggery).	459,910	436,670	591,910	753,500	532,040	500,250
Other food crops ..	3,399,460	3,667,670	3,185,540	3,751,030	3,674,750	3,714,520
Total food crops ..	14,971,580	13,276,750	13,983,900	13,849,940	13,854,740	13,474,610
<i>Commercial Crops—cont.</i>						
Groundnut	1,951,040	1,563,880	1,690,440	1,600,960	1,480,100	1,556,970
Gingelly	76,180	67,200	78,850	72,050	70,600	89,390
Castor	25,180	19,160	19,350	20,060	21,100	20,200
Coconut	..	N.A.	..	N.A.	N.A.	N.A.
Cotton (bales of 400 lb. lint).	381,310	360,670	335,780	266,093	341,650	363,040
	bales.	bales.	bales.	bales.	bales of 392 lb. lint.	bales of 392 lb. lint.
Tobacco tons] ..	132,600	132,920	108,080	107,230	114,480	83,700 *

Note: N.A. = not available.

* Final forecast figure.

APPENDIX IX.

Quantity of improved strains of seeds distributed and area covered. (1943-44 to 1947-48)

Year.	Quantity of seeds distributed.	Area covered by improved seeds of paddy.	Area of seed farms raised.	Additional production of food obtained.
	TONS.	ACS.	ACS.	TONS.
1943-44 ..	8,770 Paddy.	3,838,809	25,720	191,940
1944-45 ..	9,038 Paddy.	11,013,000	29,368	550,650
1945-46 ..	9,864 Paddy.	9,952,000	33,378	497,600
"	148 Millets.	(a)	(a)	(a)
1946-47 ..	12,540 Paddy.	780,335	34,600	107,304
"	57 Millets.	(a)	(a)	(a)
"	732 Other seeds.	(a)	(a)	(a)
1947-48 ..	9,030 Paddy.	2,585,800	34,987	92,350
"	101 Millets.	(a)	(a)	(a)
"	1 Pulses.	(a)	(a)	(a)
"	1,207 Other seeds.	(a)	(a)	(a)

(a)—Not available.

APPENDIX X.

Schemes under Emergency Food Plan, 1949-50.

Name of the scheme.	(1)	(2)	(3)	(4)	(5)
1 Land development by mechanical cultivation— Oil engine pumping sets.					
2 Electric motor pump sets (only pipes and fittings are supplied by the Agriculture Department).					
3 Distribution of oil-engines and electric motors under a hire-purchase system through the Central Agricultural Engineering Stores and Supply Centre.		13,153	6,305	10,453	1,194
4 Tractor cultivation		44,629	11,157	44,629	3,759
5 Soil conservation and contour bunding		1,500	..	4,750	139
6 Distribution of iron and steel for agricultural purposes.		No targets of additional production for this scheme.			
7 Subsidized distribution of phosphatic fertilizers ..		333,704	9,932	2,030,385	7,741
8 Distribution of ammonium sulphate		1,470,168	105,012	..	37,772
9 (a) Rural compost		7,083	887	8,728	557
(b) Urban compost		10,284	1,265	16,570	487
10 Green manure		61,551	8,304	90,408	4,836
11 Distribution of improved paddy seeds		245,960	13,207	358,321	19,324
12 Distribution of improved millet seeds		16,128	611	19,362	698
Total ..		2,204,140	156,680	2,583,606	76,507

APPENDIX XI.

Schemes under Emergency Food Plan, 1950-51.

Name of the scheme.	(1)	Total cost.	(2)	Net cost.	(3)	Units to be distributed.	(4)	Area to be benefited (in acres.)	(5)	Additional production anticipated (in tons.)	(6)
1 Land development by mechanical cultivation—Oil-engine pumping-sets.		16,85,360	RS.	12,09,562	RS.	648	5,184	2,592			
2 Electric motor pump-sets (only pipes and fittings are supplied by the Agricultural department).		9,00,000	..	..	..	3,000 sets through trade.	27,000	13,500			
3 Distribution of oil-engines and electric motors under a hire-purchase system through the Central Agricultural Engineering Stores and Supply Centre.		47,25,398	..	..	..	1,000 oil engines and 500 electric motors.	14,000	7,000			
4 Tractor cultivation		49,37,000	..	22,55,250	..	36 new and 234 old or 270 units	80,000	31,157			
5 Soil conservation and contour bunding.		8,44,800	..	5,30,550	..	60,000 tons.	9,500	475			
6 Distribution of iron and steel for agricultural purposes.		2,03,50,000	..	..	..	33,900 tons.	37,52,000	28,250			
7 Subsidized distribution of phosphatic fertilizers.		84,75,000	..	18,75,000	..	134,000 tons.	..	268,000			
8 Distribution of ammonium sulphate		4,89,10,000	..	..	..	93,720 tons.	18,744	2,343			
9 Rural compost		93,720	..	93,720	..	53,436 bags.	2,40,000	32,140			
10 Green manure		20,38,805	..	4,05,725	..	180,000 bags.	7,20,000	59,840			
11 Distribution of improved paddy seeds ..		44,65,800	..	7,64,300	..	..	..	..			

Food and Agriculture in Madras State

Area under Food and Commercial crops in Madras State (1938-39 to 1949-50)—cont.

	1944-45. (8) ACS.	1945-46. (9) ACS.	1946-47. (10) ACS.	1947-48. (11) ACS.	1948-49.* (12) ACS.	1949-50.* (13) ACS.
<i>Food Crops—cont.</i>						
Paddy	11,013,530	10,202,580	10,986,124	10,434,149	10,430,382	10,598,646
Millet	12,290,969	11,631,453	11,821,144	11,325,258	12,374,677	12,157,788
Total cereals ..	23,304,499	21,834,033	22,807,268	21,759,407	22,805,059	22,756,434
Pulses	3,005,845	2,791,886	2,935,523	2,775,623	2,945,510	2,968,586
Sugarcane	155,596	160,700	202,828	272,680	175,675	181,386
Other food crops ..	1,502,257	1,639,105	1,682,737	1,802,126	1,591,928	1,658,447
Total food crops ..	27,968,197	26,425,724	27,628,356	26,409,836	27,518,182	27,564,853

Commercial Crops—cont.

	ACS.	ACS.	ACS.	ACS.	ACS.	ACS.
Groundnut	4,298,592	4,165,385	4,121,394	4,066,830	3,698,830	3,767,123
Gingelly	616,142	599,056	672,870	638,367	612,819	759,359
Castor	284,759	235,263	229,244	240,823	229,850	223,718
Coconut	615,518	613,997	618,813	615,983	622,564	633,043
Cotton	1,670,141	1,611,338	1,566,530	1,297,647	1,632,639	1,691,001
Tobacco	328,185	363,036	303,997	293,759	322,356	345,344
Total commercial crops ..	7,814,337	7,588,076	7,512,848	7,153,409	7,119,058	7,419,588

* Including merged states.

Food and Agriculture in Madras State

APPENDIX VIII.

Output of Food and Commercial crops in Madras State (1938-1939 to 1949-50).

Crop. (1)	1938-39. (2) TONS.	1939-40. (3) TONS.	1940-41. (4) TONS.	1941-42. (5) TONS.	1942-43. (6) TONS.	1943-44. (7) TONS.
<i>Food Crops.</i>						
Paddy	6,119,740	6,667,040	7,687,120	7,396,000	6,886,320	7,360,990
Millet	3,381,350	3,673,670	3,800,540	3,570,260	3,197,450	3,307,840
Total cereals ..	9,501,690	10,340,710	11,487,660	10,975,260	10,083,770	10,668,830
Pulses	222,360	270,280	295,220	285,350	241,670	267,060
Sugarcane (tons of jaggery) ..	273,800	379,530	484,760	309,280	327,240	435,290
Other food crops	3,301,350	3,498,188	3,662,119	3,320,137	3,000,682	3,013,418
Total food crops ..	13,298,660	14,488,658	15,928,759	14,890,027	13,653,362	14,384,598
<i>Commercial Crops.</i>						
Groundnut	1,612,800	1,721,580	1,924,010	1,182,810	1,304,180	1,603,250
Gingelly	93,760	89,870	102,540	84,000	97,560	81,270
Castor	22,132	25,630	27,390	23,400	22,980	24,640
Coconut	..	N.A.	..	..	N.A.	..
Cotton (bales of 400 lb. lint) ..	369,240	452,100	530,170	562,690	470,920	482,480
Tobacco tons	119,430	141,250	126,810	129,300	113,930	93,690

Schemes under Emergency Food Plan, 1950-51—cont.

Name of the schemes. (1)	Total cost. (2) RS.	Net cost. (3) RS.	Units to be distributed. (4)	Area to be benefited (in acres.) (5)	Additional production anticipated (in tons.) (6)
12 Distribution of improved millet seeds ..	8,24,988	2,17,340	28,422 bags.	2,73,800	8,716
13 Distribution of improved pulses seeds ..	21,009	5,007	326 bags.	4,503	141½
14 Control of pests and diseases of crops.	4,25,000	2,25,000	..	..	..
15 Service schemes ..	38,97,993	38,97,993	..	..	..
Total ..	10,25,94,873	1,14,79,447	..	51,44,731	4,54,154½

APPENDIX XII.

Schemes under Emergency Food Plan, 1951-52.

Name of the scheme. (1)	Total cost. (2) RS.	Net cost. (3) RS.	Units to be distributed. (4)	Area to be benefited in acres. (5)	Additional production anticipated (tons.) (6)
1 Land development by mechanical cultivation—Oil-engine pumping-sets.	15,74,200	9,31,725	848 sets.	6,784	3,392
2 Electric motor pump-sets (only pipes and fittings are supplied by the Agriculture Department).	9,00,000	..	3,000 sets through trade.	42,000	21,000
3 Distribution of oil-engines and electric motors under a hire-purchase system through the Central Agricultural Engineering Stores and Supply centre.	60,42,066	..	1,350 oil engines 500 electric motors.	31,300	15,650
4 Tractor cultivation ..	43,85,000	20,77,500	50 new and 270 old or 320 units.	2,34,629	50,517
5 Soil conservation and contour bunding.	10,19,800	7,05,550	..	9,500	475
6 Distribution of iron and steel for agricultural purposes.	2,03,50,000	..	60,000 tons.	..	..
7 Subsidized distribution of phosphatic fertilizers.	84,75,000	31,25,000	25,000	32,48,000	20,833
8 Distribution of ammonium sulphate ..	4,17,60,000	..	116,000 tons.	..	2,32,000
9 Rural compost ..	1,04,706	1,04,706	104,706 tons.	20,941	2,617
10 Green manure ..	20,75,065	4,12,892	3,214 tons.	2,40,000	32,140
11 Distribution of improved paddy seeds ..	53,28,839	11,47,264	14,571	8,16,000	1,03,540
12 Distribution of improved millet seeds ..	10,53,850	2,86,890	2,030	5,87,000	18,975
13 Distribution of improved pulses seeds.	71,062	9,205	117 tons.	17,820	565
14 Control of pests and diseases of crops.	4,25,000	2,25,000	..	..	..
15 Services schemes— (a) Agriculture Department ..	45,50,000	45,50,000	..	..	..
(b) Food production ..	4,50,500	4,50,000	..	..	..
Total ..	9,91,65,088	1,40,26,232	..	52,53,974	5,01,704

APPENDIX XV.

Estimated additional output and value from Permanent Improvement Schemes (1943-49)

Year.	Free Assignment of land.	Land Development by mechanical cultivation.	Use of oil engines, etc.	Small Irrigation Works.
(1)	(2)	(3)	(4)	(5)
	TONS.	TONS.	TONS.	TONS.
1943-44 ..	34,634	..	..	..
1944-45 ..	58,230	..	..	13,813
1945-46 ..	59,980	..	..	28,460
1946-47 ..	70,842	..	..	1,00,640
1947-48 ..	69,624	..	..	1,47,485
Total ..	2,91,310	..	..	2,90,398
Average ..	58,262	..	..	72,599
1948-49 ..	71,031	7,203	2,168	1,68,367
Grand total	3,62,341	7,203	2,168	4,58,765

Year.	Well-Subsidy Schemes.	Total.	Value at Internal prices (a).	Value at Import prices (b).
	(6)	(7)	(8)	(9)
	TONS.	TONS.	RS.	RS.
1943-44 ..	..	34,634	85,89,232	1,11,42,148
1944-45 ..	158	70,201	1,68,48,240	2,05,40,813
1945-46 ..	..	88,440	2,15,79,360	2,58,77,544
1946-47 ..	42,896	2,14,378	5,25,22,610	4,85,13,741
1947-48 ..	42,092	2,59,201	7,17,98,677	16,00,82,538
Total ..	85,146	6,66,854	17,13,38,119	26,61,66,784
Average ..	21,286	1,33,371	3,42,67,624	5,32,33,357
1948-49 ..	52,023	3,00,792	12,60,31,848	18,83,25,871
Grand total ..	1,37,169	9,67,646	29,73,69,967	45,44,92,655

(a) Internal prices per ton.

	rs.
1943-44 ..	248
1944-45 ..	240
1945-46 ..	244
1946-47 ..	245
1947-48 ..	277
1948-49 ..	419

(b) Import prices per ton.

	rs.
1943-44 ..	322.0
1944-45 ..	292.6
1945-46 ..	292.6
1946-47 ..	226.3
1947-48 ..	617.6
1948-49 ..	626.1

APPENDIX XVI.

Expenditure on Intensive Production Schemes (1943-44).

Year.	Chemical fertilizers, groundnut and other oil-cakes.	Green manure.	Composts.
(1)	(2)	(3)	(4)
	RS.	RS.	RS.
1943-44 ..	..	..	..
1944-45 ..	..	..	..
1945-46 ..	..	..	..
1946-47 ..	..	..	..
1947-48 ..	..	..	..
Total ..	30,00,000	....	....
Average ..	7,50,000	....	....
1948-49 ..	4,70,482	26,083	21,000
Grand total ..	34,70,482	26,083	21,000

Year.	Improved strains of seeds.	Free distribution of seeds and manure.	Control of pests and diseases.	Total.
	(5)	(6)	(7)	(8)
	RS.	RS.	RS.	RS.
1943-44 ..	..	..	..	..
1944-45 ..	..	..	..	..
1945-46 ..	..	..	..	..
1946-47 ..	..	..	..	..
1947-48 ..	..	..	..	..
Total ..	6,88,000	..	..	36,88,000
Average ..	1,37,600*	..	..	7,37,600*
1948-49 ..	4,48,326	14,873	1,24,121	11,04,885
Grand total ..	11,36,326	14,873	1,24,121	47,92,885

* Average for five years.

APPENDIX XVII.

Estimated additional output from Intensive Production Schemes (1943-49.)

(1)	Chemical fertilizers. (2) Tons.	Groundnut cake. (3) Tons.	Other oil-cakes. (4) Tons.	Green manure. (5) Tons.	Composts. (6) Tons.
1943-44	..	..	..	..	..
1944-45	2,247	26,081	2,123	..	..
1945-46	47,576	46,446	1,579	..	..
1946-47	48,072	104,664	1,185	..	..
1947-48	34,093	66,031	..	..	..
Total	131,988	243,222	4,887	..	..
Average	32,997	60,805	1,629	..	..
1948-49	52,445	31,680	..	21,022	2,199
Grand total ..	184,433	274,902	4,887	21,022	2,199

Year.	Improved strains of seeds. (7) Tons.	Free distribution of seeds and manure. (8) Tons.	Control of pests and diseases. (9) Tons.	Total. (10) Tons.
1943-44	25,296	..	..	25,296
1944-45	29,856	..	..	60,307
1945-46	24,826	..	..	120,427
1946-47	32,898	..	..	186,819
1947-48	26,024	..	..	126,148
Total	138,900	..	..	518,997
Average	27,780	..	..	103,799
1948-49	40,395	33	44,874	192,648
Grand total ..	179,295	33	44,874	711,645

APPENDIX XVIII.

Value of additional output estimated from Intensive Production Schemes (1943-49.)

Year. (1)	Output. (2) TONS.	Value in terms of	
		Internal prices. (3) RS.	Import prices (4) RS.
1943-44	25,296	62,73,408	81,45,312-0
1944-45	60,307	1,44,73,680	1,76,45,828-2
1945-46	120,427	2,93,84,188	3,52,86,940-2
1946-47	186,819	4,57,70,655	4,22,77,139-7
1947-48	126,148	3,49,42,996	7,79,09,004-8
Total	518,997	13,08,44,927	18,12,14,225-0
Average of five years.	103,799	2,61,68,985	3,62,42,845-0
1948-49	192,648	8,07,19,512	12,06,16,913-0
Grand total ..	711,645	21,15,64,439	30,18,31,138

APPENDIX XIII.

Expenditure on Permanent Improvement Schemes

1943-49.

Year.	Free assignment of land.	Land development by mechanical cultivation.	Use of oil engines.	Small Irrigation Schemes.	Well-Subsidy Schemes.	Total.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	RS.	RS.	RS.	RS.	RS.	RS.
1943-44 ..	..	..	..	18,60,285	..	18,60,285
1944-45 ..	..	..	..	33,61,917	1,40,025	35,02,542
1945-46 ..	..	..	..	14,94,370	..	14,94,370
1946-47 ..	..	..	..	8,32,034	2,43,85,725	2,52,17,759
1947-48 ..	..	..	..	16,60,747	1,65,71,484	1,82,32,231
Total ..	..	..	..	92,18,353	4,10,97,834	5,03,16,187
Average ..	..	..	..	18,43,671	1,02,74,459	1,00,63,237
1948-49 ..	..	7,01,041	1,36,174	7,17,393	1,69,75,440	1,85,30,048
Grand total.	..	7,01,041	1,36,174	99,35,740	5,80,73,274	6,88,46,235

APPENDIX XIV.

Area brought under cultivation by Permanent Improvement Schemes (1943-49).

Year.	Free assignment of land.			Land development by mechanical cultivation.			Small Irrigation Schemes.			Well-Subsidy Schemes.			Grand total.		
	Area.	Cumulative total.	ACS.	Area.	Cumulative total.	ACS.	Area.	Cumulative total.	ACS.	Area.	Cumulative total.	ACS.	Grand total area.	Cumulative total.	ACS.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1943-44 ..	..	..	..	..	..	..	..	..	..	..	..	..	76,965	76,965	76,965
1944-45 ..	..	..	..	..	..	..	..	..	..	..	..	..	111,184	188,149	188,149
1945-46 ..	..	..	..	..	..	..	..	..	..	..	..	..	120,794	308,943	308,943
1946-47 ..	..	..	..	..	..	..	..	..	..	..	..	..	210,957	519,900	519,900
1947-48 ..	..	..	..	..	..	..	..	..	..	..	..	..	130,094	649,994	649,994
Total ..	169,815	675,849	..	..	..	..	377,622	871,780	102,557	102,557	196,322	649,994	1,743,951	..	..
Average ..	33,963	135,170	..	..	..	..	94,406	174,356	25,639	25,639	39,264	129,999	348,790	..	..
1948-49 ..	..	..	..	..	..	..	..	..	..	..	..	..	116,757	766,751	766,751
Grand total ..	175,386	851,235	..	..	..	..	427,622	1,299,402	128,174	128,174	324,496	766,751	2,510,702	..	..

APPENDIX XX.

Price of paddy per imperial maund in Madras State, 1801-02 to 1854-55.

Year.	Price in rupees.	Year.	Price in rupees.	Year.	Price in rupees.
1801-02	1.15	1819-20	0.97	1837-38	1.18
1802-03	1.14	1820-21	0.96	1838-39	1.25
1803-04	1.31	1821-22	1.13	1839-40	1.05
1804-05	1.43	1822-23	1.11	1840-41	0.99
1805-06	1.25	1823-24	1.40	1841-42	0.79
1806-07	1.69	1824-25	1.74	1842-43	0.73
1807-08	1.48	1825-26	1.32	1843-44	0.65
1808-09	1.04	1826-27	0.97	1844-45	0.79
1809-10	0.91	1827-28	0.91	1845-46	1.16
1810-11	0.96	1828-29	0.93	1846-47	1.17
1811-12	1.15	1829-30	1.02	1847-48	1.02
1812-13	1.38	1830-31	0.92	1848-49	0.87
1813-14	1.31	1831-32	0.86	1849-50	0.83
1814-15	1.12	1832-33	1.30	1850-51	0.80
1815-16	0.91	1833-34	1.69	1851-52	0.77
1816-17	0.96	1834-35	1.16	1852-53	0.74
1817-18	0.99	1835-36	0.92	1853-54	1.12
1818-19	0.97	1836-37	1.16	1854-55	1.30

APPENDIX XXI.

Imports of paddy and rice into Madras State from Burma, Thailand and Indo-China and the average price of paddy per imperial maund in Madras State, 1855-56 to 1948-49.

Year.	Paddy.		Rice.		Price of paddy per imperial maund in Madras State.
	Burma.	Thailand and Indo-China.	Burma.	Thailand and Indo-China.	
(1)	(2)	(3)	(4)	(5)	(6)
	TONS.	TONS.	TONS.	TONS.	RS.
1855-56	..	..	..	..	1.38
1856-57	..	..	..	..	1.18
1857-58	..	279	..	..	1.34
1858-59	..	..	1,681	..	1.69
1859-60	..	110	..	..	1.51
1860-61	..	82	24	..	1.60
1861-62	..	306	28	..	1.75
1862-63	..	354	48	..	1.83
1863-64	..	705	169	..	1.84
			251	..	

Imports of paddy and rice into Madras State from Burma, Thailand and Indo-China and the average price of paddy per imperial maund in Madras State, 1855-56 to 1948-49—cont.

Year.	Paddy.		Rice.		Price of paddy per imperial maund in Madras State.
	Burma.	Thailand and Indo-China.	Burma.	Thailand and Indo-China.	
(1)	(2)	(3)	(4)	(5)	(6)
	TONS.	TONS.	TONS.	TONS.	RS.
1864-65	..	..	..	..	2.19
1865-66	..	..	..	..	2.34
1866-67	..	19,067	2,588	..	2.85
1867-68	..	..	..	..	2.10
1868-69	..	..	..	..	2.01
1869-70	..	26,438	4,993	..	1.99
1870-71	..	11,180	2,727	..	1.65
1871-72	..	5,884	2,547	..	1.47
1872-73	..	5,104	3,182	..	1.56
1873-74	..	7,671	2,275	..	1.54
1874-75	..	8,908	2,417	..	1.55
1875-76	..	15,392	3,367	..	1.46
1876-77	..	34,344	6,848	..	2.53
1877-78	..	9,358	25,157	..	3.24
1878-79	..	..	..	..	2.55
1879-80	..	43,674	6,083	..	1.86
1880-81	..	11,218	2,828	..	1.63
1881-82	..	4,935	3,049	..	1.66
1882-83	..	3,780	2,704	..	1.56
1883-84	..	..	..	..	1.59
1884-85	..	20,279	3,504	..	1.59
1885-86	..	32,827	5,312	..	1.78
1886-87	..	11,773	4,036	..	1.75
1887-88	..	9,856	2,942	..	1.62
1888-89	..	4,082	1,492	..	1.56
1889-90	..	9,015	2,269	..	1.67
1890-91	..	30,745	7,032	..	1.83
1891-92	..	33,774	9,575	..	2.01
1892-93	..	52,742	6,716	..	2.31
1893-94	..	125,146	16,420	..	2.26
1894-95	..	76,013	12,561	..	2.03
1895-96	..	28,259	14,302	..	1.95
1896-97	..	14,681	3,164	..	1.89
1897-98	..	41,197	62,033	..	2.18
1898-99	..	59,861	52,003	..	2.69
1899-1900	..	45,305	39,214	..	2.12

APPENDIX XIX.

Aggregate expenditure on Permanent Improvement Schemes and Intensive Production Schemes and the estimated additional output and value.

Year.	Expenditure.	Additional yield.	Actual cost of production.	Value in terms of internal prices.	Differences between value at internal prices and cost of production.	Value in terms of external prices.	Differences between value at import price and cost of production.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	RS.	Tons.	RS.	RS.	RS.	RS.	RS.
1943-44 ..	18,69,285	34,634	57,26,155	85,89,232	28,63,077	1,11,52,148	54,25,993
1944-45 ..	35,02,542	70,201	1,12,32,160	1,68,48,240	56,16,080	2,05,40,813	93,08,653
1945-46 ..	14,94,370	88,440	1,43,86,240	2,15,79,360	71,93,120	2,58,77,544	1,14,91,304
1946-47 ..	2,52,17,759	2,14,378	3,50,15,074	5,25,22,610	1,75,07,537	4,85,13,741	1,34,98,667
1947-48 ..	1,82,32,231	2,59,201	4,78,65,784	7,17,98,677	2,39,32,892	16,00,82,538	11,22,16,754
Total ..	5,03,16,187	6,66,854	11,42,25,413	17,13,38,119	5,71,12,706	26,61,66,784	15,19,41,371
Average ..	1,00,63,237	133,371	2,28,41,082	3,42,67,624	1,14,22,541	5,32,33,357	3,03,88,274
1948-49 ..	1,85,30,048	3,00,792	8,40,21,232	12,60,31,848	4,20,10,616	18,83,25,871	10,43,04,639
Grand total.	6,88,46,235	9,67,646	19,82,46,645	29,73,69,967	9,91,23,322	45,44,92,655	25,62,46,010

Intensive Production Schemes.

1943-44	25,296	41,82,272	62,73,408	20,91,136	81,45,312	39,63,040	
1944-45	60,307	96,49,120	1,44,73,680	48,24,560	1,76,45,828	79,96,708	
1945-46	1,20,427	1,95,89,459	2,93,84,188	97,94,729	3,52,36,940	1,56,47,481	
1946-47	1,86,819	3,05,13,770	4,57,70,655	1,52,56,885	4,22,77,140	1,17,63,370	
1947-48	1,26,148	2,32,95,331	3,49,42,996	1,16,47,665	7,79,09,005	5,46,13,674	
Total ..	5,18,997	8,72,29,952	13,08,44,927	4,36,14,975	18,12,14,225	9,39,84,273	
Average ..	1,03,799	1,74,45,990	2,61,68,985	87,22,995	3,62,42,845	1,87,96,855	
1948-49 ..	1,92,648	5,38,13,008	8,07,19,512	2,69,06,504	12,06,16,913	6,68,03,905	
Grand total.	7,11,645	14,10,42,960	21,15,64,439	7,05,21,479	30,18,31,138	16,07,88,178	
Grand total of Permanent Improvement and Intensive Production Schemes ..	7,36,39,120	16,79,291	33,92,89,605	50,89,34,406	16,96,44,801	75,63,23,793	41,70,34,188

Imports of paddy and rice into Madras State from Burma, Thailand and Indo-China and the average price of paddy per imperial maund in Madras State, 1855-56 to 1948-49—cont.

Year.	Paddy.		Rice.		Price of paddy per imperial maund in Madras State.
	Burma.	Thailand and Indo-China.	Burma.	Thailand and Indo-China.	
	(2) TONS.	(3) TONS.	(4) TONS.	(5) TONS.	
(1)					(6) RS.
1900-01	107,589	..	97,050	..	2.64
1901-02	119,010	..	103,123	..	2.38
1902-03	81,326	..	46,358	..	2.04
1903-04	27,868	..	9,855	..	1.89
1904-05	56,335	..	27,374	..	2.13
1905-06	78,591	..	72,944	..	2.64
1906-07	125,017	..	82,944	..	2.85
1907-08	82,360	..	66,059	..	3.07
1908-09	139,946	..	109,121	..	3.38
1909-10	322,023	..	166,627	..	2.93
1910-11	180,647	..	117,695	..	2.67
1911-12	72,271	..	32,887	..	2.99
1912-13	53,890	..	48,055	..	3.46
1913-14	174,919	..	94,779	..	3.35
1914-15	167,455	..	103,006	..	3.17
1915-16	146,540	..	93,407	..	3.12
1916-17	65,583	..	90,605	..	3.21
1917-18	28,785	..	77,422	..	3.28
1918-19	16,247	..	199,307	..	4.62
1919-20	22,807	..	379,554	..	5.92
1920-21	60,251	..	236,712	..	5.12
1921-22	83,155	..	144,636	..	4.72
1922-23	115,369	..	187,297	..	4.46
1923-24	63,628	..	152,291	..	4.48
1924-25	81,515	..	208,346	..	4.86
1925-26	99,602	..	332,104	..	4.53
1926-27	73,648	..	193,373	..	4.57
1927-28	79,077	12,474	334,042	14,658	4.56
1928-29	97,949	37,627	382,077	6,416	4.25
1929-30	102,942	..	346,876	5,353	3.83
1930-31	..	..	396,858 (a)	4,617	2.98
1931-32	..	..	517,207 (a)	23,217	2.53
1932-33	..	..	417,829 (a)	35,293	2.34
1933-34	..	..	573,707 (a)	80,327	2.04
1934-35	..	..	714,504 (a)	29,398	2.41

Imports of paddy and rice into Madras State from Burma, Thailand and Indo-China and the average price of paddy per imperial maund in Madras State, 1855-56 to 1948-49—cont.

Year.	Paddy.		Rice.		Price of paddy per imperial maund in Madras State.
	Burma.	Thailand and Indo-China.	Burma.	Thailand and Indo-China.	
	(2) TONS.	(3) TONS.	(4) TONS.	(5) TONS.	
(1)					(6) RS.
1935-36	..	..	854,856 (a)	65,726	2.49
1936-37	27,063	61,036	680,441	10,327	2.34
1937-38	28,283	2,773	647,107	218	2.43
1938-39	51,080	23,276	683,328	796	2.47
1939-40	29,589	278,880	759,601	63,844	2.69
1940-41	4,754	32,461	491,469	16,753	2.99
1941-42	354	..	355,514	..	3.55
1942-43	..	..	16,867	..	5.17
1943-44	..	..	..	..	6.29
1944-45	..	..	15,731	..	6.24
1945-46	..	..	69,404	8,000	6.59
1946-47	54,392	16,700	197,576	25,287	6.96
1947-48	2,658	..	212,266	125,759	9.25
1948-49	2	..	..	..	12.25

(a) Paddy and rice in terms of rice. Separate figures in respect of paddy and rice are not readily available.

APPENDIX XXII.

Trend of prices of some major foodgrains in important centres in Madras State in the twelve months following decontrol in November 1947

District and Centre.	Price before decontrol.	January 1948.		February 1948.		March 1948.		April 1948.		May 1948.	
		Price.	Per-centage increase.	Price.	Per-centage increase.	Price.	Per-centage increase.	Price.	Per-centage increase.	Price.	Per-centage increase.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Paddy.	Week end.										
	27th December 1947.										
Vishakhapatnam district—											
Vizianagaram ..	10-93	12-63	16	12-63	16	12-63	16	21-86	100	23-14	112
North Arcot district—											
Arni ..	10-12	13-68	35	15-20	50	15-20	50	27-36	170	22-80	126
Coimbatore district—											
Erode ..	10-23	10-23	..	10-45	2	18-61	81	29-66	189	29-66	189
Tiruchirappalli district—											
Manappuram ..	9-11	..	..	9-11	..	24-16	165	19-50	114	18-50	103
	(31st January 1948).										
Ramanathapuram district—											
Ramanathapuram ..	10-81	29-22	170	24-32	125	25-93	140	25-09	132	23-44	163
CHOLAM.											
Madurai district—											
Pervakulam ..	7-16	7-16	..	8-97	25	11-13	55	14-31	100	19-88	178
Salem district—											
Rasipur ..	7-62	7-62	..	7-62	..	7-9	54	18-00	136	18-00	136
Coimbatore district—											
Perundhurai ..	5-50	10-61	93	15-72	184	15-72	136	18-88	243	23-60	329

KAMBU.

Salem district—											
Namakkal ..	7-88	..	..	..	..	..	..	14-56	85	16-63	111
Coimbatore district—											
Perundhurai ..	5-50	10-81	97	15-26	177	16-43	199	16-43	199	21-33	232
South Arcot district—											
Gingee ..	6-06	8-19	35	8-19	35	8-19	35	14-56	140	..	..
	(31st January 1948).										

RICE.

District and Centre.	Price before decontrol.	June 1948.		July 1948.		August 1948.		September 1948.		October 1948.		November 1948.	
		Price.	Per-centage increase.	Price.	Per-centage increase.	Price.	Per-centage increase.	Price.	Per-centage increase.	Price.	Per-centage increase.	Price.	Per-centage increase.
		(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
	Week ending 31st December 1947.												
Vishakhapatnam district—													
Vizianagaram ..	10-93	24-43	124	29-00	165	29-00	165	30-00	174	35-00	220	35-00	220
North Arcot district—													
Arni ..	10-12	27-36	170	36-48	260	36-48	260	27-00	167	26-25	159	33-76	233
Coimbatore district—													
Erode ..	10-23	32-36	215	35-58	246	35-58	246	35-58	246	35-58	246	27-33	166
Tiruchirappalli district—													
Manappuram ..	9-11	24-00	163	25-00	174	29-50	224	19-00	109	14-78	62	15-00	65
	(31st January 1948).												
Ramanathapuram district—													
Ramanathapuram ..	10-81	25-63	137	15-63	137	38-91	260	35-37	227	32-42	200	29-98	177

Trend of prices of some major foodgrains in important centres in Madras State in the twelve months following decontrol in November 1947—cont.

District and Centre.	Price before decontrol.	June 1948. Per- centage increase.	July 1948. Per- centage increase.	August 1948. Per- centage increase.	September 1948. Per- centage increase.	October 1948. Per- centage increase.	November 1948. Per- centage increase.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CHOLAM.							
Madurai district—							
Perviyakulam ..	7-10	20-67	189	20-67	189	19-08	166
Salem district—							
Kesipur ..	7-62	18-00	136	18-00	136	17-00	123
Coimbatore district—							
Perundurai ..	5-50	18-88	243	23-60	329	17-17	212
KAMBU.							
Salem district—							
Namakkal ..	7-88	16-68	111	18-20	131	27-80	246
Tamil Nadu district—							
Perundurai ..	5-50	21-38	289	15-26	177	17-80	224
South Arcot district—							
Glaasee ..	6-08	..	..	18-20	200	20p82	245
(81st January 1948.)							

APPENDIX XXIII.

Foodgrains Procured in the years 1942-43 to 1949-50.

Foodgrains 1942-50					Rice.	Millets.	Total.
Year.					TONS.	TONS.	TONS.
					721,164		721,164
1942-43	..	..	..	..	841,419	..	841,419
1943-44	..	..	..	..	1,025,216	27,472	1,052,689
1944-45 (November to October)	..	..	..	..	1,313,895	116,739	1,430,634
1945-46	..	..	..	..	1,498,465	123,647	1,622,112
1946-47 (Good year)	..	..	..	..	947,540	25,381	972,921
1947-48 (decontrol period)	..	..	..	..	1,364,528	77,165	1,441,693
1948-49	..	..	..	..	1,019,145	90,420	1,109,565
1949-50	..	..	..	..			

APPENDIX XXIV.

Irrigation Schemes with ayacuts below 25,000 acres.

Irrigation Schemes				
Description.	Cost of the scheme.	Date of commencement of irrigation.	Date when full ayacut will be reached.	Probable ayacut in acres.
(1)	(2) RS.	(3)	(4)	(5) ACS.
1 Makkuvageda	70,00,000	1950	1955	12,000
2 Reservoir across Janjivati.	1,10,00,000	1954	1956	11,000
3 Tuni or Thandava Reservoir.	80,00,000	1953	1955	13,300
4 Mid-Pennar Project ..	60,00,000	1952	1955	10,500
5 Rallapad Reservoir	75,00,000	1952	1954	14,800
6 Sathanur Reservoir	1,23,00,000	1952	1955	20,000
Project.				
7 Aliyar Dam	60,00,000	1952	1954	10,000
8 Vaigai Reservoir ..	1,65,00,000	1953	1956	12,500
				1,04,100
9 Tammileru	1,10,00,000	1950	1954	16,900
10 Budameru Reservoir ..	1,10,00,000	1950	1954	20,000
11 Perur Project	75,00,000	1950	1953	10,500
12 Bhairavanitippa Project.	60,00,000	1950	1953	10,000
13 Kattalai High Level Channel.	90,00,000	1950	1953	20,000

Irrigation Schemes with ayacuts below 25,000 acres—cont.

Description.	Cost of the scheme.	Date of commencement of irrigation.	Date when full ayacut will be reached.	Probable ayacut in acres.
(1)	(2)	(3)	(4)	(5)
	RS.			ACS.
14 Pullambadi Scheme ..	80,00,000	1950	1953	22,000
15 Kanhirapuzha ..	1,50,00,000	1950	1954	25,000
16 Walayar Reservoir Scheme.	40,00,000	1950	1954	16,600
	14,50,00,000			2,45,100

APPENDIX XXV.

Statement showing the index numbers of prices received by the farmer for his produce in Madras State.

Crop.	Estimated marketable surplus in '000 ton. 1938-39.	Price per ton.	Value in '000.
		RS.	RS.
Paddy	2,142	60-16	12,88,63
Cholam	253	61-52	1,55,65
Cumbu	129	65-60	84,62
Ragi	112	62-88	70,43
Korra	54	55-80	30,13
Total Foodgrains	..	..	16,29,46
Chain Relative	..	..	..
Sugarcane (Jaggery)	233	160-05	3,72,92
Groundnut	1,387	75-40	10,45,80
Gingelly	58	153-79	89,20
Castor	20	127-66	25,53
Cotton	64	181-83	1,16,37
Tobacco	101	323-10	3,26,33
Total Commercial Crops	..	..	19,76,15
Chain Relative	..	..	..
Grand Total	..	..	36,05,61
Chain Relative	..	..	..
Paddy	2,496	157-88	39,40,68
Cholam	176	167-68	2,95,12
Cumbu	103	174-21	1,79,44
Ragi	106	162-23	1,71,96

Statement showing the index numbers of prices received by the farmer for his produce in the Madras State—cont.

Crop.	Estimated marketable surplus in '000 ton. 1938-39.	Price per ton.	Value in '000.
		RS.	RS.
	1946-47.		
Korra	33	138-28	45,63
Total Foodgrains	..	..	46,32,83
Chain Relative	..	..	284.3
Sugarcane (Jaggery)	503	396-57	19,94,75
Groundnut	1,453	257-21	37,37,26
Castor	17	393-31	66,86
Gingelly	49	618-96	3,03,29
Cotton	58	461-90	2,67,90
Tobacco	92	1,118-45	10,28,97
Total Commercial Crops	..	..	73,99,03
Chain Relative	..	..	374.4
Grand Total	..	..	1,20,31,86
Chain Relative	..	..	333.7
Paddy	2,197	191-63	42,10,11
Cholam	189	197-07	3,72,46
Cumbu	96	198-16	1,90,23
Ragi	93	191-08	1,77,70
Korra	37	169-85	62,84
Total Foodgrains	..	..	50,13,34
Chain Relative	..	..	108.2
Sugarcane (Jaggery)	641	314-12	20,13,51
Groundnut	1,377	356-58	49,10,11
Gingelly	45	694-11	3,12,35
Castor	18	488-05	87,85
Cotton	47	465-19	2,18,64
Tobacco	91	1,533-30	13,95,30
Total Commercial Crops	..	..	89,37,76
Chain Relative	..	..	120.8
Grand Total	..	..	1,39,51,10
Chain Relative	..	..	116.0
	1948-49		
Paddy	2,338	232-19	51,96,41
Cholam	227	224-84	5,10,30
Cumbu	100	229-19	2,29,19
Ragi	104	215-58	2,24,20
Korra	40	200-61	80,24
Total Foodgrains	..	..	62,40,43

Statement showing the index numbers of prices received by the farmer for his produce in the Madras State—cont.

Crop.	Estimated marketable surplus in '000 ton 1938-39.	Price per ton. Rs.	Value in '000 Rs.
1948-49			
Chain Relative	..	..	124.5
Sugarcane (Jaggery) ..	453	299.42	13,56,37
Groundnut ..	1,273	394.15	50,17,53
Gingelly ..	44	728.95	3,20,74
Castor ..	19	495.88	94,18
Cotton ..	58	642.39	3,72,59
Tobacco ..	97	1,899.14	18,32,47
Total Commercial Crops	..	..	89,93,88
Chain Relative	..	..	100.6
Grand Total	..	..	1,52,34,31
Chain Relative	..	..	109.2
Paddy ..	1,650	223.48	36,87,42
Cholam ..	216	217.76	4,70,36
Cumbu ..	96	221.57	2,12,71
Ragi ..	98	209.32	2,05,13
Korra ..	38	188.91	71,79
Total Food grains	..	..	46,47,41
Chain Relative	..	..	74.6
Sugarcane (Jaggery) ..	456	537.05	24,48,95
Groundnut ..	1,416	488.87	69,22,40
Gingelly ..	49	765.43	3,75,06
Castor ..	20	485.60	97,12
Cotton ..	53	751.82	3,98,46
Tobacco ..	71	1,811.76	13,36,05
Total Commercial Crops	..	..	1,15,78,04
Chain Relative	..	..	128.7.
Grand Total	..	..	1,62,25,45
Chain Relative	..	..	106.5

Statement showing the index numbers of cost of production of Crops in Madras State.

APPENDIX XXVI.

Crop.	1938-1939.	1946-49.	1947-48.
(1)	Extent. ACS. (2)	Extent. ACS. (4)	Extent. ACS. (6)
Paddy ..	9,844,388	10,986,124	10,434,149
Cholam ..	4,913,710	4,527,427	1,211,008
Cumbu ..	2,717,545	2,366,188	2,238,989
Ragi ..	1,639,258	1,532,739	1,481,591
Korra ..	1,786,606	1,609,679	1,563,860
Total cost of production of foodgrains.	743,428,000	2,242,086,000	2,299,608,000
Chain Relative	..	..	102.6
Sugarcane ..	98,262	202,828	272,680
Groundnut ..	770,689	4,121,394	4,066,830
Gingelly ..	876,397	672,870	638,367
Castor ..	267,627	229,244	240,823
Cotton ..	1,928,714	1,566,530	1,297,647
Tobacco ..	320,134	303,997	293,759
Total cost of production of commercial crops.	250,157,000.	760,855,000	689,130,000
Chain Relative	..	..	90.6

Statement showing the index numbers of cost of production of Crops in Madras State—cont.

Crop.	1938-1939.		1946-49.		1947-48.	
	Extent.	Cost of production per acre.	Extent.	Cost of production per acre.	Extent.	Cost of production per acre.
	ACS.	RS.	ACS.	RS.	ACS.	RS.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cost of production of food-grains and commercial crops.	993,535,000	..	3,002,941,000	..	2,988,738,000	..
Chain Relative	-	302.2			99.5	
1948-49.						
Crop.	Cost of production per acre.		Cost of production per acre.		Cost of production per acre.	
	RS.	A. P.	RS.	A. P.	RS.	A. P.
(8)	(9)	(10)	(11)			
Paddy	10,430,382	124 13 2	10,362,000	126 14 5		
Cholam	4,777,373	88 0 0	4,762,400	89 0 0		
Cumbu	2,359,208	66 0 0	2,322,200	67 0 0		
Ragi	1,609,484	88 0 0	1,598,100	89 0 0		
Korra	1,704,930	68 0 0	1,604,100	69 0 0		
Total cost of production of foodgrains.	2,135,637,000 acres.		2,147,303,000 acres.			
Chain Relative	..	92.9	100.5			
Sugarcane	175,675	1,022 10 8	190,640	1,843 0 0		
Groundnut	3,698,830	95 4 3	3,863,300	118 0 0		

Gingelly	612,819	64 0 0	665,600	67 0 0
Castor	229,350	72 12 9	224,600	71 0 0
Cotton	1,632,739	92 0 0	1,652,200	108 0 0
Tobacco	322,356	398 0 0	294,300	378 0 0
Total cost of production of commercial crops.	866,481,000 acres.		1,157,444,000 acres.	
Chain Relative	125.7		133.6	
Cost of production of foodgrains and commercial crops.	3,002,118,000 acres.		3,304,747,000 acres.	
Chain Relative	100.4		110.1	

APPENDIX XXVII.

Index numbers of rural prices calculated by the Chain Base method.

Rural centre.	Population in the rural area of the districts represented by the centre.	Index numbers of rural calculated by the base method.			
		1946-47.	1947-48.	1948-49.	1949-50.
	(1)	(2)	(3)	(4)	(5)
Adivaram	..	..	361.2	115.5	105.4
Thettangi	..	..	344.5	107.7	116.4
Alamurn	..	..	345.9	102.0	107.9
Madhavaram	..	..	417.4	113.3	106.2
Puliyur	..	..	292.6	106.3	125.4
Agaram	..	..	296.4	106.2	119.0
Thulayanatham	..	..	372.2	100.8	111.5
Eriodu	..	..	334.4	107.1	113.3
Gokilapuram	..	..	347.8	111.3	116.8
Kinathukedavu	..	..	310.4	162.2	108.5
Koduvali	..	..	380.5	114.9	115.4
Guduvancheri	..	..	351.4	121.6	108.2
Kunnathur	..	..	345.3	110.1	113.5
Total	..	..	..	..	..
Weighted Average Index Number	..	..	348.4	113.4	111.8
	..	..	..	..	101.6

APPENDIX XXVIII.

Forms in which figures of cost of production of crops per acre are reported by the Collectors and by the Director of Agriculture in Madras State.

Collectors.	STATE.	RS. A. P.	Director of Agriculture.		RS. A. P.
			1	2	
1 Preparatory Cultivation	..	..	1 Lease	..	..
2 Manure and manuring	..	..	2 Land Revenue and Irrigation	..	..
3 Seeds, Sowing and Transplanting	..	..	3 Manures	..	..
4 After cultivation, irrigation and watch	..	..	4 Human Labour	..	..
5 Harvesting, bundling, carrying, threshing, winnowing, final stacking and carting.	..	..	5 Bullock Labour	..	..
6 Assessment	..	..	6 Seeds	..	..
7 Water cess	..	..	7 Landlords, other expenses	..	..
8 Interest on working expenses	..	..	8 Total cost	..	..
	..	..	To tenant	..	..
	..	..	To owner cultivation	..	..
9 Total cost of production per acre	..	..	9 Acre yield—	..	..
	..	..	Grain	..	..
	..	..	Straw	..	..
10 Selling price of straw in lb. per rupee at the village site.	..	..	10 Value of—	..	..
	..	..	Grain (pound per rupee)	..	..
	..	..	Straw (pound per rupee)	..	..

APPENDIX XXIX

*Strength of the staff in the Civil Supplies Department,
Madras, as on the 10th December 1947 (peak period).*

1 Commissioner of Civil Supplies	1	28 Assistant Labour Inspectors	4
2 Deputy Commissioners	4	29 Managers	3
3 Assistant Commissioners	2	30 Recorders	6
4 Secretary to the Commissioner of Civil Supplies	1	31 Enquiry Officers	446
5 Joint Secretary to C.C.S.	1	32 Checking Officers	313
6 Assistant Secretaries	7	33 Patrol Supervisors	86
7 Provincial Controller of Food Rationing	1	34 Assistant Commercial Tax Officers	17
8 Deputy Controller of Food Rationing	2	35 Senior Inspector of Co-operative Societies	3
9 Deputy Collectors	41	36 Supervisor for wheat	1
10 Tahsildars	124	37 Assistant Entomologist	4
11 Deputy Tahsildars	379	38 Master of the Ship	1
12 Special Officer for rice	1	39 Head Accountants	20
13 Chief Accounts Officer	1	40 Accountants	65
14 Deputy Chief Accounts Officers	3	41 Shroffs	14
15 Chief Accountants	1	42 Cashier	1
16 Marketing Officer	1	43 Grain Purchase Inspectors	48
17 Assistant Marketing Officer	1	44 Food Inspectors	31
18 Marketing Assistants	14	45 Loading Inspectors	74
19 Firka Supply Officers	1,126	46 Special Revenue Inspectors	90
20 Transport Officer	1	47 Rationing Inspectors in Malabar	41
21 Assistant Transport Officer	1	48 Superintendent for Rice	1
22 Provincial Road Transport Officer	1	49 Superintendents	52
23 District Provincial Road Transport Officer	1	50 Huzur Head Clerks	18
24 Area Transport Officer	3	51 Head Clerks	11
25 Automobile Engineer	1	52 Upper Division Clerks	446
26 Executive Engineer	1	53 Lower Division Clerks	2,498
27 Labour Inspector	1	54 Steno-typists and Typists	102
		55 Firewood Superintendents	8
		56 Assistant Firewood Superintendents	21
		57 Checking Inspectors	27

58 Clearance Inspectors	1	84 Painter	1
59 Supervisors	6	85 Assistant Painter	1
60 Sub-Registrars	2	86 Carpenters	2
61 Godown-keepers	46	87 Hammerman	1
62 Store-keepers	3	88 Van operator	1
63 Storage Assistants	28	89 Blacksmith	1
64 Tally Clerks	30	90 Tinker	1
65 Fieldman	4	91 Automobile Inspector	1
66 Inspectors	31	92 Drivers	287
67 Inspectors and Sub-Inspectors	28	93 Time-keepers	18
68 Head Constables	79	94 Tyre fitters	4
69 Police Constables	293	95 Senior cleaners	10
70 Grain Inspectors	1	96 Junior cleaners	91
71 Section-writers	703	97 Electricians	4
72 Maistris	28	98 Wireman	1
73 Firewood Guards	87	99 Boilerman	1
74 Watchmen	242	100 Drivers	4
75 Sifters	2	101 Assistant Drivers	4
76 Stitchers	2	102 Cleaner	1
77 Workmen	56	103 Gate-keeper	1
78 Attenders	42	104 Compressuraman	1
79 Peons	3,385	105 Assistant Boilerman	1
80 Senior Foremen	5	106 Tindals	2
81 Junior Foremen	9	107 Bhowdaries	2
82 Senior fitters	10	108 Mechanic	1
83 Junior fitters	22	109 Laskars	8
		110 Coolies	18

APPENDIX XXX.

Population of Madras State

Name of district.	1941 Population.	1951 Population.	Percentage increase.
Srikakulam	2,013,698	2,105,847	4.6
Visakhapatnam	1,832,246	2,071,671	13.1
East Godavari	2,076,840	2,406,352	15.9
West Godavari	1,465,111	1,697,892	15.9
Krishna	1,451,509	1,779,760	22.6
Guntur	2,277,283	2,542,244	11.6
Nellore	1,617,026	1,793,774	10.9
Cuddapah	1,056,507	1,161,713	10.0
Kurnool	1,190,842	1,264,154	6.2
Bellary	1,082,617	1,240,988	14.6
Anantapur	1,160,220	1,360,727	16.7
Madras	878,150	1,429,985	62.8
Chingleput	1,723,286	1,839,896	6.8
Chittoor	1,633,396	1,808,725	10.7
North Arcot	2,577,540	2,862,155	11.0
Salem	2,865,950	3,374,284	17.7
Coimbatore	2,809,648	3,294,849	17.3
South Arcot	2,808,753	2,766,468	6.0
Tanjore	2,563,375	2,979,754	16.2
Tiruchirappalli	2,594,136	2,942,225	13.4
Madurai	2,473,609	2,884,994	16.6
Ramanathapuram	1,990,842	2,078,750	4.4
Tirunelveli	2,237,379	2,447,949	9.4
Nilgiris	209,709	312,172	48.9
Malabar	3,929,815	4,758,886	21.1
South Kanara	1,522,016	1,746,118	14.7
State Total	49,847,508	56,952,332	14.3

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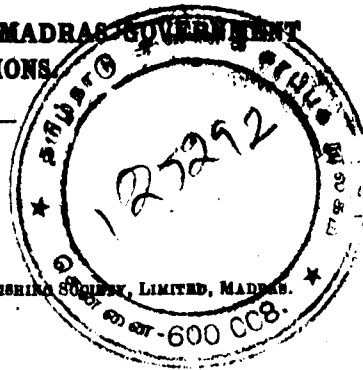
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