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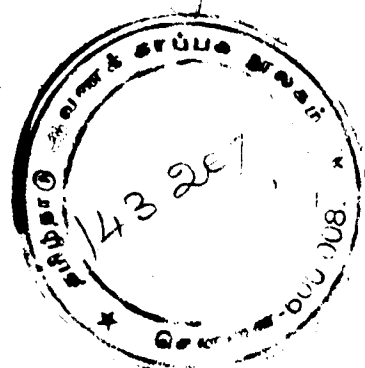
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*The Environment of the Tanjore Ryots in Relation to Agriculture in Tanjore District

By

M. P. RAJAGOPAL, B.A., L.T., DIP. GEOG.,

The chief factors of environment which shape the agricultural life of the ryots in the District are:—1. Relief, 2. Soils, and 3. Climate.

Relief.—There are two clearly marked natural divisions in the district:—1. The Delta of the Cauvery, and 2. The non-deltaic upland tracts of Tanjore, Mannargudi, and Pattukottai taluks.

The Delta. The delta which occupies rather more than half the total area of the district is a wide alluvial plain sloping gently towards the sea, and is devoid of forests, of natural eminences save the ridges and hillocks of blown sand which fringe the narrow strip of beach along the coast. These ridges of blown sand are neither very wide nor high, the south-west monsoon being strong enough to counteract the work done by the north-east monsoon, which

*A Revised form of the Paper 'Life of Tanjore Ryots,' read at the Geography and Geodesy Section of the Indian Science Congress, Baroda; Jan. 1942.

1. Statistical Atlas of Madras Presidency, 1936 edition; p. 751.

otherwise would spread the sand dunes far inland. The rainfall on the coast is moreover heavy, and saturating the sand, prevents it from being blown far. In the northern and middle parts of the Delta the land slopes towards the east; but in the southern half, however, the land slopes slightly to the south so that the course of the rivers is not due east but slightly towards south-east. In the south-eastern portion of the delta is formed a salt swamp known as the Vedaranyam swamp, which is the largest one in the Presidency.² It is filled by two periodical high tides during the year—the 'Chittrai Parvam' and 'Visaka Vellam', which occur at about the full moon in May and June respectively.

³The fall of the Cauvery above the delta is 3.4 ft. per mile, but within the delta it is only 2.7 ft. per mile. The river splits up into innumerable smaller branches forming a net work of water-ways that irrigate the whole of the deltaic portions. Near the coast at Negapatam and Tirumalaivasal, the lower reaches of the rivers are shifted in a northerly direction due to a coastal current in the sea running from south to north. The beach at Tranquebar is being rapidly eroded by the current which is dependent on direction and intensity on the prevalent monsoon. No further deltas are now being formed at the mouth of the rivers as the silt carried down is swept away by the strong coastal current.

The non-deltaic tract.—The non-deltaic tract is that upland tract which consists mainly of red laterite having an average elevation of about 50 ft. above the deltaic area or about 100 ft. above mean sea-level. It is an open flat area interspersed with spurs sloping to the east and south-east and equally destitute of hills. The only approach to a hill in this region is a small plateau broken up by ridges of gritty sandstones covered with quartz pebbles, known as the Vallam Taluk land rising a little above the surrounding level, to the south and south-west of Tanjore. The relative areas of the delta and the upland tracts have not been exactly ascertained. A number of jungle streams flow through the upland tract during the rainy season thus filling a few of the numerous tanks which were the chief sources of

2. Manual of Tanjore District, p. 141.

3. Tanjore Dt. Gazetteer, Vol. 1; 1906.

irrigation in these parts, prior to the construction of the Mettur canal.

The district can be divided into the following physiographic units:—1. The delta of the Cauvery, 2. The non deltaic upland tracts, and 3. The Salt Swamp in the south.

Soils.—The actual⁴ classification of the soils done so far in the district are:—1. *Alluvium*—usually known as 'Vandal' or silt brought down by the rivers, covering about 27% of the area of the district, and confining to the taluks of Tanjore, Papanasam, Kumbakonam, Mayavaram and Nappilam; 2. *Red Soil*—known as 'Ceveppu mun' covering an area of about 21% found mostly in the laterite regions of Tanjore, Mannargudi, Pattukotai and Arantangi. 3. *Sandy Soil*—known as 'Manal' covering an area of 7% mainly confined to places adjoining the coast in Shiyali, Negapatam, Tirutturaipundi and Arantangi taluks; 4. *Black Soil*—known as 'Karisal' covering an area of about 45%, occurring chiefly above and about the head of the delta and in all taluks except Pattukotai and Arantangi.

Climate.—Climate is the most important factor of environment which governs the agricultural activity in the district. The seasons in South India on the east coast may roughly be⁵ classified as follows:—1. *Hot and Dry*—from middle of March to middle of June; 2. *Hot and Rainy*—from the middle of June to middle of September—some rains occurring during this season from the remnants of the S. W. Monsoon of the West coast region 3. *Warm and Rainy*—from the middle of September to the middle of December—rains during this season due to the retreating monsoon; and 4. *Cold and Dry*—from the middle of December to the middle of March.

The deltaic portion of the district chiefly depends on the S. W. monsoon rainfall on the Western Ghats, which causes freshes in the Cauvery. Most of the rainfall in the district is received from the retreating monsoon, and there is a decrease in total rainfall from

4. As per the Statistical Atlas of Madras Presidency (Page 760), the classification is as follows:—Alluvial Red Ferruginous, Regur and Arenacious. The name 'Regur' is apt to create a misconception, as it is associated with Black Cotton Soil. Black Soil in the district ranks next to Alluvial in production power.

5. 'Rural Life'—N. Subramanyam; M.G.A. Vol. 2, No. 2.

the coast into the interior.—The upland tract lying chiefly to the south-west of Tanjore taluk including Pattukotai and Arantangi taluks are the driest.

In the month of May there is a sudden spurt of rainfall in the district known as 'Mango Showers', which are convection showers accompanied with thunder-storms caused before the onset of the S. W. monsoon. More frequent in November than in May such cyclones are recorded as having played great havoc in past instances. The following table⁶ illustrate these features.

Section of District.	Cold and Dry Weather (Jan.-Mar.) (inches)	Hot and Dry Weather (Apr.-May) (inches)	S. W. Monsoon Season (June-Sept.) (inches)	Retreating Monsoon Season (Oct.-Dec.) (inches)
Littoral ..	5.38	3.18	9.43	31.79
Central ..	4.58	3.19	12.23	25.98
Inland ..	3.24	4.00	11.17	19.44
Dt. Average ..	2.99	2.99	12.27	26.52

Irrigation—The rainfall in the district is inadequate for the cultivation of paddy, the average total⁷ rainfall being 48 inches only. Hence there is necessity for irrigation in the district. The conversion of the Cauvery from the inundated to the controlled type has been effected with a view to minimise the dangers to the deltaic tracts during heavy floods, and to utilise the surplus waters running to waste in the sea for the benefit of the drier upland tracts.

The present Mettur Project, executed in 1934, impounds 93,500 c.ft. of water at Mettur. The Mettur canal, strictly a 'contour' canal, with a capacity, of 4,200⁸ cusecs is intended to irrigate and bring under cultivation 3,01,000 acres of the non-deltaic tract in addition to effecting improvements in deltaic tracts. The 'New

6. Statistical Atlas of the Madras Presidency. Page 753.

7. The average rainfall of the district from 1870-1930 is 45.92" as against an average of 48" in the past ten years.

8. Cusec-multiplied by 60×60×24 gives the c. ft. of water passing through a spot in a day.

Delta' is commanded by the Mettur canal and the Vadavar extension. The following⁹ figures relate to the acreage brought under cultivation after the Mettur canal was opened for irrigation:—

	1933-1934.	1934-1935.
Vadavar	13,889.	22,134.
Grand Anicut canal	22,845.	62,314.

The percentage of irrigated area to net area sown in the district is 82. The Mettur irrigation^{9a} supply is carried on from 16th, June to 31st, Jan. (See diagram). Adequate supply of water throughout the season must be guaranteed by the Irrigation Department if the area under double crop is to be increased in the district.

Agriculture.—The district is known as the 'Granary of the South' as it is one of the¹⁰ chief rice-producing regions of India. As per census of 1931, agriculture is the chief occupation of 70% of the working population. The ratio between the number employed in agriculture and the total population in the district may be stated as follows—One agriculturist has to cultivate about 2½ acres on which 5 persons depend for their food. So in the district there is half an acre of cultivated area for every person. The pressure on cultivated land is high in the district as seen from the following table:—

Cultivated to Total area.	Percentage of		Density of Pop. per sq. mile of		
	Cultivable to Total area.	Cultivated to Cultivable area.	Total Area.	Cultivable Area.	Cultivated Area.
55.3	73.3	75.4	685	932	1241

9. 'Recent Irrigation changes in the Cauvery'—T. Krishnaswami. M.C.A.J. Vol. 14, No. 3, P. 256.

9a. Advance supply in the first half of June is made, if storage in Reservoir is found to be adequate. Supply in the second half of June is made to enable cultivation of doublecrop areas. There is assured supply for both single and doublecrop areas from July 15th to Sept. 30th. Extra supply is given in the first half of Oct., and supply from 16th Oct. to 31st Jan. will depend upon the state of the retreating monsoon rainfall.

10. Vide Season and Crop Report 1940-41. 'Tanjore was responsible for 11.4% of the total area under paddy in the province.'

Only 75.4% of the arable land is under cultivation in the district and the remaining 24.6% is in the form of forests,¹¹ cultivable waste and current fallow. The Government, if it is anxious to make the district 'grow more food' must conduct a land utilisation survey to know how much of the cultivable wastes and current fallows could be brought under the plough. The population which a sq. mile of cultivated land has to support is very high and hence the area under cultivation must be extended to relieve the growing pressure on land.

In the district cultivation is of two kinds wet and dry. In the deltaic region wet cultivation predominates and in the non-deltaic region dry cultivation predominates. The wet lands occupy roughly¹² 12½ lakhs of acres and the dry lands only about 1 lakh of acres. The main wet crop is paddy and the chief dry crop is groundnut.

Manuring.—The popular feeling in the district is that the fertility of the soil is¹³ declining since the construction of the Mettur dam as, much of fertile silt is¹⁴ held up by the regulators on the other

11. Percentage calculated from the statistics given in 'Season and Crop Report'—1940-41. The figure is very high as the published statistics are not accurate. The cultivable waste in the District is surely not as great as the statistics show. "The figures for land classified as 'Not available for cultivation' and culturable waste' in the Reports are apt to give rise to misconceptions. We consider that the classification requires careful consideration."—(Vide Report of Royal Commission on Agriculture, P. 26.).

12. Figures supplied by the District Agricultural Officer, Tanjore.

13. "No evidence of progressive soil deterioration can be deduced from Settlement Reports or from earlier records as exist. While the paucity of records of crop outturn throughout India over any long period of time makes the matter impossible of exact proof, we are of opinion that the strong presumption is that an overwhelming proportion of the agricultural lands of India long ago reached the condition to which experimental data point."—Vide Report of Royal Commission Agriculture, p. 763.

14. The fact that it is estimated by the Government that the effective storage capacity of the Mettur Reservoir will be reduced in a period of 50 years by about 10 ft. in height due to accumulation of silt etc. at the bottom, would seem to suggest that the contention of the Tanjore Ryot is at least partially correct—T. Krishnaswami, M.G.A.J. Vol. 14; No. 3. P. 265.

It cannot be denied that a portion of the silt brought down by the river at Mettur is entrapped therein; but when the discharged water required for irrigation or the floods are passed down through or overflow sluices as the

side of the Dam. Anyhow the deterioration of soil in the district is due to the lands being cropped year after year with the same kind of crops, the exhausted soil not being recouped by proper organic manuring, except by natural process by absorbing Nitrogen in the atmosphere when they remain fallow.

The decline in fertility of the soil is also due to the fact that the soil in the areas of canal irrigation is tending to become saline as the permeable banks of canals allow water to seep into adjacent fields.

As a result of the¹⁵ Soil Survey of the delta conducted by the Agricultural department in 1912, it was found out that the delta was in very great need of phosphatic manures, that the nitrogen content was generally low and that certain places were tending to become saline as they were badly drained.

Cattle manure the cheapest and best manure available is generally applied at 12 cartloads per acre for double cropped lands and 6 for the single cropped lands. Large flocks of sheep are penned in seed beds at nights. Unfortunately much of the cattle dung is being burnt away as fuel for domestic purposes by the ryots. The value of liquid manure of the farmstock which is rich in nitrogenous matter, is not at all realised by the ryots and it is allowed to run waste. The ryots must preserve the farmyard manure by using it as a compost with village sweepings, leaves and other decomposed vegetable matter.

If the ryots are to be advised to use all the cowdung as manure, then some kind of cheap fuel must be made available to them. Casuarina fuel is the cheapest fuel to be thought of and the cultivation of such trees on inferior dry lands must be encouraged. Forests provide the necessary firewood, but in the district the forest area is very small covering only 10.5 sq. miles and excluding Madras, is less than that in any other district in the Presidency. Growing of trees on sides of roads, on bunds of canals and tanks must be encouraged. Swamp areas near the coast must be afforested.

case may be, most of the silt, especially of the lighter type, passes down, and it is only the heavier silt which will settle down in the Reservoir—Dewan Bahadur N. Swaminathaiyer, M.G.A.J. Vol. 9; No. 2 P. 96.

15. 'A Soil Survey of Tanjore Delta'—Madras Agricultural Dept. 1921.

Paddy cultivation.—The time of ploughing in the district varies with the availability of water. Ploughing begins in May in dry crop and double crop areas—the 'Mango showers' at that time being taken advantage of. In single crop areas ploughing could be done only after the commencement of water supply by the middle of June. Seeds are sown early in July in wet beds (or 'Sethu nathu') in single crop areas, and in dry beds (or 'Pulidi nathu') early in June in double crop areas. Transplanting into previously manured, ploughed and puddled fields, is done by the end of August in single crop lands and early in July in double crop lands. During transplantation additional labour is imported, especially in single crop areas. One single crop 'Samba' of duration from 150 to 165 days is cropped in single crop lands, and the field is left fallow for a period of 3½ months after harvest which takes place from the middle of January to the end of February. 79% of the area sown with paddy in the district comes under single crop cultivation. In double crop lands a variety known, as 'Kuruvai' of duration 95 to 100 days is sown as the first crop and harvested by the end of October. Another variety known as 'Thaladai' of duration 140 days, sown earlier in a separate nursery bed is transplanted as soon as the first crop is harvested and its stubbles ploughed in, and this second crop is harvested by the middle of February. As a substitute to Kuruvai, a 'Kar' variety of duration 115 days is sown as the first crop at the head of the delta.

Another kind of double crop cultivation, known as 'Udu' cultivation peculiar to Tanjore Dt. is carried on in those parts where the water supply, while hardly adequate for two crops, is more than sufficient for a single crop. Here Kuruvai variety of 95 days duration is mixed with Ottadan variety of 220 days duration and sown in the third week of June. The Kuruvai crop which matures earlier is harvested in October and the Ottadan crop which matures later is harvested in February. ¹⁶Though the total outturn of the two crops falls little short of twice a single crop, or even in some places of a long growing single crop, it brings in to the poor ryot an early supply of paddy. Only 7% ¹⁷of the total area sown with paddy in the district comes under this type of cultivation.

16. Tanjore District Gazetteer, Vol. 2, 1933, p. 166.

17. Percentage calculated from figures supplied by the District Agricultural office, Tanjore.

The double crop areas are confined to the upper portion of the delta, mostly to Tanjore, Papanasam, Kumbakonam and portions of Mayavaram and Mannargudi taluks, where coarse river silt is deposited, and where the earliest freshes in the Cauvery facilitating earlier supply of water are received. These areas form only 17% of the total area sown with paddy in the district. Some parts of the 'new delta' have been brought under double crop cultivation by the Mettur canal and extended Vadavar systems.

Chief varieties of Paddy grown in the Dt.	Percentage of acreage under cultivation of each variety, to the total area sown with Paddy.	Duration of growth in days of each variety.	Highest yield in lb. per acre of each variety.
1. Kar ..	2	115	4375
2. Kuruvai ..	19	95—100	3641—3734
3. Thaladai ..	10	140	2273
4. Ottadan ..	7	220	1960
5. Samba ..	79	150—165	2863—3888

The above table shows that varieties which take a short period like the Kar and Kuruvai have the best yield while those which take a long growing season like Ottadan have the poorest yield. Two crops per year cannot be raised in single crop areas in view of the poor fertility of the soil and inadequacy of water supply throughout the seasons in those parts. Hence the best strain of Samba variety giving the highest yield must be introduced to the ryots by the Agricultural department. A better variety than Thaladai or Ottadan giving more yield must be introduced, as the first crop Kar or Kuruvai being Autumn and Spring rices could not be grown again as second crop.

¹⁸Appendix D shows the decrease in yield per acre and the increase in area under acreage of paddy especially after the advent

18. I have shown the statistics only from 1927-28 as I wanted to compare the period after the advent of Mettur canal with the period of equal number of years before it. The lowest yield is during the period 1930-32, and it was due to "heavy floods and incessant rains in Oct" (Vide Season and Crop Report, 1930-31, p. 4).

of the Mettur project. The decline in yield is certainly due to soil exhaustion in the delta. Only systematic organic and green manuring could recuperate the exhausted soil with nitrogen and thus enrich it. Night soil converted into poudrette, as is done in China, must be prepared by Municipalities and supplied to the ryots. Green manuring like growing 'Kolinji' and ploughing it into the soil before the main crop is grown, must be made more popular in the district.

The low yield is also to some extent due to absentee landlords who form nearly¹⁹ 22% of the total pastoral and agricultural population in the district, and who taking rent in money or kind are not interested in the improvement of their lands.²⁰ 'A large proportion of the cultivable lands in the District is owned by non-agriculturists, which probably accounts for the lack of enterprise among the mass of farmers and their failure to adopt better and more scientific methods in cultivation in what is generally regarded as an educated and enlightened district.'

In the district, the increase of population in 1941 over 1931, census is 7.5%, the increase in acreage under cultivation of paddy in 1940 over that in 1931 is nearly 9%; but the increase in yield of paddy is 0%! Hence, even though the increase in area under cultivation has kept pace with the increase in population, the yield has not increased, but on the other hand has been declining! So, if production of food has to be increased in the district, not only to feed the increasing population but also to supply places which had been dependent on imports from Burma, the Government must stress not merely upon extension of area under cultivation but chiefly upon higher yields of paddy by introducing improved strains of seeds advocating reduced seed-rate followed by economic transplanting, encouraging growth of green manures and liberally supplying organic manures to the ryots.

19. Percentage calculated from the statistics given against Non-cultivating proprietors taking rent in money or kind and 'Tenant cultivators' in the Table showing the Pastoral and Agricultural Population in the District as ascertained at the census of 1931, in the Statistical Atlas of Madras Presidency, 1936, p. 763.

20. District Gazetteer, Vol. 2. p. 165.

Mixed Crop cultivation.—Generally very little rotation is adopted in the district, the land remaining fallow after the harvest of paddy, from February to June. In some double crop areas, pulses like green and blackgrams are sown in the standing paddy crop and harvested in April. Betel cultivation is done in black sandy soil in Tanjore, Kumbakonam and Papanasam (chiefly at Iyampet) taluks—the total area under cultivation being only about²¹ 1,000 acres. Generally it is cultivated at a stretch for a period of 3 yrs. as a rotation to paddy crop. Sugarcane cultivation in paddy lands is practised very little in the district due chiefly to lack of drainage facilities in the fields, and also as it is one of the most expensive crops requiring much manure and attention all the year round. In the limited areas where it is grown, it is generally cultivated at a stretch for a period of three years as a rotation to paddy crop.

Dry crop cultivation.—Ground-nut is the chief dry crop of commercial importance, largely cultivated in the drier parts of Pattukotai, Mannargudi, and Tanjore taluks. After the advent of the Mettur canal, probably due to over-irrigation, conversion of some dry lands into wet lands, and to some extent due to lack of energy on the part of the ryots there, whose²² health is being affected by Malaria caused by canal irrigation the acreage and yield of the crop are declining (See ²³ Appendix D). Cereals like

21. Figures supplied by the District Agricultural Officer, Tanjore.

22. Vide the Report of the Director of Public Health, Madras, 1936, p. 21:—"The preliminary investigation of Malaria survey in the Cauvery-Mettur Project Area in the Tanjore District has brought to the fore prominently, the frequently overlooked factors bearing on Malaria in such irrigational projects. Malaria has stepped in much earlier than one would have expected and the problem of control is one of immense magnitude requiring a detailed investigation. Dr. Russel of the Rockefeller Foundation has established recently a field station at Pattukottah to study the problem of canal irrigation and Malaria."

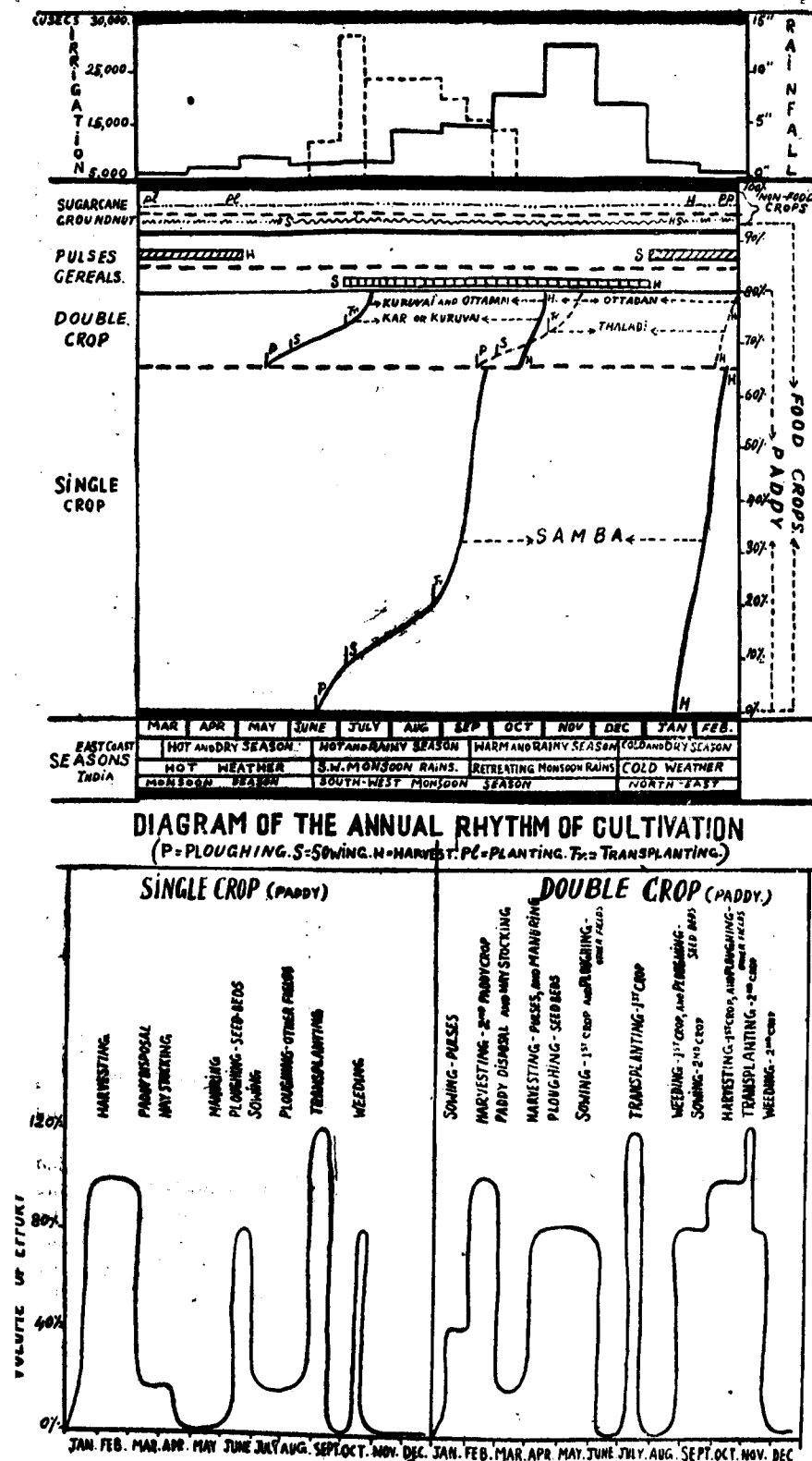
23. I have shown the statistics only from 1927-28 to compare the period after the advent of Mettur irrigation with the period of equal number of years before that. The acreage and yield are lowest during the period 1933-35. The fall in acreage is due to the fact that taking advantage of the new Mettur irrigation much of the groundnut cultivated fields were sown with paddy; and the fall in yield is due to 'partly insufficient rains and partly to low prices in the sowing season and to rainfall being inadequate in both the monsoons.' (Vide Season and Crop Report, 1934-35).

Cumbu, Cholan, Ragi Maize, etc., are also grown in some of the non-deltaic tracts, generally sown in July and harvested in December (See 24 Diagram.)

Other kinds of cultivation—Dholl and a little cotton in the red soil of Vallam, tobacco near point Calimere in Vedaranyam, plantains and bamboos in the fertile²⁵ 'Padugai' lands, condiments and spices in Pattukotai, coconuts and mangoes (of pickles variety) in almost all parts, are the only money crops grown in the district. The ryots must think of raising more money crops like soya beans, tomatoes, and fruits and vegetables. The bunds in the fields and²⁶ 'Poramboke' lands lying waste could be best utilised for growing vegetables. The reaction of plant life to canal irrigation must be studied by the Agricultural Department, in the new delta; and market gardening suited to soil and water must be advocated to the ryots in both the new and old deltas to supplement their income from paddy cultivation.

THE LIFE OF TANJORE RYOTS

A study of agriculture in the district shows that the agricultural resources are quite inadequate to meet the needs of the growing population and hence the imperative need for the development of cottage industries in the district. The environment of the ryots, no doubt limits their activities, but they must be fully occupied during all the twelve months of the year. A study of the²⁷ ergo-



24. Ref., Dr. Geddes 'Diagram of the Annual Rhythm of Cultivation in Northern Chota Nagpur Plateau'—M.G.A.J. Vol. 13. No. 2. P. 121.

The diagram shows cultivation in relation to rainfall and irrigation in the Dt. (Straight lines show R. F. Graph and dotted lines show irrigation graph). Only important wet and dry crops are shown.

25. A narrow strip of fertile land along either bank of the river where silt is deposited at the time of floods when it is submerged under water.

26. An uneven plot of uncultivated land lying between fields, which is generally used as thrashing ground.

27. Ref. Geddes 'Diagram of Seasonal Rhythm of Effort in Northern Chota Nagpu, Plateau, M. G. A. J. Vol. 13. No. 2. P. 121 and G. Kuriyan's ergographs in some 'Aspects of the Regional Geography of Kerala'—I.G.A.J., Vol. 17, No. 1.

In the ergographs, I have shown only the agricultural activities of the ryots, observed personally at two typical villages representing single and doublecrop respectively. The percentage of volume of Effort is based on the

graphs (See Graphs show that the majority of the ryots (as single crop lands from the major portion of the cultivated area of the district) are unemployed, or not actively employed from March to June and from September to December—roughly for a period of five to six months in the year. During off seasons, because the ryots have no active work on land, they indulge in social and non-agricultural work giving them little or no remuneration, like performing marriages, or visits to neighbouring towns, or participating in village improvements and festivities. Some suitable employment, either agriculturally or industrially, must be suggested to them during off seasons to supplement their income from land. Agriculturally the ryots must be advised to grow rotational crops or do market gardening as suggested already. In this they must be helped considerably by the Agricultural Department. Industrially, some cottage industries must be suggested to the ryots,²⁸ 'which should be on a small scale, involving little capital or skill, based on the raw materials available in the neighbourhood, and such that they could be taken up or dropped according to the leisure available from work on land.'

Cottage Industries.—The industrial potentialities of the region have been studied to some extent by the Department of Industries, Madras, and based on it. I suggest some possible cottage industries suited to the ryots in various places in the district:—

Bamboos which grow largely on 'Padugai' lands and on porambokes could afford raw material for basket-making and thatti-plaiting. Rattan which grows on either side of the southern bend of the Coleroon, on the banks of some rivers in Vedaranyam division, and on the banks of channels and ponds may help to promote the rattan industry among the ryots. The wild growth of 'Korai' found in abundance in railway ditches and along the banks of channels and rivers, the leaves of the screw-pine trees grown along the coast, and the leaves of the palmyra and coconut trees, have provided occupation for some ryots in mat weaving or plaiting,

hours of work per day done by a ryot during the various agricultural seasons in the year—8 hrs. (80%) as normal, 10 hrs. (100%) as maximum, and 12 hrs. (120%) as excess output of energy on the part of the ryot.

28. 'Some South Indian Villages'—A Resurvey, p. 430.

and this must be taken up by more ryots. In areas of groundnut cultivation, the oil-crushing industry organised on a more mechanised scale than in the ordinary 'Chekku' method, would bring in good manure in the form of oil cakes. As there are many clay pits in several places especially in railway ditches and in dry tank beds, pottery, country tiles and brick industries could be undertaken by the ryots. As Vedaranyam division is the greatest producer of tobacco in the district, cigar industry may engage the attention of the ryots in that locality.

Dairying industry.—The demand for milk in the district is growing especially from urban parts, and hence the Tanjore ryot 'must stop looking upon his cow as the mother of his bullock and attach more importance to its milking capacity. 'As per²⁹ census of live-stock in the district taken in 1940, only 38% of the total cattle in the district are cows kept for milk production and breeding purposes. This is not enough and cows kept for work in fields must be kept for milking purposes, only. Unfortunately, as there are no natural grazing grounds in the district, the cattle are ill-fed. Enclosed pastures must be made available, and grazing on such places must be rotational. Much of the waste lands in Tirutturai-pundi, Tanjore, Mannargudi, Pattukotai and Arantangi taluks can be considered as potential sources to which the ryots can look forward for the raising of fodder crops for their cattle.³⁰ 'With a view to stimulate the growth of fodder crops, the Government would be well advised to adopt a differential rate of assessment and exempting areas sown with such crops from water cess altogether'.

Co-operation.—At every bend of his agricultural operations, the Tanjore ryot is confronted with problems of soil exhaustion, lack of adequate manure, poor yield, etc. As suggested by³¹ Sir Horace Blunket for Ireland, 'Better farming,' 'Better business' and 'Better living' should be promoted in the district. The first two could be advocated only through Co-operative Societies organised

29. Vide Season and Crop and Report, 1939-40.

30. 'Recent irrigation changes in the Cauvery'—T. Krishnaswami, M.G.A.J. Vol. 14, No. 3, p. 258.

31. 'Co-operation for Farmers', Smith Gordon, p. 203.

by the Agricultural Department.³² There are at present 17 Sale societies, 2 Central marketing societies and 11 Stores societies besides some other small societies, in the district, and the³³ total membership of all the societies in 1931 was only 60,509—roughly one-ninth of the total agricultural and pastoral population. The societies must be increased in number, and Societies like Credit Societies, to help the ryots in the purchase of manure, seeds etc., 'Producers' Societies to sell the produce, as existing in advanced agricultural countries like Denmark, Ireland and also in the Punjab in India, should be organised. 'Better-living' among the ryots could be organised only by means of effective propaganda such as public lectures, radio broadcasts, and making the ryots learn the 3 R's. Compulsory Elementary Education to teach the ryot how to solve the real, practical problems that face him in daily life must be introduced in rural parts. As the³⁴ Royal Commission on Agriculture observes—"Of all the factors making for prosperous agriculture, by far the most important is the outlook of the ryot himself. This, in main, is determined by his environment, and it follows, therefore, that the success of all measures designed for the advancement of agriculture must depend upon the creation of conditions favourable to progress. The demand for a better life, can in our opinion, be stimulated only by a deliberate and concerted effort to improve the general conditions of the country side, and we have no hesitation in affirming that the responsibility for initiating the steps required to effect this improvement rests with the Government."

32. 'The Villagers' Guide and Calendar, 1942, Madras Agricultural Dept. p. 87.
 33. Tanjore District Gazette, Vol. 2, 1933, p. 181.
 34. Report of the Royal Commission on Agriculture, p. 672.

APPENDIX A.

Areas in acres sown with crops in Tanjore District in 1940-1941, as compared with the normal.³⁵

Crops.	Normal.	1940-41.
Paddy	1190000	1229172
Cholam	8470	8409
Cumbu	6880	6226
Ragi	15040	19331
Varagu	38000	34874
Maize	1580	11079
Other Cereals	350	362
Green gram	50200	50725
Red gram	6550	5725
Black gram	11600	11101
Bengal gram	70	38
Horse gram	480	607
Other Pulses.	2100	4527
Chillies	5420	5218
Other Condiments and Spices	3030	3691
Sugarcane	730	1524
Mangoes	5300	4677
Plantains	11000	11774
Other Fruits and Vegetables including		
Root crops	8540	9845
Groundnut	65000	50920
Gingelly	23600	13732
Castor	360	744
Coconut	36300	36279
Other Oil Seeds	5900	5690
Tobacco	1580	1442
Cotton	130	177
Fodder crops	20	430
Net area cropped	1318960	1327799

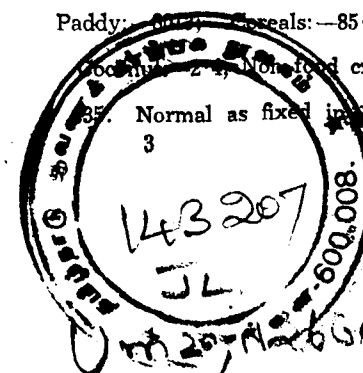
APPENDIX B.

Percentage of area under main crops in 1940-41 to the total area sown:—

Paddy: 85.0; Cereals:—85.0; Food crops:—92.4; Groundnut:—3.3;

Coconut: 2.4; Non-food crops:—7.6.

35. Normal as fixed in 1912.



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APPENDIX C.

Normal yield in lbs. per acre and the yield per acre attained in 1940-41:—

<i>Some Important Crops.</i>	<i>Normal.</i>	<i>1940-41.</i>
Paddy	1750	1628
Cholam	1300	858
Cumbu	1200	1224
Ragi	1100	935
Maize	1000	910
Sugarcane	1384	1080
Groundnut	—	6065
Varagu	1000	939

APPENDIX D.

<i>Pre-Reservoir Period.</i>	<i>Paddy.</i>		<i>Groundnut.</i>	
	<i>Yield.</i>	<i>Acreage.</i>	<i>Yield.</i>	<i>Acreage.</i>
1927-28	1750	10,90,000	1,090	92,000
1928-29	1625	10,80,000	1,100	90,000
1929-30	1690	10,90,000	1,130	90,000
1930-31	1580	10,80,000	1,000	86,000
1931-32	1520	10,70,000	930	68,000
1932-33	1530	11,10,000	870	68,000
1933-34	1660	11,20,000	830	50,000
Average	1637	10,90,000	1,134	77,143
<i>Post-Reservoir Period.</i>				
	<i>Yield.</i>	<i>Acreage.</i>	<i>Yield.</i>	<i>Acreage.</i>
1934-35	1670	11,40,000	950	56,000
1935-36	1680	11,70,000	950	64,000
1936-37			940	68,000
1937-38	1600	12,00,000	900	56,000
1938-39			890	54,000
1939-40			900	56,000
1940-41	1630	12,30,000	930	50,000
Average	1545	11,90,000	923	57,143

Food Production in War Time

By

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In normal times the foodstuffs produced in India, with the important exception of rice, more than met the actual demands of the teeming millions of the country, though according to the standards prescribed by nutrition experts there was a serious deficiency in the supply of pulses, milk and milk products, vegetables and fruits not to speak of meat, fish and eggs, which some sections of the people would not consume even if they had the purchasing power. It had become an article of faith in Western countries that people should be provided with the essential articles of diet which included besides wheat, oats and barley, sugar, fruits and vegetables, a variety of animal products—meat, bacon, fish, eggs, milk, butter and cheese—which were considered to be 'protective foods' indispensable for the maintenance of optimum health and efficiency. Expert nutrition committees had declared that mere vegetarian foods, however rich in proteins and fats, were not equal to animal proteins and fats in assimilability. No country in Europe was self-sufficient in respect of the rich variety of the above foodstuffs, which most of the people who were in receipt of higher wages or incomes got used to consume during the last 30 or 40 years. Most of these countries were at first so pleased with the arrivals of cheap cereals and meat—thanks to the enormous progress in transport and cold storage facilities—from North and South America, Australia and New Zealand that they specialised more and more in rearing dairy cattle and pigs, growing vegetables and fruits and keeping poultry. Their agriculture became so ill-balanced that its evil effects were felt severely during the last war, when the perils of the sea transport were at their worst. Since then the cry of self-sufficiency in respect of essential foodstuffs has been growing in volume in almost all the countries of Europe and plans were laid down for the increase in the area under wheat, oats, barley, potatoes, fruits and

vegetables, dairy cattle and pigs, leaving the supply of beef and mutton to come from foreign countries which had abundant land and sparse population.

Some countries, notably Germany, aimed at complete self-sufficiency in the absence of a colonial empire and adequate shipping facilities to draw supplies in times of war. An elaborate programme was drawn up by the Nazi Government as early as 1936, to produce almost all the essential foodstuffs within the country and the people were told what they should consume and what they should avoid even in peace time, so as to be prepared for rationing in a time of war. The taboo included such animal foods as beef and mutton, which were too costly to produce in terms of land and labour in the homeland, while people were exhorted to consume more of cereal foods, vegetables, milk, milk products, eggs and fish, which were relatively cheaper to produce on the limited land within the country. Besides this, the soyabean, which was found on analysis to have proteins and fats of high biological value, which no other vegetable and few animal foods were known to have, was said to have been imported by Germany from China, Japan, etc., to the tune of more than a million tons every year from 1929 onwards; and it was processed into a powder known as 'Edelsoya' which occupied little space and would keep for a long time. The bean was introduced as a crop in the Eastern European States of Bulgaria and Rumania, which were under the sphere of influence of Germany. The United States and U.S.S.R. have also been cultivating an increasing area under this wonder crop in recent years.

Ridicule was poured on such elaborate plans of war food programmes by popular English writers like G.D.H. Cole. But it seems to be more or less the programme that Britain has had to adopt during, and even prior, to this war. In fact the rumblings of another world war, which were heard since the Nazis came to power in 1933, altered radically the *laissez faire* attitude of Britain and led to the encouragement of the growing of more wheat, oats and barley and the raising of dairy cattle to the limit of the availability of fodder, of the growing of vegetables and quick growing fruits on allotments in town and country. By March 1942 the area of arable land had increased by 50 per cent and allotments by 100 per cent. Thanks to the import of wheat, butter, cheese, dried milk and eggs mostly from Canada to supplement home grown supplies, which

have nearly doubled, the weekly ration of an adult could be maintained at a high level even in the third year of the war: 1 to 1½ oz of meat, 8 oz of fat (including butter 2 oz, cheese 3 oz), 8 oz of sugar; 3 pints of milk (extra for children and invalids), 2 oz of tea, 4 oz of preserves (excluding honey), while bread and fish were not rationed and home produced food like vegetables, potatoes, eggs and honey did not count.

The problem of food supply in India was not considered serious or urgent until Japan entered the war just a year back. On the other hand the problem of how to dispose of the agricultural surplus—particularly jute, short-staple cotton and groundnut—engaged the attention of the authorities and the people concerned. It was when the perils of shipping over the Bay of Bengal increased that our serious deficiency in respect of the most important foodstuff, rice, was brought home. In normal years, India was supposed to be self-sufficient in respect of almost all foodstuffs but rice, of which she had to import 6 per cent of her requirements—mostly from Burma and to a small extent from Siam and Indo-China. Normally the production of wheat was just enough to meet the demand in the country, but this year the failure of the crop in certain provinces resulted in a deficit of 3 per cent. It is the scarcity of these two cereals that seems to worry the authorities more than that of other essential foodstuffs like grams and pulses, milk and ghee, oils and fats, vegetables and fruits, meat and eggs, which are noted 'protective foods'. It is in the production and consumption of the latter that there was always a marked deficiency in India, which has certainly been accentuated by the growing demand for troops both within the country and in the Middle East. This concentration on cereals is in striking contrast to the solicitude felt by foreign governments for the supply of their nationals of not one or two cereals, but a variety of protective foodstuffs. But this is also a measure of the purchasing power of masses of people in this country, who in the best of times had a very poor diet. There is no use crying for the ideal, the balanced diet, particularly for the civilian population at a critical time like this, while even in normal times mere lip sympathy was paid to the idea and no serious action was taken. The immediate aim of the Government is naturally to keep the civilian population contented, if not happy, and to help them secure the bare necessities of life according to their low,

but time-honoured, standard. The Government is perhaps anxious to avoid the rationing of rice, even as the rationing of bread was put off to the last by the British Government in the last war. But the sudden stoppage of import of rice from Burma, Siam, Indo-China, the three greatest exporters of rice which are all in the hands of Japan now, has left no other alternative to provinces and states with a heavy deficit of rice than to think of rationing, the incipient forms of which are already noticeable in certain Indian States and parts of British India and Ceylon.

It might be possible to import wheat from Australia and New Zealand into India, not only for the troops stationed in India but also for the civilian population, if only the Government were prepared to take some risks on the sea. It has been estimated in England that a shipload of wheat could feed 40,000 people for an year at a stretch. Perhaps more could be fed in India. It is, however, rice that seems to give the greatest trouble; for there is no country in the possession of the United Nations which has any considerable quantity of surplus rice to export. The biggest areas under rice are found in Bengal, Bihar and Madras; but all of them are deficit provinces in respect of rice because of their dense population. Central Provinces, Sind and Orissa have each a small surplus, of about 2 lakhs of tons of rice in a normal year, which is hardly sufficient to meet the deficit in the neighbouring provinces and states. It is, therefore, imperative to increase the supply of rice, particularly in South India, where not only Madras but Mysore and even more Travancore and Cochin want rice very badly, as rice is the staple diet in most parts of South India. Ceylon too had long been importing rice from Madras, though latterly she had shown a preference for Burma rice. Now that this supply has been cut off, she looks to her old supplier, and the Government of India has promised help. The failure of the monsoon this year in several parts of Madras, Bengal and Bombay has worsened the situation. Some normally surplus districts like Chingleput in Madras, have become deficit districts, and there is no compensating increase over normal reported, except in Orissa and Sind, which are too far away from consuming centres in South India.

The campaign to 'Grow more food' began rather too late in our country and it is not easy, at any rate it is too early now, to know the results of that campaign. What the harvests will be and whe-

ther it is possible to assess accurately the total quantity harvested and the stock on hand in a country so wide and with cultivation carried on on such a small scale need not be discussed here. This is always difficult, but particularly so when the fear of shortage and the threat of price-control and rationing are likely to drive stocks, old and new, underground. When supplies were suddenly and unexpectedly cut off, all efforts should have been concentrated, in the first instance, not on long-range measures which are counsels of perfection, but on short-range measures likely to bring about an increase as quickly as possible.

Among the facilities extended by the Government of Madras to cultivators to grow more food crops a prominent place has been given to the assignment of cultivable waste lands, unoccupied, with some concessions in respect of the dry assessment, the supply of water where there is scope for irrigation and loans for the cultivation of lands which would be kept fallow otherwise. One of the great mysteries behind the official agricultural statistics of India is the extent of so called cultivable wastes, the figures of which are derived after deducting the acreage under other classes of land, doubtful in themselves, from the total area. The high proportion of the area under cultivable wastes to the area under cultivation is so abnormal in an old and populous country that grave doubts have been expressed by the Royal Commission on Agriculture and other authorities of the real nature and extent of these wastes. Off-hand opinions of revenue officers, big and small, with no expert knowledge of agriculture have been decisive factors in this classification. An expert committee should have been appointed to examine the physical texture and chemical composition of the soil and facilities for drainage and irrigation available as regards the more accessible of these cultivable wastes and encourage their cultivation by all means—particularly by helping to break up the land if necessary by tractors, as has been done in western countries, and nearer home by the Mysore Government in the Irwin canal area.

We have in this country nothing analogous to the grassland of England, which is a sort of reserve land which could be readily converted into arable land to grow wheat and other cereal crops or root crops. In the last four or five years, thanks to the subsidy of £2 per acre and the issue of hundreds of farm tractors and imple-

ments through the County War Agricultural Committees, more than six million acres of grassland in that county have reverted to tillage. We can expect no such spectacular results with the meagre assistance offered by the state in this country and in the absence of any obviously tillable land lying waste.

Even if some new land were brought under tillage, it is very doubtful if rice could be grown there; for it is a crop that thrives better on old, mellow land, enriched by organic manure and getting ample supply of water by rainfall or irrigation. Millets, such as ragi, cholam and cumbu might probably be better cultivated on such new land. So also in the case of land hitherto growing short staple cotton, millets might be substituted, though already they are grown in rotation.

Millets are said to be more nutritious than rice and provide bulkier fodder for cattle which could be preserved. The war is an opportunity to induce the cultivators to go back to millets from rice at least partially. Even the non-cultivating classes who have been habituated to rice might be induced to try millets, if they are malted and flavoured so as to make them more palatable and more easily digestible. Malting is said to have passed the experimental stage at the Agricultural Department, but it is a pity that it has not been taken up on a commercial scale as a private or co-operative enterprise.

More tapioca and maize might also be grown as a substitute for rice, though they are starchy foods and if eaten in excess maize produces pellagra. Tapioca was a standby in the past in the West Coast in years of scarcity, but the price of tapioca has shot up very high on account of its use as starch in the textile mills of India, which have no alternative supply at present. More pulses ought to be grown on dry land of South India, which can no longer look to imports from Burma or even arrivals from North India. They are badly needed to supplement the rice diet, especially for those who do not eat meat and cannot afford to go in for milk products. The possibilities of fisheries, coastal and inland, ought to be explored for the sake of millions of non-vegetarians who are too poor to buy meat. How far groundnut, which is very easily produced and for which the foreign market is closed, and which contains a lot of fat and proteins could be made into foods more easily digestible,

is a subject that ought to engage the urgent attention of experts on diet.

But when all is said and done, there is no use denying that the demand for rice to which people have been so long accustomed will still persist and the denial of it, or even rationing of it, will produce plenty of dissatisfaction in the country. So every effort possible should be directed to increase the acre-yield of rice on the existing land under rice even if more land, particularly irrigated land, cannot be brought under it, because of the equally, if not more, valuable crops like plantain or sugarcane grown on such land. It is notorious that our rice yield per acre, as well as per capita, is much lower than in China and Japan not to speak of Italy and Spain. Is there no way by which we can bring up the yield at least to the level which is necessary to make the country self-sufficient in respect of rice (which is only 6 per cent short of requirements)?

It is here that the work of the Agricultural Department done for several years now is naturally expected to tell most. The use of improved strains of paddy evolved after years of effort by the Department is bound to increase the yield, provided there is no lack of water or manure needed for the crop. But unfortunately only about six per cent of the land under rice is sown with improved seed. Neither enterprising business men nor agricultural graduates nor co-operative seed-farms have developed this business of seed-farming in the country. As for manures, the yield could be most quickly increased as in Japan by the use of chemical fertilizers, like sulphate of ammonia and phosphates. Indian production of these manures in spite of the fillip given by the war is still negligible, and the imports which had been steadily increasing before the war have practically stopped at present. Surely this is an opportunity to utilise completely the bone-meal and fish-meal and the oil-cakes available in the country, which were in the past exported largely to the detriment of the soil in the country. A vigorous drive to make use of all organic waste material as compost is an essential duty of the State. Improved implements and machinery have played little part in the cultivation of rice in India, thanks to the abundance of cheap labour available in the country and the need to produce fine tilth rather than deep ploughing in paddy land. Still the light iron ploughs and the common spade have gone

up in price by more than 200 per cent. There has been no attempt at control of price or an assured supply of these simple implements to cultivators, except perhaps in the Mysore State. In the deltaic areas where rice cultivation is concentrated, there may be a shortage of labour in the harvesting as well as sowing season, as it has been already felt in wheat areas in the Punjab, due to the recruiting of labour for war purposes. The Government of the United Kingdom had on the one hand taken steps to conserve enough agricultural labour and on the other, to assure labour on land minimum wages comparable with wages in industry.

Some of the measures suggested above may not be feasible of adoption in the immediate future. For the next crop, however, the Government should be more generous in its supply of water from all the river and tank works without detriment to its existing commitments. It can also encourage the construction and deepening of as many wells as possible and the installation of electric pumping of water, wherever power is available. Government may permit tank-beds to be ploughed up and sown with suitable crops leaving the necessary width of fallow margin to prevent the erosion of the foreshore. Next to the supply of water, what paddy requires is manure. All facilities necessary should be given to grow green manure plants on fields and to cart green leaves from forests in the neighbourhood. Oil-cakes should be conserved and no export permitted in any case; all that remains after feeding cattle should be applied to lands growing food crops. Every endeavour must be made to get chemical fertilisers, especially phosphates, from Australia or elsewhere even at some risk. Waste of manurial substances, especially cowdung, should be discouraged and penalised wherever possible.

It is not easy in this country for the State to enforce the carrying out of necessary repairs of wells, drains, etc., by owners of land and the efficient cultivation of the land by the owner or the tenant or have them done on the lines on which the Minister of Agriculture in Britain has been empowered to 'do any work on any land', through the War Agriculture County Committees and recover the cost from the parties. But we hope that the incentive of high prices will be a sufficient stimulus to bring under cultivation of rice and other essential food crops some at least of the cultivable wastes and

the land growing crops like short-staple cotton for which the market is shrinking. While, on the one hand, the Government must take steps to reduce the prices ruling at present in the interest of consumers, it must on the other hand guarantee, in addition to facilities suggested above, minimum prices for essential foodstuffs more than ample to cover the increased cost of cultivation for a period of two years after the end of the war. Without this assurance, which is by no means uncommon in the West, it is not easy to get an extension of the area under cultivation that involves any expensive improvements.

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Extracts from Periodicals

THE WINDS:

THEIR NAME IS LEGION

By

D. COMPTON-JAMES.

One-way traffic is no new invention. Before the advent of steam, the winds controlled sea traffic to a remarkable extent. Homer tells the now familiar story of how Odysseus was presented with a leathern bag in which all the unfavourable winds were imprisoned. Inquisitive sailors opened the bag with the result that the ship was driven back to port. This story has its counterpart in real life. Every year in the late summer, hundreds of sailing craft are held up at Tenedos an island at the Greek entrance to the Dardanelles. The persistent northerly winds make it impossible for sailing vessels to pass through the strait. These winds—called the *etesians*—blow annually for about six weeks, and during that period they make the Dardanelles a "one-way strait."

In various parts of the world, notably on the western coasts of Eire and Chile, there are harbours which become sealed to outgoing traffic when the wind blows from a certain direction.

There are hundreds of local winds and many of them exert a strong influence on the lives of mankind. Wind can make life very miserable. At Simonstown, in South Africa, there is often a strong wind which lifts small pebbles and pieces of gravel head high. In a province that lies on the border between Persia and Afghanistan there is a wind called the *bad-isad-o-bist-roz* (the wind of 120 days). The late Lord Curzon averred that this wind is the most vile and abominable one in the whole universe. It blows with appalling violence and little or no cessation from the beginning of June to the end of September.

Effect of Wind on Human System.

The physical discomfort experienced in a strong wind is caused by the increase of pressure. Weather experts express the strength

of a wind in terms of speed but they calculate this from its pressure. Personally, I think it would convey a better impression of the force of a wind to describe it in terms of pressure. An ordinary hurricane for instance exerts a pressure of forty pounds on every square foot of surface exposed to it. An average man exposed to its full force is subject to a total pressure of about four hundredweights. He cannot stand upright without hand-grips. The effect of continued wind-pressure on the human system is a sense of acute physical discomfort.

Perhaps the most regular winds of all are the trade winds, which blow all the year round north and south of a belt of low pressure at the equator. The "trades" are north-easterly in the northern hemisphere and south-easterly in the southern hemisphere. They have been used regularly by ships from time immemorial. They never fail.

The strongest winds are the hurricane and the tornado. These are regular in the sense that they occur at certain periods of the year, but they are essentially travelling cyclones or whirlwinds which may arise at any time within the period and travel anywhere within their zone. They are extremely destructive.

Of the periodic local winds, the one which blows with greatest force is the mistral. This wind is experienced over the whole of the north-east of the Mediterranean but it is most marked in the Rhone delta. It is a strong, dry wind usually accompanied by cloudless skies, brilliant sunshine, intense dryness and piercing cold. On occasions it develops into a wind of great violence. At times it has been strong enough to blow railway carriages from the track. There are spots in the Rhone Valley where the trees are permanently bent, almost horizontal, by the force of the wind.

Similar to the mistral is the gregale—or Greek wind—of Malta. Like the mistral, it is periodic rather than seasonal, and it attains a considerable degree of violence. This was the tempestuous wind which brought shipwreck to St. Paul but in those days its name was euroclydon, not gregale.

Warm winds are numerous. The foehn of the Alpine regions comes regularly every year and is notable for the speed with which it melts the snow: in Switzerland they

call it the *Schneefresser*, or the snow-eater. There is a similar wind, locally known as the chinook, which blows over the Eastern Rocky Mountains and performs the same function of making the snow vanish. The foehn is not only warm but also extremely dry. It has the reputation of turning woodwork to tinder, hence the dreaded "Foehn fires" which often reduce Swiss villages to ashes.

"DOCTOR" WINDS

In hot countries, cool winds are often called "the doctor" because of their valuable effect on health. This nickname is given to the harmattan, a dry and somewhat dusty wind of the west coast of Africa. Although not actually cool by temperate standards, it promotes evaporation and brings a sense of relief from the oppressive moist heat of the coast.

Another dusty wind is the khamsin of Egypt, so-called because it is supposed to last for fifty days. It is a southerly wind which makes its appearance in late Spring and causes a certain amount of discomfort by its very grittiness.

The same wind, or extensions of it, is variously called leveche, simoom, and sirocco, according to locality. The leveche is a hot dry wind experienced along the south-east coast of Spain. The simoom is confined to Arabia and the Sahara. The most common name is sirocco, which although used specifically to denote the hot, dry, wind of Sicily and Southern Italy, is in general use on the Mediterranean seaboard for any warm, southerly wind.

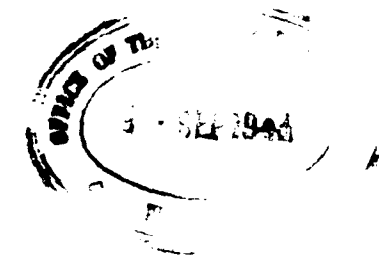
The leveche is sometimes confused with both the levanter and the leste, but both are quite different winds. The levanter, also called the solano, is a strong easterly wind of the Mediterranean which attains maximum force in the Straits of Gibraltar where it brings damp and foggy weather. The leste is peculiar to Madeira. It is a hot dusty wind resembling the leveche, which may strike the island at any season except in the summer.

The bora is an Adriatic version of the French mistral. It blows from a cold mountainous interior towards a warmer coastal region where it appears as a cold wind. The name is derived from Boreas, North Wind of Greek mythology. A moderate bora is termed a "borina" and a strong one is called a "boraccia."

The world's wettest wind is the south-west monsoon of India. This is not a violent wind but there is a period of stormy weather known as the "burst of the monsoon". Other monsoons occur in the Arabian sea, in Mississippi, Northern Australia, and East Central Africa. These winds blow for about six months from the north-east and then six months from the south-west. They are not associated with rainfall except in India, where the term monsoon now means the rainy season.

Nearly every wind that blows with any pretence at regularity has its special name. In thousands of localities the fall of evening brings a cool breeze from the hills. Many of these little winds have special names. For instance, near the town of Lyons in France, a nocturnal breeze blows down the valley. It is called the pontias and legend has it that the wind was carried in a glove from a distant sea for the purpose of improving the climate. The alleged performer of this miracle was the Archbishop St. Caesarius of Arles. A full-sized book has been written about the pontias or rather about the pros and cons of the legend, but even in the credulous year of 1647 the learned author could not quite bring himself to believe that a wind may be imprisoned in a glove, however pontifical the garment.

—The Hindu.



Brazil and Her Progress

By

FRANK LONGWORTH

Brazil may within the next quarter of a century have become the greatest manufacturing and exporting country in the world. It is a staggering announcement, but the fact was impressed on the British Mission which, under the leadership of Lord Willingdon, toured the South American continent. The country is one which in the past we have been inclined to dismiss with a shrug of the shoulders as merely somewhere on the other side of the Atlantic, but not of very great importance. There could be no greater mistake.

The size of Brazil alone demands attention. It is slightly larger than the United States, covers a greater area than the whole of Australia, is more than twice as big as the European part of Russia, and four times as large as India. To carry the comparison to its extreme, Brazil is more than sixty times as large as Great Britain. Yet there has been some justification for the old idea. Until the last two or three years, Brazil has been merely a producer of raw materials. Now she is definitely entering the manufacturing stage. In 1939 her Government boldly embarked on a "Five Year Plan", under which every incentive was to be given to the development of industry.

Brazil had the raw materials. She was sending them to Great Britain, to the United States, Germany and Japan, to be turned into manufactured articles, and then re-imported. It was bad economics. Brazil realised this, and came to the wise decision, from her point of view, that it would be far more profitable to create her own factories and workshops, manufacture marketable goods and export them. Accordingly, her Government agreed to spend £10,000,000 a year for five years on the establishment of basic industries, such

as iron and steel, cotton and rubber. Hitherto she has been exporting rather more than £42,000,000 worth of raw materials every year, and buying back about £40,000,000 of manufactured articles.

Recently Brazil has altered her policy. She has continued to send abroad considerable quantities of cotton, rubber and other products, but has been converting others into manufactured goods. Instead of her usual import she has been buying machinery, rolling stock and motor cars. Now she looks forward to the day when she will be almost entirely self-supporting, both in raw materials and finished products. The war has certainly proved of the greatest assistance. Normally Brazil imported something like £4,000,000 worth of merchandise from Great Britain, and another £9,000,000 worth from Germany. In the last eighteen months she has been able to obtain practically nothing from the latter country, while purchases from Britain have also had to be curtailed owing to our ships being engaged on more important duties.

Brazil is admirably situated to become a great manufacturing country. It is estimated that more than two-fifth of the world's supply of iron lies in her soil; she grows more cotton than any other country except the United States and India; only the Malay States exceed her production of rubber: while it is confidently stated that there is more timber in Brazil than in the whole of Europe. In fact there are few commodities which Brazil does not possess in large quantities.

It is, of course, not only in raw materials suitable for manufacture that Brazil excels. She leads the world in the production of many articles of food. More than three-quarters of the world's coffee is grown in Brazil; she is the second largest grower of cocoa, and one of the three leading producers of sugar. It is the same with fruit. More than one-quarter of the world's oranges are exported from Brazil, and almost the same proportion of bananas. The same applies to minerals. Apart from iron ore, she has enormous deposits of copper, tin, gold, silver and lead. Until recently it was thought that the country was short of both coal and oil, but Brazil

has proved the error of this. Large sources of supply of both items have recently been discovered. Moreover when it comes to a matter of power, Brazil is in the fortunate position of being served by the mightiest of rivers, which will make electricity for next to nothing.

Until a few years ago the foreigner was attempting to exploit Brazil, Great Britain took little part, wisely deciding to concentrate on her own Empire. On the other hand, both Germany and Japan, and to a smaller extent Italy, were of the opinion that it was profitable soil, and there was considerable immigration from all three countries. Recently, however, a new Government has decided that it must be a case of Brazil for the Brazilians, and have imposed very strict immigration laws and quotas. They intend to develop their resources and their markets. Within the next few years they will be doughty opponents, but they will be clean fighters.

—The Hindu.

Sakhalin Island Shared by Russia and Japan

By

J. M. MICHAELSON

Tension between Russia and Japan draws attention to one of the least known frontiers dividing these nations, a line drawn along latitude 50 degrees N. across the island of Sakhalin. The south of this long narrow island just off the coast of Eastern Siberia belongs to Japan. The northern half of the island is part of the U.S.S.R., a much-prized "baby" which is never forgotten in any Soviet manifesto, although it is one of the most inhospitable inhabited regions in the world, Japanese ambitions certainly extend to the conquest of the Russian half of the island. Russia has probably not forgotten that for generations the whole island was part of her territory and that Japan obtained a footing only as a result of the Russo-Japanese War. In 1917, Japan took advantage of the Civil War in Russia to overrun the whole island and only surrendered the northern half again in 1925. The celebration of the 15th anniversary of Russian Sakhalin was carried out in 1940 with considerable significance.

What makes this 600 mile long island, which is frozen for five months in the year and swept by tremendous wind and rain in summer when it is not covered in fog, of such importance to Russia and Japan? The answer is not so much its position as its natural resources. These are not tremendous, but they are of vital importance where they occur. Japan depends upon Sakhalin for one-fourth of her oil supplies and much of her wood pulp and fertiliser. Russia obtains coal in limited quantities but of the greatest importance because it is her only source in many thousands of square miles. The island also flanks the naval port of Nikolaevsk. In establishing a line of communication between the U.S.S.R. and the U.S.A., Sakhalin aerodromes would occupy a vital position.

The emphasis laid on Sakhalin in the Five Year Plans, apparently out of proportion to the resources of the island, depends upon these factors as well as the general Soviet policy of developing to

the full every square mile of her vast territory. Men and machinery have been carried to this barren inhospitable land and prodigies performed. Recently it contributed 18.6 million roubles to the Soviet Defence fund and its collective farmers offered products valued at 1,000,000 roubles to the fund.

Russian interest in Sakhalin is comparatively recent. Until the more valuable half of the island was ceded to Japan by the Treaty of Portsmouth in 1905, Russia had used Sakhalin chiefly as a place of imprisonment and exile for the most dangerous political criminals. Many of those who set up the Soviet State had personal knowledge of Sakhalin's rigours. Until recent years the population of Russian Sakhalin was very small—about 12,000. The last census in 1939 gave it as 95,000, the great increase being due to immigration of mechanics, engineers and technicians of all kinds as well as farmers from the Eastern Siberia coastal regions well-accustomed to a rigorous climate. All work under tremendous handicaps, resulting from the climate.

The Russian half of Sakhalin consists of tundra-like country, with larche the predominating tree. The narrow water between the island and the mainland is regularly frozen over, so that navigation is impossible for some five months of the year. During summer, it remains very hazardous because of the gales and fogs. The harbour facilities of Alexandrovsk, the most notable port, remain poor.

THE JAPANESE HALF OF THE ISLAND

In contrast to this, the Japanese half of the island enjoys a rather milder climate and has an ice-free port at Maoka on the west coast. A warm current makes the west coast more habitable. The Japanese population has increased rapidly and was about 327,000 in 1937, giving a density of 20 per square mile compared with 2 per square mile in the northern half.

The arrangement over oil in the island is complex. The reserves are estimated at 100,000,000 tons, lying in a narrow belt close to the east coast. By the Treaty of Nikolaevsk in 1925, the Russians agreed to allow the Japanese to develop the oil fields in return for a 15 per cent royalty. Under the first five Year Plan petroleum engineers were brought from Baku and a considerable number of wells driven. The Second Five Year Plan called for an output of

800,000 tons a year, but it is thought that the actual output was considerably less.

The oil engineers work under tremendous handicaps. Tankers can be loaded only during four months of the year, which means that large supplies have to be stored at the wells. Periodically the winter is such that the wells themselves cannot be worked. There is the further difficulty that every piece of machinery and nearly all the needs of the workers have to be imported over difficult transport routes. Nevertheless, the Soviet considers the wells of paramount importance as the only known workable reserves of oil in the Far East.

The Japanese took about 300,000 tons of oil in 1940 and the industry is now under the direct control of the naval authorities. They frequently complain that Soviet labour and other regulations result in their output being limited and Japan has undoubtedly fostered this propaganda as an "excuse" for aggression when the moment is considered propitious.

Japanese Sakhalin is heavily timbered with coniferous trees and provides valuable wood pulp for her industries. The very considerable fisheries sent many thousands of tons of manure to Japan every month. The Soviet fisheries are also being developed as a collective enterprise. A valuable fish is a porpoise which gives a tough leather for footwear. Sakhalin contains valuable coal, which, in the Russian section outcrops conveniently near the sea. The mines have been developed under the Five Year Plans and provide not only heat and power for the island, but also a surplus for export to Vladivostok.

Normally, Sakhalin had good air communications with the mainland. Although much of the country is hilly and boggy, sites for aerodromes are not hard to find, but the heavy snows and frosts of winter and the gales and fogs of summer make flying a hazardous business.

—The Hindu.

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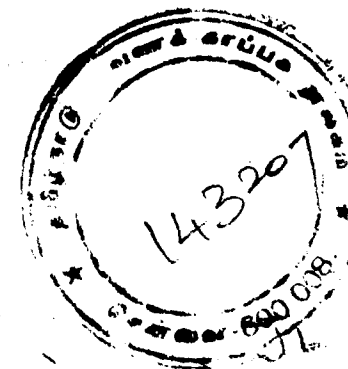
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