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Crop Planning Problems for Maximisation of Production in the Malampuzha Project Area (Malabar District)

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Malabar has been a deficit district in the matter of food even before the recent war. Rice, which is the staple food crop of the area, occupies 8·1% of the total extent and makes up 6·8% of the total normal output of the Madras State; and the district continues to depend on imported food grains. Within the district the southern zone grows 69·50% of the total area under paddy, while the Palghat taluk alone contributes 26·60% of the total production in the district. Vast stretches of fertile paddy lands exist in Palghat taluk in contiguous blocks. The soil is red loam in most parts, the rainfall is fairly well-distributed and the area is benefited by both the monsoons during normal years. The terrain is fairly plain in comparison with the rest of the district, and there is a well-knit system of roads touching all villages and the ryots are comparatively progressive and responsive to all major improvements. Owing to these natural advantages, all pioneering work on improvements recommended by the department, have been tried here.

In spite of these advantages, the vagaries of the season have been a severe handicap for any concerted localisation of effort to increase production, as the paddy crop here is entirely rainfed. The average annual rainfall is 80″ in normal years, distributed as 2″ during dry weather, 8″ during hot weather and 55″ during the South-West monsoon and 15″ during the North-East monsoon period. It is not uncommon in certain years, to have the annual precipitation as low as 48″, with practically no rains during January-April, with about 40″ during South-West Monsoon and 8″ during North-East Monsoon periods. Instances are also not rare when the annual rainfall is as high as 150 inches, with 100-115 inches during the South-West Monsoon and 25-40 inches during the North-East Monsoon period. The normal rainfall, if well distributed, is sufficient to aid the first and second crops of paddy.

The first crop, which occupies 58% of the total area under paddy in the taluk is generally broadcast during April-May and harvested during September-October. In order to cultivate a succeeding second crop and depending upon the supply of rain water, two major varieties, one long and another short are grown.

A second crop is raised on about 42% of the paddy area and this is invariably transplanted, Nurseries are raised in drylands by July-August and planting is done during September-October. Based on the availability of water and family rains, a longer and a slightly short duration varieties are raised.

When the dry and hot weather rains are weak, the South-West monsoon is strong, putting out of gear all the preparatory operations, including sowing. During years of heavy South-West monsoon rains, planting of second crop is affected, while, when the North-East Monsoon is weak, the entire second crop succumbs to drought. On the other hand the shorter crop may be caught up in rains, while in flower, if the North-East monsoon is abnormally heavy. During this season the rice bug also thrives well and concentrates on the short crop and affects grain-setting. Thus the entire paddy cultivation is a gamble with the monsoons.

Investigations were started as early as 1914, to harness the seasonal floods in the Malampuzha river, near Palghat, in order to save the first and second crop paddy, but these were subsequently given up, as the revenue aspect of the project was not considered to be quite attractive until in 1949, when the scheme was sanctioned as a Grow More Food measure. The project consists of a storage reservoir near Palghat with an initial capacity of 4,500 m. c. ft. and 6,000 to 8,000 m. c. ft. in the successive stages with a discharge capacity of 1,84,000 millions cusecs and 20 miles of main canals. Preliminary investigations by the Public Works Department reveal that the canals traverse through Elapulli, Palghat, Kollengode, Koyalmanna firkas and finally falls into the Gayathri river. The area commanded by the main canal is roughly all the wet ayacut to the west of itself upto Cochin State, Kalpathy and Bharatha rivers on the north and west and Gayathri river on the south and some dry area. The aim of the project is to stabilise 40,000 acres of single and double crop wet lands. Incidentally 7,000 acres of single crop wet lands will be converted into double, 11,000 acres of double into third crop and 6,000 acres dry lands will be converted into single crop wet lands.

The benefits of this project will be felt in 64 villages; 14 in Palghat, 2 in Elapulli, 9 in Alathur, 6 in Kollengode and 33 in Koyalmannam firkas, for an irrigable extent of 65,700 acres in the first instance and extension to about another 30,000 acres in the second and successive stages.

Although the scheme has been classified as unremunerative from the point of view of outturn on capital outlay, the utility of project is clear enough. After the completion of the first stage 25·9% of the existing single crop, and 31·75% of the double crop wet land will be stabilised and insured against the vagaries of the monsoons. Conversion of the existing single to double, double to third and dry to wet lands is possible by 14·75%, 13·75% and 9·4% respectively.

The tables below give a clear account of the distribution of benifits under each class in each firka. Stabilisation of the entire single and double crop lands is possible in Koyalmannam firka with conversion of half of the existing double to three-crop area and single to double crop area. Palghat comes next and Alathur and Kollengode, are benefited equally but to a lower degree.

Agronomic Problems of the Project Area: 1. The risk of deleterious after-effects of irrigation on soil does not exist as the soil is very open, and well-drained, and does not contain any harmful salts in the subsoil.

2. Canals and distributories may cut across the high level drylands, which form the major catchment area of the paddy flats in the uncommandable area reducing to a certain extent the bountiful supply of rain water. It is also a matter of engineering detail in the interest of the proper maintenance of the canals; of restoring supply of rain water to uncommanded tracts. The undulating terrain of the ayacut may present serious difficulties, and ryots would naturally be anxious that valuable lands not commanded and intercepted by the canals should not be left without sufficient water to mature the crop.

3. The project commands only 25% of the single crop and 31.57% of double-crop wet lands and still a lion's share will be dependent on the uncertain monsoons. It is here that a little crop planning, adjustment and alteration in the existing cropping practices are necessary, so as to ensure the maximum utilisation of water for the greatest advantage of the paddy crop of the taluk.

Adjustments in cropping: The first crop of paddy which is now broadcast between April and June may still succumb to the adverse seasonal conditions, if this practice is continued. Broadcasting in semi-dry conditions during April and May has to be given up in favour of transplanting between 1st and 15th of June. A medium-duration variety has to be chosen, nurseries raised between April-May and June and transplanting completed on receipt of monsoon early in June. These crops mature by August. Single crop lands can be followed by a green manure crop. The second crop should be so chosen, as to fit into a fairly long duration samba crop between September and January following a green manure crop for the summer. The third crop areas have an assured water supply and there is no problem arising out of this.

The adjustments in cropping will bring in its train a number of advantages and a few serious handicaps as well.

(a) *Nurseries for the first crop:* The canal water does not feed all villages and the entire area of commandable ayacut villages. Therefore it may not be possible to raise nurseries for the entire first crop individually. This calls for a co-operative effort on the part of the ryots to raise nurseries in groups of the ayacuts and distribute the seedlings to non-ayacutdars by June. There is a local practice of selling and buying seedlings, already prevalent among the ryots. This has to be coordinated, and organised by the timely intervention of the non-official agencies and the State.

In addition to rationalising the sowing and planting operations to ensure a good start of the crop, the seed rate for broadcasting (which is now 100—150 lbs. per acre) can be effectively reduced to 40 to 60 lbs per acre.

The preparatory cultivation of the first crop lands is at present far from satisfactory. Dry and hot weather ploughings depend on rains which are uncertain. The efficiency of the preparation of land for sowing is also very low, as the entire operation is hurried through to avail of the optimum moisture during April—May.

As a result of this perfunctory cultivation, the cost of weeding and removal of wild paddy and paddy stubbles of old crops, is very high. The first crop as it is, receives practically no green manure, as the crop is sown semi-dry. By adoption of transplanting for the first crop by June all these handicaps can be avoided during

preparatory cultivation, incorporation of green manure *in situ* is made possible and planting of healthy and robust seedlings is ensured for over 130,000 acres.

The problem reduces itself to this: (a) Raising of 13,000 acres of first crop nursery between April and June in 64 villages of the ayacut for distribution to the six firkas. Stabilisation of the single crop area is contemplated by the P. W. D. in about 18,800 acres; and it should be explored if water cannot be made available to raise 13,000 acres of nursery in the interests of the first crop.

There is a maximum potential of raising green manure crops in over 40,000 to 60,000 acres of irrigated land which might suffice for 130,000 acres of first crop.

The green manure crops to be sown on unirrigated single-crop lands and the present area under green manure crops, together with the forest resources available may be depended upon as a supplemental source for second crop paddy manuring.

(b) *Second crop: Nurseries:* Now seedlings are raised between July–August and September in dry lands to plant the second crop. Roughly 2 acres of dry land area are taken up to plant 5 acres of crop. This practice has to be altered to a quick and thin-grown wet nursery thereby relieving the heavy seed rate and releasing about 30,000 acres of dry land for cultivation of other crops during the main season. The area under dry land in this tract is only about 70,000 acres, other uncultivated land is about 22,000 acres and current fallows about 5,000 acres and these last two are 5·4%, 1·2% of the total extent of the taluk. Therefore adoption of a wet nursery will make available dry lands for extension of other crops that are more profitable than paddy.

(a) *Stabilising use of strains:* Improved strains are already popular but the seasonal failure of crops has been impeding to some extent the natural spread of these strains. This aspect of the Grow More Food efforts also will be improved over 60,000 acres of paddy crop.

(d) *Top-dressing with artificials:* The area is keenly manure-minded and the only handicap to the extension of this practice is the uncertain water supply which will now be overcome by

the project to at least 25–30% for the first crop and 35–40% for the second crop and an additional area of 12,000 acres for the third crop.

(e) *Rotation and introduction of other crops:* There is ample scope for the introduction of rotational crops like cotton, betel vine, short-term subsidiary food crops like sweet potato and tapioca. There will be a growing tendency to substitute more economic wet crops other than paddy and the State has to forestall this diversion from paddy, even now.

(f) *Piloting work on Agronomic problems:* Irrigation being entirely new to the tract, certain radical changes in the existing practices would be necessary, ensure the maximum utilisation of the project water. Some pilot demonstration work and extension by persuasion and legislation on specific problems may also be necessary. Fortunately, two minor private anicuts now exist, supplying 400 acres of land in Kadukkankunnu, Akathathara, Elapulli, provide an unsteady and inadequate supply of water to four other villages–Elapully, Pollpully, Thenari and Panayur. One of these areas can be selected for piloting and extension work on specific problems well in advance of the completion of the project.

1. Summary and conclusions: Palghat taluk which is one of the major paddy tracts of this deficit district Malabar is entirely dependent on the uncertain monsoons. Failure of crops is a frequent feature.

2. Harnessing of seasonal floods in the Malampuzha river was sanctioned only in 1949. This scheme was investigated as early as 1914 but was given up subsequently, owing to the unremunerative revenue outturn expected.

3. The estimated increase in production under stabilisation and conversion as per table VII is an estimate for revenue purposes and is very low. Malabar has a peculiar terrain and provision of one or two supplemental irrigations can save the crop and add to the production resources considerably.

4. The distribution of benefits within the ayacut is investigated firka-war, which throws light on the priority of areas for localisation of agricultural improvement in future. There are other jungle streams in the district, the harnessing of the seasonal

floods of which, can be utilised for maximisation of production. Although the revenue outturn on the ayacut may not warrant a huge capital outlay on these schemes, the principles in preliminary investigations, should have a greater bearing on the agricultural aspect of the ayacut and should be taken up by agricultural experts as well.

5. Irrigation is practically new to the tract and there are numerous handicaps in the existing cultural practices, in the way of effective utilisation of project water. Therefore certain major adjustments and alterations in practice are indicated.

6. The maximum potential under each altered or adjusted recommendation is indicated to throw light on the magnitude of problem.

7. When the project becomes a '*fait accompli*' several benefits will accrue to the ayacut, by way of efficient preparatory cultivation, optimum organic and artificial manuring, reduced seed rate, good start of the crop at planting, maintenance of pure paddy strains in addition to a release of 30,000 acres of dry lands for other crops.

3. The extension and enforcement of these practices has to be preceded by some pilot extension work in the area now commanded by the existing minor anicuts.

TABLE I

Area and production under paddy

Details	Madras State	Malabar District	Southern zone of Malabar	Palghat Taluk
Total area (Normal) in acres	10,774,620	8,75,000	6,07,718	2,12,000
% of Malabar to State	...	8,12	...	...
% South Malabar to District	...	...	69·45	...
% Palghat to District	...	...	...	26·60
Total outturn (Normal) in tons	72,63,470	4,91,300	3,79,825	1,32,500
% of Malabar to State	...	6·8	...	...
% South Malabar to District	...	...	70	...
% Palghat to District	...	...	...	26 60

TABLE II

Rainfall Data, (in inches) Palghat Taluk

Rainfall station	Year	Dry weather (Jan-March	Hot weather(Apl-May)	South-West Monsoon (June-Sept.)	North-East Monsoon (October Dec.)	Total annual rainfall
		Average (1870—1939)				
Palghat ...	...	1-48	7-54	57-77	13-2	80-00
Alathur ...	...	1-75	8-79	64-22	14-3(	89-12
Parli ...	...	1-60	9-09	68-21	18-0	96-95
		Maximum				
Palghat ...	1924	1-68	5-26	100-97	12-8	120-73
Alathur ...	1924	2-40	4-44	116-82	18-5	142-25
Parli ...	1924	2-31	8-82	115-20	22-7	149-11
		Minimum				
Palghat ...	1870	0-30	...	39-31	8-7	48-38
Alathur ...	1934	0-31	4-17	47-09	9-5	62-13
Parli ...	1928	1-05	3-03	47-06	8-06	60-10

TABLE III

Monthly sowing and harvesting (Percentage under Paddy)—Palghat Taluk:

Month	Sowing	Harvesting	Month	Sowing	Harvesting.
January	...	31	July	13	...
February	...	2	August	3	2
March	...	...	September	16	20
April	2	...	October	17	5
May	23	...	November	5	5
June	20	...	December	1	12

TABLE IV

Distribution of First and Second Crop Paddy—Palghat Taluk (Firka-war.)

Name of firka	Area under 1st crop paddy (in acres)	Area under 2nd crop paddy (in acres)	Single Crop land in each area (in acres)
Palghat ...	19,160	9,840	0,320
Parli ...	15 560	9,440	6,120
Elapulli ...	20,880	12,120	8,760
Kollengode ...	25,780	15,220	10,560
Koyalmannam ...	19,500	14,500	5,000
Alathur ...	29,000	21,000	8,000
Total ...	1,29,880	82,120	47,760

Total area under paddy in the taluk .... 2,12000 acres.

TABLE V

Distribution of Beneficial Effects of the Project (Firka-war)

Details of benefits	Palghat		Parli		Elapulli		Kollengode		Koyalmannam		Alathur		Total	
	Area in acres	% of benefit	Area in acres	% of benefit	Area in acres	% of benefit	Area in acres	% of benefit	Area in acres	% of benefit	Area in acres	% of benefit	Area in acres	% of benefit
1. Stabilisation of single crop wet lands ...	3,577	38·0	...	...	218	2·4	1,570	14·9	5,942	100	1,863	23·3	13,170	25·9
2. Stabilisation of double crop ...	5,024	51·0	...	...	234	2·4	3,387	22·2	14,528	100	4,276	20·3	27,509	31·75
3. Conversion of single to double crop ...	2,294	24·6	...	...	130	1·6	670	6·3	3,090	56·8	1,000	12·5	7,184	14·75
4. Conversion of double crop to third crop ...	2,077	24·1	...	...	155	1·3	836	5·5	6,980	48·1	1,324	6·30	11,372	13·75
5. Conversion of dry to wet land ...	702	...	...	...	42	...	245	...	4,753	...	723	...	6,465	9·40
Total ...	13,674	...	...	...	839	...	6,708	...	35,293	...	9,186	...	65,700	...

TABLE VI

Estimated increase in production per acre

1.	Stabilisation of single wet	12 paras (i.e., 180 lb.)
2.	Stabilisation of double wet	18 paras (i.e., 270 lb.)
3.	Converted single to double	42 paras (i.e., 630 lb.)
4.	Converted double to third	36 paras (i.e., 540 lb.)
5.	Converted dry to wet	36 paras (i.e., 540 lb.)