Agric. Econ. Res. Rev. Vol. 4 (2), 1991

INCOME AND EMPLOYMENT POTENTIALITIES OF PLANNED FINANCING OF VERY SMALL FARMS IN KERALA

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ABSTRACT

The paper examines the impact of farm planning and outside financing in the form of short term credit on agricultural incomes and employment even in the very small holdings in Kerala. The paper is based on a sample beneficiaries of a Regional Rural Bank in Kerala. Linear programming technique was employed to study the crop combinations in the existing farm plans and to see the possibility of improving the farm plans with existing capital as well as with larger quantum of capital. The analysis has revealed that net incomes of the borrower farms were uniformly higher than the non-borrower farms both in the existing plan as well as in the optimal plans reworked. It has also been shown that with better availability of credit, farm incomes and employment could be further increased if planned use of all resources takes place.

Agriculture in Kerala is characterized by certain peculiar features. The average size of holding is only 0.36 ha on account of pressure of population. As much as 91.53 per cent of the holdings are of less than 1 hectare. Almost 23.72 per cent of the gross area is under paddy. The bulk of the paddy land is wet land and is water logged for many months and hence is unsuitable for any other crop. In the garden land a variety of crops could be grown and most of these crops are higher valued in comparison to paddy. They also involve heavy expenditure on cultivation by way of inputs. Since the average size of holdings is very small, in the financing of such crop enterprises internal resources of the farms can make only meagre contribution. Outside finance often may not flow adequately on account of both internal as well as external capital rationing. Moreover, in order to get the full potentiality of additional financial resources, these will have to be used as a part of proper farm planning. This paper, which forms parts of a wider study on the performance of Regional Rural Banks in Kerala (Viswanathan, K.U. 1986), is intended to examine the impact of farm planning and outside financing in the form of short term credit on agricultural incomes and employment on the very small holdings in Kerala.

Methodology

The study is based on primary data collected from a sample of beneficiaries and non-beneficiaries in the area of operation of the South Malabar Gramin Bank.

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Primary data were generated through personal interview of a sample of borrowers of short-term loans and a sample of non-borrowers, the latter to serve as control. A well structured interview schedule was used for this purpose. The reference period was the year 1984-85.

Two stage random sampling method was adopted for the selection of beneficiaries. The first stage units were bank branches and the second stage units were the borrowing households. Sample size for crop loanees was 60 and for non-borrowers it was 30. The crop loanees were post–stratified into sub-groups according to the land area possessed by them such as Group I (0-0.04 ha), Group II (0.041-0.4 ha), Group III (0.41-1 ha) and Group IV (more than 1 ha). The distribution of the sample in each size group is given in Table I.

Table 1. Distribution of the sample in each size group

Size groups	Borrowers		Non-borrowers	
	No. of farms	percentage to total	No. of farms	percentage to total
I. (0—0.04 ha)	3	5.0	2	6.67
II. (0.041—0.40 ha)	31	51.7	12	40.00
III. (0.41 ha—1.0 ha)	18	30.0	14	46.66
IV. (1 ha and above)	8	13.3	2	6.67
Total	60	100.0	30	100.00

Linear programming technique was employed to study the crop combinations in the existing farm plan and to see the possibility of improving the existing farm plans with existing capital as well as with larger quantum of capital.

Linear programming is a planning technique that is helpful in decisions requiring a choice among a large number of alternatives. The programming procedure is designed to specify the farm plan which will yield maximum income given the restraints, prices and yields anticipated. As Singh (1977) has stated, in agriculture the main resource constraints may be different qualities of land, seasonal labour supply, animal and mechanical power, fertilizer and chemicals, finance, behavioural constraints such as consumption goal flexibility and adoption constraints and technological constraints. Here, on this study, the attempt was to arrive at optimum crop combinations on the sample farms of borrowers as well as non-borrowers and to compare these optimal plans with the existing crop mix.

Selection of activities

In order to develop optimum crop plans, it is necessary to identify activities which are technically feasible and suited to the study area Five crops almost wholly dominated the cropping pattern on the sample farms. These were paddy, coconut, arecanut, pepper and banana. Paddy was grown exclusively as single crop in the wet land available for each of the farms. A notable aspect in the cultivation of pepper and arecanut was that, they were raised as a single enterprise with respect to land utilization, with pepper vines trained on the arecanut palms. As such arecanut+pepper was considered in this study as a single enterprise.

Resource availability and constraints

After examining the resource position the following were identified as the limiting factors, viz., wet land, garden land, labour and capital. For the formulation of programme matrix, it is necessary to estimate the level of availability of each of these constraints. The average amounts of these resources used on the sample farms selected were taken as the level of resources available in the matrix.

(*i*) *Land* : Type of land available in the study area could be broadly classified as wet land and garden land. Wet land was exclusively used for the cultivation of paddy and therefore the average wet land available for the sample farm was directly estimated.

In the estimation of available garden land on the farms selected, the area occupied by young and non-bearing plants of crops had to be excluded. This is because while non-bearing plants entailed maintenance expenditure they did not add to the income of the farm. The programming was done for one year period assuming that all the activities included contribute to the income of the farm. This resulted in need to consider, primarily, the bearing plants among the perennial crops for estimating area occupied. The broad guidelines of spacing recommended by Kerala Agricultural University were used in estimating area subject to the existing total area and plant density. To this estimate area under banana, which could be directly recorded since it was raised as pure crop, was added to get the size of total available garden land for the sample farms.

(*ii*) *Labour* : During the survey it was observed that almost all the farmers used a mixture of family and hired labour for various operations on the farm and in majority of cases the use of hired labour was negligible. Therefore, the seasonal variations in the supply of labour was not considered as separate constraint levels. Separation of the family and hired components of labour that went into an operation was found to be difficult. Therefore no attempt was made to separate family and hired labour used on the farm.

Valuation of labour was done at rates paid out on the sample farms during the period of survey. In the technological matrix labour was accounted in man days. Standardization of female labour was done using the wage ratio of male and female labourers.

(*iii*) *Capital* : The amount of working capital utilized on the sample farms during the entire one year was taken as the restriction level. Items included under working capital were expenditure on seed material, fertilizer, organic manure, pesticides, labour charges and propping charges.

Input coefficients

The input coefficients of the technological matrix are resource requirements per unit of the activity. In the percent study the input coefficients were calculated by taking the average of a resource used for each activity in the sample farms and computing the quantity per unit of activity. Input coefficient for arecanut and pepper, which were taken together as one enterprise for programming were worked out separately. For those farms which actually grew arecanut and pepper as one enterprise, the total use of each resource was apportioned between arecanut and pepper according to the ratio of the value of their products on the particular farm.

Net margins

For stating the objective function, it is necessary to have the net margins or the net income per unit of activities. Calculation of net margins of activities with one year duration is relatively easy. First total variable costs for the activity on each farm was determined and deducted from the total returns. The net returns for the activity on each farm were added up and from this average net returns per unit of activity was worked out.

With regard to perennial crops, the variable costs incurred during an year represent only the maintenance expenditure. The net income for an year from an adult plant cannot be considered as the returns for that year alone, because a part of it is the returns to investments made earlier. Thus unlike annual crops, the problem of investment in perennial crops demand consideration in depth because of their longer economic life span and the fact that several years must lapse after planting before any returns are obtained from them.

The problem of net margins for perennial crops was solved in this study by calculating the average annual net present worth. George and Joseph (1973) have calculated average annual net present worth for coconut, rubber and oil palm. The distinct advantage of calculating average annual net present worth of perennial crops is that it facilitates comparison not only among perennial crops with different economic life spans, but also of returns between annual and perennial crops. In the persent study,

average annual net persent worths were calculated for each perennial crop activity separately, using the formula :

$$\text{Net present worth} = \sum_{i=1}^{n} \frac{R_i - Ci}{(1+r)^i} \text{ ; where}$$

n = Economic life period of the crop (40 years for coconut and arecanut and 20 years for pepper)

C_i = Gross costs in the ith year

R_i = Gross returns for the ith year

r = Discount rate (taken as 9% which was the interest rate for long term loans advanced for investments in perennial crops)

Method of analysis

The objective of the study was to determine the optimum combination of crops that would maximise net farm income subject to resource availability. Optimal crop combinations were worked out using linear programming technique for three farm size groups, viz., 0.04 ha to 0.4 ha, 0.41 ha to 1 ha and above 1 ha both among borrowers and non-borrowers. The first group of sample were agricultural labourers with a land holding of less than 10 cents. They were taking crop loans for cultivating banana on leased—in land. Therefore, this group was excluded from the programming for optimal plans. Here by the optimal plan we mean that crop combination which maximises the farm income with the existing resource constraints. The three groups of non-borrowers were then assumed to have borrowed a quantum of money equal to the average amount of borrowing by the corresponding group of borrowers and the optimal plans were re-worked. In other words, the capital constraint of the non-borrowers were relaxed to the extent of amount borrowed by the same size group of borrowers. Similarly, optimal plans were also re-worked for the borrowers by increasing their capital availability to the extent of 25 per cent and 50 per cent of existing levels.

Results

The results of the study are presented size groupwise. Table 2 to 4 show the existing and optimum crop combinations for each of the size groups. It can be seen

that in existing plan the net income of borrowers were uniformly higher than that of non-borrowers, though substantial increase was found only in the highest size holdings. In can also be seen that net margins in the optimal plans are uniformly higher in all the size groups of borrowers as well as non-borrowers.

Table 2. Existing and optimum crop mix for size group 0.04 ha to 0.4 ha (average garden land 0.21 ha. per farm for borrowers and 0.23 ha per farm for non borrowers)

Items	Areas in hectares of paddy or number of plants of other crops			
	Existing plan	Optimal plan	Optimal plan with 25% increase in capital	Optimal plan with 50% increase in capital
Borrowers (31 no.)				
Paddy (Ha)	0.06	—	—	—
Coconut (no.)	16	28	22	150
Banana (no.)	100	125	200	250
Arecanut+Pepper (no.)	25	—	—	—
Net margin (Rs.)	3050	4395 (44.09)	4730 (55.08)	5066 (160.09)
Non-borrowers (12 no.)				Optimal plan with borrowing
Coconut (no.)	18	21		7
Banana (no.)	60	100		300
Arecanut+Pepper (no.)	43	—		—
Net margin (Rs.)	2796	2896 (5.46)		4193 (52.69)

Figures in parenthesis are percentage change over existing plan.

In the size group II, the net margin of the borrowers increased from Rs. 3,050 to Rs. 4,395 (44.09 per cent) in the optimal plan at the existing level of borrowing. As far as non-borrowers were concerned by mere re-allocation of the existing resources, they could improve their net margin only by 5.45 per cent. But assuming they could borrow an amount of money as much as the borrowers in this group could

borrow, the optimal plan worked out showed a remarkable improvement in the net margin by 52.69 per cent more than the existing plan.

In the size group III the borrowers could increase their net margin from Rs. 4,956 to Rs. 10,513 (112.12 per cent) by reallocation of the existing resources. The margin of the non-borrowers has been shown to increase by 113.85 per cent in the optimal plan without borrowing. With borrowing (as stated above) their net margins would increase by 160.68 per cent over the existing plan.

Table 3. Existing and optimum crop mix for size group 0.4 to 1 ha. (average garden land 0.52 ha. per farm for borrowers and 0.59 ha. per farm for non borrowers)

Items	Area in hectares of paddy or number of plants of other crops			
	Existing plan	Optional plan	Optional plan with 25% increase in capital	Optimal plan with 50% increase in capital
Borrowers (18 no.)				
Paddy (ha.)	0.23	—	—	—
Coconut (no.)	25	68	59	52
Banana (no.)	175	325	450	550
Arecanut+Pepper (no.)	160	—	—	—
Net margin (Rs)	4956	10513 (112.12)	11095 (123.87)	11667 (135.41)
Non-borrowers (14 no.)				
				Optimal plan with borrowing
Paddy (ha)	0.43	—		0.21
Coconut (no.)	28	30		—
Banana (no.)	115	725		1150
Arecanut+Pepper (no.)	130	—		—
Net margin (Rs.)	4828	10359 (113.85)		12586 (160.68)

Figures in parenthesis are percentage change over existing plan.

In the largest size group (above 1 ha) the net margin of the optimal plan showed a rise by 214.07 per cent, from Rs. 7,314 to Rs. 23,223 by just reallocating the existing resources. Non-borrowers of this group can also increase their net

margin from Rs. 5,394 to Rs. 14,757 (173.58 per cent) by reallocation of the existing resources. With borrowing their net margin from the optimal plan would increase by 239.02 per cent over the existing plan.

From the analysis it was found that garden land of all the groups of borrowers and non-borrowers was completely utilised while wet land was left unutilised except in the case of size group IV of the borrowers (Table 4). Wet land is highly crop specific to paddy on account of the prolonged water logged condition. One point noteworthy here is that in all the improved plans while the area under paddy was nil or lower, the number of plants of banana and coconut was increasing. In other words,

Table 4. Extsting and optimum crop mix for size group above 1 ha. (average garden land 1.34 ha. per farm for borrowers and 1.35 ha. per farm for non borrowers)

Items	Area in hectares of paddy or number of plants of other crops			
	Existing plan	Optimal plan	Optimal plan with 25% increase in capital	Optimal plan with 50% increase in capital
Borrowers (8 no.)				
Paddy (ha.)	0.48	0.26	0.48	0.48
Coconut (no.)	59	231	222	200
Banana (no.)	50	—	—	—
Arecanut+Pepper (no.)	150	—	65	220
Net margin (Rs.)	7394	23223 (214.07)	23829 (222.27)	24361 (229.41)
Non-borrowers (2 no.)				
				Optimal plan with borrowing
Paddy (ha)	0.65	—		—
Coconut (no.)	44	84		21
Banana (no.)	50	550		1450
Arecanut+Pepper (no.)	180	—		—
Net margin (Rs.)	5394	14757 (173.58)		18287 (239.02)

Figures in parentheses are percentage change over exising plan

resources other than land got allocated to other more remunerative crops like banana and coconut. Had the land restriction not been put separately as wet and garden land and had the land restriction been put as a single unit, the paddy area also might have got allocated to more remunerative crops of banana or coconut in the improved plans. Net margins worked out at increased levels of capital suggest that it is very much worth using more capital. It is to be concluded that from purely economic point of view there is a comparative advantage for the cultivation of perennial crops in Kerala. That is, the State is more endowed for the cultivation of perennial crops compared to paddy though it may have other consequences.

Capital, including borrowed funds, was also fully utilised in all the optimal plans. It appeared that the capital constraint was the reason for the non-utilization or under-utilization of wet land. It was therefore, decided to relax the capital constraint by assuming 25 per cent increase in borrowing. Here also the results showed that there was very little improvement in the utilization of wet land. In view of this, capital constraint was further relaxed to allow for 50 per cent increase in capital use from the existing level. Here again, though there was possibility of further increase in net margins, wet land remained unutilized in all but the largest size group.

In the analysis it was assumed that labour was available as per requirement. In other words the labour constraint was relaxed infinitely. Assuming such an unlimited availability of labour, the increase in labour requirement in the improved plans was worked out and the results are given in Table 5.

In the optimal plans worked out with the existing resources, labour requirement was within the used limits in the existing plan. But with an assumed increase in capital by 25 per cent, the labour use increased by 1.17 per cent, 14.1 per cent and 1.63 per cent respectively in the size group II, III and IV of the borrowers. When the capital was increased by 50 per cent, labour use increased correspondingly by 19.80 per cent, 32.02 per cent and 2.29 per cent. The increase in labour use was more remarkable in the case of optimal plan of non-borrowers. In the optimal plans with borrowing of the non-borrowers, labour use increased from 11.58 man days to 21.11 man days (82.29 per cent) for size group 0.04 ha to 0.4 ha, from 46.69 mandays to 104.50 mandays (123.80 per cent) for size group 0.4 ha to 1 ha and from 37.95 man days to 114.63 mandays (202.05 per cent) for size group above 1 ha. In a State like Kerala where the industrial employment opportunities are scarce and where lot of unemployment and under employment exist, creation of more mandays of employment in the agricultural sector as a part of improving farm plan with the help of credit is very desirable.

Table 5. Resources not utilized in the optimal plans

Categories	Resources	
	Wet land (ha.)	Labour (Mandays)
Borrowers		
0.04—0.4 ha.	0.06	5.69
	(0.06)	(21.26)
0.41 to 1 ha.	0.23	3.35
	(0.23)	(40.40)
Above 1 ha.	0.22	11.97
	(0.48)	(72.73)
Non-borrowers		
0.04—0.4 ha.	—	1.76
		(11.58)
0.41—1 ha.	0.43	—16.85
	(0.43)	(46.69)
Above 1 ha.	0.65	—18.26
	(0.65)	(37.95)

Figures in parentheses are available wet land and labour for that size group.

Notes : (1) Garden land and capital got completely utilized in all size groups of borrowers and non-borrowers.

(2) Negative figures under labour column indicate the excess number of mandays utilized in the optimal plans. This was arrived at by deducting the labour requirement in the optimal plans from the labour available for the respective size groups.

Conclusion and Policy Implications

The average size of holdings in Kerala is very low. Size of holdings is considered as a major factor limiting agricultural incomes and employment in the State. However, it has been shown that there are possibilities of increasing income with better crop planning at the existing level of resources. It has also been shown that with better availability of credit, farm incomes and employment could be further increased if planned use of all resources takes place. If this has to happen, agricultural credit must become development oriented rather than mere targed oriented. In Kerala where there exists an office of the State Department of Agriculture in every

panchayat, it will not be difficuult to achieve the needed development orientation in agricultural financing with better co-ordination between the governmental agencies and the financing institutions.

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