Research Paper | **Management**

Analysis on Cost & Returns with Special Reference to Paddy Cultivation, Thiruvarur District - Tamil Nadu

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ABSTRACT

This study aims at an analysis of the Cost-Returns structure of paddy cultivation in the study area – Thiruvarur District and characteristics & Cost and returns for the paddy cultivation of the sample farmers (large and small farmers, according to their land holdings) are ascertained. Proportionate random sampling technique was adopted for the accuracy of the study. The structural differences between small and large farmers were tested by using Chow's F-test. The behaviour of prices and arrivals of paddy was analyzed by computing ratio to moving average method and Residual Method

The results revealed the importance of cost and returns in the chain of production that starts with the producer and ends with the consumer. The study has also elucidate fruitful suggestions for the betterment of the farmers, to encourage Government machinery and to educate themselves on maximum productivity avoiding wastage and other irrelevant aspects of paddy production in Thiruvarur District , TamilNadu.

KEYWORDS : Farmers, land, holdings, yield, cost, returns, input, output, variables, productivity, Tiruvarur.

PRELUDE

Agriculture is very important among all economic activities in countries like India. Of the many kinds of food grain available, paddy (rice) is the most important one, especially in countries like India. Hence, a place of supreme importance has been given to the acceleration and growth and marketing of paddy cultivation during the plan periods. This is precisely the reason why the production and marketing of paddy has turned out to be a veritable avenue of research for both explorative and innovative thinkers in recent years.

STATEMENT OF THE PROBLEM

Paddy is an important food crop and it has greater economic importance among the food crops, since it is one of the leading commodities in agricultural exports. Hence, the production performance of the crop is of critical importance in improving the efficient use of resources.

The market imperfection and the consequent loss in marketing efficiency are more pronounced in markets for perishable commodities which require quick transportation and better storage facilities, involving large number of intermediaries who take away high margins from the price paid by consumers. Paddy has a pride not only for its diverse uses but also for its special preference by consumers - rich and poor, while it is also subjected to the above stated production and marketing problems. Hence, the present study is an attempt to analyze the above said issues in marketing of paddy in Thiruvarur district.

CONCEPT USED

Production of any output is a result of prudent and efficient utilization of different quantities of inputs. Cost of production is defined, as the sum total of costs of all inputs that aided production and farmers' profit is dependent on the cost of production.

Cost of production in general comprises four concepts namely, Cost A1, Cost A2, Cost B and Cost C. Various authors have defined these four concepts differently. The Directorate of Economics and Statistics used this concept in many of the cost of production studies and farm management studies and they are discussed below

Cost A1 – it approximates the actual expenditure incurred in cash and kind. It includes value of used human labour, value of bullock labour (owned and hired), machine labour, value of seeds, manures and fertilizers, plant protection chemicals, irrigation charges, land revenue and cess, water rates, interest paid on working capital and depreciation on implements, machinery and farm buildings.

Cost A2 – it comprises cost A1 plus rent paid for leased land.

Cost B – it includes cost A2 plus rental value of owned land plus interest on fixed capital excluding land.

Cost C – it includes cost B plus imputed value of family labour.

OBJECTIVES OF THE STUDY

To estimate the cost and returns structure of paddy cultivation for small and large farms To analyze the resource productivity and to examine the resource-use efficiency of different factor inputs used in paddy cultivation To find out the views, opinions and problems of paddy cultivators and To suggest a few measures to make paddy cultivation more productive and profitable in Thiruvarur district.

RESEARCH METHODOLOGY

Study Area

The area chosen for the present study is Thiruvarur district, situated at the southernmost tip of Tamil Nadu. Eighty three per cent of its population is residing in villages and 58.8 per cent of its working population is anchored in agriculture and its allied activities. This district stands first in area under cultivation and third in production of paddy among the districts in Tamil Nadu.

Sampling Procedure

Multistage Stratified Random Sampling Technique has been adopted for the study, taking Thiruvarur district as the universe, the block as the stratum, the village as the primary unit and paddy cultivators as the ultimate unit.

Among 10 blocks of Thiruvarur three blocks were selected (Thiruvarur, Thiruthuraipoondi and Needamangalam) and five villages in each block were selected, which account for the highest area under paddy cultivation as the study unit for primary data collection.

In order to analyze the marketing costs, marketing margins and price spread, 30 intermediaries, 10 in each category namely village traders, commission agents, wholesalers and retailers were randomly selected. The selected respondents were contacted individually and required information was collected from them. The Sample consists of 600 farmers who have been classified as small and large farmers according to their land holdings. Proportionate random sampling technique was adopted.

COLLECTION OF DATA

Primary data was collected based on questionnaire prepared for direct interaction with the sample farmers covering all aspects of production relevant to cost and retunes and Secondary data were collected from Directorate of Economics and Statistics, Government of Tamil Nadu, Chennai, Office of Assistant Director of Economics and Statistics, Thiruvarur District, Office of The Thiruvarur District Market Committee, Thiruvarur and Office of the Joint Director of Agriculture, Thiruvarur.

TOOLS USED

In order to identify the key factors of marketing paddy in the study

area, a Multiple Linear Regression Model, Garrett's Ranking Technique, Shepherd's Formula, Acharya and Agarwal's Formula and Composite Index Methods were used.

ANALYSIS
Cost and returns
An attempt has been made in this section to analyze the collected data with reference to cost and returns including various components of cost relating to two groups of farmers - small and large. In the present study, Cost C, comprising Cost A plus rent on land and interest on fixed capital has been used to analyze the cost structure.

Input – Output Structure
The input-output structure per acre of paddy cultivation for small and large farmers is presented in Table

INPUT-OUTPUT STRUCTURE AT MEAN LEVELS OF PADDY CULTIVATION FOR SMALL AND LARGE FARMERS

Particulars	Small Farmers	Large Farmers	t–value
Yield per acre (in Kg.)	2419.25	2274.55	3.99*
Human Labour (in Rs. per acre)	4066.91	4466.16	5.36*
Bullock Labour (in Rs. per acre)	839.93	739.15	1.29
Chemical Fertilizers (in Rs. per acre)	2799.11	2969.61	4.91*
Farm yard manure (in Rs. per acre)	956.15	926.15	1.11
Pesticides (in Rs. per acre)	683.14	569.21	1.29
Irrigation (in Rs. per acre)	1013.21	1199.73	1.71
Seed (in Rs. per acre)	1039.61	966.39	1.81
Sample Size	416	184	?

*The difference is significant at the 5 per cent level

Source: Survey Data.

It is observed from Table that yield per acre under small farmers was 2419.23 kgs., and under large farmers 2274.55 kgs. The difference in yield between small and large farmers was found to be 144.70 kgs., and this difference was statistically significant at the 5 per cent level. Apart from yield, the other variable inputs namely human labour and chemical fertilizers were found to be significantly different between small and large farmers. The amount spent on human labour and chemical fertilizer by small farmers was Rs.4066.91 and Rs.2799.11 while it was Rs.4466.16 and Rs.2969.61 respectively in the case of large farmers. Small farmers employed Rs.839.93 worth of bullock pairs while it was Rs.739.15 in the case of large farmers. Small farmers applied Rs.956.15 worth of farm yard manure and the large farmers applied Rs.926.15 worth of farm yard manure. Regarding the pesticides and irrigation, small farmers spent about Rs.683.14 and Rs.1013.21 per acre while it was Rs.569.21 and Rs.1199.73 in the case of large farmers. The amount spent on the quantity of seed per acre by small and large farmers was Rs.1039.61 and Rs.966.39 respectively.

Cost Components
In agricultural operations, the cost of cultivation refers to the expenses incurred on the various inputs to obtain the final produce. In the present study, the cost has been categorised into Cost A (operational cost) and cost C (cost A plus fixed cost) which are considered for the analysis of cost structure, based on the general classification of cultivation costs into Cost A1, Cost A2, Cost B and Cost C in the farm management studies in India.

For the present study, the costs were estimated for the components taken for cultivation of paddy with respect to land, human labour, bullock labour, seed, farm yard manure, fertilizers & plant protection chemicals, land revenue, depreciation, irrigation, interest on fixed capital and interest on working capital.

Cost and Returns Structure
Cost and returns structure per acre for small and large farms producing paddy are furnished in Table

COST AND RETURNS STRUCTURE PER ACRE OF SMALL AND LARGE FARMERS CULTIVATING PADDY

Cost Components	Small Farmers		Large Farmers	
	in Rs.	Percentage	in Rs.	Percentage
Cost A Human Labour	2298.16	21.64	2461.16	22.35
Bullock Labour	466.26	4.40	411.25	3.74
Chemical Fertilizers	1621.15	14.82	1626.66	14.77
Pesticides	376.26	3.59	322.66	2.93
Seed	611.24	5.50	591.55	5.37
Farm Yard Manure	532.15	4.95	513.46	4.66
Irrigation	1264.16	11.05	1299.69	11.80
Interest on working capital	591.23	5.34	699.15	6.35
Harvest and Transportation	981.31	9.39	916.21	8.32
Total (Cost A)	8742.28	80.68	8841.79	80.31
Cost C (Cost A plus) Rent	1512.66	13.90	1469.69	13.34
Interest on Fixed Capital (Excluding land cost) plus land revenue, cess and taxes, depreciation of implements and machineries	569.21	5.42	698.65	6.35
Total (Cost C)	10833.15	100	11010.13	100
Yield (per acre in Kg.)	2419.25	--	2274.55	--
Yield (per acre in Rs.)	14621.56	--	14516.15	--
By products	388.66	--	429.16	--
Gross Returns (Rs.)	15010.22	--	14945.31	--
Net Returns (Rs.)	4177.07	--	3935.18	--

Source: Survey Data

Table reveals that small farmers obtained a yield of 2419.25 kgs. per acre, it's worth being Rs.14621.56 per acre. The gross returns realized including by-products was Rs.15010.22. The net income over the total cost (Cost C) turns out to be Rs.4177.07 per acre.

Out of the total cost of cultivation of Rs.10833.15, operating costs (Cost A) accounted for 80.70 per cent (Rs.8742.28) and fixed costs 19.30 per cent (Rs.2090.87). Among costs, expenditure on human labour formed the major input component and it was 21.21 per cent of the total cost. The chemical fertilizers assumed the second largest share (14.92 per cent) of total cost. It was followed by expenses on rent of land and irrigation. They constituted 14.05 per cent and 11.67 per cent of total cost respectively. Expenditure on seed, interest on working capital, interest on fixed capital, pesticides, farm yard manure, bullock labour and harvesting and transportation constituted nearly 5.64 per cent 5.46 per cent, 5.25 per cent, 3.47 per cent, 4.91 per cent, 4.30 per cent and 9.06 per cent of total cost respectively.

In the case of large farmers, yield obtained per acre was 2274.55 kg. and the gross returns realised were Rs.14945.31 with a net income of Rs.3935.18. The total cost (Cost C) incurred by them was Rs.11010.13. Operational costs formed 80.31 per cent of total cost while fixed costs constituted 19.69 per cent. The major constituent of total cost was human labour accounting for 22.35 per cent. It was followed by chemical fertilizer and it constituted 14.77 per cent of the total cost. The share of seed and rent on land in the total cost of cultivation was 5.37 per cent and 13.34 per cent respectively. The other items of expenses in order were farm yard manure (4.66 per cent), interest on working capital (6.35 per cent), interest on fixed capital (6.35 per cent), pesticides (2.93 per cent), irrigation (11.80 per cent) bullock labour (3.74 per cent) and harvesting and transportation (8.32 per cent). Except expenses on human labour and farm yard manure, expenditure on other inputs exhibited almost the same pattern in both cases. Human labour constituted the major cost component for both groups of farmers. It is to be noted that in spite of the higher cost of paddy production, the large farmers were getting lower yield and lesser net income than small farmers.

Thus, it may be inferred that the difference between two farmer

groups in terms of cost of human labour, farm yard manure and yield per acre emerged statistically significant.

Comparative Analysis of Cost and Returns for Small and Large Farmers

The comparative analysis of cost and returns per acre for small and large farmers is presented in table

COMPARATIVE ANALYSIS OF COST AND RETURNS PER ACRE OF PADDY CULTIVATION UNDER SMALL AND LARGE FARMERS

Particulars	Small Farmers	Large Farmers
Gross Returns	15010.22	14945.31
Total Operating Cost (Cost A)	8742.28	8819.79
Net Returns Over Cost A	6267.44	6103.53
Cost C	10833.15	11010.53
Net Return Over Cost C	4177.07	3935.18
Cost of Production per Kg. (Cost A)	3.50	3.87
Cost of Production per Kg. (Cost C)	4.34	4.80
Input-Output Ratio (Gross Return / Cost A)	1.72	1.69
Input-Output Ratio (Gross Return / Cost C)	1.39	1.36
Cost-Benefit Ratio (Net Return Over Cost C / Cost C)	0.39	0.36

Source: Computed Survey.

The details of cost of cultivation of paddy incurred by small and large farmer groups presented in Table , reveal that the input-output ratio in terms of operational cost and total cost was found to be Rs.1.72 and Rs.1.39 for the small farmer and Rs.1.69 and Rs.1.36 per acre for the large farmers. It showed that each rupee spent resulted in a benefit of Rs.0.39 for small farmers, likewise the benefit was worth Rs.0.36 for large farmers.

Thus, it may be clearly seen that the small farmers benefited more in terms of both yield and profit per acre. It reveals that this could be the outcome of the better economic and institutional position of small farmers compared to large farmers in the study area.

SUMMARY OF FINDINGS
The analysis has brought out synthetic and objective insight into the corresponding variables and come out with the following major findings.

The study has brought into limelight that the farmers are yet to optimize their rewards. Congenial conditions prevail and they could perform better if only certain essential facilities are provided and unproductive factors removed.

The size of operational holdings range from 0.5 acre to 4.6 acres with a mean 2.43 acres per farm in the case of small farmers, and 5.20 to 9.78 acres with a mean of 6.72 acres in the case of large farmers.

Regarding the cropping pattern, food crops like paddy, pulses, oil seeds such as groundnut and gingili and commercial crops like fruits, sugarcane and spices are raised. Paddy is the most predominately cultivated food crop in the district.

The input-output structure revealed that there is a significant variation in terms of yield in Kilograms per acre between the small and the large farmers. The yield per acre was 2419.25 kgs of paddy in the case of the small farmers and 2274.55 Kgs in the case of the large farmers. Hence, it is concluded that the small farmers produced higher yield than the large farmers.

With regard to the use of inputs, significant difference between the two groups of farmers was found in the case of human labour and chemical fertilizers. With regard to the use of other variable inputs namely bullock labour, farm yard manure, pesticides, irrigation and seed, the difference was only marginal.

Regarding the cost and returns structure, the analysis revealed that the small farmers received higher returns when compared to the large farmers per acre. The small farmers incurred low cost of production. They benefited by both physical and monetary terms of yield in paddy cultivation compared to the large farmers in the study area.

It is also observed from the analysis that except the expenditure on human labour and interest on working capital, other inputs exhibited the same pattern for both type of farmers. The analysis of cost-benefit ratio revealed that each rupee spent resulted in a benefit of Rs.0.39 in the case of the small farmers and Rs.0.36 in the case of the large farmers.

Therefore, it may be concluded from the analysis of cost and returns structure that the small farmers benefited more in terms of both yield and net returns per acre. The major reason for such trends seems to be that the small farmers concentrate with more care and caution than the large farmers in production and marketing.

The results of regression equation fitted to the different categories of farmers as well as to the pooled category have significantly explained that the variables influencing the gross returns of paddy were human labour, fertilizers, area under paddy and capital flows. Among these significant variables, human labour had a greater influence on the gross returns of paddy.

Further, the results indicated that the returns of paddy cultivators could be increased with a greater use of the aforesaid inputs. The regression model fitted was highly significant in all categories of farmers.

In order to examine the structural difference between the small and the large farmers, Chow's test was applied. The results revealed that there existed a structural difference between the two groups only at the slope level. At the slope level, variable factors like human labour and capital flow were responsible for the differences in the gross returns. At the intercept level, the co-efficient of dummy variable was not statistically significant. It implies that there was no difference with regard to technological change in both groups.

The working out of the ratios of marginal value products to their respective cost with respect to human labour, bullock labour, fertilizer and capital flows of the small farmers and human labour, bullock labour, fertilizers and capital flow in the case of the large farmers were greater than unity. It shows that farmers are rational in terms of their response to economic opportunities and make adjustments in resource-use. The presence of an excess marginal value product over respective factor cost indicates the unexploited economic margins in the cultivation of paddy. One may conclude that there is scope for increasing the use of such resource-inputs in paddy cultivation for both groups of farmers to maximise their returns.

The Garrett's ranking technique was applied to identify the factors affecting paddy cultivation and it was found that severity of diseases and pest attacks were the major hurdles for both the small and the large farmers in paddy cultivation in the study area. This makes it very necessary that the farmers cultivating paddy should adopt the required level of pest-control measures in their cultivation.

A FEW SUGGESTIONS
In the present study, the marginal value product is greater than the respective factor cost in the cultivation of paddy. There is existence of unexploited economic surplus and there is scope for effective utilisation of resources in the cultivation of paddy for both groups of farmers to maximise the yield of paddy. Hence, it is suggested that the Government of Tamil Nadu should direct the co-operation and support of the Tamil Nadu Agriculture University for creating awareness for the efficient use of resources in paddy cultivation. The government may arrange periodical seminars and training programmes in which farmers should be imparted adequate and improved training in paddy cultivation practices at regular intervals of time. Lack of awareness of such practices ultimately resulted in a low level of production and unjustified profit margins with respect to paddy.

The major problem encountered in the cultivation of paddy in the Thiruvarur district is severity of diseases and pests. It would, therefore, be necessary to evolve suitable arrangement for effectively controlling this menace by the Agricultural Development Officers leading to the effective application of appropriate pesticides and fungicides at the prescribed level at the right time.It is found that many farmers incur losses due to diseases which damage crops and the subsequent yield. Hence, the government should arrange for tacking pests and fungus that will go a long way in increasing the farm income.

The Government of Tamil Nadu should arrange more storage facilities accessible to farmers so as to encourage the farmers to store and sell their produce and use the pledge loan system at their convenience. Such measures and precautions would enable the farmers to obtain a fair price for their produce.

Agricultural Research with advanced tech support should be directed at evolving high yielding varieties of paddy by using new techniques such as genetic transformation, marker assisted selection, forecasting of pest epidemics, and promotion of hybrid and disease resistant varieties to meet the challenges under the new agricultural trading environment.

Improved crop management techniques may be imparted to the farmers by the extension agencies for effective cultivation. Essentially, it would be better if the paddy cultivators and dealers of Thiruvarur district are provided with better and more purposeful exposure to innovations.

A few short tours to popular agricultural pockets to nearby districts could be arranged by the agriculture department officers at regular intervals. Mutual interviews and interactions between Thiruvarur district farmers and other district farmers will enable them exchange ideas and clarify doubts to learn better methods of production and marketing.

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