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Cost and Returns of Chilly Cultivation in Ramnad District of Tamil Nadu

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Abstract
Chilly is one of the most important commercial crops occupies an area of 8.34 lakh hectares in India with production of 8.47 lakh tones. In Tamil Nadu the chilly was cultivated in 67.14 thousand hectares during 2007-08 leading to a production of 341 thousand tones. Ramnad district stood first both in area under chilly cultivation and production. The area, productivity and yield of chilly show wide variations from time to time. This affects the progress and prosperity of the chilly farmers which depend on the cost and returns structure of the crops raised by them. The present study endeavors to examine the cost and returns structure of chilly cultivation in Ramnad district of TamilNadu with the objectives of to analyze the cost and return structure of chilly cultivation, to examine the relative efficiently of inputs in the cultivation process of chilly and to study the inequalities in the net income per acre in the cultivation of chilly in Ramnad district. The regression coefficients of all the inputs are positive for production of chilly which indicates that there is great scope of increasing production of chilly by increasing the use of inputs. The MVP has been found greater than unity for seeds, fertilizers, insecticides and irrigation. This indicates that the added return at this level is higher than the additional cost incurred for the additional unit of land. The MVP of land preparation cost, labour and organic manure has lower than the unity which indicates that there is over expense on these inputs.
Key words: chilly cultivation, cost and returns, input efficiency, marginal value productivity

Introduction

Agriculture has always been back bone of the Indian Economy. Nearly 55 percent of the total population is engaged in agriculture. It provides employment to around 68 percent of the total work force in the country. Increase in agriculture production and productivity leads to increase in the income of the farmers. The significance of agriculture marketing has increased with the introduction of purely commercial crops in most of the villages. Chilly is one of the most important commercial crops occupies an area of 8.34 lakh hectares in India with production of 8.47 lakh tones. Andhra Pradesh, Karnataka, Orissa, Rajasthan and Tamil Nadu are the major chilly producing states in India contributes around 86 per cent of total area of chilly cultivation in the country and 90 per cent of the total Indian produce. In Tamil Nadu the chilly was cultivated in 67.14 thousand hectares during 2007-08 leading to a production of 341 thousand tones. Ramnad, Thoothukudi, Sivagangai and

Virudhunagar districts are the major chilly tracts of Tamil Nadu. Among these districts Ramnad stood first both in area under chilly cultivation and production.

Review of Literature

Nannapaneni, A.C and Broadway (1976) assessed the cost of production per quintal of chillies on small, medium and large farms as Rs. 449, Rs.509 and Rs.519 respectively. Further they revealed that out of all the costs, fertilizers ranked first followed by plant production. The input-output ratio was 1:1:94, 1:2:30 and 1:1:66 on small, medium and large farms respectively. Singh G.N., Kushwala R.K.S., and Rekhi R.S., (1983) in their study "Profitability of Chilly crop in Eastern Utter Pradesh" observed that the cost of the cultivation of chilly per hectare has an increasing trend with increase in size of farms. Madalia V.K. and Kudalia M.V. (1978) estimated that the cost of production of chilly was Rs.4400.50 per hectare. Further they pointed out that labour accounted for major share in the total amount of expenditure. Singh B.M.K. (1982) employed Multiple Regression Model for tomato, brinjal and chilly farms around Hyderabad and found out that there was a constant return to scale on all the vegetable farms. Vengateshwarlu U. (1977) employed Cobb- Douglas production function for green chilly farms of coastal belt of Andhra Pradesh. The results revealed that the regression co-efficient of manure and fertilizers was high and significant at 1 per cent level indicating scope for further use of this input. Naidu M.R. and Gupta S.P.L. (1983) computed resource use efficiency in chilly fallow in Prathipadu area of Prakasam District by employing Cobb-Douglas production function and found that the regression co-efficient for all the variables (land, human labour, manure and fertilizers) except motive power were significant. The sum of elasticities was found to be 1.073, which indicated that the operation of constant returns to scale. The MVP of human labour was higher than the marginal cost. The marginal productivities of land, manure and fertilizers were 4.5, 4.47 and 2.44 respectively. Nahatkar S.B. and Pant S.P. (1984) in their study found that area under chilly cultivation, plough unit (in days), expenditures on manures, fertilizers, irrigation and pesticides were the factors significantly influencing the gross income from chilly. Anwarual Huq A.S.M. (2010) in his study "Technical Efficiency of Chilly production", examined the level of technical efficiency of the chilly producing farmers and in Jamalpm district analyzed the status of resource allocation. He used Cobb-Douglas production function to estimate the level of technical efficiency. He found that on an average total cost of production and total cost of production per hectare of land were Rs.71,950 and Rs.78,950 respectively and the gross return was Rs.1,52,114 for cultivating chilly net return profit was Rs.73,164 from his study it is observed that human labour and irrigation costs were found to be highly significant and of seed was found significant. The co-efficient of fertilizers and pesticide cost was positive, but its impact was not significant.

He concluded that seed, human labour and irrigation cost were identified as important factors for increases of chilly production.

Significance of the Study

Chilly is considered as one of the commercial spice crops. Different varieties are cultivated for varied uses like vegetable, pickles, spice and condiments. In daily life, chilly is an integral and the most important ingredient in many different cuisines around the world as it adds pungency, taste, flavour and colour to the dishes. Indian chilly is considered to be world famous for two important commercial qualities its colour and pungency levels. A study of secondary data for the past few years and a review of previous literature show that there exists inter farm variation in the cost of cultivation and also in the returns and production of chilly. Further there was also considerable difference between the actual and potential yield of chilly implying that bridging the existing gap alone could contribute to the significant increase in the production of chilly in Tamil Nadu, with the existing area under chilly. The area, productivity and yield of chilly show wide variations from time to time. This affects the progress and prosperity of the chilly farmers which depend on the cost and returns structure of the crops raised by them. The present study endeavors to examine the cost and returns structure of chilly cultivation in Ramnad district of TamilNadu. Thus an empirical analysis of studying relative economic efficiency of farmers producing chillies would help in formulating policy to improve the cultivation of chilly in Ramnad district of TamilNadu. Hence, the present study is confined "Cost and returns of chilly cultivation in Ramnad district of Tamilnadu".

Objectives of the Study

1. To analyse the cost and return structure of chilly cultivation in Ramnad district.
2. To examine the relative efficiency of inputs in the cultivation process of chilly in Ramnad district.

Methodology

Ramnad district is one among the chilly producing districts inTamil Nadu and stood first both in area under cultivation and production. The district also recorded good productivity. Hence for the purpose of the present study Ramnad district has been chosen. Primary data has been used for the present study. The primary data has been collected through interview method by using well structured questionnaire. Ramnad district consist of 11 blocks namely Tiruvadanai, R.S.Mangalam, Paramakkudi, Bogalur, Nainarkoil, Kamudi, Mudukulathur, Kadaladi, Ramnad, Tiruppullani, Mandapam. Among the 11 blocks kamuthi block was purposively chosen for the present study since kamuthi is one of the major block cultivating chilly. In keeping view of the objectives of the study it was decided to study 150 samples from the chilly cultivators in kamuthi block.150 chilly cultivating framers were identified by using snow ball sampling technique. The field survey was carried out from December 2010 to June 2011.

Tools of Analysis

The first objective of the study is to analyse the cost and return structure of chilly cultivation in Ramnad district. For this the Cobb- Douglas production function has been fitted. The estimated production function was of the following from.

Ln Y = α0 + β1 ln x1 + β2 ln x2 +β3 ln x3 +β4 lnx4 +β5 ln x5 + β6 ln x6 + u

where,

Y = dependent variable (income per acre)

x1 = land preparation cost x2 = labour cost x3 = seed cost

x4 = organic manure cost x5 = Fertilizer cost x6 = insecticide cost

x7 = irrigation cost $\beta 0, \beta 1, \ldots\ldots\beta 7$ = parameters to be estimated.

MVPX1	Land preparation cost	= β1	$\frac{\overline{Y}}{\overline{X1}}$
MVPX2	Labour cost	= β2	$\frac{\overline{Y}}{\overline{X2}}$
MVPX3	Seed cost	= β3	$\frac{\overline{Y}}{\overline{X3}}$
MVPX4	Organicmanure cost	= β4	$\frac{\overline{Y}}{\overline{X4}}$
MVPX5	Fertilizers cost	= β5	$\frac{\overline{Y}}{\overline{X5}}$
MVPX6	Insecticide cost	= β6	$\frac{\overline{Y}}{\overline{X6}}$
MVPX7	Irrigation cost	= β7	$\frac{\overline{Y}}{\overline{X7}}$

The second objective of the present study is to examine the relative efficiency of inputs in the chilly cultivation process in Ramnad district. For this Marginal value productivity (MVP) of the inputs were calculated as the basic condition to be satisfied to obtain efficient resource use is the equality of marginal value productivity to factor cost. Since all the inputs and output are expressed in monetary terms in the present study, the acquisition cost of inputs is taken as one rupee. The criterion used to assess the resource allocation efficiency is to test the MVPs against unity.

In order to find out the value of economic efficiency at different inputs, the MVPs of inputs have been compared with the respective acquisition costs then the ratio (P) of

MVPs to marginal costs were calculated. For P=1, the use of given resources has been considered optimum, P>1 indicated that the employment of a given resource could be increased till P become equals to unity and on the other hand P<1 indicated that employment of a given resource should be decreased till it becomes unity.

Major findings of the study

i. Cost components of chilly cultivation

In agriculture operations, the cost of cultivation refers to the expenses incurred on the various inputs to obtain the final produce. In the present study cost has been categorized as preparation of land cost, labour cost, seed, organic manure, fertilizer, insecticide and irrigation. Cost of production of chilly is calculated based on the following assumptions. The cost of human labour was calculated at the price of Rs.80 per man day which is the prevailing wage rate during the period under study. The actual amounts paid by the farmers towards the cost of Fertilizer, insecticide and organic manures were considered. In the case of manure market value at the rate of Rs.250 per load was uniformly taken. The actual expenses incurred on seeds per acre during the study period were considered and these included both transportation and seed treatment charges.

Cost components and average cost per acre in the chilly cultivation in the study area are furnished in the table.1

Table.1 Cost components and average cost per acre

Sl.No.	Cost Components	Cost per acre (Rs.)
1.	Preparation of land	1862.11
2.	Labour	2415.14
3.	Seed	1073.61
4.	Organic manure	1297.00
5.	Fertilizer	1401.40
6.	Insecticide	551.83
7.	Irrigation	231.37
	Average cost per acre	8832.45
Computed from Primary data		

Table.1 reveals that the per acre total cost for the cultivation of chilly is worked out to Rs.8832.45 .The labour cost forms the major portion to the total cost which amounted to Rs.2415.14 next to labour cost the amount spent on the preparation of land occupies the major portion to the total cost of production which amounted to Rs.1862.11. The cost of Fertilizers, organic manure, seeds, insecticide and irrigation amounted to Rs.1401.4, Rs.1297, Rs.1073.61, Rs.551.82, and 231.37 respectively. Thus it is evident from the table.1 that the cost of irrigation is least in the production of chilly in the study area.

ii. Cost and returns of chilly cultivation

The cobb-Douglas production function has been fitted in order to determine the cost and return in the production of chilly in Ramnad district. The estimated production functions for chilly was of the following form.

Ln Y =β0 +β1 ln x1 + β2 ln x2 +β3 ln x3 +β4 ln x4 +β5 ln x5 + β6 ln x6 + β7 ln x7 + u

Where, Y = Value of gross return

x1 = Cost of land preparation per acre in rupees

x2 = Expenditure on labour per acre in rupees

x3 = Cost of seeds per acre in rupees

x4 = Cost of organic manure per acre in rupees

x5 = Cost of Fertilizer per acre in rupees

x6 = Cost of insecticide per acre in rupees

x7 = Cost of irrigation per acre in rupees

β0, β1, ……..β7 = parameters to be estimated.

Table.2 Estimated Results

S.No.	Variables	Regression Co-efficeint	't' value	R2
1.	Land preparation cost	0.044	0.505	0.877
2.	Labour cost	0.001	0.022	
3.	Seeds cost	0.176	1.647**	
4.	Organic manure cost	0.023	0.627	
5.	Fertilizer cost	0.597	7.134*	
6.	Insecticide cost	0.086	1.753**	
7.	Irrigation cost	0.070	1.539	

*** Significant at 1 per cent level.**
**** Significant at 10 per cent level.**

1. Preparation of Land Cost : It is observed from the table.2 that the value of R2 is 0.877 for the production of chilly which indicates that the selected inputs are important factors for explaining the variation in the production of chilly in Ramnad district. It is noted from the Table.2 that 1 per cent increase in the cost of land preparation may lead to 0.044 percentage increase in the yield of chilly in Ramnad district.

2. Labour Cost : It indicates that one per cent increase in the cost of labour may lead to 0.001 percentage increase in the yield of chilly in Ramnad district.

3. Seed Cost : It indicates that one per cent increase in the cost of seed may lead to 0.176 percentage increase in the yield of chilly in Ramnad district.

4. Organic manure : It indicates that one per cent increase in the cost of organic manure may lead to 0.023 percentage increase in the yield of chilly in Ramnad district.

5. Fertilizers : It is noted that cost of fertilizer are statistically significant at 1 per cent level and it is positively related to total return in the case of chilly production. It indicates that one percent increase in the cost of fertilizers may lead to 0.597 percentage increase in the yield of chilly is Ramnad district.

6. Insecticide : It is noted that cost of fertilizer are statistically significant at 1 per cent level and it is positively related to total return in the case of chilly production. It indicates that one percent increase in the cost of insecticide may lead to 0.086 percentage increase in the yield of chilly is Ramnad district.

7. Irrigation : It indicates that one per cent increase in the cost of irrigation may lead to 0.070 percentage increase in the yield of chilly in Ramnad district.

The regression coefficients of all the inputs are positive for production of chilly. This indicates that there is great scope of increasing production of chilly by increasing the use of these inputs.

iii. Input use efficiency

Each factors of production is paid according to its marginal productivity. The value of marginal productivity judges the input use efficiency. The marginal value productivity (MVP) of a particular input represents the expected addition to the gross revenue caused by an addition of one unit of that input while other inputs are held constant. The Marginal value productivity (MVP) of the inputs were calculated as $MVP_{x_i} = dy / dx_i$

The basic condition to be satisfied to obtain efficient input use is the equality of marginal value productivity to factor cost. Since all the inputs and output are expressed in monetary terms in the present study, the acquisition cost of input is taken as one rupee. The criterion used to assess the input use efficiency is to test the MVP against unity.

In order to find out the value of economic efficiency at different inputs, the MVPs of inputs have been compared with the respective acquisition costs then the ratio (P) of MVPs to marginal cost was calculated. For P=1, the use of given input has been considered optimum, P>1 indicates that employment of a given input could be increased till P becomes equals to unity and P<1 indicates that employment of given resource should be decreased till it becomes unity.

Table.3 MVP and input use efficiency of inputs in the chilly cultivation

Input	MVP
Land	0.2087
Labour	0.4022
Seed	1.4412
Organic manure	0.1566
Fertilizer	3.7626
Insecticide	1.3764
Irrigation	2.6722

The MVP has been found greater than unity for seeds, fertilizers, insecticides and irrigation. This indicates that the added return at this level is higher than the additional cost incurred for the additional unit of land. The MVP of land preparation cost, labour and organic manure has lower than the unity which indicates that there is over expense on these inputs. Therefore withdrawal of a rupee could improve the gross return. It is suggested that the employment of these inputs should be decreased till the ratio becomes unity. In other words, the part of these variables cost should be transferred to seeds, fertilizers, insecticides, and irrigation in order to attain maximum level of yield.

Conclusion

Chilly, the universal spice of India and a commercial crop of the tropics that comes up in the hot regions of South India and is a second prominent crop next to paddy in Ramand District. It is evident from the present study that chilly cultivation is yielding more profit as well as improving the livelihood of the peasant in the study area. It is also inferred from the analysis of cost and return that there is over expense on land preparation, labour

and organic manure. Therefore it is suggested that either part of these variables should be withdrawn or should be transferred to other expenses such as seeds, fertilizers, insecticides and irrigation in order to attain maximum level of yield.

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