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Economic Analysis of Tomato Cultivation

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ABSTRACT: The present paper aims to study the profitability of tomato cultivation. The study was conducted in Siddipet district of Telangana state. The primary data required for the study was collected from 102 tomato growers of the district. The collected data was analysed using the appropriate statistical tools to obtain the required results. The results of the study revealed that the overall cost of cultivation was found to be Rs. 2, 16,266.43 per hectare and among which the major proportion was occupied by human labour costs. The return per rupee investment was found to be 1.29 indicating the profitable cultivation of tomato.

Keywords: Economic analysis, tomato, cost concepts, returns, farm income measures.

INTRODUCTION

India is bestowed with bountiful resources, fertile soils and diversified cropping patterns which give a boost to the cultivation of numerous varieties of vegetables. As such India has occupied the second position with respect to production of vegetables in the world and is estimated to produce 197.23 million tonnes of vegetables from 10.97 million hectares of land during the year 2020-21. Among the numerous vegetables cultivated, tomato occupies a major share with 21.056 million tonnes of production from 0.86 million hectares of land. (Third advance estimates, Ministry of agriculture and farmers welfare, 2020-21). Apart from this, tomato is considered as a protective food and is a rich source of vitamins A, C, potassium, minerals and fibers. (Ramappa and Manjunatha 2016). Despite having such an extensive cultivation, tomato farmers often face issues related to production and marketing such as high production costs and high market price fluctuations which impact their income adversely. The present study aims to analyse the production pattern of tomato by computing the cost of cultivation, cost concepts and farm income measures in a holistic manner and to derive the necessary measures for the improvisation of the cultivation pattern of tomato.

MATERIALS AND METHODS

The present research was conducted in Siddipet district of Telangana state. Two villages were purposively chosen from each of the three selected mandals and 17 tomato growing farmers were chosen at random from each village and thus making a total of 102 farmers to collect the primary data needed for the study. The collected data was analysed employing various analytical tools such as simple tabular analysis to calculate the cost of cultivation of tomato per hectare. In addition, cost concepts formulated according to the CACP methodology as well as farm income measures were enumerated in order to assess the profitability of tomato farming. The collected primary data pertains to the kharif season of the agricultural year 2019-20.

A. Cost Concepts

The cost concepts viz., Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1, Cost C_2 and Cost C_3 were computed as follows:

Cost A_1: It included all actual expenses in cash and kind (if any) incurred in production by the farmer.
(i) Value of hired human labour
(ii) Value of bullock labour (both hired and owned)
(iii) Value of machine power (both hired and owned)
(iv) Value of seeds (both owned and purchased)
(v) Value of insecticides and pesticides, weedicides
(vi) Value of manures (both owned and purchased)
(vii) Value of fertilizers
(viii) Depreciation of implements and farm buildings
(ix) Irrigation charges
(x) Land revenue, cess and other taxes
(xi) Miscellaneous expenses (electricity charges etc)
(xii) Interest on working capital

Cost A_2: Cost A_1 + rent paid for leased in-land
Cost B_1: Cost A_2 + interest on value of owned capital assets (excluding land)
Cost B_2: Cost B_1 + rental value of owned land
Cost C_1: Cost B_1 + imputed value of family labour
Cost C_2: Cost B_2 + imputed value of family labour

Cost C_3: Cost C_2 × 1.10, (10% of cost C_2 is added to cost C_2): This concept was added to provide allowance for managerial functions undertaken by the farmer. It is the total cost or comprehensive cost of cultivation.

B. Gross income and net income

The physical output (in tonnes per hectare) realised was multiplied with per tonne market price to arrive at the gross income. The net income was then obtained after subtracting the cost of cultivation incurred.

C. Farm income measures

i) Returns over variable cost (RVC) = Gross income – Cost A_1

ii) Farm business income (FBI) = Gross income – Cost A_2

iii) Family labour income (FLI) or returns to family labour = Gross income – Cost B_2

iv) Net income (NI) = Gross income – Cost C_2

v) Returns to management (RM) = Gross income – Cost C_3

D. Returns per rupee investment

It was computed by dividing the gross income with the cost of cultivation incurred.

RPR = Gross income / Cost C_2

RESULTS AND DISCUSSION

A. Cost of cultivation of tomato

The cost of cultivation particulars of tomato per hectare are presented in Table 1. The overall cost of cultivation of tomato per hectare was found to be Rs. 2, 16,266.43. Out of which variable costs occupied a greater share of 91.95 per cent whereas the share of fixed costs was 8.05 per cent. These results were found to be in accordance with the results of Agarwal and Banerjee (2019). Among the variable costs, labour costs were major and alone occupied about a 50 per cent share in the total costs. This is because of the reason that the vegetable cultivation is a labour-oriented enterprise. Next to labour cost, the plant protection chemicals occupy a major share (8.30%) of the total costs. Fungicides like Mancozeb and Chlorothalonil were found to be extensively utilised (about 3 to 5 applications) in the tomato cultivation. In addition to these, urea, DAP and other complex fertilizers were applied and they occupy a share of 7.25 per cent in the total costs. Herbicides like Metribuzin were also utilised for the weed control and they occupied a meagre share of 0.54 per cent. Next to the plant protection chemicals, the greater share was occupied by seed/seedling cost, occupying 6.31 per cent of the total costs. In addition to these, the other material costs which included those of the mulch sheets and growth promoters were also considered as a component of variable costs and they occupied a share of 3.63 per cent of total costs. Further, the interest on working capital was also computed at the rate of 7 per cent and it was found to occupy a major share of 11.29 per cent of the total cost. Among the fixed costs, the rental value of owned land occupied the major share of 7.43 per cent of the total cost. The other fixed costs like depreciation and interest on fixed capital (which was computed at the rate of 10%) occupied only a meagre share of total cost of cultivation.

Table 1: Cost of cultivation of tomato (Rs./ha).

Sr. No.	Particulars	Unit	Quantity	Amount (Rs./ha)	Per cent to total cost
I. Variable costs					
1.	Human labour	Man days	227.15	108388.90	50.12
	a. Hired labour	Man days	82.24	39875.11	18.44
	b. Family labour	Man days	144.91	68513.79	31.68
2.	Bullock labour	CPD	1.74	871.27	0.41
3.	Machine labour	TP	10.95	8876.23	4.10
4.	Seeds	Kgs	0.40	13654.46	6.31
5.	Fertilizers and manures				
	a. FYM	Tonnes	4.16	15670.93	7.25
	b. Urea	Kgs	125.24		
	c. DAP	Kgs	119.56		
	d. MOP	Kgs	62.46		
	e. 20:20:20	Kgs	124.67		
6.	Pesticides and insecticides	Litres	0.62	17940.02	8.30
7.	Herbicides	Kgs	0.22	1171.57	0.54
8.	Other input cost				
	a. Mulch sheets	Kgs	358.68	7855.44	3.63
	b. Growth promoter	Litres	0.50		
9.	Interest on working capital (@ 7% per annum)			24420.03	11.29
	Total variable costs			198848.85	91.95
II. Fixed costs					
1.	Land revenue			0.00	0.00
2.	Rental value of owned land			16066.18	7.43
3.	Depreciation			198.55	0.09
4.	Interest on fixed capital (@ 10% per annum)			1152.85	0.53
	Total fixed costs			17417.58	8.05
	Total cost of cultivation			216266.43	100.00

The various cost concepts of tomato were also calculated according to the CACP methodology and presented in Table 2.

Table 2: Cost of cultivation of tomato as per cost concepts (Rs./ha).

Sr. No.	Cost	Amount (Rs./ha)
1.	Cost A_1	130533.61
2.	Cost A_2	130533.61
3.	Cost B_1	131686.46
4.	Cost B_2	147752.64
5.	Cost C_1	200200.25
6.	Cost C_2	216266.43
7.	Cost C_3	237893.07

The actual expenses incurred for cultivation of tomato is considered as cost A_1 which was Rs.1, 30,533.61 per hectare. Both the cost A_1 and A_2 were equal as all the respondents were cultivating tomato in their owned lands. Among these costs, cost C_2 was considered as the total cost of cultivation which was Rs. 2, 16,266.43 and cost C_3 which also included the managerial component of the farmer was found to be Rs. 2, 37,893.07.

B. Returns obtained from tomato cultivation

The returns obtained from cultivation of tomato are presented in Table 3. The average yield of tomato per hectare was found to be 30.46 tonnes and the average gross price obtained per tonne was Rs. 10,087.96. Since prices of vegetables fluctuate widely, the gross price per tonne was computed by considering the average of price obtained at multiple harvests. The price of tomato thus ranged from Rs. 8000 per tonne to Rs. 25000 per tonne. It can also be observed that cultivation of tomato was profitable as indicated by its returns per rupee investment of 1.29 (*i.e*. greater than unity) and net income of Rs. 91,012.98.

In addition to these, farm income measures were also computed and presented in Table 4.

Table 3: Returns obtained from tomato cultivation.

Sr. No.	Particulars	Amount
1.	Cost of cultivation (Rs./ha)	216266.43
2.	Yield (t/ha)	30.46
3.	Price per tonne	10087.96
4.	Gross income (Rs./ha)	307279.41
5.	Net income (Rs./ha)	91012.98
6.	Returns per rupee investment	1.29

Table 4: Farm income measures of tomato cultivation.

Sr. No.	Income measures	Amount (Rs./ha)
1.	Returns over variable cost (RVC)	176745.80
2.	Farm business income (FBI)	176745.80
3.	Family labour income (FLI)	159526.77
4.	Net income (NI)	91012.98
5.	Returns to management	69386.34

It is evident from the table that both farm business income and returns over variable cost were equal, which was Rs. 1, 76,745.80 per hectare. The net income and returns to management of tomato growers was found to be Rs. 91,012.98 and Rs. 69,386.34 respectively.

CONCLUSION

In a nutshell, tomato cultivation was found to be profitable as indicated by the greater returns per rupee investment of 1.29. The major loophole evident in the tomato farming is that of the higher cost of cultivation which reduced the net income of tomato growers. This could be corrected by encouraging farmers to take up improved methods of production practices like organic farming and zero budget natural farming. These methods not only are remunerative to farmers but are also beneficial on the basis of environmental and consumer health standards.

FUTURE SCOPE

A thorough analysis of the costs and returns structure of tomato would be helpful for devising the strategies to reduce the cost of cultivation and thereby improve the profits of tomato growers.

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Conflict of Interest. None.

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