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An economic analysis of tomato production in periphery of Raipur city of Chhattisgarh

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Abstract

The study was conducted at periphery of Raipur city of Chhattisgarh, where sample of 55 respondents was selected randomly. The respondents were classified into three groups viz., small (>2.00 hectares), medium (2.01- 4.00 hectares) and large (4.01 hectares and above) farms. The total cost of cultivation of tomato of sample farms at overall was Rs.150142.28/ha. total variable cost was 85.80 per cent and the share of human labour cost was maximum and found to be 39.61 per cent followed by materials imputed cost plant protection (14.28 per cent), staking (11.35 per cent), machine power cost (3.69 per cent). While overall input-output ratio and B: C ratio were found to be 1:2.39 and 1:1.39. On an overall basis Gross returns (total income) was observed to the Rs 277045.75/ha, while net returns was found to be Rs 208416.12/ha and overall production of tomato was 813.40 quintal /ha.

Keywords: Gross returns, net returns, B: C ratio, input-output ratio

Introduction

Vegetables are important constituents of Indian agriculture and nutritional security due to their short duration, high yield, nutritional richness, economic viability and ability to generate on-farm and off-farm employment. India produces the world's second-largest amount of fruits and vegetables. Horticultural crops cover 21.83 M.ha, with a total production of 240.53 MT. Fruits and vegetables account for over 92% of the country's total horticultural production. India's vegetable production has risen to new heights in recent years, making it the world's second-largest producer of vegetables, after only China (Kumar *et al.*, 2005; Kumar *et al.*, 2004 a & b). Their demand is expected to rise even more, requiring 185 million tonnes of production by 2011-12. (Singh *et al.*, 2004). Area under Tomato cultivation in the state is 64717 ha. with the production of 1182648 MT and the productivity is 18.27MT/ha. in the year 2019-2020.

Methodology

Sampling technique periphery of Raipur city of Chhattisgarh was purposively chosen as the study area because, it has the larger area under tomato cultivation in the district. A multistage simple random sampling technique (SRS) was adopted to select the villages and the respondents, different farmer involved in Tomato production and marketing in Raipur district. The details of the sampling techniques at various stages are given as under:

Costs and returns of vegetable cultivation

Despite the costs & return was worked out by old concepts, a standard method of cost of cultivation of tomato was also used. This method is accepted by The Commission of Agricultural Costs and Prices (CACP). Under this method, the cost of cultivation was computed by using the 7 Cost concepts, which are known as cost A₁, cost A₂ cost B₁, cost B₂ and cost C₁, cost C₂, and cost C₃.

Cost A1: Consist of following 16 items of costs

1. Value of hired human labour (permanent and casual)
2. Value of owned bullock labour
3. Value of hired bullock labour
4. Value of owned machinery
5. Hired machinery charged
6. Value of fertilizers
7. Value of manure (produced on farm and purchased)
8. Value of seed (both farm-produced and purchased)

9. Value of insecticides and fungicides.
10. Irrigation charges (both of the owned and hired tube wells, pumping sets etc.)
11. canal-water charges
12. Land revenue, cesses and other taxes
13. Depreciation on farm implements (both of the bullock drawn and worked with human labour)
14. Depreciation on farm building, farm machinery.
15. Interest on the working capital.
16. Miscellaneous expenses (wages of artisans, and repairs to small farm implements)

Cost A_2 = Cost A_1 + Rent paid for Leased in Land.

Cost B_1 = Cost A_1 + Interest on value of Owned fixed 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 + 10 per cent of cost C_2 taking as managerial allowances.

Income over different cost

Income over cost A_1 = Gross Return – Cost A_1

Income over cost A_2 = Gross Return – Cost A_2

Income over cost B_1 = Gross Return – Cost B_1

Income over cost B_2 = Gross Return – Cost B_2

Income over cost C_1 = Gross Return – Cost C_1

Income over cost C_2 = Gross Return – Cost C_2

Income over cost C_3 = Gross Return – Cost C_3

Net income

It is the difference between total return and total expenses. So,

Net income = Gross income - Total expenses

Input – output ratio

It is the ratio of input and output, which is an under

Input - Output Ratio = Value of output / Value of input used

Results and Discussion

The cost and returns of tomato

Cost on different heads of tomato in the Raipur district

Costs and return of tomato cultivation is essential to understand that how much cost incurred for different inputs and whether farmers are receiving the profit or not. It is therefore, the cost and return of tomato cultivation in Raipur district was estimated in Rs/ha, which is given in table 1.

The total cost of cultivation of tomato of sample farms at overall was Rs 150142.28/ha. total variable cost was 85.80 per cent and the share of human labour (hired and family labour) cost was maximum and found to be 39.61 per cent followed by materials imputed cost manure and fertilizer (6.42 per cent), plant protection (14.28 per cent), staking (11.35 per cent), seed (4.62 per cent), machine power cost (3.69 per cent), interest on working capital (3.91 per cent), irrigation (1.40 per cent). Total fixed cost was 14.20 per cent, rental value of owned land was 12.81 per cent and interest on fixed capital was 1.28 per cent. Among all the input cost human labour was noticed to be the major cost. In which, imputed value of hired labour cost was shared comparatively more than that of family labour cost i.e. 23.73 per cent.

The total cost of cultivation of tomato was increasing with respect to farm size of holdings and found to be maximum under large farms Rs 16713.06/ha and minimum at marginal farms Rs 138367.69/ha.

Table 1: Cost on different heads of tomato in the Raipur district (Rs./ha)

Particular	Marginal		Small		Medium		Large		Overall	
	Rs./ha	%	Rs./ha	%	Rs./ha	%	Rs./ha	%	Rs./ha	%
A. Variable cost										
1. Human labour										
a. Family labour	34065.25	24.62	24605.55	15.93	12200	7.45	1156.33	0.69	23837.41	15.88
b. Hired labour	24125.65	17.44	36125.45	23.39	48253.25	29.48	59455.63	35.57	35627.17	23.73
Total human labour	58190.9	42.06	60731	39.32	60453.25	36.93	60611.96	36.26	59464.57	39.61
2. Machine power	5510.5	3.98	5125.65	3.32	5825.5	3.55	5915.25	3.54	5535.32	3.69
3. Seed	6125.32	4.43	7210.25	4.67	7965.45	4.87	8005.25	4.79	6935.86	4.62
4. Manure and fertilizer	9225.65	6.67	9875.5	6.39	10126.33	6.19	10131.25	6.06	9646.45	6.42
5. Plant protection	16585.45	11.99	24450.5	15.83	28652.55	17.50	30195.5	18.07	22227.67	14.80
6. Irrigation	1765.5	1.28	2250.5	1.46	2495.65	1.52	2565.12	1.53	2105.84	1.40
7. Staking	15650.5	11.31	16580.25	10.74	19022.65	11.62	20165.55	12.07	17041.12	11.35
8. Interest on working capital	5377.17	3.89	6054.90	3.92	6435.79	3.93	6583.73	3.94	5871.08	3.91
Total variable cost	118430.99	85.59	132278.55	85.65	140977.17	86.12	144173.61	86.26	128827.91	85.80
B. Fixed cost										
1. Land revenue	12	0.01	12	0.01	12	0.01	12	0.01	12.00	0.01
2. Rental value of land	18000	13.01	20000	12.95	20500	12.52	20650	12.36	19228.18	12.81
3. Depreciation	123.5	0.09	145.5	0.09	165.55	0.10	235.25	0.14	150.17	0.10
4. Interest on fixed capital	1801.2	1.30	2001.2	1.30	2051.2	1.25	2066.2	1.24	1924.02	1.28
Total fixed cost	19936.70	14.41	22158.70	14.35	22728.75	13.88	22963.45	13.74	21314.37	14.20
Total cost (A+B)	138367.69	100	154437.25	100	163705.92	100	167137.06	100	150142.28	100

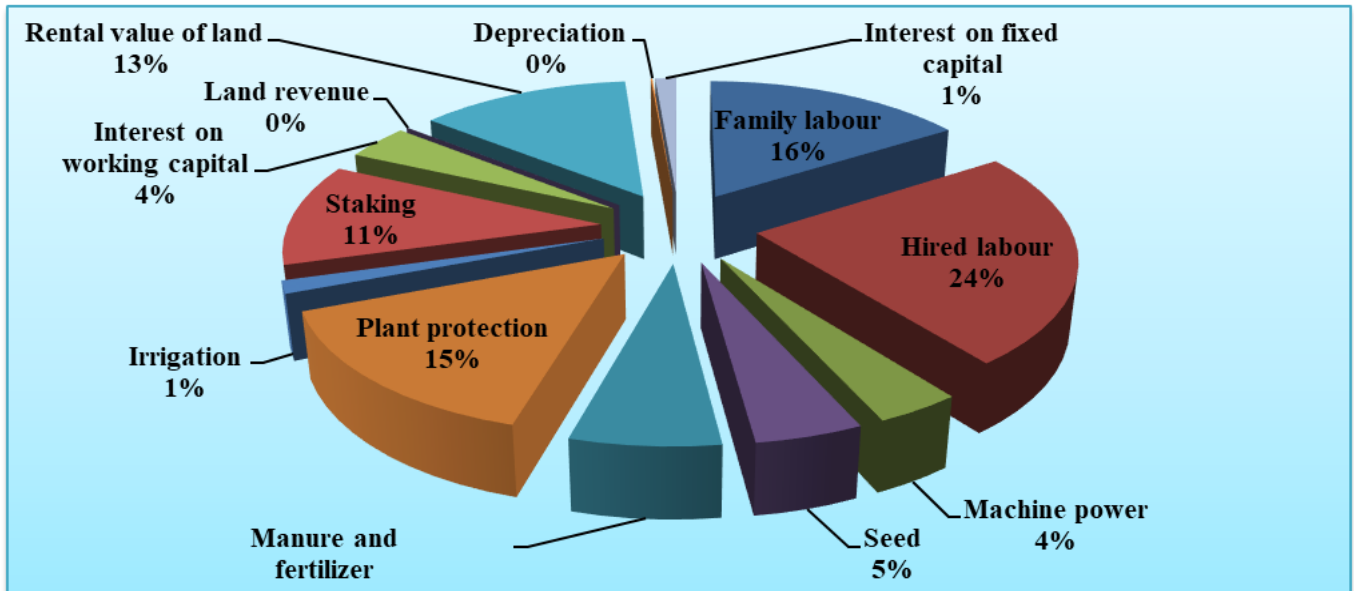


Fig 1: Overall cost of tomato cultivation of sampled household in Raipur district

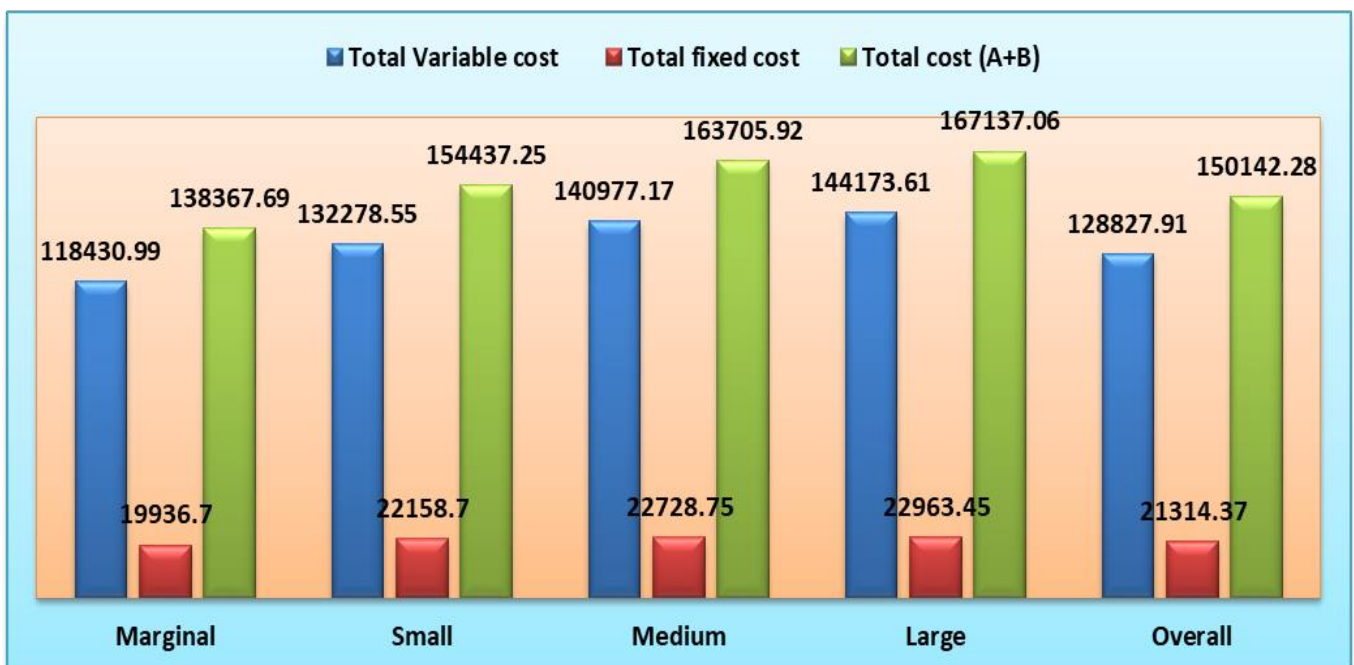


Fig 2: Total Costs of tomato cultivation of sampled household in Raipur district

Measures of farm profit in tomato cultivation

The economics of tomato cultivation presented in table 2. It has been observed from empirical findings that overall total cost of cultivation of tomato was Rs 150142.28/ha, it was vary from Rs 138367.69/ha to Rs 167137.06/ha for marginal to large farms size.

The cost of production was found to be Rs.343.84/qtl,

Rs.342.34/qtl, Rs.337.08/qtl, Rs.333.15/qtl and Rs.340.60/qtl for marginal, small, medium, large and overall farms size, respectively. While overall input-output ratio and B: C ratio were found to be 1:2.39 and 1:1.39, On an overall basis Gross returns (total income) was observed to the Rs 277045.75/ha, while net returns was found to be Rs 208416.12/ha and overall production of tomato was 813.40 quintal /ha.

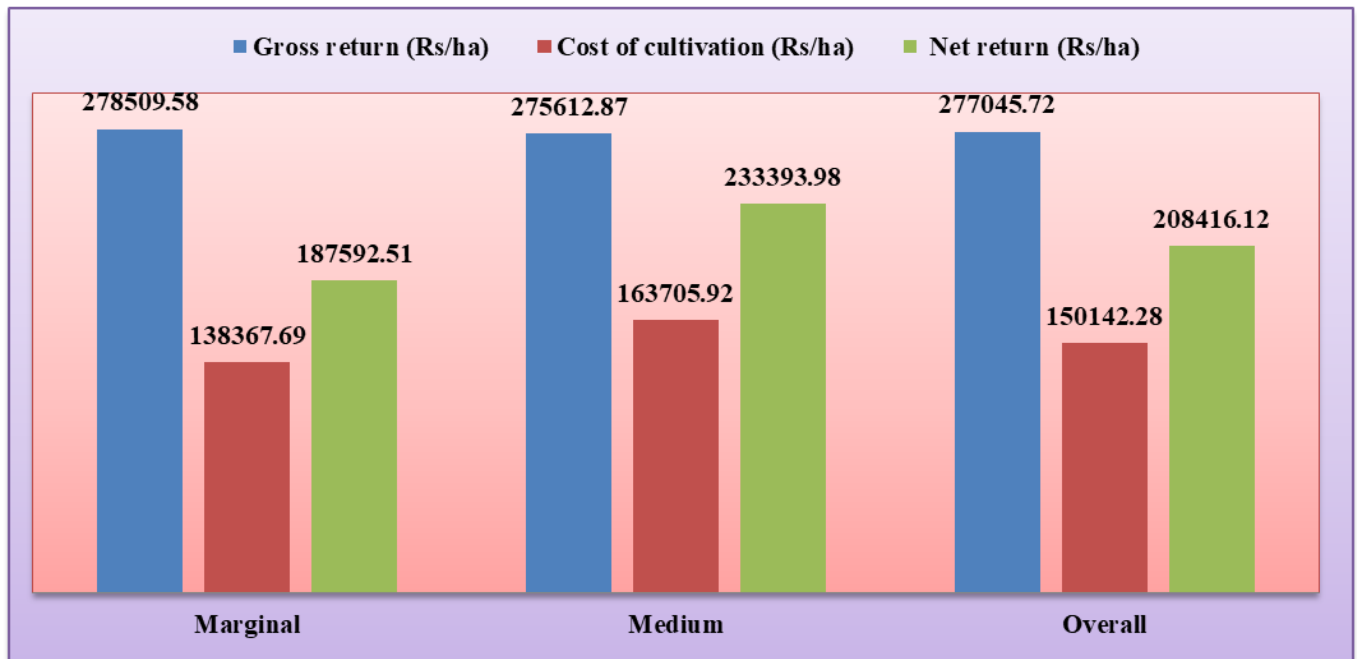


Fig 3: Measures of farm profit in tomato in Raipur district (Rs/ha)

Table 2: Per ha. yield value of output and cost of production per quintal of tomato (Rs/ha.)

Particular	Marginal	Small	Medium	Large	Overall
A. Yield main product (qtl/ha)	343.84	342.34	337.08	333.15	340.60
Price (Rs/qtl)	810.00	812.50	817.65	821.50	813.40
B. Gross return (Rs/ha)	278509.58	278152.74	275612.87	273681.15	277045.72
C. Cost of cultivation (Rs/ha)	138367.69	154437.25	163705.92	167137.06	150142.28
D. Net return (Rs/ha)	187592.51	212097.75	233393.98	245001.27	208416.12
E. Cost of production (Rs/qtl)	343.84	342.34	337.08	333.15	340.60
F. Input Out ratio	1:2.36	1:2.37	1:2.43	1:2.47	1:2.39
G. B: C ratio	1:1.36	1:1.37	1:1.43	1:1.47	1:1.39

Cost obtain on the basis of different cost concept of tomato

Cost of cultivation of tomato of sample farms in the Raipur district has been worked out and presented in table 1. It is envisaged that Cost A₁ as designated the variable cost and it was found to be Rs.105152.67/ha an overall basis, which was added of rent paid for lease in land and dignified with Cost A₂, found to be Rs.105152.67/ha, indicates the interest on fixed capital imputed with Cost B₁ Rs 98007.36/ha rental value of own land Rs 19228.18/ha prevailed in the study area. Normally, farmers are cultivating the crop in their own land

but it has imputed rental value of land of Rs 19228.18/ha notified Cost B₂ was Rs.126304.87/ha. The Cost C₁ found to be Rs 130914.10/ha, includes the value of Cost B₁ and imputed value of family labour was found to be Rs.23837.41/ha, The Cost C₂, found to be Rs.150142.28/ha, includes the value of Cost B₂ and imputed value of family labour and The Cost C₃, found to be Rs 165156.51/ha, imputed value of managerial allowances at 10 per cent of Cost C₂.

Table 3: Break-up of total cost obtained over different cost of tomato (Rs/ha.)

Cost/ Category	Marginal	Small	Medium	Large	Overall
Cost A ₁	84501.24	107830.50	128954.72	143264.53	105152.67
Cost A ₂	84501.24	107830.50	128954.72	143264.53	105152.67
Cost B ₁	86302.44	109831.70	131005.92	145330.73	107076.69
Cost B ₂	104302.44	129831.70	151505.92	165980.73	126304.87
Cost C ₁	120367.69	134437.25	143205.92	146487.06	130914.10
Cost C ₂	138367.69	154437.25	163705.92	167137.06	150142.28
Cost C ₃	152204.45	169880.98	180076.52	183850.77	165156.51

Return obtained over different cost of tomato

Table 3 shows the returns over Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁, Cost C₂, and Cost C₃ was obtained to be

Rs.253405.73/ha, Rs.253405.73/ha, Rs.251481.71/ha, Rs.232253.53/ha, Rs.227644.30/ha, Rs.208416.12/ha and Rs.193401.89/ha, respectively.

Table 4: Return obtained over different cost of tomato in Raipur district (Rs/ha)

Particulars	Marginal	Small	Medium	Large	Overall
Return over Cost A ₁	241458.96	258704.50	268145.18	268873.80	253405.73
Return over Cost A ₂	241458.96	258704.50	268145.18	268873.80	253405.73
Return over Cost B ₁	239657.76	256703.30	266093.98	266807.60	251481.71
Return over Cost B ₂	221657.76	236703.30	245593.98	246157.60	232253.53
Return over Cost C ₁	205592.51	232097.75	253893.98	265651.27	227644.30
Return over Cost C ₂	187592.51	212097.75	233393.98	245001.27	208416.12
Return over Cost C ₃	173755.75	196654.03	217023.38	228287.57	193401.89

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