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Cost structure and profitability of green chilli production in Nandurbar district of Maharashtra

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ABSTRACT

Green chilli (*Capsicum annuum* L.) is an important commercial vegetable and spice crop contributing significantly to farm income in Maharashtra. The present study was undertaken to examine the economics of green chilli cultivation in Nandurbar district of Maharashtra. Primary data were collected from selected green chilli growers through a structured schedule, and the economic performance of the crop was evaluated using different cost concepts and return measures. The analysis revealed that the overall average gross return from green chilli cultivation was ₹609941.23 per farm, while the total cost at Cost 'C' amounted to ₹335879.45. The corresponding net return over Cost 'C' was estimated at ₹274061.78, with an average production of 186.53 quintals. Among the farm-size categories, large farmers recorded the highest gross return of ₹625855.07, whereas small farmers obtained the highest net return of ₹291172.16 over Cost 'C'. The overall input-output ratio at Cost 'C' was 1:1.82, indicating that green chilli cultivation was economically viable and provided satisfactory returns to the growers.

Keywords: Green chilli, Cost of cultivation, Gross return, Net return, Economic viability, Input-Output ratio

Introduction

Chilli (*Capsicum annuum* L.) is an important commercial spice and vegetable crop belonging to the family Solanaceae. It is widely consumed in fresh and processed forms and is valued for its characteristic pungency, colour and flavour. Besides its culinary importance, chilli is also recognized for its nutritional and medicinal properties due to the presence of vitamins, minerals, antioxidants and capsaicin. India possesses a wide diversity of chilli varieties and has an important position in the production and export of chilli. During 2023, chilli was cultivated over 18.03 lakh hectares globally, producing about 58.22 lakh tonnes, with an average productivity of 3,229 kg/ha. India ranked first in chilli production with 27.82 lakh tonnes, followed by Bangladesh, Thailand, China and Ethiopia. In India, green chilli cultivation has shown considerable growth, with area increasing from 140.0 thousand hectares in 2013-14 to 438.7 thousand hectares in 2023-24, while production increased from 1,687.3 thousand tonnes to 4,670.8 thousand tonnes during the same period. The average productivity in 2023-24 was 10.6 MT/ha. (Source: Horticulture Statistics Unit, Department of Agriculture and Farmers Welfare). Among the Indian states, Madhya Pradesh recorded the highest green chilli production of 1,039.19 thousand tonnes, followed by Karnataka (694.22 thousand tonnes), Bihar (490.81 thousand tonnes) and Andhra Pradesh (450.02 thousand tonnes) during 2023-24. Maharashtra accounted for 43.77 thousand hectares of area and 438.38 thousand tonnes of production with an average productivity of 10.02 MT/ha. Major chilli-growing districts of Maharashtra include Nagpur, Sangli, Kolhapur, Nanded, Amravati, Dhule and Nandurbar. In Nandurbar, the average area under chilli cultivation during 2012-13 to 2023-24 was 253.90 hectares, with an average production of 138.72 tonnes and productivity of 1.94 tonnes/ha. (Source: Horticulture Statistics Unit, Department of Agriculture and Farmers Welfare). The present study was therefore undertaken to examine the economics of production of Kharif green chilli (*Capsicum annuum* L.) in Nandurbar district of Maharashtra, with particular emphasis on costs and returns in green chilli.

Methodology

For the present investigation, Nandurbar district of Maharashtra was purposively selected owing to the importance of green chilli cultivation in the district. The study was conducted using a multistage sampling procedure for the selection of the study area and respondents. Primary data were collected from selected green chilli growers through personal interviews using a pre-tested and structured schedule. A total of 90 farmers were considered for the study and classified into small, medium and large farm-size groups, comprising 30 farmers in each category. The data pertaining to the agricultural year Kharif-2025. Study were collected and

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systematically tabulated for analysis. The economics of green chilli cultivation was assessed using different cost concepts, namely Cost A, Cost B and Cost C. Gross returns, net returns and input-output ratio were worked out to evaluate the profitability of green chilli cultivation. The collected data were analysed using tabular analysis and suitable statistical techniques to draw meaningful conclusions regarding the economics of production.

Analysis of data

Cost of cultivation

The estimation of costs and returns, the various components of costs were estimated by using standard cost concepts as under. (Cost A, Cost B and Cost C.)

Results and discussion

Per hectare cost of cultivation of green chilli

The cost of green chilli cultivation were estimated on a per hectare basis for different farm size groups and are presented in Table 5.8. The analysis revealed considerable variation in the cost of cultivation, among small, medium and large farms, mainly due to differences in resource utilization, scale of operation and management practices.

At the overall level, the total cost of cultivation, measured by Cost 'C', was estimated at ₹3,35,879.45 per hectare. Cost 'A' and Cost 'B' amounted to ₹2,06,811.67 and ₹3,11,396.79 per hectare, respectively. Among the individual cost components, manure constituted the major expenditure, amounting to ₹79,549.42 per hectare and accounting for 23.68 per cent of Cost 'C'. Followed by expenditure on seedlings, which amounted to ₹29,959.47 per hectare (8.92 per cent), hired female labour at ₹19,401.74 (5.78 per cent) and machine power at ₹17,338.80 (5.16 per cent). The relatively higher expenditure on manure indicates the importance of organic nutrient application in green chilli cultivation, whereas the substantial expenditure on seedlings reflects the intensive planting-material requirement of the crop.

Among the different farm-size groups, the small farms recorded a Cost 'C' of ₹3,28,106.19 per hectare. The major expenditure items on small farms were manure, amounting to ₹76,041.24 per hectare, followed by seedlings at ₹30,274.31, hired female labour at ₹16,108.25 and machine power at ₹14,561.86. The medium farms incurred a Cost 'C' of ₹3,30,883.57 per hectare. Among the major components, manure accounted for the highest expenditure at ₹84,070.80 per hectare, followed by seedlings at ₹29,410.00, hired female labour at ₹18,075.22 and machine power at ₹15,199.12. The comparatively higher expenditure on manure and hired labour contributed to the overall cost of cultivation on medium farms. The large farms recorded the highest Cost 'C' of ₹3,48,648.59 per hectare. The major cost components were manure at ₹78,536.23 per hectare, hired female labour at ₹24,021.74, machine power at ₹22,255.43 and seedlings at ₹30,194.09. Large farms also incurred relatively higher expenditure on plant protection chemicals and micronutrients. This pattern indicates more intensive use of mechanization, hired labour and crop-protection inputs on larger holdings. The per quintal cost of cultivation was ₹1,791.35 on small farms, ₹1,781.32 on medium farms and ₹1,828.37 on large farms, with an overall average of ₹1,800.34 per quintal. Thus, although medium farms incurred a slightly higher total cultivation cost than small farms, they recorded the lowest cost per quintal, indicating comparatively efficient conversion of production expenditure into output. Large farms, despite obtaining the highest production, recorded the highest per quintal cost because the increase in cultivation expenditure was relatively greater than the corresponding increase in output. Overall, the findings indicate that green chilli cultivation is a highly remunerative enterprise under the prevailing production conditions. Higher investment in improved production technologies, balanced nutrient management, efficient irrigation and timely crop protection measures substantially enhanced productivity and profitability. The similar study indicated higher economic efficiency on small farms, whereas Jagtap *et al.* (2012) [1] Rajur *et al.* (2008) [2] and Jorwar *et al.* (2018) [3] reported the highest input-output ratio and net returns on small farms, followed by large farms and medium farm respectively.

Table 1. Per hectare Cost of cultivation of Green Chilli (₹ /ha)

Sr. No	Cost Items	size group											
		SMALL			MEDIUM			LARGE			OVERALL		
		Qty	Value	Per cent	Qty	Value	Per cent	Qty	Value	Per cent	Qty	Value	Per cent
1	Hired Human Labour (Days)												
	A. Male	28.35	8505.15	2.59	32.74	9823.01	2.97	38.22	11467.39	3.29	33.11	9931.85	2.96
	B. Female	64.43	16108.25	4.91	72.30	18075.22	5.46	96.09	24021.74	6.89	77.61	19401.74	5.78
2	Seedling (No.)	17808.42	30274.31	9.23	17300.00	29410.00	8.89	17761.23	30194.09	8.66	17623.22	29959.47	8.92
3	Machin Power (Hr)	19.42	14561.86	4.44	20.27	15199.12	4.59	29.67	22255.43	6.38	23.12	17338.80	5.16
4	Bullock Power (Days)	4.98	3487.97	1.06	3.10	2168.14	0.66	0.25	177.54	0.05	2.78	1944.55	0.58
5	Manure (Qtls)	190.10	76041.24	23.18	210.18	84070.80	25.41	196.34	78536.23	22.53	198.87	79549.42	23.68
6	Fertilizer (Kg)												
	N	131.30	2407.08	0.73	128.54	2356.50	0.71	126.91	2326.67	0.67	128.92	2363.42	0.70
	P	76.82	4169.22	1.27	77.23	4191.31	1.27	78.33	4251.28	1.22	77.46	4203.94	1.25
	K	77.05	4474.66	1.36	71.63	4160.00	1.26	78.71	4570.97	1.31	75.79	4401.88	1.31
7	Irrigation Charges (₹)		7364.19	2.24		7334.64	2.22		7235.45	2.08		7311.42	2.18
8	Plant Protection (₹)		9019.93	2.75		8119.47	2.45		9940.58	2.85		9026.66	2.69
9	Micronutrient (₹)		3000.00	0.91		3750.00	1.13		5007.61	1.44		3919.20	1.17
10	Incidental Charges (₹)		3115.12	0.95		3107.08	0.94		4833.41	1.39		3685.20	1.10
11	Repair (Rs)		802.41	0.24		759.03	0.23		855.07	0.25		805.50	0.24

(continued on next page)

Sr. No	Cost Items	size group											
		SMALL			MEDIUM			LARGE			OVERALL		
	Working Capital	183331.38	55.88		192524.31	58.18		205673.47	58.99		193843.05	57.71	
12	Interest On Working Capital@ 6%	10999.88	3.35		11551.46	3.49		12340.41	3.54		11630.58	3.46	
13	Depreciation On Farm Implement	933.47	0.28		1091.38	0.33		1200.46	0.34		1075.10	0.32	
14	Land Revenue And Taxes	259.66	0.08		261.31	0.08		267.83	0.08		262.93	0.08	
	Cost A	195524.39	59.59		205428.45	62.08		219482.16	62.95		206811.67	61.57	
15	Rental Value Of Land	102953.40	31.38		97187.07	29.37		104041.35	29.84		101393.94	30.19	
16	Interest On Fixed Capital @10%	3949.70	1.20		3201.68	0.97		2422.17	0.69		3191.18	0.95	
	Cost B	302427.49	92.17		305817.20	92.42		325945.69	93.49		311396.79	92.71	
17	Family Labour												
	A. Male	34.19	10257.73	3.13	35.84	10752.21	3.25	35.76	10728.26	3.08	35.26	10579.40	3.15
	B. Female	61.68	15420.96	4.70	57.26	14314.16	4.33	47.90	11974.64	3.43	55.61	13903.25	4.14
18	Cost C	328106.19	100		330883.57	100		348648.59	100		335879.45	100	
19	Output (Qtls)												
	A. Main Produce	183.16	619278.35		185.75	584690.27		190.69	625855.07		186.53	609941.23	
	B. By Produce	0.00	0.00		0.00	0.00		0.00	0.00		0.00	0.00	
	Gross Returns	619278.35			584690.27			625855.07			609941.23		
20	Per Quintal Cost (₹)	1791.35			1781.32			1828.37			1800.34		

(Figures in parentheses indicates the percentage to the cost C)

Table 2. Cost and Returns from Green Chilli Cultivation (₹/ha)

Sr. No.	Particular	Unit	Small	Medium	Large	Overall
1	Gross return	₹	619278.35	584690.27	625855.07	609941.23
2	Total cost					
	Cost A	₹	195524.39	205428.45	219482.16	206811.67
	Cost B	₹	302427.49	305817.20	325945.69	311396.79
	Cost C	₹	328106.19	330883.57	348648.59	335879.45
3	Profit					
	Cost A	₹	423753.96	379261.81	406372.91	403129.56
	Cost B	₹	316850.86	278873.07	299909.38	298544.44
	Cost C	₹	291172.16	253806.70	277206.49	274061.78
4	Production	Qtl	183.16	185.75	190.69	186.53
5	B:C Ratio					
	Cost A		3.17	2.85	2.85	2.95
	Cost B		2.05	1.91	1.92	1.96
	Cost C		1.89	1.77	1.80	1.82

The cost and returns from green chilli cultivation across different farm-size groups were estimated and are presented in Table 5.9. The result indicated that the gross return was highest among large farmers (₹6,25,855.07/ha), followed by small farmers (₹6,19,278.35/ha), while medium farmers recorded the lowest gross return (₹5,84,690.27/ha). The higher gross return among large farmers was mainly associated with their higher production of 190.69 q/ha, compared with 183.16 q/ha for small and 185.75 q/ha for medium farmers.

The total cost under Cost A was highest for large farmers (₹2,19,482.16/ha), followed by medium (₹2,05,428.45/ha) and small farmers (₹1,95,524.39/ha), reflecting greater expenditure with in-

creasing farm size. Similarly, Cost B and Cost C were highest for large farmers, indicating relatively higher overall resource use. Despite this, the profit under Cost A was highest for small farmers (₹4,23,753.96/ha), followed by large farmers (₹4,06,372.91/ha) and medium farmers (₹3,79,261.81/ha), mainly due to small farmers incurred comparatively lower costs while obtaining a relatively high gross return. Under Cost C, small farmers again recorded the highest profit (₹2,91,172.16/ha), followed by large farmers (₹2,77,206.49/ha) and medium farmers (₹2,53,806.70/ha). The B:C ratio under Cost A was highest for small farmers (3.17), whereas medium and large farmers recorded 2.85 each. Under Cost B, the ratio was 2.05 for

small, 1.91 for medium and 1.92 for large farmers, while under Cost C it was 1.89, 1.77 and 1.80, respectively. Overall, the B:C ratios remained above unity across all farm-size groups and cost concepts, indicating that green chilli cultivation was economically viable and profitable in the study area, with small farmers showing comparatively better economic efficiency.

The results of the cost and return analysis showed that green chilli cultivation generated positive returns under all the farm-size groups. The overall B:C ratio was 2.95 under Cost A, 1.96 under Cost B and 1.82 under Cost C, indicating that the returns exceeded the corresponding costs of cultivation. The overall net returns were also positive, amounting to ₹4,03,129.56 under Cost A, ₹2,98,544.44 under Cost B and ₹2,74,061.78 under Cost C. These findings indicated that green chilli cultivation was economically viable and provided adequate returns to the growers.

Therefore, the null hypothesis (H_0 : Green chilli cultivation in Nandurbar district was not profitable) was rejected, while the alternative hypothesis (H_1 : Green chilli cultivation in Nandurbar district was profitable) was accepted. Hence, it was concluded that green chilli cultivation was a profitable and economically feasible enterprise in the study area during the study period.

The Similar Finding reported by Desale (2008) [4] study on economics of production and marketing of chilli in Dhule and Nandurbar district. Deshmukh (2001) reported the result on Economics of production of chilli in Achalpur tahsil of Amravati district Unpublished M.sc. (Agri.) thesis submitted to Dr. P.D.K.V., Akola, Maharashtra.

Conclusion

The study revealed that green chilli cultivation in Nandurbar district was a profitable and economically viable enterprise. The overall cost of cultivation under Cost 'C' was ₹3,35,879.45 per hectare, against a gross return of ₹6,09,941.23 per hectare, resulting in a net return of ₹2,74,061.78 per hectare. The average production was 186.53 quintals per hectare, with an average cost of ₹1,800.34 per quintal. Among the farm-size groups, large farmers obtained the highest production and gross returns, whereas small farmers recorded the highest net returns

and B:C ratio, indicating comparatively better economic efficiency. The overall B:C ratios were 2.95, 1.96 and 1.82 under Cost A, Cost B and Cost C, respectively. Since the B:C ratios were greater than unity across all farm-size groups, green chilli cultivation was found to be economically feasible and remunerative in the study area. The study therefore indicates that efficient resource utilization, improved production practices, balanced nutrient management and timely crop management can further enhance the profitability of green chilli cultivation in Nandurbar district.

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