P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating: 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 7; SP-Issue 11; December 2024; Page No. 181-184

Received: 16-10-2024
Accepted: 23-11-2024

Indexed Journal
Peer Reviewed Journal

Economics of production of cauliflower in Nagpur district

[1]SS Noroliye, [2]SM Sarap, [3]SN Ingle and [4]MS Naware

[1]M.Sc. Student, Agriculture Economics and Statistics Section, Shri. Shivaji Agriculture College, Amravati, Maharashtra, India

[2, 3]Assistant Professor, Agriculture Economics and Statistics Section, Shri. Shivaji Agriculture College, Amravati, Maharashtra, India

[4]Associate Professor, Agriculture Botany Section, Shri Shivaji Agriculture College, Amravati, Maharashtra, India

DOI: https://doi.org/10.33545/26180723.2024.v7.i11Sc.1383

Corresponding Author: SS Noroliye

Abstract
Cole vegetables are the most important contributor in cultivated vegetable. Among the different vegetables grown in India Cole vegetables contributed good in both Regional and National income. India is second largest global producer of Cole vegetables after China. The present study was undertaken in Nagpur district of Vidarbha region of state Maharashtra. Cauliflower was selected for the present study. Out of fourteen tahsils in Nagpur district, two tahsils namely Katol and Narkhed were selected purposively having maximum area and production of cauliflower. Five villages were selected from each tehsil and 10 farmers were selected from each village purposively. A list of all the selected vegetable growers of the selected villages were prepared from consolidated list of selected vegetable growers, total 50 cauliflower vegetable growers have been selected randomly (20 small, 15 medium, 15 large). The per hectare total cost of cultivation at Cost C_3 for cauliflower was Rs. 90793.83. The input-output ratio at cost C_3 for cauliflower was 1.62. The study indicates that cultivation of cauliflower was economically profitable to the selected cultivators.

Keywords: Cauliflower, cost and returns, input-output ratio, profitable

Introduction

Cole Vegetables play a significant role in total cultivated vegetables regarding production and income of farmers. These crops are generally short duration hence more than one crop can be raised on the basis of early, medium and late duration varieties. In India, Cole vegetable crops are generally grown in open fields therefore the cost of cultivation is less as compared to protected cultivation as followed in the Western Countries. Cole vegetables are the vital sources of minerals, vitamins and dietary fibres and play an important role in supplying nutrition to human health. Cole vegetables play an important role in the household nutritional security, employment generation and alleviation of hunger. According to (FAO-2022-23), India ranks second cauliflower production. In India West Bengal ranks first in Cauliflower production (NHB- 2022-23).

Materials and Methods

The study was undertaken in Nagpur district of Vidarbha region. District was selected purposively. The data pertained for the year 2022-23. Cauliflower was selected for the study. Out of fourteen tahsils in Nagpur district, two tahsils namely Katol and Narkhed were selected purposively having maximum area and production of vegetables. Katol and Narkhed tehsil were selected and five villages were selected from each tehsil and 05 farmers were selected from each village purposively. Total 50 cauliflowers vegetable growers have been selected randomly for the study.

The estimation of cost, returns and profitability of selected cauliflowers vegetable growers were achieved by simple tabular analysis. The objective to study the cost of cultivation of vegetables, the standard cost concept i.e. Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1, Cost C_2, and Cost C_3 used and input-output ratio was worked out.

Cost A_1: All actual expenses incurred in production by producer. The following items are included in cost A_1

1. Value of Hired human labour (HL)
2. Value of hired and owned bullock labour (BL)
3. Value of hired and owned machine labour (ML)
4. Value of seeds
5. Value of insecticides and pesticides
6. Value of manures
7. Value of fertilizers
8. Irrigation charges
9. Depreciation on implements and farm building
10. Land revenue, cesses and other taxes
11. Interest on working capital
12. Miscellaneous expenses

Cost A_2: Cost A_1 + Rent paid for leased-in land
Cost B_1: Cost A_1 + interest value of owned fixed capital assets
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 on account of managerial functions performed by farmers.

Gross and net returns

Gross returns

Gross returns of the farmers under the present study were estimated from returns obtained from sale of main produce.

Gross returns = Value of main produce + Value of by produce

Net returns

Net returns were computed at different costs i.e. Cost A_1, Cost A_2, Cost B_1, Cost B_2, Cost C_1, Cost C_2, and Cost C_3 by deducting respective costs from the gross returns.

Input- output ratio

It is ratio between the value of gross output and the cost of cultivation at different cost. The input output ratio was worked out with reference to cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3. The importance of working input output ratio with reference to cost was taken on in to account to judge the efficiency of farm input.

Table 1: Per hectare input utilization of cauliflower growers. (Rs/ha.)

Sr. No.	Particulars	Unit /ha		Small	Medium	Large	Overall
1	Hired Human Labour	Male	Days	20.09	25.44	25.52	23.26
		Female	Days	51.04	27.2	68.02	56.56
2	Bullock Labour		Days	8.6	8.4	8.64	8.74
3	Machine Charges		Hrs	3.21	3.1	2.95	2.84
4	Manure		Qtl.	5.29	6.75	5.06	5.31
5	Seeds		Kg	0.65	0.66	0.65	0.64
6	Fertilizers	N	Kg	106.12	106.88	105.33	106.16
		P	Kg	48.62	47.94	57.69	51.05
7	Family Human Labour	Male	Days	18.45	23	23.41	21.04
		Female	Days	26.12	28.72	31.41	28.52

It is seen from the Table 1. that per hectare hired human labour utilization was observed in small, medium and large group were 20.09, 25.44, 25.52 days respectively and at overall level it was 23.26 labour days. It is observed that the hired human labour utilization was highest in large group. Among the groups, the utilization of hired female labour was observed highest in large size group followed by medium and small size group i.e.68.02, 27.2, 51.04 days respectively and at overall level it was 56.56 days.

The bullock labour utilization was observed highest in large size group i.e. 8.64 pair days followed by small and medium size group were 8.6 and 8.4 pair days respectively and at overall level it is 8.74 pair days.

The average per hectare utilization of machinery was found to be highest in small size group (3.21 hours) followed by medium size group (3.1 hours) and large size group (2.95 hours) and at overall level it is 2.84 hours.

In medium size group per hectare utilization of seed was highest i.e. 0.66 kg and at overall level utilization of seed was 0.64 kg per hectare, for small and large it was 0.65 kg and 0.65 kg per hectare.

The farmers of medium size group used more amount of manure i.e. 6.75 quintal per hectare followed by large 5.06 quintal per hectare and small 5.29 quintal per hectare group and at overall level it was 0.65 quintals per hectare. It is observed that amongst all three land holding groups per hectare nitrogenous fertilizer was observed highest in small size group i.e. 106.12 kg followed by medium and large group i.e. 106.88, 105.33 kg fertilizers and at overall level it was 106.16 kg per hectare. It is observed that amongst all three land holding groups per hectare phosphorus fertilizer was observed highest in large size group i.e. 57.69 kg followed by small and medium group i.e. 48.62, 47.69 kg fertilizers and at overall level it was 51.05 kg per hectare.

Cost of Cultivation of cauliflower growers

An analysis of cost would enable the farmers to re-examine the utilization of farm resources effectively. Various cost concepts such as cost A_1, A_2, B_1, B_2, C_1, C_2 and C_3 were estimated.

Per hectare cost of cultivation of cauliflower growers

The per hectare cost of cultivation of cauliflower growers were workout and presented in Table 2.

The estimation of cost helps us to known the profitability of the crop enterprises. The per hectare cost of cultivation of small group of cauliflower growers was work out and the results are presented in table 2. It is observed that per hectare cost of cultivation of cauliflower for small group of farmers at total cost i.e. cost "C_3" was Rs. 65450. Among all the expenses incurred in cost "C_3" the highest 20.10 per centage share was rental value of land fallowed by hired human labour (12.7%) and seeds (15.71%). The percent share of Cost "A_2" and Cost "B_2" were Rs (56.74%) and Rs (79.28%) in total cost respectively. The cost of cultivation of cost "A_2" was observed Rs. 37138 and at cost "B_2" Rs. 51890.

It is revealed from the table 2. that per hectare cost of production at cost "A_2" of selected medium cauliflower growers was found Rs. 44282 and the share in total cost i.e. cost "C_3" was 57.32 per cent. it is observed that per hectare cost of cultivation of cauliflower at "B_2" cost was Rs. 62235 and the per cent share at cost "C_3" was 80.56 per cent. It is observed from the table 2, that the per hectare cost of cultivation in medium growers at cost "C_3" was Rs.77248. Among all the expenses incurred in cost "C_3" the percentage share of rental value of land was the highest (20.37%) followed by hired human labour (16.29%).

Table 2: Per hectare cost of cultivation of selected cauliflower growers (Rs/ha)

Sr. No.	Input	Unit	Small	Medium	Large	Overall
1	Hired human labour	Days				
	Male		3220 (4.91)	4580 (5.92)	4988 (5.81)	4147 (5.47)
	Female		5104 (7.79)	8016 (10.37)	10884 (12.67)	7683 (10.14)
2	Bullock Pair	Days	2804 (4.28)	1566 (2.02)	2533 (2.95)	3763 (4.97)
3	Machinery	Hrs.	2125 (3.24)	1275 (1.65)	2525 (2.94)	1980 (2.61)
4	Seed	Kg	10287 (15.71)	11338 (14.67)	11316 (13.18)	10910 (14.41)
5	Manure	Qtl.	2645 (4.04)	2700 (3.49)	2541 (2.95)	2644 (3.49)
6	Fertilizers	Kg				
	N		2334 (3.56)	2565 (3.32)	2535 (2.60)	2644 (3.49)
	P		1167 (1.78)	1306 (1.69)	1396 (1.62)	1277 (1.68)
7	Irrigation		309 (0.47)	410 (0.53)	560 (0.65)	470 (0.62)
8	Plant protection		3142 (4.80)	2967 (3.84)	2650 (3.08)	2921 (3.85)
9	Incidental charges		69.41 (0.10)	56.94 (0.07)	104 (0.12)	75.84 (0.10)
10	Repairing charges		367.5 (0.56)	413 (0.53)	404 (0.47)	392.40 (0.51)
11	Int. on working capital @6% per annum		2067 (3.15)	2455 (3.17)	2778 (3.23)	2394 (3.16)
12	Depreciation		531 (0.81)	856 (1.10)	345 (0.40)	579 (0.76)
13	Land revenue		82.54 (0.12)	95.44 (0.12)	79.63 (0.09)	85 (0.11)
14	COST A_1		37138 (56.74)	44282 (57.32)	49518 (57.67)	42953 (56.73)
15	**Rental value of leased in land**					
16	COST A_2		37138 (56.74)	44282 (57.32)	49518 (57.67)	42953 (56.73)
17	Int. on fixed capital @10% per annum		1592 (2.43)	2217 (2.87)	1475 (1.71)	1735 (2.29)
18	COST B_1		38730 (59.17)	46499 (60.19)	50994 (59.39)	44688 (59.02)
19	Rental value of land		13159 (20.10)	15736 (20.37)	17638 (20.54)	15923 (21.03)
20	COST B_2		51890 (79.28)	62235 (80.56)	68633 (79.94)	60612 (80.06)
21	**Family Human Labour**					
	Male		3691 (5.63)	3680 (4.76)	4700 (5.47)	3933 (5.19)
	Female		3918 (5.98)	4308 (5.57)	4712 (5.48)	4278 (5.65)
22	COST C_1		46341 (70.80)	54487 (70.53)	60406 (70.36)	52900 (69.87)
23	COST C_2		59500 (90.90)	70224 (90.90)	78045 (90.90)	68824 (90.91)
24	10% Of Cost C_2		5950 (9.09)	7022 (9.08)	7804 (9.08)	6882 (9.09)
25	COST C_3		65450 (100)	77246 (100)	85850 (100)	75706 (100)
	Gross income		79451	97266	106311	97555

(Figures in parentheses indicates the percentages to cost C_3)

It is observed from the table 2, that the per hectare of cultivation of cauliflower for large size group of farmers was found Rs.49518, Rs.68633 and Rs.85850 at cost "A_2", cost "B_2" and cost "C_3" respectively. It is observed from the table 2, that the per hectare cost of cultivation of cauliflower for overall farmers group was found Rs.42953, Rs.60612 and Rs.75706 at cost"A_2", cost "B_2" and cost "C_3", respectively. The percentage share cost "A_2" and cost "B_2" was 56.73 per cent and 80.06 per cent in total cost "C_3".

Per hectare cost, returns and profitability from cauliflower

The per hectare cost and returns of the cauliflower was workout are presented in Table 3.

Table 3: Per hectare cost, returns and profitability from cauliflower. (Rs/Ha.)

Sr. No.	Input	Small	Medium	Large	Overall
1	Yield (q/ha)	23	24	22.5	22.02
2	Gross return (Rs)	79451	97266	106311	97555
	Value of main produce	79451	97266	106311	97555
3	**Costs (Rs)**				
	COST A_1	37138	44282	49518	42953
	COST A_2	37138	44282	49518	42953
	COST B_1	38730	46499	50994	44688
	COST B_2	51890	62235	68633	60612
	COST C_1	46341	54487	60406	52900
	COST C_2	59500	70224	78045	68824
	COST C_3	65450	77246	85850	75706
4	**Net Return**				
	COST A_1	42312	52984	56792	54602
	COST A_2	42312	52984	56792	54602
	COST B_1	40720	50767	55316	52866
	COST B_2	26557	35827	67014	46120
	COST C_1	33110	42779	45904	44655
	COST C_2	18946	28083	29884	29828
	COST C_3	12895	21164	15614	21107
5	**Input-Output ratio**				

	COST A_1	2.15	2.19	2.15	2.2
	COST A_2	2.15	2.19	2.15	2.2
	COST B_1	2.06	2.09	2.09	2.1
	COST B_2	1.5	1.5	1.58	1.6
	COST C_1	1.72	1.78	1.76	1.8
	COST C_2	1.31	1.41	1.39	1.4
	COST C_3	1.19	1.28	1.17	1.2

It is revealed from the table 3, that the highest gross returns (Rs.106311) were observed in large farmer followed by medium (Rs.97266), small (Rs.79451) and overall (Rs.97555) group of farmers. On the other side net returns at cost A_2 were Rs.37138, Rs.44282, Rs.49518 and Rs. 42953 in case of small, medium, large and overall farmers. The Table 3, indicates that the per hectare production of cauliflower for small, medium and large farmer was 23.00 qt, 24 qt and 22.5 qt respectively. At overall production was 22.02 qt/ha. The average per hectare net return received by the small, medium and large cabbage growers were Rs. 12895, Rs. 21164 and Rs.15614. At an overall the net returns were Rs.21107. The benefit cost ratio at cost C_3 was 1.19, 1.28 and 1.17 for small, medium and large farmer respectively. The overall output-input ratio was 1.2. It indicates that the cauliflower cultivation was profitable crop enterprise.

Conclusion

The average yield of cauliflower was 22 qt/ha at overall level. It is observed that per hectare cost of cultivation of cauliflower at cost C_3 at overall level was Rs. 75706. The gross returns from cauliflower were Rs. 97555 at overall level. The average yield (Rs/ha) from cauliflower was Rs. 97555 at overall level. The average yield and gross returns per hectare increased with the increase in size of farms. The input-output ratio at cost C_3 for cauliflower was 1.2 at overall level. This indicate that, cultivation of cauliflower was economically profitable.

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