



ISSN (E): 2277-7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2023; SP-12(11): 180-184  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 07-09-2023  
Accepted: 12-10-2023

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## An economic analysis cauliflower production in Kondagaon district of Chhattisgarh state

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### Abstract

Being a plentiful and affordable source of vitamins and minerals, vegetables play a significant role in the diet of Indian consumers. A research titled "An Economic Analysis of Production and Marketing of cauliflower Crop in Kondagaon district" has been made in an effort to answer this question. The study was carried out to achieve the particular goal. work out the cost and return of cauliflower crop in study area. The Kondagaon district of Chhattisgarh is where the current study was carried out. Based on the size of their holdings, 100 farmers were chosen from the two blocks of Kondagaon and Pharsgaon and divided into marginal, small, medium, and big farmers. For the years 2020–21, the primary data were gathered. The main conclusion of this study showed that the average farm size was calculated to be 2.35 hectares. Cropping intensity was reported to be 183.60 percent overall. Approximately 36.28, 33.81, and 29.89% of the total planted land was taken up by kharif, rabi, and zaid crops, respectively. Cauliflower had cultivation costs per hectare that, on average, were Rs. 113464 respectively. In the profitability of cauliflower crop were estimated and found to be at input-output ratio 1:2.66 On an overall basis Gross returns (total income) was observed to the Rs. 256500/ha, while net returns was found to be Rs. 143036/ha and overall production of cauliflower crop was 900 Rs./q.

**Keywords:** Gross returns, net returns, input-output ratio

### Introduction

Vegetables are one of the important aspects of the horticulture sector of India in particular and of the agricultural sector of India in general. Various factors have led to the rise in the area under production of vegetables in India. The productivity of vegetable in India has been rising from last many year. All this has happening because of the factors like increasing per capita income, urbanization, increasing health consciousness, increasing working women, shifting of farmers in growing higher value vegetables due to higher returns and increasing annual growth rate of vegetable India. Due to their short lifespan, high output, nutritional diversity, economic viability, and capacity to create both on-and off-farm jobs, vegetables are crucial components of Indian agriculture and the country's ability to ensure adequate dietary security. India is the second-largest producer of fruits and vegetables in the world. With a total production of 333.3 million tone horticultural crops (2021-22). a decrease of about 1.35 million tonne (Decrease of 0.4%) over 2020-21. Over 92 percent of the country's entire horticultural output consists of fruits and vegetables. Vegetables grown in India are Potato, Tomato, Brinjal, Cauliflower, Onion, Cabbage, Okra, Pea, Bean, Cucumber and Garlic, Okra. The major vegetable crops are Tomato (845 ha.) grown round the year in state followed by Potato (2203 ha.), Onion (1624 ha.), other vegetables (1517 ha.) the year 2020-21 (Table 1.2). Besides other vegetables are also grown in the state in limited area similarly chilli (702 ha.) is a major spices grown all over the state followed by Coriander (656 ha.) and Ginger (205 ha.).

Cauliflower (*Brassica oleracea* L. Var. *botrytis*) is generally characterized nitty-gritty as one of the most delicious and delicious vegetable of the Cole crops. Cauliflower consists of a good source of vitamin A and vitamin B, Carbohydrate (5.2%), protein (2.7%), and fat (0.2%). Cooked cauliflower contains large amount of vitamin B and a fair amount of protein in comparison to other Cole crops. It is one of the most popular vegetables in the world. It is grown throughout the world especially in China, India, USA, Spain, Italy, Mexico and France due to sine qua non its higher nutritional value and widespread cultivation. In India during 2017-18 cauliflower was grown in an area of 452.59 hectares with a production of 8668.22 tonnes and productivity was about of 19.15 Metric ton per hectares (source – Horticulture statistics at a glance 2018).

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Chhattisgarh accounts for 5.06 percent of total production of Cauliflower in the country and is producing about 20 million tones of cauliflower from an area of about 9225 million hectare with productivity of 19.50 million ton.

### Material and Methods

Sampling technique of Kondagaon district of Chhattisgarh was purposively chosen as the study area because, it has the larger area under cauliflower crop in the district.

A multistage simple random sampling technique (SRS) was adopted to select the villages and the respondents, different farmer involved in production and marketing of cauliflower crop Kondagaon district. The details of the sampling techniques at various stages are given as under:

### Costs and returns of vegetable cultivation

#### Estimation of different cost

Despite the costs & return was worked out by old concepts, a standard method of cost of cultivation of major vegetable crops 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 = It includes the following items

- Wages of permanent labour.
- Wages of hired human labour.
- Wages of hired bullock labour.
- Imputed value of owned bullock labour.
- Imputed value of owned machinery.
- Charges of hired machinery.
- Imputed value of owned seed.
- Market rate of seed.
- Imputed value of owned manures.
- Market value of manures and fertilizers.
- Irrigated charges.
- Market value of pesticides, herbicides etc.
- Interest on working capital.
- Depreciation charges on machinery, farm implements etc.
- Land revenue, cess etc.
- Miscellaneous charges.

Cost A2 = Cost A1+ Rent paid for leased in land.

Cost B1 = Cost A1+ Interest on value of owed capital assets (excluding Land)

Cost B2 = Cost B1+ rental value of owned land (Net of land revenue) and paid for leased in land.

Cost C1 = Cost B1+ Imputed value of Family Labour. Cost

C2 = Cost B2 + Imputed value of family Labour.

Cost C3 = Cost C2 + value of management input at 10% of cost C2.

### Farm business measures

Gross income = Value of total output

Family labour income = Gross Income – Cost B2

Farm investment income= Farm business income-Imputed value of the family labour

Benefit cost ratio= Net returns/Total cost of Cultivation

Cost of production= Total Cost/ yield

Net income = Gross income – Total expenses

**Farm business income:** Farm business income is defined as the difference between gross income and the cost A1 or cost A2.

Farm business income = Gross income - the cost A1 or cost A2

**Input – output ratio:** It can be expressed as the ratio of output to input. The ratio will be calculated as.

Input – output ratio = O/I

Where,

I = Total input cost in Rs./qtls

O = Total output value in Rs.

### Result and Discussion

#### The cost and returns of cauliflower in the study area

##### Cost of cultivation

The cost of growing the cauliflower crop is shown in Table 1. It is abundantly obvious that large farms incurred higher costs per hectare of cauliflower production than did small ones. Cauliflower's total production cost per hectare was found to be, on average, Rs. 113464. Large farms had greater production costs (Rs. 137732/ha) than marginal farms (Rs. 87621.7/ha), small farms (Rs. 105864/ha), and medium-sized farms (Rs. 121640/ha). As the size of the farm increased, the price of agriculture per hectare indicates an upward tendency. This resulted from larger farmers spending more on resources for modern farming, such as improved seeds, fertilizers, and supplies for plant protection.

##### Yield and Income from cauliflower cultivation in selected study area

The average gross profits from cauliflower cultivation at per hectare were computed using the market price of Rs. 900per quintal and total gross return from cauliflower was found to be Rs. 256500/ha. The total from business earnings, family labour income and farm investment income were estimated to be Rs. 163836/ha. Rs. 137923/ha. Rs. 145448/ha. It is concluded that as farm size increases, so does the net return. The average cauliflower yield hectare was 210quintal/ hectare.

The table 2 below shows the productivity, cost of cultivation and cost of production of cauliflower for different group of sampled farmers in study area. Show this fig 1.

**Table 1:** Cost of cultivation of cauliflower in selected study area

S. No	Particulars					
		Variable Cost	Marginal	Small	Medium	Large
A.	<b>Material input Cost</b>					
1	Seed (Kg/ha)	4580.34 (7.04)	6570.65 (8.11)	7690.41 (8.13)	7800.6 (5.70)	6960.76 (8.00)
2	Manure	8900.22	9700.6	10520.5	11600	10180.7
	FYM/Compost (ton/ha.)	(13.69)	(11.97)	(11.12)	(10.82)	(11.71)
3	<b>Fertilizer (kg/ha)</b>					
	Urea	650.17 (1.00)	670.43 (0.82)	700.12 (0.74)	750.92 (0.70)	692.5 (0.76)
	DAP	2520.98 (3.87)	2988.23 (3.68)	2889.06 (3.05)	3325 (3.10)	2930.5 (3.37)
	MOP	2201.56 (3.38)	2149.05 (2.65)	2450.90 (0.25)	2449.5 (2.28)	2312.25 (26.80)
	Total	5371.31 (8.26)	5807.23 (031)	6039.02 (6.38)	6524.14 (6.08)	5935.25 (6.82)
4	Plant protection	11550.65	17650.72	21580.27	24500.7	20570
	Chemical and	(17.76)	(21.78)	(22.82)	(22.86)	(23.66)
	Herbicide Irrigation Charge	1570.11	2255.61	2535.69	2700.86	2265.97
		(2.41)	(2.78)	(2.68)	(2.52)	(2.60)
	Human Labour	25527.07	28750.27	30075.26	33450.9	29450.5
	(day/Rs./ha)	(39.26)	(35.49)	(31.81)	(31.21)	(33.87)
	Family labour	31450.82	22855.54	12745.37	6500.25	18387.5
		(48.37)	(28.21)	(13.48)	(6.06)	(22.15)
	Hired labour	22450.03	35680.33	45560.13	54000.3	39422.5
	Machine power	(34.53)	(44.04)	(48.19)	(50.39)	(45.35)
	Used Machine power	65009.21	6700.18	6900.78	7000.98	6775.08
	used Charge(Rs./ha)	(100.0)	(8.27)	(7.29)		
D.	Interest on	2382.37	3382.2	4231.4	4912.05	3726.9
	Working Capital	(3.66)	(4.17)	(4.47)	(4.58)	(4.28)
	Total Operational	65009.23	81007.2	94531.4	107162	86927.4
	Costs	(74.19)	(76.52)	(77.71)	(77.24)	(76.61)
<b>B. Fixed Costs</b>						
1	Depreciation	545.43 (0.62)	585.52 (0.55)	632.27 (0.519)	688.98 (0.49)	612.5 (0.53)
2	Land Revenue	12.00 (0.00)	12.00 (0.00)	12.00 (0.00)	12.00 (0.00)	12.00 (0.00)
3	Rental Value of	20000.50	22000.30	24000.19	28000.3	23500.6
	Owned Land	(22.82)	(20.78)	(19.73)	(20.18)	(20.71)
4	Interest on Fixed	2055.7	2259.7	2464.4	2870.78	2412.45
	Capital (IOFC)	(2.34)	(2.13)	(2.02)	(2.06)	(2.12)
	Total Fixed Cost	22612.7 (25.80)	24856.7 (23.47)	27108.4 (22.28)	31570.8 (22.75)	26537.6 (23.38)
	Total Cost	87621.7 (100)	105864.8 (100)	121640.4 (100)	136732 (100)	113464 (100)

**Table 2:** Cost of cultivation of cauliflower in term of cost concepts in selected study area

Yield and Income	Marginal	Small	Medium	Large	Overall
Cost of cultivation	87621.7	105864	121640	138732	113464
Yield (q/ha)	210	260	300	350	285
Price (Rs./q)	900	900	900	900	900
Gross return (Rs./ha)	189000	234000	270000	333000	256500
Net Return (Rs./ha)	101378	128136	148360	194268	143036
Farm business income(Rs./ha)	134884	153251	163570	203638	163836
Family labour income	112828	128991	137105	172768	137923
Farm investment income(Rs./ha)	103434	130396	150825	197138	145448
Cost of production(Rs./q)	417.246	407.169	405.467	374.951	398.119
Input - Output ratio	1:2.16	1:2.21	1:2.22	1:2.40	1:2.26

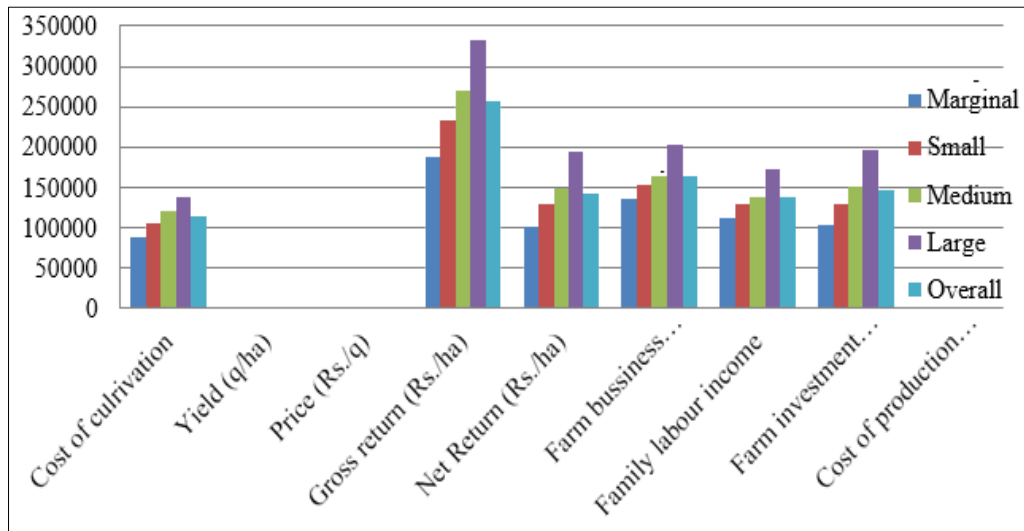


Fig 1: Graph depicting costs and returns of cauliflower in study area of different farmers

**Cost of cultivation of cauliflower in terms of Cost Concept in selected study area**

The table 3 the results of an evaluation of the various concepts used in cauliflower economic analysis. The overall Cost A1 and Cost A2 is 69164.4/h and 92664.4/ha as show in the table. Cost B1 and Cost B2 were 95076.9/ha and 118577/ha respectively. Cost C1 and Cost C2 per hectare anticipated to be Rs. 113464/h and Rs. 136964/ha respectively. Cauliflower cost per hectare on various farms revealed erratic patterns. Show this fig 2

Table 3: Cost of cultivation of cauliflower in terms of cost concept in selected study area

Items	Marginal	Small	Medium	Large	Overall
Cost A1 (Rs/ha.)	34116	58749.2	82430.4	101362	69164.4
Cost A2 (Rs/ha.)	54116	80749.2	106430	129362	92664.4
Cost B1 (Rs/ha.)	56171.7	83008.9	108895	132232	95076.9
Cost B2 (Rs/ha.)	76171.7	105009	132895	160232	118577
Cost C1 (Rs/ha.)	87621.7	105864	121640	138732	113464
Cost C2 (Rs/ha.)	107622	127864	145640	166732	136964
Cost C3 (Rs/ha.)	118384	140650	160204	183405	150661

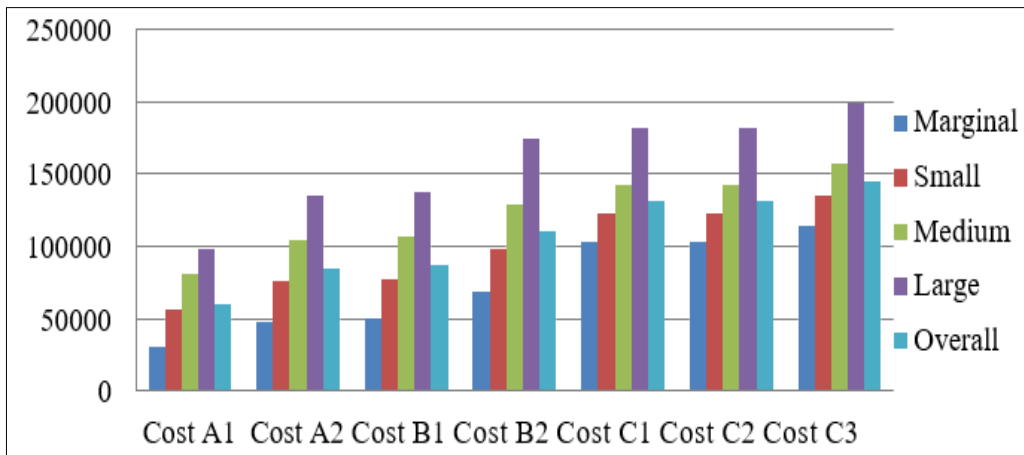


Fig 2: Cost of cultivation of cauliflower of different size of sample household

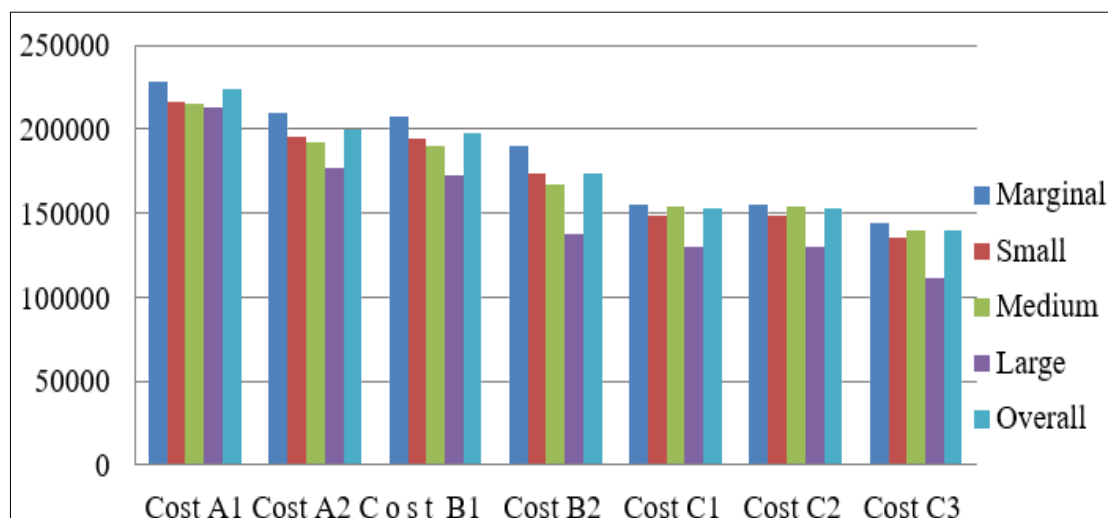
**Return over different costs on sample farms**

For specific farm types, returns on various costs were also measured and concluded in the table 4 the table state that

income over cost A1, A2, B1, B2, C1, C2 and C3 at overall level were 187336, 163836, 161423, 137923, 143036, 119536, 105839 respectively. Show this fig 3

Table 4: Returns over different cost in selected study area

Items	Marginal	Small	Medium	Large	Overall
Cost A1 (Rs/ha.)	154884	175251	187570	231638	187336
Cost A2 (Rs/ha.)	134884	153251	163570	203638	163836
Cost B1 (Rs/ha.)	132828	150991	161105	200768	161423
Cost B2 (Rs/ha.)	112828	128991	137105	172768	137923
Cost C1 (Rs/ha.)	101378	128136	148360	194268	143036
Cost C2 (Rs/ha.)	81378.3	106136	124360	166268	119536
Cost C3 (Rs/ha.)	70616.1	93349.7	109796	149595	105839



**Fig 3:** Cost and return over different costs on Sample farmers

### Suggestion

- Disease and pest resistant varieties should be planted, and strong technical information for enhanced packaging and vegetable crop practises, as well as information on regular fertilizer doses, should be supplied.
- Information about the market should be distributed to all farmers.
- For effective marketing, marketing infrastructures should be established.
- Farmers should be more engaged in activities such as demonstrations, training programmes, and exhibitions.
- All business issues should be given full consideration by market relevant authorities.
- For a higher return on fertilizer, human labour, and interculture, proper allocation and amount of increase must be practiced
- To solve constraints and connect vegetable growers to markets, the government should foster collaboration between research institutes, agricultural universities, non-governmental organizations, and private industry.
- The government should help to develop the market and raise awareness about the benefits of including healthy vegetables in one's diet.
- To improve performance and achievement, horticultural crop producer cooperative groups should be founded.
- Transportation management should be adequate to allow producers easy access to the processing plant.

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