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Economics of production and marketing of cauliflower in Indore district of Madhya Pradesh

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Abstract

India is the second largest producer of fruits and vegetables in the world and the leading in several horticultural crops namely Mango, Banana, papaya, cashew nut, areca nut, potato and okra. The scenario of horticulture crops in India has become very encouraging. The percentage share of horticulture output in agriculture sector has become more than 30 percentage of the nutritional intake from fruits and vegetables is higher among urban population than that rural population. As Cauliflower has been recognized as an important food article due to its palatable taste and rich supply of minerals (potassium, sodium, phosphorus, iron, calcium and manganese), vitamin B and C, protein, carbohydrates and dietary fibre. With this view a study was conducted in Indore district of Madhya Pradesh on economic analysis of cauliflower production to know the cost of cultivation, profitability of the crop, marketing costs, marketing margins and problems faced by the producers in the selected area. The study revealed that average cost of cultivation of cauliflower per hectare was incurred Rs. 71311.02 which was found to be Rs. 66803.44 and Rs. 75818.6 per hectare on small and medium farms respectively. The paper analyzed that an average cauliflower cultivating in the area spent of total cost 23.34 percent on manures and fertilizers, 11.23 percent on hired human labour and 10.10 percent on farm machineries realized net returns of Rs.73888.98 per hectare. This marginal may be due to the fact that the value of BCR has reached at maximum (2.08) only at the medium sized farm categories. On an average cauliflower production was found to be 181.5 qt/ha. Gross income from the cauliflower production of the selected farmers was observed to be Rs. 132000 in small size farmers Rs. 158400 in medium size farmers. Benefit cost ratio was observed to be 1:2.03. Three channels were observed in marketing of cauliflower in the study area. It was observed that Producer's share in consumer's rupee was 94.11% in channel -I (Producer – Consumer), 80.00% in channel-II (Producer-Retailer-Consumer), 66.66% in channel-III (Producer – Wholesaler – Retailer – Consumer). The study also revealed that storage facilities and malpractices, low price at peak period, lack of market information communication problem etc., were the major constraints in production and marketing of cauliflower faced by the respondents in the study area.

Keywords: Cauliflower, cost and revenue, marketing channel, constraints analysis, Madhya Pradesh

Introduction

Horticultural crops play a unique role in Indian economy by improving the income of the rural people. India, with its diversified soil and climate comprising several agro- ecological regions, provides the opportunity to cultivate different crops and varieties of horticultural crops. Investment in agricultural both in public and private sectors has increased and agricultural production has achieved reasonable growth rate. This growth rate has not only to be maintained, but accelerated fluctuations in agricultural production have to be minimized. Cultivation of crops is a labour intensive and as such it generates employment opportunities to rural people. In order to overcome the present situation, the crop cultivation is an effective instrument for generating greater income per unit area, additional employment, provision of nutritive and pretentious diet and conservation of shifting cultivation. To improve income, provide gainful employment and save natural resources from degradation, diversification from grain crops to high-value crops like vegetables has emerged as an important strategy for agricultural growth (Sekhon and Kaur, 2004) ^[1]. Growing demand for fruit and vegetables induced by rising incomes and changing consumption patterns coupled with declining farm incomes due to rising costs and stagnating food grain productivity has necessitated diversification towards high- value crops in recent times. Apart from income enhancement, these high-value crops have potential to generate additional employment opportunities in farming due to their labour – intensive character (Weinberger and Lumpkin, 2006) ^[2]. Among the vegetable crops, cauliflower (*Brassica oleracea* var. botrylts) is one of the most important and popular winter vegetable.

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It's an amazing vegetable which plays an important role in human diet for high nutrition value and with added taste. Cauliflower is a crop which is grown three times in a year as early, mid & late season crops which further offer great opportunity of income and employment generation to the community which are mainly involved in its cultivation. Since, prices of inputs like seeds, manures, fertilizer, chemical, irrigation and labour charges are increasing every year.

Global production of cauliflower (combined with broccoli) was 25.5 million tonnes, led by China and India which combined, had 73 percent of world total. Secondary producers having 0.4-1.3 million tonnes annually were the United States, Spain, Mexico and Italy. The vegetable production in India has touched a new height in recent years, placing it as the second largest producer with 169.478 million metric tonnes in the world, 14.0% of the total world production of vegetables. The area under cultivation of vegetables is 9.542 million hectares. India is the second largest producer of cauliflower in the world. It acquires about 6 percent (Indian Horticulture database) in overall vegetable production. West Bengal, Madhya Pradesh, Bihar, Punjab, Uttar Pradesh and Karnataka are major cauliflower growing states in India. In Madhya Pradesh cauliflower is cultivated in about 25,747 ha area with production of 72,503 tonnes and productivity about 28.16 qt/ha (MP horticulture 2013-14). In Indore district of Madhya Pradesh area of cauliflower is about 2255 ha with production of 51065 tonnes and productivity about 23qt/ha (Horticulture Department, Indore district).

Marketing of the vegetables plays an important role as they are highly perishable and high-value products; good and well-structured markets are required. Farmers sell their produce to the commission agents or to the middle man and these are the main reasons for the high marketing costs of vegetables. Thus it is of utmost important to study the economics and marketing practices of Cauliflower cultivation, in order to present the authentic scenario of Cauliflower cultivation. By considering all the facts a study has been conducted in Indore district of Madhya Pradesh with the following set of objectives.

Objectives

1. To determine the cost of production and profitability of cauliflower.
2. To estimate the marketing cost and margin at different levels of intermediaries.
3. To study the major marketing problems and suggestion for upgradation of the system.

Methodology

The study was conducted in Indore district of Madhya Pradesh in the year 2015-16. Depalpur, Sanwer, Indore and Mhow are the four blocks of Indore district out of which Sanwer block was selected purposively as it has the maximum area under cauliflower cultivation. Multistage stratified random sampling techniques was adopted to select the block, villages and the cultivators, market and different market functionaries involved in marketing of cauliflower in Indore district. Three stage stratified random sampling procedure was adopted for the selection of ultimate sampling unit of cauliflower growers from selected villages. Five villages were selected from the block purposively.

First stage was selection of district, second stage selection of block and third stage was selection of villages and farmers.

The cauliflower producing farmers were then categorized as small (0-2 ha.), medium (2-4ha.) and large (above 4 ha.), based on land holding size of the farmers. 18 farmers from each selected villages were selected randomly among three size groups. Thus total 90 respondents were considered for detail investigation. The data was collected through well-structured the pre tested interview schedule. The schedule comprised over general profile of respondent, cost of cultivation, returns, production and marketing constraints of cauliflower. Secondary data related to background of the study area were collected from Horticulture and Food Processing Department, Madhya Pradesh and Horticulture department of Indore district.

Analytical tools used

Costs concepts

Costs concepts commonly used farm management studies were followed in this present study.

Cost A_1 = All actual expenses in cash and kind incurred in production of cauliflower.

This cost includes the expenditure on following items.

- i. Hired human labour including male and female
- ii. Bullock labour
- iii. Machine labour
- iv. Value of planting material
- v. Value of manures
- vi. Value of fertilizer
- vii. Value of plant protection
- viii. Irrigation charges
- ix. Land revenue and taxes
- x. Depreciation on implements
- xi. Repairs and hiring of implements
- xii. Interest on working capitals

Cost A_2 = cost A_1 + rent paid for leased in land

Cost B_1 = cost A_2 + interest on fixed capital (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% of cost C_2 (As managerial cost)

Profitability aspects

For the estimation of profitability, the following income measures will be used.

- a) Net farm income (NFI) = Gross income – Cost C_3 (total cost)
- b) Family labor income (FLI) = Gross income – Cost B_2
- c) Farm business income (FBI) = Gross income – Cost A_1
- d) B: C ratio (Benefit cost ratio) = Gross income / Gross expenses
- e) Marketing costs:

$$MC = C_f + C_{m1} + C_{m2} + \dots \dots \dots C_{mn}$$

Where,

MC = Total marketing cost

C_f = Cost paid by the producers from the time the produce leaves the farm till he sells it,

C_{mi} = Cost incurred by the i^{th} middleman in the process of buying and selling the product.

Result and discussion

Per hectare cost of cultivation of small and medium farmers are summarized in table 1. A group wise comparison between

small and medium size farms showed that medium farms have made higher investment than small farms. It was due to higher investment capacity for different inputs. It varied between Rs. 75818.6 per hectare on medium farms and Rs. 66803.44 per hectare on small farms. Average cost of cultivation was observed to be Rs. 71311.02. Among various components of operational costs manures and fertilizers accounted for 23.34

per cent of the total cost followed by expenditure on hired labour 11.23 per cent, family labour 9.76 per cent, seed 6.50 per cent, irrigation charges 6.06 per cent, rental value of owned land 4.55 per cent, plant protection 5.15 per cent. The table indicates that cost of cultivation of cauliflower per hectare showed an increasing trend with the increase in the size of farms.

Table 1: Cost of cultivation of Cauliflower per hectare on the basis of cost concepts.

Particulars ↓ Categories →		Small (0-2 ha)	Medium (2-4 ha)	Average (Rs./ha)
Cost -A ₁	Hired Human Labour	7812 (11.69)	8211 (10.83)	8011.5 (11.23)
	bullock labour	810 (1.21)	918 (1.21)	864 (1.21)
	Farm Machinery	6871 (10.29)	7624 (10.06)	7247.5 (10.16)
	Seed	4145.4 (6.21)	5125 (6.76)	4635.2 (6.50)
	Manure (FYM) & fertilizer	15765 (23.60)	17530.00 (23.12)	16647.5 (23.34)
	Plant protection chemicals	3058 (4.58)	4286 (5.65)	3672 (5.15)
	Irrigation charges	4351 (6.51)	5147 (6.79)	4749 (6.66)
	Interest on working capital	2156.48 (3.21)	2473.02 (3.26)	2314.75 (3.24)
	Depreciation	2975 (4.45)	2794 (3.69)	2884.5 (4.04)
	Land revenue	50 (0.07)	50 (0.07)	50 (0.07)
	Cost- A ₁	47980.4 (71.82)	53611 (70.71)	50795.7 (71.23)
Cost -A ₂	Cost-A ₁ + Rent paid for leased-in land	47980.4 (71.82)	53611 (70.71)	50795.7 (71.23)
Cost -B ₁	Cost-A ₂ + Interest on fixed capital @ 10%	51230.4 (76.69)	58136 (76.68)	54683.2 (76.68)
Cost -B ₂	Cost -B ₁ + Rental value of owned land	54180.4 (81.10)	61676 (81.35)	57928.2 (81.23)
Cost -C ₁	Cost-B ₁ + Imputed value of Family labour	57780.4 (86.49)	65386 (86.24)	61583.2 (86.36)
Cost -C ₂	Cost -B ₂ + Imputed value of Family labour	60730.4 (90.91)	68926 (90.91)	64828.2 (90.91)
Cost -C ₃ *	Cost -C ₂ + 10% of Cost -C ₂	66803.44 (100)	75818.6 (100)	71311.02 (100)

Cost- C₃* managerial cost

* Figure in parentheses shows percentage to the total cost C₃

Table 2 showed that the production (in quintals) of cauliflower per hectare was more in medium sized (198 qt/ ha) group than in small sized groups (165 qt/ ha). On an average 181.5 qt/ha cauliflower production was recorded. The gross income was found to be more in medium sized group with Rs. 158400 than small farmers and an average gross income was Rs. 145200.

Data revealed that as the farm size increased the gross income also increased. Total cost was Rs. 75818.6 more in medium size than in small size Rs. 66803.44 per hectare. The gross income increased with the increase of land size of farms, because the medium sized farmers had incurred higher investment per hectare on modern inputs in the production of cauliflower which in turn resulted in high yield and gross income on these farms. The average net farm income was

worked out to be Rs. 73888.98per hectare and family labour income and farm business income were Rs. 87271.8and Rs. 94404.3 per hectare respectively. The data also revealed that, the average benefit cost ratio of cauliflower production was 1:2.03 and it was observed 1:2.08 and 1:1.97 in medium and small size groups respectively. The return per rupee investment on cauliflower was more in medium sized farm groups. The data showed cost of production of cauliflower per quintal was Rs. 404.86in small and Rs. 382.92in medium sized group. On an average it was observed that, per quintal cost of production of cauliflower was Rs. 392.89. This revealed that cost of production per quintal decreased as the farm size increased. This was due to the higher productivity in higher farm size. This was supported by the result obtained after the study by Pundir and Patel (2013) [3].

Table 2: Yield and Profitability of cauliflower production per hectare.

S. No	Particulars	Small	Medium	Average
1	Production per ha (in quintal)	165	198	181.5
2	Cost C ₃	66803.44	75818.6	71311.02
3	Gross income	132000	158400	145200
4	Net farm income	65196.56	82581.4	73888.98
5	Family labour income	77819.6	96724	87271.8
6	Farm business income	84019.6	104789	94404.3
7	Benefit cost ratio	1:1.97	1:2.08	1:2.03
8	Cost of production per quintal	404.86	382.92	392.89

Channel of marketing

Movement of the produce from producer to ultimate consumer comprises chain of intermediaries, called marketing channel. Different intermediaries are involved in holding of produce through different channels of trade. From the preliminary survey conducted in the study area, it was observed that the marketing of cauliflower was done mainly through following three channels.

Channel – I Producer ---- Consumer

Channel – II Producer--Retailer-- Consumer

Channel – III Producer ---- Wholesaler ----Retailer ---- Consumer

Table 3 indicates the marketing cost, price received by producer, Consumer’s price and Producer’s share in consumer’s price (per cent) of cauliflower. Marketing cost has been increased from channel I (Rs.50) to channel –III

((Rs.170). price received by the farmers remains constant in all the channels. Increase in Consumer's price was recorded Rs. 850, Rs.1000 and Rs.1200 in channel-I, channel-II and channel-III respectively. Channel –III showed less percentage (66.66) of producer's share in consumer's price. It was

observed that channel –III was the most commonly practiced channels through which 75 percent of the cauliflower produced in the district was marketed. This was supported by the result obtained after the study by Ravekar *et al.* (2015) [4].

Table 3: Marketing costs of different channels

S. No.	Particulars	Channel - I	Channel - II	Channel - III
1	Marketing cost (Rs.)	50	75	170
2	Price received by producer (Rs.)	800	800	800
3	Consumer's price (Rs.)	850	1000	1200
4	Producer's share in consumer's price (per cent)	94.11	80.00	66.66

Constraints

Constraints in marketing of cauliflower were analyzed through opinion survey which is shown in table 4. The data revealed that the respondents were facing more problems due to malpractices in the markets and unavailability of storage facility in market which was on an average observed to be

95.55 per cent. Followed by getting low price at peak period (86.66%), lack of market information (85.55%), communication problem (78.88%). The data revealed that, about 75.55 per cent of respondents were having problem with unauthorized charges in market.

Table 4: Constraints in Cauliflower marketing

S. No.	Constraints	Small	Medium	Total	Rank
1	Unauthorised charges	36 (80)	32 (71.11)	68 (75.55)	V
2	Malpractices in market	42 (93.33)	44 (97.77)	86 (95.55)	I
3	Delayed of payment	37 (82.22)	31 (68.88)	68 (75.55)	V
4	Malpractices in market	42 (93.33)	44 (97.77)	86 (95.55)	I
5	Lack of market information	40 (88.88)	37 (82.22)	77 (85.55)	III
6	Inadequate storage facility	43 (95.55)	43 (95.55)	86 (95.55)	I
7	Communication problems	35 (77.77)	36 (80)	71 (78.88)	IV
8	Low price at peak period	41 (91.11)	37 (82.22)	78 (86.66)	II

Figure in parentheses is percentage to the total

Cauliflower is the one of the most important winter vegetable in India. It is grown for its tender heads or curd. India is second largest producer of the cauliflower in the world after China. It is a labour and capital intensive short duration crop which generate the better possibilities for income and employment to the farm family. The study revealed that the yield of cauliflower has been increased as the farm size increased which in turn gave the more income. Increased income helped the farmers to use more inputs which in turn generates employment opportunity. Benefit cost ratio was found more in medium farmers. Benefit cost ratio was also showed the positive result with the increase in farm size this is due to increase in investment. As vegetables are perishable goods marketing of these commodities place important role. The present study depicted that channel –I have showed the highest and less in channel – III in producer's share in consumer rupee as producers located at far distance from the market place. Marketing cost was observed to be more in channel – III this was due to intervention of market intermediaries.

To make cauliflower crop more remunerative, market organization should be strengthened, state government should come forward for more remunerative prices for the cauliflower growers. Though the farmers are producing adequate quantity of cauliflower crop to meet the consumer demand, they are facing problems in marketing of their produce. On the other hand, market intermediaries are getting higher margins by incurring less cost and services. Therefore, in order to regulate the expenditure on commission, transportation and packing, efforts should be made to develop the necessary infra-structure for marketing of cauliflower crops in the state.

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