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Profitability of cabbage in tribal area of Madhya Pradesh

Dr. JK Gupta, Paras Nath Jhariya, Reena Hota and Shilpi Singh

Abstract
Cabbage is an important vegetable grown in mandla tribal district of Madhya Pradesh. The aim of present study is to assess the cost, returns and profitability from cabbage production in different size of farm. A sample of 60 cabbage growers were selected from 5 block of mandla district. Comprises of three size groups, cost of cultivation, net profit, benefit cost ratio technique were used to analysis the collected data. The study review that total cost per hectare in sample farm was Rs 63414.81 which varied between Rs 59141.22 to Rs 68352.19 per hectare. Inverse relation between total cost and farm size were observed. The share of variable cost and fixed cost 28161.96 and 35252.18 Rs/hec. respecticaly. The net profit obtained on sample farm were Rs 143250.00 which also some inverse relation with farm size. The benefit cost ratio on sample farm observed to be 1:2.30 which was higher in opinion minimum in 1:2.23. Thus, tribal farmers earn handsome profit by growing cabbage vegetable on their farms. On the basis of findings of the study it is suggest thus farmers should made constant support scientist of krishi vigyan kndra to adopt package of practice recommend for cabbage crop in the area. Constraints should be minimized to augment the prodnitintg of crop also.

Keywords: cabbage cost and returns profitability, resource use efficiency, price spread, marketing efficiency

Introduction
The vegetable production in India has touched a new height in recent years, placing it as the second largest producer of vegetables the world, next only to China. Vegetable crops in India occupy only 6.8 percent of the total cultivated land (2011-2012). India share 17 percent of world production of vegetable with productivity of 16 tonnes per ha. Which is quite low as compared to many countries. The growing population and the improving economic status in the country have increased vegetables consumption, both across regions and income groups. The present production is not sufficient to meet the requirement of 285 gm. of vegetables per capita per day. At present our per capita availability is around 145 gm per day. Their demand is expected to grow further, requiring the production of 185 million tonnes by 2011-12. The position of Madhya Pradesh in Cabbage production is seventh. Mandla is a largest vegetables producing district. In Mandla 44,656.33 tonnes vegetable produced in the year of 2016-17. The cabbage covers 5,66,990 tonnes production. The major cabbage growing district of Madhaya Pradesh is Shadol, Betul, Chindwara, Ratlam, Balaghat, Jabalpur, Mandla, and Dindori. In mandla cabbage covers 93.66 tonnes production in a year and it shares 19 percent production in Madhya Pradesh.
Therefore, this study was undertaken with the following objective to assess the present scenario of cabbage production and marketing in the State. These objectives were:-

1. To study the economics of cabbage production on the farm of different size groups.
2. To work out the resource use efficiency for cabbage cultivation.
3. To study the price spread and marketing efficiency of various channels in cabbage marketing.
4. To identify the constraints in cabbage production and marketing and suggest measure for minimized them.

Methodology
The cabbage production in Madhya Pradesh is concentrated mainly in districts of Chhindwara, Indore, Rewa, Narsinghpur, Dindori, Betul, Sehore, Jabalpur, Shadol, Mandla, and Seoni. The present study was confined to Mandla district of Madhya Pradesh. This district is purposively selected considering area and facilities available, which will help to researcher to their work.
Mandla block was purposively chosen as the study area as it has the larger area under cabbage cultivation in the district. A multistage random technique was adopted to select the cultivators

randomly in proportionate to area under cultivation of cabbage of under block/village of Mandla district. There are nine blocks in the Mandla district, namely Mandla, Bichhiya, Bijadandi, Ghughri, Mawai, Mohgaon, Nainpur, Narayanganj, and Niwas. At the first Stage Mandla block of Mandla district was purposively selected for the study due to the highest number of cabbage growers and maximum area under cabbage crop. At the second stage, in Mandla block five villages namely Purva, Padmi, Rambag, Sakwah, Bhapsa were selected on the basis of maximum number of cabbage growers and the third stage of selection, list of cabbage growers was prepared in ascending orders according to the size of their land holding. The cabbage producing farmers were then categorized as small (below to 2 ha.) medium (2 to 4 ha.) and large (Above to 4 ha.), based on land holding size of the farmers. 12 farmers from each selected villages were selected randomly among three size groups according to proportional allocation technique, which a total to 60 in number sufficient num of a commission agent, retailer, wholesaler and a consumer well selected to examine the price spread and marketing efficiency of identified of marketing channels. Required primary data collected by survey method use a pre tested interview schedule and a personal interview of the respondent. Following statically tools were employed to analysis the collected data, the required data. All the selected cabbage growers sold their produce through the forwarding agent in the wholesale market. The data pertains to the agriculture year 2017-18.

Profitability concept

1. Gross income: monetary value of a main product and by product.
2. Net income: Gross income – total cost
3. Benefit cost ratio: Gross income/ total cost
4. Cost of production: total cost – value of by product / physical product and

Resource use efficiency

Production function analysis was carried out to examine the productivity and efficiency of different resources of the sample farms. Multiple regression analysis was done to examine the cost — benefit relationship and productivity of farm inputs on cabbage. Cobb - Douglas type of production function was finally fitted which gave the best fit to data. Because of the higher R^2 value obtained in the Cobb-Douglas function, this form was finally retained for economic analysis. Cobb — Douglas production also provided an addition Information regarding returns to scale in farming operation.

The Cobb- Douglas type of production took the form of:

$$Y=AX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}X_6^{b6}X_7^{b7}$$

Where,
Y = Yield of cabbage in quintal, A = Constant,
X_1= Family labour use in days, X_2 = Hired labour use in pair days,
X_3 = Machinery power (Hr), X_4 = Seed (Kg),
X_5 = Fertilizer (Kg), X_6 = Irrigation (No.),
X_7 = Chemical (Kg).

The value of the constant (a) and regression coefficient (bi) in respect of independent variables in the Function have been estimated by using the method of least squares.

Marginal Value Product (MVP)

The marginal value product of inputs was estimated by taking partial derivatives of return with respect to the input concerned, at the geometric mean level of the inputs. The marginal value product (MVP) of each resource was worked out by using the following formula:

MVP with reference to resource Xi = bi

Where,
Y = Geometric mean of gross return of the crop. Xi = Geometric mean off independent variable.
bi = The regression coefficient of independent variable.

After estimating the marginal value of each input, it was compared with its marginal cost.

Marketing pattern of Cabbage

Marketing cost*

Marketing cost includes all the marketing charges from local assembling to retailing of the marketing process.

Marketing margin*

Marketing margin covers all the expenses and profits of the marketing agencies and/ or functionary.

$$\text{Market margin} = (\text{Pmi})\frac{[\text{Pri}-(\text{Ppi}+\text{Cmi})]}{\text{Pri}} \times 100$$

Where,
Pmi = Percentage margin of 1st middle man.
Pri = Total value of receipts per unit (sale price).
Ppi = Purchase value of goods per unit (purchase price).
Cmi = Cost incurred on marketing per unit.

Price spread*

Price spread is the difference between the price paid by the consumer and price received by the farmer.

$$\text{Price spread (P)} = \frac{C-M}{C} \times 10$$

Where,
P = Producer share to the consumers rupee, C = Consumer rupee, M = Marketing cost.

Marketing efficiency*

Marketing efficiency is the ratio of market output (satisfaction) to marketing input (cost of resources). An increase in this ratio represents improved efficiency and a decrease denotes reduced efficiency. A reduction in the cost for the some level of satisfaction. Marketing efficiency is estimated by using Shepherd's formula as given below.

$$\text{ME} = \frac{V-T}{T}$$

Where,
ME = Marketing efficiency V = Value of goods or consumers' price
T = Total marketing cost (marketing cost and marketing margin)

Marketing channels*

Marketing channel is an alternative routes of product flows from producers to consumers.

Results and Discussion

1. Cropping pattern

The cropping pattern of cabbage growers across various size of farm holding and presented in table 1. It is observed from the data that paddy area was more for all the farm size categories. It was found maximum (41.53%) of small category and minimum (28.43%) for medium category in relation to gross cultivated land. The area under soybean crop was not so good, even then, it was maximum (15.09%) under large category and minimum (7.87%) for medium size respondents. The maximum area under okra crop (20.05%) was estimated for medium category followed by large (9.69%) and 8.20 per cent area under okra was observed of small category. The area under wheat was found almost the same for all the categories of farm size viz. small, medium and large. It was found (45.90%) followed by 39.86, 42.04 per cent area under small, medium & large category. The maximum area under chickpea (28.94%) was seen under large category, followed by medium (24.54%). It was found minimum (20.77%) area under large category. The area under cabbage was found under small (28.42%), medium (22.72%) and large (12.16%). The area under *Rabi* crops was estimated for medium (50.71%) followed by small (50.56%) & small (50.00%).

Table 1: Cropping pattern of cabbage growers (ha).

Particulars	Small	Medium	Large	Average
Soybean	0.19 (10.38)	0.31 (7.87)	1.37 (15.09)	0.62 (11.11)
Paddy	0.76 (41.53)	1.12 (28.43)	3.35 (36.89)	1.74 (35.62)
Tur	0.56 (30.6)	0.91 (23.1)	2.06 (22.69)	1.18 (25.46)
Lady fingure (Bhindi)	0.15 (8.2)	0.79 (20.05)	0.88 (9.69)	0.61 (12.65)
Brinjal	0.17 (9.29)	0.81 (20.56)	1.42 (15.64)	0.8 (15.16)
Total Kharif	1.83 (100)/50	3.94 (100)/50.71	9.08 (100)/50.56	4.95 (100)/50.42
Wheat	0.84 (45.9)	1.61 (42.04)	3.54 (39.86)	2 (41.2)
Gram	0.38 (20.77)	0.94 (24.54)	2.57 (28.94)	1.3 (26.75)
Onion	0.09 (4.92)	0.41 (10.7)	1.69 (19.03)	0.73 (15.06)
Cabbage	0.52 (28.42)	0.87 (22.72)	1.08 (12.16)	0.82 (16.99)
Total rabi	1.83 (100)/50	3.83 (100)/49.29	8.88 (100)/49.44	4.85 (100)/49.58
Gross Cropped Area	3.66/100	7.77/100	17.96/100	9.8/100
Cropping intensity (%)	200	197	198	198

(Fig in parenthesis show the percentage of total Farmhousehold's).

Thus it may be concluded that paddy and wheat were the important crops in kharif and *Rabi* season of the study area. However, cropping intensity of an average respondents related to study (198%). At on overall level in kharif soybean (11.11%), paddy (35.62%), tur (25.46%), okra (12.65%) and brinjal (15.16%) were found to be major crops, while wheat (41.2%), gram (26.75%), cabbage (16.99%) and onion (15.06%) were found to be major rabi crops in the study area

2. Cost and return analysis

The cost and return structure of sample household's in cultivation of cabbage in different size of farms. The total cost of cultivation of cabbage was classified under two major heads

(i) Total variable cost and (ii) Total fixed cost.

Total variable cost

Total variable cost Rs/ha incurred in cultivation of cabbage was further divided in the 3 subheads i.e.

(i) Total input cost, (ii) Total labour cost and (iii) Total indirect variable cost.

Total material cost

The total input cost includes the expenses done by cabbage growers in different input items in cultivation of cabbage in table 2.

Table 2: Material cost used in cabbage cultivation in different categories (Rs/ha).

Particulars	Small	Medium	Large	Average
Seed (gm)	1141 (11.01)	1258 (10.85)	1256 (11.86)	1218.33 (11.23)
Fertilizer (kg)	3001 (28.96)	3558 (30.68)	3158 (29.83)	3239 (29.85)
Manure (quintal)	1267 (12.23)	833 (7.18)	881 (8.32)	993 (9.16)
Irrigation (No.)	2500 (24.12)	3098 (26.71)	2778 (26.24)	2792 (25.73)
Plant protection (lit)	2455 (23.69)	2851 (24.58)	2514 (23.75)	2606 (24.03)
Total Material cost	10364 (100.01)	11598 (100)	10587 (100)	10849 (100)

Fig: shows the percentage of total

It is observed form the table that the cabbage grower invested Rs 10849/ha in inputs to cultivate cabbage in his farm, out of which he expends the highest fertilizers (29.85%) followed by irrigation (25.73%), Plant protection (24.03%), seed (11.23%) and manure's (9.16%) (fig.5.4).The total input cost was found to be maximum in medium (Rs.11598/ha), large (Rs.10587/h) and small (Rs. 10364/ha).

Total labour cost

The expenditure incurred in different operations of cabbage cultivation also taken into consideration, while calculating the total cost of cultivation in Table 3. The total labour cost has divided into three categories (a) human labour (b) bullock labour and (c) machine power.

Table 3: Total labour used in different size of farm household's (Rs/ha).

Particulars	Small	Medium	Large	Average
Hired labour	3655 (23.11)	6299 (41.7)	10466 (58.29)	6806.67 (41.77)
Family labour	5862 (37.06)	4674 (30.94)	2980 (16.6)	4505.33 (27.65)
Bullock labour	2552 (16.13)	1109 (7.34)	865 (4.82)	1508.67 (9.26)
Machine power	3750 (23.71)	3025 (20.02)	3644 (20.3)	3473 (21.32)
Total Labour Cost	1581 (100)	15107 (100)	17955 (100)	16293.67 (100)

Fig: shows the percentage of total

The comparative picture of total cost incurred in various operation and different types of labour used. It is observed from the data that - (a) as the size of holding increases from small (Rs 15819ha) to large (Rs 17955/ha) the total cost of labour increases. As the size of holding increases the cost incurred family labour decreases while cost incurred in hired labour, Bullock labour and machine power increases. At overall level was found to be incurred in Hired labour (41.77%) followed by family labour (27.65%) machine power (21.32%) and bullock labour (9.26%).

Indirect variable cost

The total indirect variable cost incurred in the different size of farms was also worked and found that an average cabbage growers invested the 1019.29/ha, in this interest of working capital (67.73%), was found the main component of this cost followed by depreciation of the machine used (32.27%) in Table 4.

Table 4: Indirect variable cost incurred in different size of farm household's

Particulars	Small	Medium	Large	Average
Depreciation	292.67 (32.08)	318.26 (32.14)	375.87 (32.53)	328.93 (32.27)
Interest on working capital	619.76 (67.92)	671.83 (67.86)	779.49 (67.47)	690.36 (67.73)
Total Indirect Cost	912.43 (100)	990.09 (100)	1155.36 (100)	1019.29 (100)

Fig: shows the percentage of total cost.

Fixed cost

Interests in Fixed capital, rental value of owned land, land revenue are the main component of the fixed cost and presented in Table (5). An average cabbage grower invested RS 35252.18/ha as a fixed cost in the cultivation of cabbage in the area under study. As the size of holding increased from small (Rs 32045.79/ha), to large (RS 38654.84/ha), the fixed cost increases. The rental value of owned land (67.73%) was found to be main component of the fixed cost followed by 10 % on cost C2 (16.36%), interest on fixed capital (15.79%) and land revenue (0.13%).

Table 5: Fixed cost incurred in different size of farm household's (Rs/ha).

Particulars	Small	Medium	Large	Average
Land revenue	45.00 (0.14)	45.00 (0.13)	45.00 (0.12)	45.00 (0.13)
Interest on owned fixed capital	3974.32 (12.4)	5681.28 (16.21)	7046 (18.23)	5567.20 (15.79)
Rental value of owned land	22650.00 (70.68)	23625.00 (67.39)	25350.00 (65.58)	23875.00 (67.73)
10 % on cost C2	5376.47 (16.78)	5704.64 (16.27)	6213.84 (16.08)	5764.98 (16.35)
Total Fixed Cost	32045.79 (100)	35055.92 (100)	38654.84 (100)	35252.18 (100)

Fig: shows the percentage of total expenditure incurred

3. Profitability (Rs/ha) of cabbage

The profitability per hectare of cabbage production is given (Table 6). The average profitability of cabbage production per hectare on net farm income Rs 79835.19, family labour income Rs 90105.51, farm business income Rs 119547.71 and farm investment income Rs 29442.20. However, the Family labour, Farm business and Farm investment income per hectare was increasing with size of increase, revealed that overhead cost like interest on fixed capital and on rental value of land were much higher than other items of cost incurred.

Table 6: Average profit (Rs/ha) of Cabbage growers in different size of Farm

Particulars	Small	Medium	Large	Average
Gross return (Rs.)	**135900**	**141750**	**152100**	**143250**
Family labour income (Rs.)	87997.25	89377.63	92941.65	90105.51
Farm business income (Rs.)	114621.57	118683.91	125337.64	119547.71
Farm investment income (Rs.)	26624.32	29306.28	32396.00	29442.20

4. Cost of production of Cabbage

The cost per quintal of cabbage is presented in table 7 for all three farm categories, which shows that per quintal cost was marginally higher for large farms followed by medium and small farms at cost A1,B1,B2,C1,C2 and C3. The average overall cost (C3) was estimated at Rs 199.09/quintal. The maximum per quintal cost of production of cabbage was Rs 202.23 in large farm households and minimum of Rs 195.83/quintal in small farms. This suggested that farm harvest price must be higher than per quintal production cost of cabbage to meet out operational and overhead costs. The operational cost A1 was estimated at Rs 70.46, Rs 73.23 and Rs 79.18/qts for small, medium and large farms respectively.

Table 7: Cost of production (Rs/qts.) of cabbage growers in different size of farm

Particulars	Small	Medium	Large	Average
Cost A1	70.46	73.23	79.18	74.29
Cost B1	83.62	91.26	100.02	91.63
Cost B2	158.62	166.26	175.02	166.63
Cost C1	103.03	106.10	108.84	105.99
Cost C2	178.03	181.10	183.84	180.99
Cost C3	195.83	199.21	202.23	199.09

5. Net Return (Rs/ha) of cabbage

The net return of cabbage are presented in table 8 indicates that average per hectare return was Rs 143250.00 of cabbage. The gross return per hectare of cabbage was observed in small categories (Rs. 135900.00), Medium (Rs. 141750.00) and large (Rs. 152100.00) category under the study area. The net return Rs/ha at cost A1/A2,B1,B2,C1,C2 and C3, the trend was averagely Rs 119547.71, Rs 113980.51, Rs 90105.51, Rs 109475.18, Rs 85600.18 and Rs 79835.19 respectively The higher per hectare yield/net return of cabbage can be achieved through better management of technology i.e. cost effective, marketing and future trading.

Table 8: Net Return (Rs/ha) of Cabbage growers in different size of Farm

Particulars	Small	Medium	Large	Average
Gross returns (Rs.)	135900.00	141750.00	152100.00	143250.00
Cost A1	114621.57	118683.91	125337.64	119547.71
Cost B1	110647.25	113002.63	118291.65	113980.51
Cost B2	87997.25	89377.63	92941.65	90105.51
Cost C1	104785.25	108328.63	115311.65	109475.18
Cost C2	82135.25	84703.63	89961.65	85600.18
Cost C3	76758.78	78998.99	83747.81	79835.19

From the Table 8 it is observed that more than 64 % variation in the yield was jointly explained by the independent variables. The regression coefficients for the variable representing the area were significant at 1 per cent with positive sign. It indicates that the yield increased with the increase in the area.

The regression coefficient of human labour (X_2) as well as bullock labour ($X_{3)}$ was found negatively significant. This indicates that one per cent increase in the human labour and bullock labour will decrease the yield by -0.322 per cent and -0.051 per cent, respectively. It indicates that the yield decreased with the increase in the both labour. It may be because of inefficient management of labour in crop cultivation.

Table 9: The estimated Cobb-Douglas type of production function

S. No	Particulars	Coefficients	Standard Error
1.	Constant	5.694	0.447
2.	(X_1) Area (ha)	0.802	0.232
3.	(X_2) Seed (gm)	1.260	0.034
4.	(X_3) Fertilizer (kg)	3.210	0.046
5.	(X_4) Manure (quintal)	1.490	0.000
6.	(X_5) Irrigation (No.)	0.009	0.051
7.	(X_6)Plant protection (lit)	-0.012	0.033
8.	(X_7)Human labour use in days.	-0.034	0.059
9.	(X_8) Bullock labour use in pair days	-0.009	0.019
10.	R^2	0.646	0.067

*, **and *** are significant at 10, 5 and 1 per cent, respectively.

The regression coefficient of seed (X_2) was found positively significant. This indicates that one per cent increase in the seed will increase the yield by 1.26 per cent. It indicates that the yield increased with the increase in the seed quantity. It may be because there was minimum use of seed quantity in field and them no maintenance of plant population in field.

The regression coefficient of fertilizer (X_5) was found positively significant. This indicates that one per cent increase in the fertilizer will increase the yield by 3.21 per cent. It indicates that the yield increased with the increase in the fertilizer quantity. It may be because there was minimum use of fertilizer quantity in field and more requirement of fertilizer dose in crop production. The regression coefficient of manure (X_6) was found positively significant. This indicates that one per cent increase in the manure will decrease the yield by -1.49 per cent. It indicates that the yield increased with the increase in the manure quantity. It may be because there was execs use of manure quantity in field. The regression coefficient of irrigation (X_7) was found positively significant. This indicates that one per cent increase in the irrigation will increase the yield by 0.009 per cent. It indicates that the yield increased with the increase in the irrigation quantity. It may be because there was minimum use of number of irrigation in field and them no sufficient water available in field. The regression coefficient of chemical (X_8) was found negatively significant. This indicates that one per cent increase in the chemical will decrease the yield by -0.012 per cent. It indicates that the yield decreased with the increase in the chemical quantity. It may be because there was execs use of chemical quantity in field. In nutshell, it is to say that the factors, viz, area, human labour, seed, fertilizer manure and irrigation chemical have significant influence on the yield.

6. Resource use efficiency

Determining the Economic Efficiency of Resource use the following ratio was used to estimate the relative efficiency of resource use

R = MVP/MFC

Where
MFC = Cost of one unit of a particular resource
MVP = Value added to cabbage

Output due to the use of an additional unit of input, calculated by multiplying the MPP by the price of output. i.e. MPP xi x Po.

Decision rule

If r = 1, resource is efficiently utilized,
If r > 1, resource is under utilized while
If r < 1, resource is over utilized.

Economic optimum takes place where MVP = MFC. If r is not equal to 1, it suggests that resources are not efficiently utilized. Adjustments could be therefore, be made in the quantity of inputs used and costs in the production process to restore r = 1.

An efficiency of resource use on the sample farms was judged with the help of r (MVP/MFC) ratio and results of the resource use efficiency are presented in Table 9.3

Table 10: Resource use efficiency of the sample farms

S. No	Variable	APP	MPP	MVP	MFC
1	Area (hectare) X_1	1.00	0.00	0.00	1.00
2	Human labour use in days X_2	78.10	0.66	86.03	130.00
3	Bullock labour use in pair days X_3	7.60	0.97	174.08	180.00
4	Seed (kg) X_4	0.31	1.00	3504.76	3500.00
5	Fertilizer (kg) X_5	275.74	2.19	19.75	9.00
6	Manure (qtl) X_6	5.60	0.98	234.18	240.00
7	Irrigation (No.) X_7	4.00	1.02	712.13	700.00
8	Chemical (kg) X_8	2.60	0.99	642.68	650.00

Measure of technical efficiency of resource use such as Average Physical Product (APP), Marginal Physical Product (MPP), and Marginal Value Product (MVP) and Marginal Factor Cost (MFC) were derived (Table 5.7). The values of the MPP show that the farmers were more efficient in the use of fertilizer than the other resources. This suggests that if additional quantity of fertilizer were available, it would lead to an increase in cabbage production/yield by 1.89 kg among the farmers. This implies that the farmers are more technically efficient in the use of fertilizer. Of all the resources used, labour had the least MPP (0.28). This shows more efficiency in the use of available labour. Given the level of technology and prices of both inputs and outputs, efficiency of resource use was further ascertained by equating the MVP to the productive MFC of resources. A resource is said to be optimally allocated if there is no significant difference between the MVP and MFC i.e. if the ratio of MVP to MFC =1 (unit). Table 9 further reveals that the ratios of the MVP to the MFC were greater than unity (1) for seed, fertilizer and irrigation input but area, human and bullock labour, manure and chemical. This implies that seed, irrigation and fertilizer were under-utilized, while area, human and bullock labour, manure and chemical were over utilized (less than one). This means that cabbage yield was likely to increase and hence revenue if more of such inputs (seed, irrigation and fertilizer) had been utilized.

7. Marketing of Cabbage

Marketing pattern of cabbage was observed in the following aspects.

a) Marketing channels
b) Price spread
c) Marketing efficiency

a. Marketing channels:

Movement of the produce from producer to ultimate consumer comprises chain intermediaries, called marketing channel. Different intermediaries are involved in the handling of the produce through different channels of trade.

From the preliminary survey conducted in the study area, it was observed that the marketing of cabbage was done mainly through following three channels.

Channel – I. Producer-Consumer
Channel – II. Producer-Retailer-Consumer, and
Channel – III. Producer-Wholesaler-Retailer-Consumer

Channel - I (Producer-Consumer)

In this channel, the farmer performed the dual function of both producer and seller. From the table any one can see that, under the marketing costs at producer level, many components are presented. Under this cost of bags and transportation is 8 and 3 Rs/quintal. Price received by producer is (450 Rs./Quintal) is lesser than sale price of the farmer or consumer's price (470 Rs/Quintal = Average marketing costs and margins involved in the marketing of cabbage in Channel - I (Producer-Consumer) and presented in table 5.18. it was the channel - I, in which the farmers got highest share of 95.74 per cent in cabbage of consumer's price. This happened mainly due to the non-intervention of middle man. Thus, with the lower prices, consumers were attracted and farmers could soon clear of the produce. They incurred marketing cost Rs. 20 in cabbage per quintal from village to local market.

Table 11: Marketing costs and margins borne by various agencies for cabbage under channel-I.

S. No.	Particulars/Market functionaries	Amount (Rs./q)
1.	**Marketing costs at producer level**	
	Cost of bags	8
	Transportation	3
	Loading, unloading and weighing	4
	Miscellaneous	5
	Total cost	20
	Price received by producer	450
	Sale price of the farmer/consumer's price	470
2.	Producer's share in consumer's rupee (per cent)	95.74

Channel – II (Producer-Retailer-Consumer)

Average marketing costs and margins involved in the marketing of cabbage and presented in table11. It was the second best channel, through which the farmer got in cabbage with 77.59 per cent of consumer's price. Marketing costs borne by retailer account for Rs. 32/qtl in cabbage and the retailer sold the produce to the consumer with the marginal profit of Rs. 78/qnt in cabbage cultivation

Table 12: Marketing costs and margins of various agencies for cabbage under channel – II

S. No.	Particulars/Market functionaries	Amount (Rs./q)
1	**Marketing costs at producer level**	
	Cost of bags	7
	Transportation	5
	Loading, unloading and weighing	3
	Miscellaneous	5
	Total cost	20
	Price received by producer	450
	Sale price of the farmer/consumer's price	470
2	**Marketing costs incurred by village merchant**	
	Cost of bags	9
	Transportation	5
	Loading, unloading and weighing	5
	Storage	3
	Miscellaneous	11
	Total cost	32
	village merchant's margin	78
	Consumer's price/selling price of village merchant	580
3	Producer's share in consumer rupee (per cent)	77.59

Channel-III (Producer-Wholesaler-Retailer-Consumer)

Average marketing costs and margins involved in the marketing of cabbage and presented in Table 5.20.

Table 13: Marketing costs and margins of various agencies for cabbage under channel – III

S. No.	Particulars/Market functionaries	Amount (Rs./q)
1	**Marketing costs at producer level**	
	Cost of bags	9
	Transportation	5
	Loading, unloading and weighing	6
	Miscellaneous	35
	Total cost	46
	Price received by producer	450
	Producer's selling price	496
2	**Marketing costs incurred by village merchant**	
	Cost of bags	7
	Transportation	6
	Loading, unloading and weighing	5
	Shop/Godown rent	3
	Grading charges	5
	Spoilage & Miscellaneous	8
	Total cost	27
	village merchant's margin	98
	village merchant's selling price	620
3	Marketing costs incurred by Wholesaler	
	Cost of bags	5
	Transportation	3
	Loading, unloading and weighing	3
	Storage cost	5
	Spoilage & Miscellaneous	10
	Total cost	26
	Wholesaler's margin	114
	Wholesaler's selling price	760
4	Producer's share in consumer rupee (per cent)	59.23

Table 12, shows was the most commonly used channel through which most of the cabbage grower in the study area was marketed. Here, the producer's share in the consumer's price was in cabbage with 59.23 per cent. The total marketing cost incurred from different functionaries was in cabbage with Rs. 99.00/qtl.

(b) Price spread of cabbage

Price spread is the difference between the price paid by the consumer and that received by the producer. Below price spread table shows the involved the information of all three channels. Producer's net share is equal for all three channels (450 Rs/q), but percent is high is channel I as compare to other two channels. The information of whole seller is available only for channel III. Village merchant's sale price is in channel III (760 Rs/q), which is more than other two channels.

Table 14: Price spread of cabbage under different channels (Rs./qtl)

S. No.	Particulars	Channel-I		Channel-II		Channel-III	
		Rs./q	%	Rs./q	%	Rs./q	%
1	Producer's net share1	450	95.74	450	77.59	450	59.23
2	Producer's cost	20	4.26	20	3.45	46	6.05
3	village merchant purchase price/producer's sale price	470	-	470	-	496	
4	Wholesaler cost	-	-	-	-	27	3.49
5	Wholesaler's margin	-	-	-	-	98	12.83
6	Wholesaler's sale price/retailers purchase price	-	-	-	-	620	
7	village merchant's cost	-	-	32	5.52	26	3.42
8	village merchant's margin	-	-	78	13.45	114	14.98
9	village merchant's sale price / consumers purchase price	470	100.00	580	100.00	760	100.00

The marketing costs and margins in three channels, identified in the present study. In channel-I, producers directly sold their produced to consumer. They incurred marketing cost of Rs 20/qtl from village to local market. In this channel, there are very few producers and they belong marginal and small group, having low marketable surplus. The channel-II consisted of producer, retailer and consumer. In this channel, village retailer's purchased directly from producers and sold to consumers. They incurred total marketing cost of Rs 52/qtl in channel II. However, they received Rs. 78 per quintal as margin. Channel III consisted of producers, wholesalers, retailers and consumers. In this case, wholesaler purchased from producers and sold to retailer. The retailer finally sold to consumer. In this channel, the total marketing cost of Rs 99/qtl by various intermediaries. The producer received fewer amounts as compared to other channels. The second and third channels were found in interior villages. The producer received the maximum share in consumer's rupee in channel-I

(95.74%) followed by channel II (77.59%) and channel III (59.23%). The highest share in consumer's rupee was obtained by the farmers in channel-I as there was no intermediary between producers to consumer. In second channel, the producer received only 77.59 per cent of consumer's rupee and retailer received 13.45 per cent of consumer's rupee. In third channel, the farmers received still less i.e. 59.23 per cent of consumer's rupee. The share of wholesaler (12.83 %) and retailer (14.98%) of consumer's rupee, respectively. The producers' share was less in channel-II and III as producers were located at a large distance from market place. The intervention of market intermediaries has reduced he producer share in consumer's rupee.

(c) Marketing efficiency of cabbage

Marketing efficiency explain how marketing process run in different channels. To what extent the marketing agencies are able to move the goods from producer at the minimum cost, extending maximum service from producer to final consumer (Table14). The efficiency of the different marketing channels of cabbage was given by using Shepherds formula.

The different marketing channels the maximum cost was Rs. 99/qtl for channel III, which was due to the cost increased in large number of middleman. The least cost was seen in channel I in Rs. 20/qtl due to the direct marketing of produced. The consumer's price or value of sold quantity was maximum in channel III is Rs. 650 and minimum in channel I Rs. 470/qtl. The marketing efficiency was highest in channel I (22.50%) and cannel II (10.15%). It was lowest in channel III (6.71%).

Table 15: Marketing efficiency of different channels of cabbage

Channel	Value of goods sold (Consumer's price) Rs./ q (V)	Total marketing cost Rs. / q (I)	Marketing Efficiency (m)
Channel-I	470	20	22.50
Channel –II	580	52	10.15
Channel-III	760	99	6.71

Constraints in adoption of cabbage production

The selected farmers were observed the constraints in production as well as in the marketing of cabbage cultivation and presented in table 15.

The un-availability of good quality of seed (86.67%) followed by, high price of fertilizers, pesticides and fungicides and wage rate of labour (81.67%), high cost of seed (80.00%), ignorance of severs infestation of insect-pest disease control (63.33%) and unavailability of institutional fund (60.00%) respectively.

The Problem of higher market charges during the transpiration and selling of cabbage was reported by (90.00%) followed by high charges of transportation (81.67%), lack of market yard (76.67%), mall practices by traders (68.33%), traders collusion between commission agent and the buyers (outside traders) during the auction was also reported (65.00%) of total respondents, lack of market linkages facility (63.33%), lack of knowledge about market information(60.00%), lack of price information (55.00%), lack of packing material (53.33%), Problem of availing credit facilities to meet the marketing cost was also reported by (50.00%), price fluctuation and crasher (50.00%), no correct weighing (46.67%), delay in receiving late payment after the sale of their produce was reported by (38.33%), non-availability of adequate storage facilities (35.00%) and lack of storage in market yard (33.33%) of sample farmers did not stored on their farm due to no requirement after harvesting of crop.

Table 16: Constraints in production and marketing of cabbage

S. No.	Constraints relating production and marketing of cabbage.	No of Sample	Percent to total (N=60)
	Production		
1	Unavailability of good quality of seed	52.00	86.67
2	High cost of seed	48.00	80.00
3	High price of fertilizers, pesticides and fungicides and wage rate of labour	49.00	81.67
4	Ignorance of severs infestation of insect-pest disease control	38.00	63.33
5	Unavailability of institutional fund	36.00	60.00
	Marketing	0.00	0.00
1	Lack of Market linkages facility	38.00	63.33
2	High charges of transportation	49.00	81.67
3	Lack of knowledge about market information	36.00	60.00
4	Lack of market yard	46.00	76.67
5	Traders collusion	39.00	65.00
6	Mall practices by traders	41.00	68.33
7	Higher market charges	54.00	90.00
8	No correct weighing	28.00	46.67
9	Late payment	23.00	38.33
10	Lack of credit facilities	30.00	50.00
11	Lack of packing material	32.00	53.33
12	Price fluctuation and crasher	30.00	50.00
13	Lack of price information	33.00	55.00
14	Lack of storage in market yard	20.00	33.33
15	Non-availability of adequate storage facilities	21.00	35.00

Cabbage growers reported Unremunarative price during the peak season, lack of market & price information to the important constraints. Besides high price of seed, fertilizers and pesticides, costly transportation and market charges, inadequate skilled labour and lack of information about

arrivals and prices in the consuming market were main problem reported by various cabbage producers.

Suggestion

With a view to remove constraints mentioned earlier and to enhance overall effectiveness the following suggestions are made for consideration.

- Apply of recommended doses of practices like fertilization, plantation of green manuring and organic matter content.
- It should be testing soil of before season and give the training to the farmers about apply particular contents.
- State government should be provided price & market information, to the farmers.
- There should be regular supervision of the administrative authorities to check mal-practices in the market.
- The authorities of Krishi Upaj Mandi should be more vigilant and equipped with more power to check unauthorized deduction, cheating and delay payment in Mandi.
- It should be connected with all roads reduce the transportation cost.
- For remunerative price, grading of produce should be done in the market on the basis of the characteristics like size, colour, quality etc.
- Many of the farmers were ignorant about market news. They must be communicated at village level so that they can sell their produce when they get attractive remunerative price.

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