Economics of production and marketing of cabbage in Bankura district of West Bengal

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ABSTRACT

The economics of cabbage production and price spread in marketing of cabbage was under taken during the year 2010-11, while primary data was collected from three villages namely Ola, Nikunjipur and Pingrui of Onda block in Bankura district of West Bengal. Three major marketing channels were identified in direct sale of cabbage that are of very short period. The price spread was estimated to be Rs. 2.69 / kg of cabbage in channel III followed by Rs.1.66 in channel II and only Rs. 1.18 per kg of cabbage in channel I, which indicates a very normal situation with greater marketing efficiency.

Key words*: Cost of cabbage production, marketing channel, marketing efficiency, price spread.*

India ranked second in vegetables production as well as in cabbage production after China during 2010-11. The decadal trend analysis of area production and productivity of cabbage shows that cabbage production in India has increased from 2.78 MT in 1991-92 to 7.95 MT in 2010-11, with the growth rate of 9.29 percent. In similar line with production, acreage has also increased from 177.3 thousand ha in 1991-92 to 369 thousand ha in 2010-11, with the annual growth rate of 4.30 per cent (www.faostat.com). The growth rate of area and production was specifically observed to be 3.94 percent and 3.73 percent during 2000-01 to 2010-11 (Dastagiri *et al.*, 2013). The productivity of Indian Cabbage is 21.5 tonnes/ ha which is far behind than Japannes (66.1 tonnes/ha.) and South Korean cabbage (62.1 tonnes/ha.). Adequate amount of nutrients (N@ 120 Kg ha–1 and P2O5 @ 100 kg ha–1) are required for higher production of Chinese Cabbage in gangetic Plains of West Bengal (Prasad *et al*, 2009) Though India contributes only 0.27 percent of world cabbage export and earned Rs. 1.33 crores in total by exporting cabbage (Rs.45.6 lakh) and cabbage seeds (Rs.87.48 lakh) during the year 2010-11, but it's quite interesting in terms of lowest cost of production, that can accrue higher relative advantage in international market of cabbage (Vanitha *et al*., 2013).

Among Indian states, West Bengal ranked first in production as well as consumption of cabbage where it produced 2087.8 thousand tonnes in an area of 75.3 thousand hectares during 2010-11 constituting 27.86 percentage of total India's production (NHB, 2012). The productivity of cabbage was also recorded to be

highest in West Bengal (27.7 tonnes/ ha) as compared to national average (21.5 tonnes/ ha).Orissa and Bihar are other important states that produced significantly by contributing 14.49 percent and 8.94 percent) in India's cabbage production.

In West Bengal, the major cabbage producing districts that produced more than 100 thousand tonnes during the year 2010-11 are Murshidabad, Nadia, North and South 24 Parganas, Jalpaiguri, Coochbehar and Bankura. Among these all districts, Bankura recorded a significant productivity 30.43 tonnes/ha, with the acreage of 4750 hectares during 2011-12 (www.indiastat.com).

A widespread increase in consumption of vegetables has been observed across income groups, regions and areas (both rural and urban). The vegetable consumption has been found to accelerate at a higher rate among the poor (Kumar *et al.*, 2004). Though, West Bengal ranked first in cabbage production but the average price of cabbage was around Rs. 4 to 6 per kg which is comparatively lower than the other states which was around Rs. 8 to10 per kg during the same time (Nandeshwar *et al.*, 2013). In this background, the study was undertaken in Bankura district of West Bengal to study the productivity and profitability of cabbage production and the prevailing marketing system of this vegetable.

MATERIALS AND METHODS

Primary information on various socio economic behaviours of sample farmers were collected from three villages namely Ola, Nikunjipur and Pingrui of Onda block in Bankura district of West Bengal. A total of 100 cabbage growers were selected by simple random sampling without replacement (SRSWOR)

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technique based on the respective land holding status of farmer (i.e. below 1 acre, 1.01 acre to 2 acre, 2 .01 acre and above) and were classified as the marginal and small, medium and large farmers, respectively. A well structured and pre-tested schedule has been used to collect primary information for the year 2010-11 related to production and marketing of cabbage.

Simple tabular analysis was done to accomplish the objectives of the study. The different cost concepts like Cost A_1 and Cost D are used to work out the cost of production of cabbage. For the analysis of market efficiency, three popular methods of measuring the marketing efficiency namely, conventional, Shepherd's and Acharya's methods are employed. For prioritizing the constraints faced by farmers and market intermediaries Garrett's ranking technique has been applied.

Cost A_1: It includes the expenditure on seed, manures and fertilizers, hired human labour, land revenue, irrigation charges, machinery charges interest on working capital and depreciation on farm implement.

Cost D: Cost A_1 + imputed value of family labour-land revenue and cess.

The price spread in agriculture is assessed by estimating price received by the farmers expressed as a percentage of the retail price (i.e. the price paid by the consumer). If it is the retail price, the producers share in the consumer's rupee (Ps) is expressed as follows.

$$Ps = \frac{\text{Net price received by the producer}}{\text{Price paid by the consumer}} \times 100$$

The three efficiency measurement methods used in the study are presented as follows:

i) Conventional method: $ME = \dfrac{MC + MM}{MC} = \dfrac{GMM}{MC}$

ii) Shepherd's method: $ME = \dfrac{RP}{MC + MM} = \dfrac{RP}{GMM}$

iii) Acharya's method: $MME = \dfrac{FP}{MC + MM} / \dfrac{FP}{MC + MM} - 1$

As, [RP = FP + MC + MM]

where,

ME: Marketing efficiency

MME: Modified measure of marketing efficiency

MC: Total marketing costs

MM: Total net marketing margin

GMM: Gross marketing margin

RP: Retailer's price or Price paid by the consumer

FP: Net price received by the producer

Garrett's ranking technique

$$\text{Percentage position} = \frac{100\,(R_{ij} - 0.50)}{N_j}$$

where,

R_{ij} = Rank given for the ith item by the jth individual and

N_j = Number of items ranked by the jth individual.

In this method, respondents are asked to rank the specific problems faced by them according to their own perception. The assigned rank is then converted to percentage position which is subsequently transferred into Garrett score using Garrett's table. For each constraint, scores of individual respondents are added together and then divided by total number of respondents. Thus, mean score for each constraint has been ranked by arranging them in descending order.

RESULTS AND DISCUSSION

The economics of cabbage production is presented in Table 1 in a very crisp manner. In the study area the cabbage farmers received a net profit of Rs. 16545.61/acre and Rs. 14970.41/acre on an average over Cost A_1 and Cost D, respectively. The overall return to cost ratio over cost A_1 is 1.94 represents, for every one rupee of out of pocket/ paid out expenses, 94 paisa is net gain through cabbage cultivation. The return to cost ratio for the first group is 1.56 which clearly indicates that the cultivation is mostly done by employing family labour as usual.

Table 1: Costs and returns of cabbage production in Onda block

(Rs. acre^{-1})

Size group	Landholding class(acre)	Cost A_1	Cost D	Gross returns	Surplus over Cost A_1	Surplus over Cost D	Return -Cost ratio Cost A_1	Return -Cost ratio Cost D
I	Up to 1.00	18602.46	20897.26	32613.96	14011.50	11716.70	1.75	1.56
II	1.01 to 2.00	17319.96	18625.56	34355.44	17035.48	15729.88	1.98	1.84
III	> 2.01	16890.95	18016.15	35480.80	18589.85	17464.65	2.10	1.97
	Overall	17604.46	19179.66	34150.07	16545.61	14970.41	1.94	1.78

The cost of production of cabbage per quintal is estimated and presented in Table 2. It is evident from the study that farmers with small production unit have greater cost over the other group of farmers. It indicates their intensive cultivation practices with use of higher doses of input as compared to the other group of farmers. The average cost of production per quintal is Rs. 194.80 and the farmers earn a net profit of Rs. 182.49/ quintal. The return is almost double of the cost indicating the cabbage production is a highly remunerative farming occupation.

Table 2: Costs and returns of cabbage production in Onda block

(Rs. quintal^{-1})

Size group	Land holding(acre)	Cost A$_1$	Cost D	Gross returns	Surplus over	
					Cost A$_1$	Cost D
I	Up to 1.00	211.04	237.08	370.00	158.96	132.92
II	1.01 to 2.00	191.50	206.01	379.85	188.35	173.84
III	> 2.01	181.85	193.96	382.00	200.15	188.04
	Overall	194.80	212.35	377.28	182.49	164.93

The major costs in cabbage production are tabulated in Table 3. It was found that, the major cost of cabbage is the wage payment for hired labour that is required at different stages of cultivation. The farmers spend Rs. 8349.19/acre on an average for all types of owned and hired labour. Next to wage payment of labour, expenditure on manures and fertilizers, plant protection chemicals, irrigation and planting material are on high side respectively.

Table 3: Break up major costs of cabbage production in Onda block

(Rs. acre^{-1})

Size group	Land holding class(acre)	Labour		Seed. saplings^{-1}	Manures & fertilizer	Irrigation	PP chemicals	Misc. expenses	Cost A$_1$
		Owned	Hired						
I	Up to 1.00	2294.80	6379.54	1200.00	5556.25	1975.20	2712.40	779.07	18602.46
II	1.01 to 2.00	1315.60	6851.87	1227.20	4663.53	1824.00	2018.00	735.36	17319.96
III	> 2.01	1135.20	7070.55	1244.00	4209.55	1745.20	1900.80	720.85	16890.95
	Overall	1581.87	6767.32	1223.73	4809.78	1848.13	2210.40	745.09	17604.46

Marketing channels, marketing margin and price spread in relation to marketing of cabbage

In the study area, most of the cabbage growers are marginal and small and the total production is used to meet the consumption need of local people or nearby towns. Therefore, farmers sell either directly to consumers or itinerant traders purchase cabbage from producers and sell in the local market to ultimate consumers. Small quantity of cabbage is transported to nearby districts and sold through wholesalers. In short, the total cabbage production of the district is marketed largely through the following three channels:

Channel I : Cabbage grower → Consumer

Channel II : Cabbage grower → Petty trader/ Retailer → Consumer

Channel III : Cabbage grower → Petty trader/ Commission agent → Wholesaler → Retailer → Consumer

The Table 4 represents the distribution of marketing costs, margins and producer's share in consumers' rupee at different stages of the three identified marketing channels. Direct selling to consumers by producers (channel I) brings an additional income of Rs. 92 per quintal of cabbage. In channel II, local itinerant traders purchase cabbage at farm gate at the same time, perform the function of retailing in local market. Performing these two opposite activities i.e. buying and selling, they receive a net income of Rs. 134 per quintal of cabbage. Cabbage producers in channel III, earn an additional income of Rs. 193 per quintal of cabbage by incurring an extra cost of Rs. 76 per quintal of cabbage. Thus in channel III net earnings of petty trader/commission agent wholesaler and retailers are Rs. 54, Rs. 31 and Rs. 95 per quintal of cabbage respectively.

The retail prices of cabbage are Rs. 4.88, Rs. 5.26 and Rs. 6.39 per kg for channel I, channel II and

Table 4: **Estimation of marketing costs, margins and producer's share in consumer rupee identified in cabbage marketing channels**

(Rs.quintal^{-1} of cabbage)

Particulars	Channel I	Channel II	Channel III
Price of cabbage at farm gate	370.00	370.00	370.00
Cost incurred by farmers	26.00	——	8.00
Selling price of the farmer	488.00	——	391.00
Net margin of the farmer	92.00	——	13.00
Purchase price of petty trader/ commission agent	——	——	391.00
Cost incurred by petty trader/ commission agent	——	——	25.00
Selling price of cabbage to wholesaler	——	——	470.00
Net margin of the petty trader	——	——	54.00
Purchase price of wholesaler from petty trader/ commission agent	——	——	470.00
Cost incurred by the wholesaler	——	——	16.00
Selling price of wholesaler to petty trader/ commission agent	——	——	517.00
Net margin of the wholesaler	——	——	31.00
Purchase price of petty trader/retailer	——	370.00	517.00
Cost incurred by petty trader/retailer	——	32.00	27.00
Selling price of petty trader to consumer	——	536.00	639.00
Net margin of the petty trader/retailer	——	134.00	95.00
Purchase price of the consumer	488.00	526.00	639.00
Producer's share in the consumers' price (percent)	94.67	70.34	59.94
Price spread or gross marketing margin	118.00	166.00	269.00
Total cost of marketing	26.00	32.00	76.00
Net marketing margin	92.00	134.00	193.00
Percentage of farmers involved	32.00	57.00	11.00

channel III respectively, while, producer's share in consumers' rupee is estimated to be 94.67, 70.34 and 59.94 percentage for three channels in the same order.

Measurement of marketing efficiency

Estimation of marketing efficiency by three different methods for three different channels is given in table 5. It is quite noticeable that the marketing efficiency coefficients estimated by three methods are in descending order in three channels. It may be inferred that channel I is more efficient than channel II and channel III is less efficient than channel II. It may be further noted that, lower values does not always reflects inefficiency, if involvement of processing and value addition through marketing functions are considered. But in this case, due to lack of processing and value addition, the efficiency of the marketing channels can easily be compared by just comparing the calculated values. As observed in all the channels, middleman involved in marketing process do not earn excess profit and don't charge a very high price to the consumer, but just by adding nominal marketing margin to their respective services. Considering this point, by seeing mere efficiency parameter, we cannot overthrow the fact of employment. Thus from the notion of marketing efficiency, it can be concluded that all the cabbage marketing channels are more or less efficient.

Table 5: Marketing Efficiency of different marketing channels by various methods

Methods	Channel I	Channel II	Channel III
Conventional	4.54	5.19	3.54
Shepherd's	4.14	3.17	2.38
Acharya's	3.92	2.23	1.98

Problems and constraints faced by the farmers and market intermediaries

The cabbage producers and market intermediaries face multidimensional problems ranging from physical, socio-economical to ecological and environmental from production to marketing. These constraints are ranked based on the realisation of the actual growers as well as intermediaries and have been prioritised using Garrett's ranking technique.

Problems and constraints faced by the farmers in cabbage production

The important problems confronted by the cabbage farmers are having Garrett's score greater than ten are listed in table 6 in descending order. Incidence of heavy pest and disease infestation, high cost of chemical fertilizers and pesticides, short winter causing early maturity of cabbage head and heavy rainfall during sowing season are the most important factor causing huge loss and are potential threat

against the survival of cabbage farming occupation. The cabbage growers placed these problems in the top of the list having Garrett score of 38.39, 34.25, 31.76 and 21.82 respectively. The other major problems are heavy weed infestation, non-availability of quality cabbage seed leading to low production and thereby less income. These five dominant problems are far ahead of other eleven identified constraints. Most of the cabbage growers used to borrow money from village moneylenders at high interest rate varied from 24 to 48 percent per annum. Thus, financial support from government has an urgent need to save the farmers from the clutches of usurious moneylenders. Lack of organic manure and theft and pilferages takes Garrett score of 14.38 and 14.91 respectively. The need for extensive extension programmes for pursuing farmers to adapt modern techniques to make the occupation more remunerative comes next with Garrett score of 11.63.

Table 6: Ranking of problems and constraints faced by the farmers in production of cabbage

Sl. No.	Problems and constraints	Garrett score	Rank
1	Heavy pest and disease infestation	38.39	I
2	High cost of inorganic inputs	34.25	II
3	Short winter causes early maturity	31.76	III
4	Heavy rainfall during the sowing season	21.82	IV
5	Heavy weed infestation	17.52	V
6	Non availability of quality cabbage seeds	15.43	VI
7	Lack of organic manure	14.91	VII
8	Theft and pilferages	14.38	VIII
9	Lack of capital	12.76	IX
10	Lack of extension services	11.63	X
11	Lack of Government support	11.24	XI

Problems and constraints faced by the market intermediaries

According to the perception of the farmers and some market intermediaries, major problems faced in marketing of cabbage are documented and presented in Table 7. Low production and high demand in rural areas necessitates efficient marketing system to benefit all stakeholders including producers, consumers and market intermediaries.

During the peak harvesting season, huge volume of cabbage arrival in the market in very short period of time causes glut in the market. Thus, retailers realize very less bargaining power and fetch relatively very less price, that positioned first with Garrett score

45.67. High perishability coupled with absence of storage facilities, quality deterioration result lower income of intermediaries are also major problems faced by market functionaries. According to the perception of market functionaries, high perishability associated with cut throat competition is the most damaging aspects of cabbage business and occupy the second and third position among the eleven identified market related problems with Garrett score 33.78 and 24.43 respectively. Some other problems that scored greater than 10 point are poor infrastructural facilities, lack of processing unit, high bargaining power of the consumers, high price fluctuation, spoilage of cabbage during handling, lack of market information etc.

Table 7: **Ranking of problems and constraints faced by the market intermediaries in marketing of cabbage along with Garrett's score**

Sl. No.	Problems and constraints	Garrett score	Rank
1	Market glut during harvesting season	45.67	I
2	High perishability of the product	33.78	II
3	Lack of storage facility	24.43	III
4	Large number of market intermediaries	22.36	IV
5	Huge competition among retailers	21.85	V
6	Lack of bargaining power	17.47	VI
7	Distance from field to market	14.24	VII
8	Spoilage of cabbage during marketing	13.33	VIII
9	Lack of processing unit	12.54	IX
10	Culture of intake of processed food is yet not grown	12.13	X
11	Lack of market information	11.45	XI

Opportunity of cabbage production:

During the last two decades, area, production and productivity of cabbage in India has increased significantly. The return to cost ratio of cabbage production is 1.94 indicating its opportunity of cultivation. Out of total 100 farmers, 77 farmers belonged to the small and marginal category and grow cabbage mostly through employing the family labour only. In marketing of cabbage, the major production is routed through channel-II involving an intermediary that indicates a good number of persons are directly related to cabbage production for their livelihood. The study indentified some issues related to cabbage production, mainly heavy disease and pest infestation, high temperature and early maturity which can be checked through cultivating suitable cultivars. The marketing problems can be overcome by establishing warehouses and creating infrastructure with proper planning.

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