



An Economic Assessment of Production and Marketing of Winter Vegetables in Selected Char Areas of Mymensingh District

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The aim of the present study was to examine the cost and return of selected winter vegetables (bitter gourd, sweet gourd and brinjal). The main objective of the study was to find out the marketing costs and margins at different marketing stages through examining the marketing system. Primary data on production and marketing costs and problems of 30 vegetables producers and 30 vegetables traders were collected by face-to-face interview method. For estimating profitability and marketing margins, mainly descriptive statistics were used in this study. Results revealed that among these three vegetables, per acre total cost of production was highest for brinjal and lowest for sweet gourd. On an average, Benefit cost ratio (BCR) was highest for brinjal (2.65) and lowest for sweet gourd (1.28). This indicates that brinjal was the most profitable vegetables in selected char areas. On the other hand, four different channels were identified in vegetables marketing system. However, the net marketing margin was highest for retailers in channel 4 for sweet gourd and lowest

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for faria for bitter gourd. The producers share in consumer taka was highest i.e., 65.48 percent for bitter gourd in channel 4 and price spread was lower in the same. The study also found out some production and marketing problems and constraint faced by winter vegetables producers and traders. Among them lack of capital, higher transportation cost, lack of training facilities, lack of market information, price instability etc. were main. The study also suggested some necessary measures to reduce these problems, one of which is transportation cost would be reduced by constructing a bridge over the river Brahmaputra. The bridge would also be the solution of the backwardness of char Iswardia and char Nilakshmia.

Keywords: Winter vegetables, char areas, cost and return, marketing costs and margins, marketing channel.

1. INTRODUCTION

Historically, the agriculture sector is prominent for long in Bangladesh. This sector plays a pivotal role in the economic development of Bangladesh. The agricultural activities in the country are pursued intensively for the crop as well as allied sectors and in conditions of scarce natural resources. Vegetables are performing as high-value crops in Bangladesh agriculture. Every year, the cultivation of vegetables is increasing day by day. Vegetable production has more than doubled in just over a decade, making Bangladesh one of the fastest-growing vegetable producers in the world [1].

Vegetables sub-sector plays an important role for development of Bangladesh. It is important for its nutrition, contribution to economy and food security. Vegetables are an herbaceous plant whose fruits, seeds, roots, tubers, leaves etc., are used as food. Vegetable growing is an important farming activity from the point of view of economic returns. The International Food Policy Research Institute (IFPRI-1998) conducted an economic evaluation in Bangladesh during 1996-97. Vegetables are rich sources of essential vitamins such as A, C, niacin, riboflavin and thiamin and minerals such as calcium and iron. It contributes to the intake of essential nutrients from other foods by making them more palatable.

Most of the agricultural production in Bangladesh is strenuous in rice, occupying about 75 percent of total cropped areas, whereas only 7 percent of the total cropped land is used for horticultural crops, including root and tuber crops [2]. The area under vegetable cultivation accounts for only 2.56 percent of the total cropped areas. From this small proportion of the cultivable land area, Bangladesh produces about 1.76 lac metric tons of vegetables annually, of which about 65 percent are produced in winter and the rest in

summer. Therefore, production is not well distributed throughout the year and produce for domestic use is relatively scarce in the off-season [3]. The vegetables which are mainly grown from November to March in Bangladesh are called Rabi or winter vegetables. Winter vegetables are very important because of their dietary values and source of income. Tomato, cabbage, cauliflower, potato, sweet gourd, bottle gourd, bitter gourd, brinjal, beans, ladies finger etc. are some main winter vegetables grown in all over Bangladesh. A major area under winter vegetables is char areas [4].

Chars are new riverine lands and islands created by the continual shifting of the rivers, when sand and silt are deposited from upstream. Chars are found along all the major river systems, both lining the banks of rivers and as mid-river islands [5]. Chars in Bangladesh have been divided into five sub-areas: the Jamuna, the Ganges, the Padma, the Upper Meghna and the Lower Meghna rivers. There are other areas of riverine chars in Bangladesh, along the Old Brahmaputra and the Tista rivers. But compared to the chars in the major rivers, these constitute much less land area. In 1993 the estimated total area covered by chars in Bangladesh was 1,722 square kilometers. In 1992-93 there were some 4.29 million people living in about 3300 mouzas covering 8,400 square km. in the main river char lands implying about 4.89 million in 2000 [6].

Char land is suitable to produce quick growing vegetables. After flood, the land is saturated with plant nutrients derived from floodwater. Leafy vegetable production with zero tillage proved a profitable technique. Expanded cultivation of vegetables on homesteads has brought about a revolution in the char economy with fortune to thousands of the extremely poor and landless families living on the Brahmaputra basin in recent years [7].

However, Vegetable production in Bangladesh has increased between the years 1995 to 2005. The annual growth rate of vegetable area was found 4.7 per cent for the whole period. Export of all horticultural crops in comparison to total country's exports share is below 0.5 percent and all policy makers may not take equal interest in expanding horticultural crop exports [8]. Again, production of vegetables is being more labor intensive. Bangladesh is in advantageous position as it has abundant labor supply and natural resources endowments like land and climate. It should thus, take advantage of export potentials in vegetables.

There are different types of winter vegetables (tomato, bitter gourd, sweet gourd, potato, brinjal, cauliflower, cabbage, radish, beans, etc.) grown in the study area (char Nilakshmia and char Ishwardia) under Mymensingh sadar upazila. Among them, sweet gourd, brinjal, and bitter gourd were selected for the study because most of the farmers grow these vegetables. Bitter gourd also known as bitter melon, bitter gourd, bitter squash or balsam-pear in English. It has many other local names. It is a tropical and subtropical vine of the family Cucurbitaceae, widely grown in Asia, Africa and the Caribbean for its edible fruit, which is extremely bitter. Bitter gourds are very low in calories but dense with precious nutrients. Brinjals are native to Southeast Asia, but were brought to Europe sometime in the 1500s, where they eventually became popular and were exported around the world [9].

However, Market participation is the ability to participate in a market effectively and efficiently [10]. It increases the ability from subsistence farming to market engagement mode. As Bangladesh is now moving from subsistence to commercial agriculture farmers need to focus on diversification of surplus produces, secure extension services, information, fair prices of farmers, and access to high value market. So, success of commercialization depends on the secure connection with better price and access to premium market. But remoteness, inadequate infrastructure, transport and storage facilities, diverse number of traders and difficulties accessing reliable information on products and prices hinder them to access better price market [11].

In Bangladesh, there are different types of agricultural markets through which agricultural products are exchanged. These are rural primary market, rural assembly market, rural secondary

market, urban retail market. The rural primary markets are scattered over the entire country and are the first link for the growers in the market structure [12]. Farmers produce vegetable crops, which is particularly perishable in nature. It is estimated that a loss of about 25-40% of the vegetables occur due to rough prepackaging and improper handling, transportation and storage practices and the variation often depends on the type of vegetables [13]. Some of the constraints both biotic and abiotic, which hamper the vegetable marketing, post-harvest losses, slow process of technology transfer, ignorance of people, weak storage capacity, marketing intelligence etc, [14].

Although a lot of information is available from past studies on comparative profitability of winter vegetables, yet the present study is undertaken to add more information about cost of production and return on winter vegetables in the char areas. Chars of Bangladesh are always deprived as they are backward. The present study would have important information regarding vegetables production and its marketing in char Nilakshmia and char Ishwardia of Mymensingh district. Char Nilakshmia and char Ishwardia are very fertile and their soil demography is very suitable for producing vegetables. These two regions have a great potentiality in producing winter vegetables. Moreover, the study identified the problems of production and marketing of winter vegetables in the selected char areas that may be helpful for the policy decision.

Hence, the specific objectives of the study are as follows:

1. To estimate the costs and return of production of winter vegetables and also to examine the marketing system.
2. To assess the marketing costs and margins at different marketing stages and producer's share at consumer's taka.

2. MATERIALS AND METHODS

2.1 Site Selection

This study purposively selected two chars of Mymensingh district namely char Nilakshmia and char Ishwardia of Mymensingh sadar upazila due to the high fertility and their soil demography for producing winter vegetables.

2.2 Sample and Sampling Technique

Vegetable producers of the selected areas and the traders of the selected markets were

considered as the population for this study. There were two types of respondents for this study, i.e., vegetable growers and vegetable traders. The total sample size was fixed at 60 of which 30 (15+15) vegetable producers from two areas and 30 traders (10 from each category; retailer, bepari and faria). The selected 30 vegetable producers were selected purposively from two villages taking 15 from each village. Three markets were selected from Mymensingh sadar upazilla. Ten retailers, 10 bepari and 10 faria were selected by using convenience sampling technique from these three markets. In this study, three vegetables named brinjal, sweet gourd and bitter gourd were selected.

2.3 Data Collection

Data were collected in the month of March 2021 from the vegetables producers and traders. Survey method was used to collect necessary primary data from the respondents. Two comprehensive interview schedules were prepared to record of the desired data. One schedule was used for collecting data from vegetable producers and another for traders. A pre-tested draft interview schedule was prepared. After pre-testing, necessary modifications were made in order to ensure their applicability in actual field conditions. And final interview schedules were made for the survey. Structured questionnaire was employed in collecting most of the quantitative data. Both primary and secondary data were collected for this study. Secondary data regarding area, amount and other aspects of vegetable production and marketing were collected from various reports, publications, journal articles, online sources, reports of BBS, and ministry of planning. The final interview schedule included farmers' socioeconomic information, marketing system, different marketing channel, and different functions of vegetable marketing, marketing cost and return data, price spread, profitability analysis, and Problems and constraints of the vegetable farmers.

2.4 Analytical Techniques

The study used a mixed research design approach using both qualitative and quantitative methods. Data were analysed by using statistical software (MS Excel). Conventional descriptive type statistics (like, mean, standard deviation, and percentage), frequency tables, ranking, graphical analysis, etc., were used to examine the different attributes.

2.5 Marketing Margin

To determine the marketing margin, the following formula was used,

$$MM_{aw} = \frac{\sum (P_{si} - P_{pi}) Q_i}{\sum Q_i}$$

Where,

Q_i = quantity purchase/sale of ith variety

P_{si} = Sale price of the ith variety

P_{pi} = Purchase price of the ith variety

$i=1,2,3,\dots,n$

MM_{aw} = Weighted average marketing margin.

2.6 Profitability Analysis

Net return was calculated by deducting all costs from gross return.

$$Net\ Return = Gross\ Return - Gross\ cost.$$

An undiscounted benefit-cost ratio (BCR) was also estimated in this study by using the following equation:

$$Benefit\ cos\ ratio\ (BCR) = \frac{Gross\ return}{Gross\ cost}$$

3. RESULTS AND DISCUSSION

3.1 Profitability of Vegetable Producer

For the convenience of analysis, the cost items were classified into two groups: (a) variable cost and (b) fixed cost.

Table 1 represents the information related to the cost associated with production cost. For variable cost, it reveals that the human labor cost of bitter gourd, sweet gourd, and brinjal were 35.80 percent, 39.85 percent, and 52.12 percent of total production cost respectively, which is highest cost item. The second largest cost of production was Fertilizer cost for sweet guard and brinjal though the second cost for bitter gourd was seedling cost. The lowest cost item was fencing cost for all three winter vegetables. On the other hand, fixed cost was calculated for land use cost and interest on operating cost. Where land use cost is remarkable and calculated for one crop period which is almost 26.56 percent for bitter gourd, 29.751 percent for sweet gourd and 15.39 percent for brinjal respectively.

Table 1. Per acre cost of material inputs for production

Cost Item	Units	bitter gourd		sweet gourd		brinjal	
		Total Cost	% of total cost	Total Cost	% of total cost	Total Cost	% of total cost
A) Variable Cost	TK						
Human labor	Tk./acre	13474.24	35.800	13396.48	39.855	33868.42	52.129
Seeds/Seedlings	Tk./acre	4378.79	11.634	1446.55	4.304	1106.06	1.702
Fertilizer cost	Tk./acre	3950.31	10.496	3889.31	11.571	7991.25	12.300
Irrigation	Tk./acre	2560.76	6.804	2496.89	7.428	3508.77	5.401
Interest on operating cost	crop period of 6 months	674.10	1.791	575.92	1.713	1145.83	1.764
Pesticides	Tk./acre	2293.64	6.094	1807.58	5.378	6118.6	9.418
B) Fixed Cost	TK						
Land use cost	crop period of 6 months	10000	26.569	10000	29.751	10000	15.392
Fencing	Tk./acre	306.06	0.813		0.000	1231.15	1.895
C) Total cost (A+B)	TK	26963.8	100	23036.81	100	45833	100

Table 2. Per acre production cost and returns of bitter gourd, sweet gourd, and brinjal

Vegetable Name	Bitter gourd	Sweet gourd	Brinjal
Particulars	Value (Tk./acre)	Value (Tk./acre)	Value (Tk./acre)
A. Gross return	51125.49	34487.32	133327.7
B. Total variable cost	26963.8	23036.81	45833
C. Fixed cost			
Land use cost	3234.55	3234.55	3234.55
Interest rate on operating capital	674.1	575.92	1145.83
Total	3908.65	3810.47	4380.38
D. Gross cost(B+C)	30872.45	26841.28	50213.38
E. Gross margin(A-B)	24161.69	11450.51	87494.7
F. Net return(A-D)	20253.04	7646.04	83114.32
H. Benefit cost ratio (A/D) (undiscounted)	1.66	1.28	2.65

The information on per acre cost, margin, returns, and B: C ratio of Bitter gourd, sweet gourd and brinjal are presented in given Table 2.

Gross returns were calculated by multiplying the total amount of product produced by their respective market prices. The table shows per acre average quantity of bitter gourd, sweet gourd and brinjal and per kg value of these three vegetables. Thus, per acre gross return were estimated Tk. 51125.49, Tk. 34487.32 and Tk. 133327.70 respectively. From the table it is observed that, the gross costs were Tk. 30872.45, Tk. 26841.28 and Tk. 50213.38 respectively for bitter gourd, sweet gourd and brinjal.

Gross margin can be increased if the total returns increased. In the study area gross margin for bitter gourd, sweet gourd and brinjal were estimated at Tk. 24161.69, Tk. 11450.51 and Tk.87494.70 per acre respectively. Finally, the Per acre net return was estimated at Tk. 20253.04, Tk. 7646.04 and Tk. 83114.32 for bitter gourd, sweet gourd and brinjal respectively.

The cultivation of Bitter gourd, sweet gourd and brinjal is economically viable as the BCR (undiscounted) was estimated 1.66, 1.28 and 2.65 respectively for bitter gourd, sweet gourd and brinjal implying that TK. 1.66, 1.28 and 2.65 would be earned by investing every Tk. 1.00 in bitter gourd, sweet gourd and brinjal production. The BCR of brinjal was the highest (2.65)

whereas [15] also found that the BCR of Rabi brinjal was 3.79 and [16] found that BCR of Brinjal was 3.2. Benefit cost ratio at all the levels of cost and groups were observed more than unity, Hence the hypothesis that is Profitable is proved.

3.2 Marketing System

Marketing system of winter vegetable is composed of mainly three components namely marketing channels, market participants and business activities. These components are discussed below:

Marketing channels of winter vegetables.

The marketing channels of vegetables as found in the study areas are shown in Fig. 1.

Marketing channel of winter vegetable in selected char areas of Mymensingh district

- Channel 1: Producer→Consumer
- Channel 2: Producer→Faria→ Consumer
- Channel 3: Producer→Bepari→Retailer→ Consumer
- Channel 4: Producer→Retailer→Consumer

3.3 Market Participants

The participants in the marketing channels of winter vegetables in the study areas are briefly discussed below;

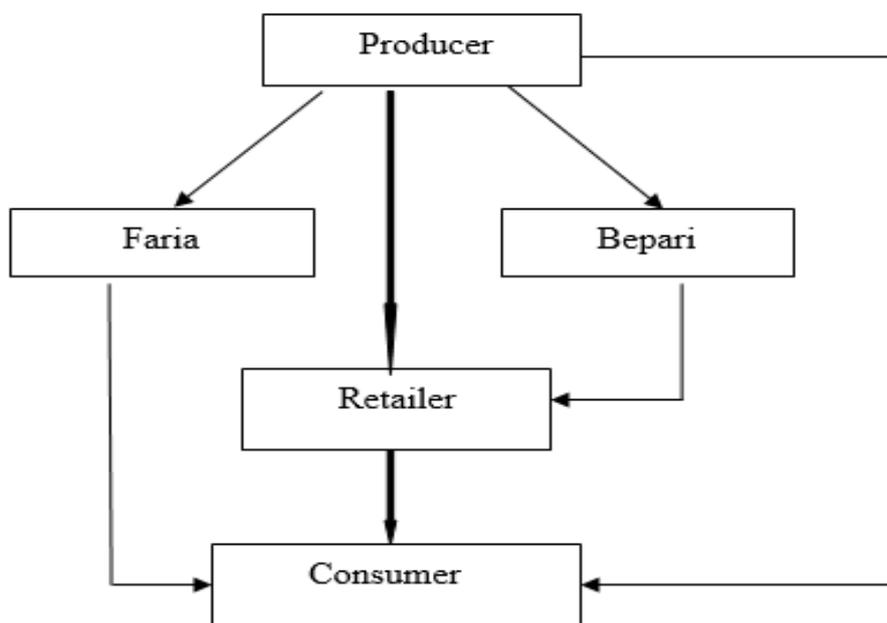


Fig. 1. Marketing channel of winter vegetables of char areas

The first link in the chain of vegetable marketing was the farmer who produced vegetables in their farms in winter season. In the study areas producers sold their vegetables to faria, bepari and retailer.

Farias purchase vegetables from the producers in the village and offered the same directly to the consumers in the markets (Kewatkhali market and Sheshmor market). On the other hand, Bepari were professional traders who purchased from producers at the bank of the Brahmaputra River, brought them to the KR market, Kewatkhali market and Sheshmor market and sold them to the retailers directly. Adding that the retailers are the last link in the channel of winter vegetable marketing. They were the professional traders who operated in the local markets and sold about 100-120 kg vegetables in 2000-2500 taka per day. In the study area, most of retailers purchase vegetables directly from the farmers and the rest from the bepari and sold to the ultimate consumers in local markets.

3.4 Functions Performed in Vegetable Marketing

In this study, winter vegetable marketing functions were buying and selling, transportation, storage, packaging, grading, financing, market information, risk bearing and pricing which were performed by the different market participants.

Buying is the function of exchange. In the present study faria, bepari and retailer bought vegetables from the farmers at farm place, retailers also bought vegetables from the bepari at market place and finally consumer bought

vegetables from the retailer at marketplace. In this study, farmers sold their 30 percent vegetables at marketplace and sold the other 70 percent to the traders (faria, bepari and retailer), bepari sold their 100 percent of vegetables to the retailers and retailers and faria sold their 100 percent of vegetables to the consumers at market place. All traders sold their vegetables in cash. The physical functions are those activities that involve handling, movement and physical change of the actual commodity itself [17].

The study observed that area, only faria used head or shoulder load for transporting vegetables from the farm. Table 3 shows the percentage of using transports among the different intermediaries.

3.5 Facilitating Function

The facilitating functions are those that make possible the smooth performance of the exchange and physical functions.

In the study area most of the farmers and vegetables traders were self-financed; other sources of financing were NGO, mahajon, friends and relatives. It is evident from Table 5.2 that 70% of the vegetable's producers depended on self-financing, 20% of them depended on mohajon and the rest 10 % depended on relatives and friends. About 80% of the faria were self-financed. Other 20% depended on friends and relatives. About one third of the bepari and 30% percent of retailer depended on own sources with borrowing from NGOs. The rest of the bepari and retailer collected money from own sources and friends.

Table 3. Mode of transportation used by vegetables farmers and traders

Intermediaries	Head load/ shoulder load (%)	Boat (%)	Troller (%)	Rickshaw (%)	Auto-rickshaw (%)	Van (%)	Average distance covered (km)	Average cost (Tk./kg)
Faria	30	30	10	20	-	10	6	4.59
Bepari	-	40		20	10	30	6	3.39
Retailer	-			30	20	50	6	3.64
All intermediaries	10	23.33	3.34	23.33	10	30	6	3.87

Table 4. Sources of financing of vegetable producers and traders

Intermediaries	Self- financing (%)	Friends & Relatives (%)	NGOs (%)	Total
Faria	80	20		100
Bepari	66.67		33.33	100
Retailer	70		30	100
Total	72.22	6.67	21.11	100

Moreover, two types of risks were incurred in vegetables marketing in the study area. One was physical risk and another was market risk. Perishability, production dependency on weather and seasonality were covered by the physical risk and fluctuation of market prices of vegetables was considered as market risk. Besides, pricing is an important marketing function for producers and traders. All producers and traders who were involved in buying and selling vegetables followed the individual negotiation for setting the price of their products. They fixed prices through bargaining based on market price.

3.6 Marketing Cost and Margin at Different Stages

3.6.1 Marketing cost

The marketing cost of any product represents the cost of performing the various kinds of marketing functions and operations made by various intermediaries from the point of production to the point of consumption.

3.6.1.1 Marketing cost of Faria

Faria performs the function of collecting vegetables from farmers, transporting them to the disposal center and selling them to the buyers directly. The average marketing cost incurred by each faria was calculated at Tk. 12.23 per kg (Table 5). The major components

for cost were transportation, wastage, cage, market toll and personal expenses.

The table said that, the average cost for transporting bitter gourd, sweet gourd and brinjal was 5 Tk. /kg, 4.8 Tk./kg and 3.96 Tk./kg respectively and it constituted 55.17 percent of total marketing cost (Table 5).

In addition, the cost of personal expenses for per kg bitter gourd, sweet gourd and brinjal were estimated at Tk. 1.8, Tk. 1.5 and Tk. 1.44 respectively. It accounted for 18.99 percent of the total marketing cost. However, the average wastage cost for bitter gourd, sweet gourd and brinjal was estimated at Tk. 0.86, 0.5 and 0.8 respectively which accounted for 8.65 percent of the total marketing cost. The faria could not sell those rotten vegetables or they had to sell those in lower prices. On the other hand, the average charge of market toll per kg bitter gourd, sweet gourd and brinjal were Tk. 1.60, 1.20 and 1.50 respectively which constituted 17.18 percent of total marketing cost (Table 6.1).

3.6.1.2 Marketing cost of bepari

Bepari performed the function of assembling, transporting the vegetable to the market and selling it to retailers. The major cost items for bepari included cost for transport, cost of loading and unloading, personal expenses, wastage, market tolls, grading, tips, donations and miscellaneous cost (Table 6). A brief description of individual cost items is given Table 6.

Table 5. Marketing cost of faria

Cost item	Bitter gourd	Sweet gourd	Brinjal	All Vegetables	Percentage
Transportation	5.00	4.80	3.96	4.59	55.17
Personal expense	1.80	1.50	1.44	1.58	18.99
Wastage	0.86	0.50	0.80	0.72	8.65
Market toll	1.60	1.20	1.50	1.43	17.19
Total	9.26	8.00	7.70	8.32	100.00

Table 6. Marketing cost of bepari

Cost item	Bitter gourd	Sweet gourd	Brinjal	All vegetables	Percentage
Transportation	3.25	3.27	3.66	3.39	45.14
Loading & unloading	0.50	0.35	0.45	0.43	5.73
Personal expenses	1.75	1.15	1.14	1.35	17.98
Wastage	1	0.4	0.6	0.67	8.92
Market toll	1.5	0.5	1	1	13.32
Miscellaneous	0.67	0.67	0.67	0.67	8.92
Total	8.67	6.34	7.52	7.51	100.00

3.6.1.3 Marketing cost of retailers

Finding from the study is that, the retailers had their own shops on the marketplace. When they bought vegetables from bepari, they did not have any transportation costs. But if they bought directly from the farmer, they had to spend a lot on transportation purpose. 30% of the retailers bought vegetables from bepari, 50% of them bought directly from the farmers and 20% of them did both. Marketing cost of Retailers are shown in below Table7.

3.7 Marketing Margin

Marketing margin is the difference between the price received by the producers and the price paid by the final consumers. In this part, both

gross and net marketing margins per kg bitter gourd, sweet gourd and brinjal were calculated separately for different intermediaries. The marketing margin of different intermediaries of winter vegetables is shown in the Fig. 2.

Fig. 3 shows that, the gross margins of faria, bepari, retailer (channel 3) and retailer (channel 4) were 18.67, 18.78, 15.96 and 20.46 taka/ kg respectively and net margins were 9.41, 10.11, 11.58 and 12.58 taka/ kg respectively for bitter gourd.

Fig. 3 shows that, the gross margins of faria, bepari and retailer (channel 3) and retailer (channel 4) were 23, 17.25, 16.44 and 18.12 taka/ kg and net margins were 15, 10.91, 12.64 and 10.75 taka/ kg respectively for sweet gourd.

Table 7. Marketing cost of Retailers

Cost item	Bitter Gourd	Sweet gourd	Brinjal	All Vegetables	Percentage
Transportation	3.50	3.57	3.86	3.64	48.66
Wages and salary	0.36	0.89	0.95	0.73	9.76
Loss in weight	0.48	0.20	0.34	0.34	4.54
Loading & unloading	0.80	1.00	0.50	0.77	10.29
Personal expenses	0.75	0.45	0.24	0.48	6.42
Cage	0.82	0.40	0.60	0.60	8.02
Market Toll	0.51	0.50	0.45	0.49	6.55
Miscellaneous	0.66	0.36	0.25	0.42	5.61
Total	7.88	7.37	7.19	7.48	100.00

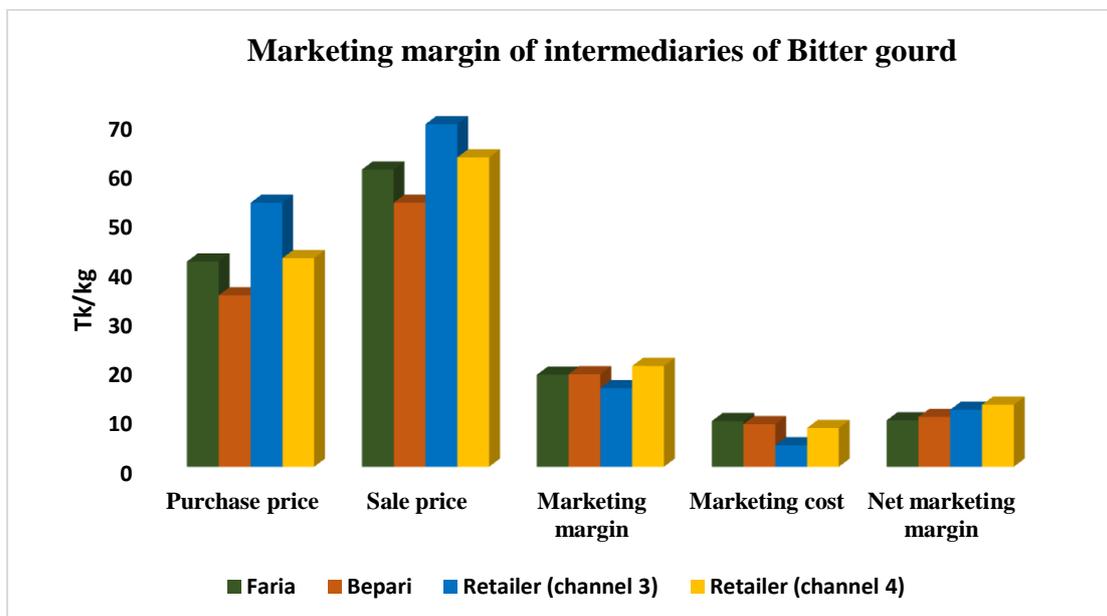


Fig. 2. Marketing margin of intermediaries for bitter gourd (Taka/ kg)

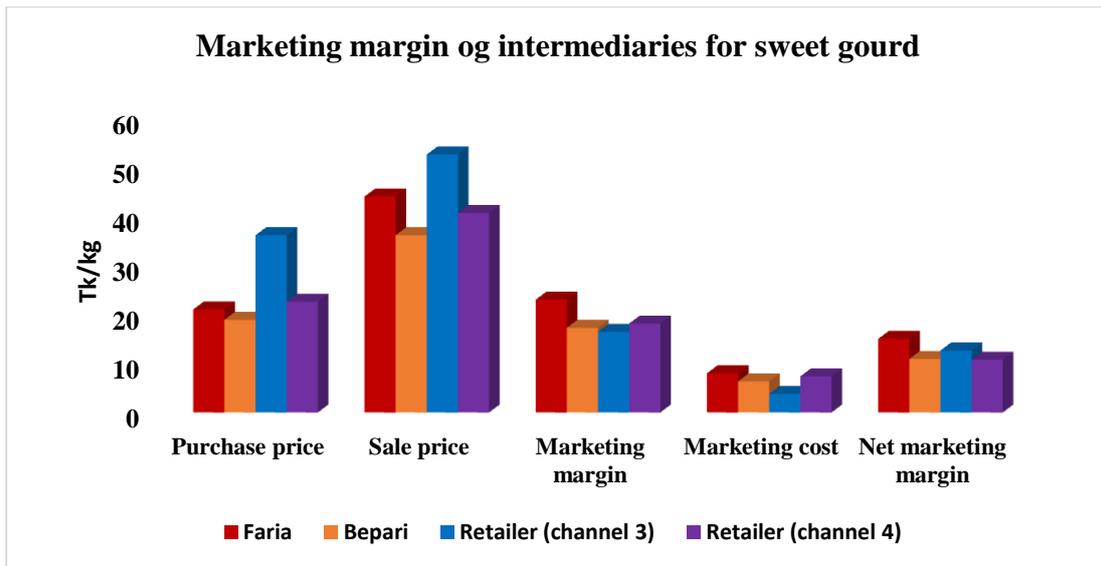


Fig. 3. Marketing margin of intermediaries for sweet gourd (Taka/ kg)

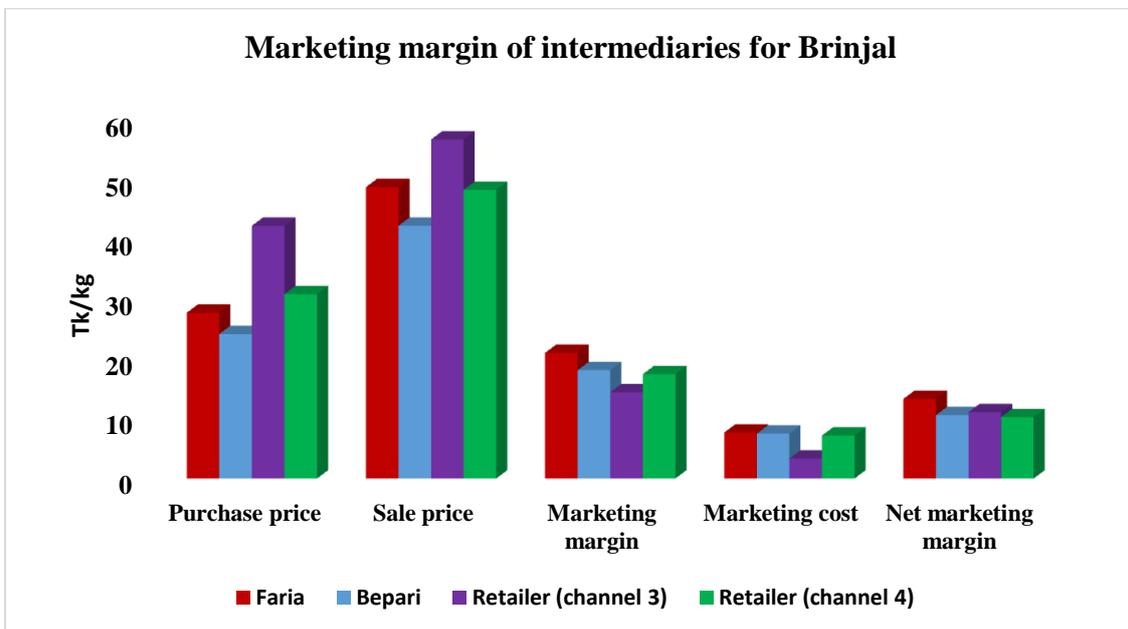


Fig. 4. Marketing margin of intermediaries for brinjal (Taka/ kg)

Fig. 4 shows that, the gross margins of *faria*, *bepari* and retailer (channel 3) and retailer (channel 4) were 21.04, 18.14, 14.45 and 17.47 taka/ kg and net margins were 13.41, 11.97, 11.12 and 10.28 taka/ kg respectively for brinjal.

It is clear from fig. 3-5 that the presence of middlemen decreases the efficiency of the total marketing system. It higher the retail price and thus the consumer is affected. The net margin of retailer was higher than that of other intermediaries because of their higher gross

margin and lower cost of marketing compared to other intermediaries.

3.8 Price Spread

In vegetable marketing price spread has a great significance. It helps to determine the amount of price received by the farmers. If they do not get enough prices for their vegetables, they would be discouraged to produce. If the farmer is not paid enough, they would reduce production. In the present study, the channel selected for calculating price spread is:

Channel 3: Farmer → *Bepari* → Retailer → Consumer
 Channel 4: Farmer → Retailer → Consumer

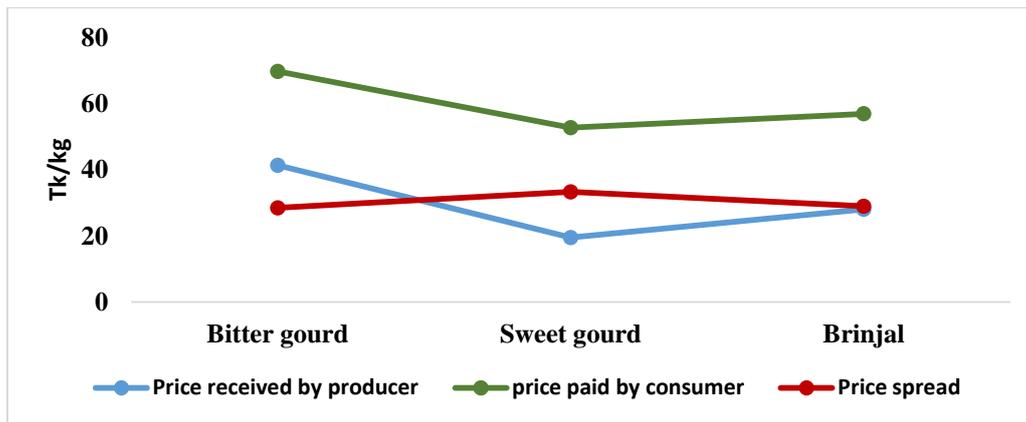


Fig. 5. Price spread for bitter gourd, sweet gourd and brinjal (In channel 3)

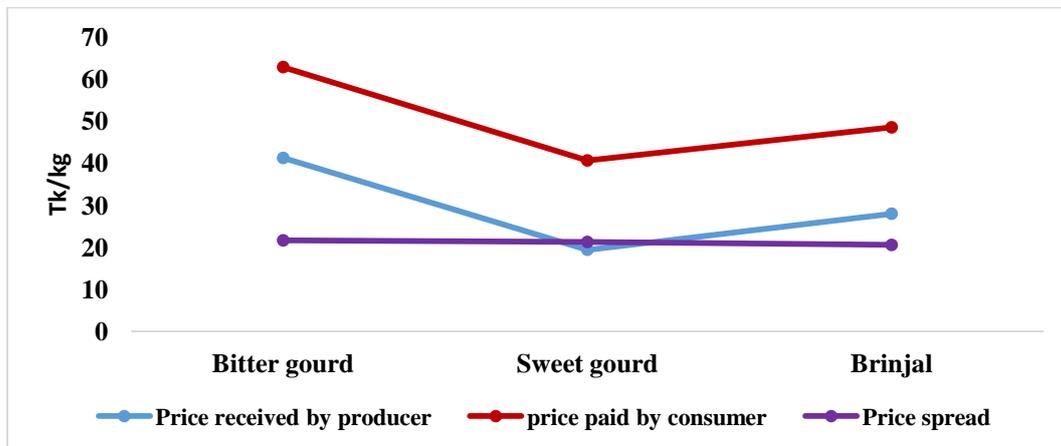


Fig. 6. Price spread for bitter gourd, sweet gourd and brinjal (In channel 4)

Table 8. Producer’s share at consumer’s taka for bitter gourd, sweet gourd and brinjal (In channel 3)

Particulars	Bitter gourd	Sweet gourd	Brinjal
Price received by producer	41.2	19.38	27.94
price paid by consumer	69.55	52.56	56.78
Producer’s share	59.24%	36.87%	49.21%

Table 9. Producer’s share at consumer’s taka for bitter gourd, sweet gourd and brinjal (In channel 4)

Particulars	Bitter gourd	Sweet gourd	Brinjal
Price received by producer	41.20	19.38	27.94
price paid by consumer	62.80	40.60	48.47
Producer’s share	65.61%	47.73%	57.64%

It is clear from above Fig 5 and 6 that, channel 3 was less efficient than channel 4. The presence of an extra middleman increases the price

spread for each vegetable for both channels. Price spread was highest for sweet gourd in channel 3 and lowest for brinjal in channel 4.

3.9 Producer's share at Consumer's Taka

Producer's share at consumer's taka was the percentage that is actually received by the producers in comparison to the ultimate price.

From the above table 8 and 9 it can be said that the presence of an extra middleman reduced the producer's share in consumer's taka for bitter gourd, sweet gourd and brinjal in channel 3. Channel 4 was more efficient than channel 3 in regarding producer's share at consumer's taka. Producer's share in consumer's taka was the highest for bitter gourd in channel 4 and the lowest for sweet gourd in channel 3.

3.10 Production and Marketing Problems of Winter Vegetables and Measures for Improvement

3.10.1 Production problems faced by the farmers

Farmers faced various problems in producing vegetables. According to the producers, the following problems and constraints were identified in the study area which the farmers emphasized upon. The problems were grouped into economic, technical, marketing, social and natural which are discussed Table 10.

From the table it is predicted that, the most important problems to vegetable producers in the study area was the lack of capital. About 80% farmers in the study areas reported that they suffered due to lack of capital (Table 10). They cannot produce vegetables in the large scale due to lack of capital. So, they produced vegetables only in limited quantities. Though char lands have a large potentiality in vegetable farming for its soil content and structure, but for the lack of institutional credit, producers are unable to enjoy these facilities. Farmers cannot expand their production for the lack of institutional credit. It is a matter of great regret that, though Bangladesh is an agricultural country, Government support was very poor in the study area.

Moreover, it is not easy to travel to char lands. For this reason, the price of seeds and fertilizers are very high in these areas. It was one of the most important constraints that the farmers mentioned. On the other hand, a farmer should have technical knowledge to produce vegetables profitably. Most of the farmers did not have any technical knowledge. They started farming as it had become their family tradition and they have no better option than this. The main technical problems are: lack of training facilities, inadequate supply of good quality seeds, lack of modern technology and equipment that is about 37% farmers complained that they did not have modern equipment's to plough or produce.

Table 10. Problems and constraints reported by the vegetable farmers

Nature of Problems	Farmers reported (%)	
	Number	Percentage
A. Economic Problems		
i) Lack of capital	24	80
ii) Lack of institutional credit	18	60
iii) Lack of government support	20	67
iv) High price of seeds and fertilizers	21	70
B. Technical Problems		
i) Lack of training facilities	12	40
ii) Inadequate supply of good quality seeds	15	50
iii) Lack of modern technology and equipment's	11	37
C. Social and Natural Problems		
i) Attack by pest and disease	20	67
ii) Loss of production due to theft	6	20
iii) Natural calamities	4	13
D. Marketing problems		
i) Transportation problem	30	100
ii) Inadequate storage facilities	7	23
iii) Fluctuation of price	15	50
iv) Lack of marketing facilities	14	47
v) Lack of market information	9	30
vi) Dominance of intermediaries	24	80

Table 11. Problems and constraints reported by the vegetable traders

Nature of problems	Traders reported (%)	
	Number	Percentage
i) Lack of capital	24	80
ii) Lack of institutional credit	18	60
iii) Lack of storage facilities	9	30
iv) Transportation problem	18	60
v) Inadequate space in the market	20	67
vi) Price instability	12	40
vii) Wastage of vegetables	6	20

3.10.2 Social and natural problems faced by the farmers

It was found that farmers were facing some social and natural problems in producing winter vegetables. These are discussed below.

About 67% farmers producing selected winter vegetables mentioned that considerable amount of yield of vegetables were lost by the attack of pests and diseases. In the study areas, most of the vegetable farmers faced this problem and they faced losses for this reason. In the study areas, 20% vegetable farmers reported that their products were stolen. Vegetable production was greatly dependent on nature. In winter, excessive fog or drought situation damage the production. Again, Due to pollution and environmental change, the water flow of Brahmaputra River is decreasing day by day which was the only source of irrigation in the study area. Now people depend on deep tube well for irrigation which is costly and needed power supply which is unavailable.

3.10.3 Marketing problems faced by the farmers

The farmers faced the following problems during the marketing of vegetables:

The main marketing problem of the study area was transportation problem. 100% of the farmers indicated this problem. In the study areas, there was no sufficient storage facility for keeping vegetables for the time being. So, lack of storage facility was a problem that caused damage of these perishable vegetables especially during the peak season. Fluctuation of price is also a major problem which is faced by the farmers.

Moreover, there were no shed to protect the farmer's vegetables from rain or sun and the farmers had to sell their produce standing in the

open place. So, lack of market facilities such as pucca floor, tin shed, drainage, water supply was mentioned as problems by vegetable farmers. Finding of the study is that, 30% farmers did not get the market information properly. As a result, they did not get fair price of their produce as compared to terminal market.

3.10.4 Problems faced by vegetable traders

In the study area vegetable traders were found to face various marketing problems. These problems are discussed below and presented in Table 11.

In the study area, 80% of the traders indicated that lack of capital was the major problem of vegetable marketing. Traders wished to trade large volume of vegetables but they did not have capital for operating various marketing activities.

Table 11 indicated that 60% of the traders had identified the problem of the lack of institutional credit facilities on easy terms and conditions. Traders who collected vegetables directly from the farmers from their fields faced serious transportation problems. As there was no bridge over the river, transportation was costly and time consuming and it alone bared half of the marketing costs. Vegetable is a perishable commodity. They cannot be stored for few days. As a result, traders had to face the problem of wastage.

4. CONCLUSION

This study evaluated to examine the cost and return, marketing system, and marketing margins at different stages of winter vegetables that is bitter gourd, sweet gourd and brinjal in the study areas. To achieve the objectives, two chars of Mymensingh district char Nilakshmia and char Ishwardiya were selected. Primary data were collected by applying survey method. The study revealed that brinjal production was relatively

more profitable than bitter gourd and sweet gourd. The management practices of selected vegetables production in the study area were not found efficient enough. Farmers were not known about the application of modern methods of farming and improved seeds. Thus, well planned management training in accordance with their problems, needs, goals and resource base can lead to viable production and sustainable income from bitter gourd, sweet gourd and brinjal. There are different types of marketing problems found in the char areas. If those problems are solved then the producers, traders as well as consumers would be benefitted.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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