

Review

# Evaluating the Production and Marketing Assessment of Selected Vegetables in Bangladesh

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**Abstract:** The prosperity of Bangladesh depends upon agricultural development. In addition to that, vegetables play a significant role in the economy of Bangladesh. The present study aims to overview the production and marketing of vegetables. The study also attempts to highlight the value chains and channels of vegetable marketing and the problems related to the production and selling of vegetables. Conspicuously, the cultivation of vegetables in our country is growing day by day due to the higher profitability. Nearly 1.25 million hectares of cultivable land area are engaged for producing vegetables. This study attempts to pronounce the existing vegetable supply chain system along with the problems and constraints faced by the farmers during producing and marketing of vegetables. The usual supply chain is that the middlemen collect vegetables from growers at a cheaper price and then sell it to the general consumers with a markup. There is almost a complete absence of specialized facilities and equipment for handling vegetables in the market. The study reports some policies based on the problems to increase the production and marketing opportunities of the farmers. In particular, the vegetable marketing system is unorganized in Bangladesh which needs to be developed for the well-being of the farmers and common people.

**Keywords:** Profitability, Supply Chain, Middleman, Production, Marketing

## Introduction

Bangladesh has an overwhelmingly agricultural economy. Agriculture accounts for 13.47% of its Gross Domestic Product (GDP) and assimilates 40.60% of the country's labor force (BER, 2021). Government-backed funds for irrigation systems, rural infrastructure, agricultural research, and extension services have helped farmers significantly to raise their agricultural production. Production revolution has been achieved and food production has more than doubled since independence in 1971, these have mainly supported the country's large population base rather than raising the standard of living of the average citizen. Food security remains a major development problem (Hoque, 2000).

Bangladesh exports 0.07 to 0.10 million tons of vegetables in 2016 to 52 countries. Simultaneously, the expansion of vegetable cultivation scales around the year is serving the country to emerge with a brand-new comfort. In this age of manufacturing, wide-ranging vegetables around the year help to have different seasons. Bangladesh is lucky enough to have soil appropriate for each leafy and fruiting vegetable. As a result, immigrants

and non-resident Asians are the main customers. There also are varied distant customers. It is good that a large section of farmers cultivates vegetables throughout the year. Few vegetables are now rigidly confined to winter and summer (DAE, 2016).

Vegetables can perform an essential contribution to the economy of Bangladesh, where about 20.5% of people live below the poverty line (BBS, 2019), by providing necessary nutrients to full fill the nutritional deficiency and it could be an additional source of income for the farmers. Moreover, a considerable number of people can be absorbed both in the process of production and in the marketing of vegetables. Compared to wheat and rice 50% more human labor is required in vegetable production which will reduce the unemployment problem in the country (Sabur, 1990).

Considering the importance of vegetables, the Bangladesh government has provided technical support to increase vegetable production and consequently production support increased from 1.15 million tons in 1970-71 to 6.3 million tons in 2019 (BBS, 2019).

Agricultural marketing shelters the services concerned with transferring an agricultural product from the

Production unit to the consumer. Several interrelated activities are involved in doing this, such as production preparation, rising and collecting, grading, packing, storage, transport, agri-food processing, distribution advertising, and sale. A few definitions would indeed incorporate "the acts of obtaining supplies, leasing equipment, paying labor", contending that promoting is everything a trade does. Such activities cannot take place without the exchange of information and are often heavily dependent on the availability of suitable finance (Aker *et al.*, 2016).

The marketing channel is characterized as a set of substances (organizations or people) straightforwardly included within the upstream and downstream streams of products, services, finances, or information from one source to a customer. The marketing of needle products has the potential to raise the profit level of those involved in different sections of the marketing channel, such as the sourcing, sale, and purchase of agricultural products. (Mentzer *et al.*, 2001).

In Bangladesh, farmers, Farias, beparias, aratdars, and retailers are generally involved in the channel for marketing agricultural products. Among these agents especially farmers and middlemen face problems of investment shortage, poor communication and carriage facilities, inadequate storage facilities, inadequate market information, higher market tolls, inadequate market structures, etc. In this context, producers must choose a channel where direct marketing can that matches both their strengths and their experience in agricultural production. They should consider their customers, products, resource, and the opportunities and threats associated with using a particular marketing channel. (Bruch *et al.*, 2010). Considering the above-mentioned information this study analyzed the overall production situation focusing on the profitability of popular vegetables in Bangladesh. To understand the potentialities post-harvest marketing and export quantities are also mentioned in this study which snaps the average overview of selected vegetables of Bangladesh. The study has undertaken the following objectives for being analyzed:

- To review the production status of vegetables
- To highlight the marketing system of vegetables
- To overview the problems associated with the production and marketing of vegetables

## Materials and Methods

This is an exclusive review paper. So, no precise methodologies are involved to prepare this study. In this study, the production situation of different vegetables along with their profit situation is analyzed by using secondary sources data. Last four years export situation of vegetables is being categorized to show vegetables'

potentialities in Bangladesh. Supply chain management of vegetables in the domestic market is constructed and performances of stakeholders are being discovered. Production and marketing-related problems associated with vegetables are identified and related policy suggested for the solution. This study mainly depends on secondary data. Different published reports from different journals are mainly supported in providing data for this study. It has been prepared by comprehensive studies of various articles published in different journals, books, and proceedings. Different information has been collected through contact with respective persons and Internet facilities to enrich this information.

## Results and Discussion

### Area and Production

In Bangladesh, nearly 100 different types of vegetable varieties comprising both local and exotic are used to produce around 26.70 million tons of vegetables across Bangladesh. Although only a small percent of the country's total arable land could be brought under vegetable cultivation, the production of vegetables has increased significantly in the last decade which is about 37%. Moreover, the quantity of land growing vegetables increased by almost 29% and nearly 1.25 million hectares of the land area is engaged in the fiscal year 2018-19. (Hasan, 2020).

The above table 1 shows that in 2013-14 land area and cultivated number of vegetables were only 0.97 million hectares and 19.40 million tons respectively. This area increased to 0.99 million hectares in the next fiscal year and the cultivated number of vegetables increased to 21.04 million tons in 2014-15. In the fiscal year 2015-16, around 20 million tons of vegetables were produced, which is a little less than the previous year. Additionally, an extra 2.65 million tons were produced in 2017-18, compared to 2016-17 and lastly, around 26.70 million tons of vegetables were produced on 1.25 million hectares of land in the following year. This indicates that the area under vegetable cultivation, as well as the production of vegetables, has increased over the year from 2013 to 2019.

It is observed in Fig. 1 that for summer vegetables (i.e., kakrol, pumpkin, patal, jhinga, karala, chalumau, etc.) the production was 1742000 metric tons in the year 2017-18 which is increased to 1871000 metric tons in the next year 2018-19. Furthermore, in the years 2019-20, we witnessed a significant increase in production which is 2000000 metric tons which is a positive sign. Although the area under vegetable production does not indicate a tremendous change throughout these years. In 2017-18 the area was 481000 acres which increased to 535000 acres in 2019-2020.

Again, Fig. 2 shows that for winter vegetables (i.e., cauliflower, cabbage, radish, water gourd, carrot, etc.) the area under production was 538000 acres in 2017-18. In

the next year, it was increased to 547000 acres and the area was 575000 acres in the year 2019-20. If we consider the production of winter vegetables, the production and area are more. The production was 2372000 metric tons in the year 2017-18 which is 630000 metric tons more than summer. Furthermore, in 2018-19 we also observe an increase of 594000 metric tons of summer vegetables. Moreover, in the fiscal year of 2019-20, the production of winter vegetables was 2576000 metric tons which have a significant increase of 576000 metric tons than that of summer vegetables. This shows that in winter the productivity of vegetables is more than in the summer season.

According to the Year Book of Agricultural Statistics, among all other vegetables, six types of vegetables are being cultivated in 36.51% of the total cultivated area and other vegetables are cultivated in 63.49% area under vegetable cultivation. Here brinjal has most of the area which is 12.49 percent of the total vegetable area. Moreover, tomatoes occupy 6.37%, radish 6.20%, and cauliflower, pumpkin, and cucumber are cultivated in 5.29, 3.33, and 2.35 percent areas respectively which is shown in (Fig. 3).

### *Cost and Return of Vegetables Production*

We know that the profitability of a crop depends on factors like yield, price of the product, cost of inputs and as well, and management capacity of farmers. Any variation in any of the above factors changes the profitability Cost and return value of vegetable production having a major influence on the willingness of farmers' production decisions.

From the above table, we can say that cost of production per acre of land for brinjal is Tk.70,262.40. For per acre production of tomato, the cost is Tk.78,503.60 which is Tk.8,241.20 more than brinjal. Finally, for cauliflower, the required production cost is Tk.85,478.40 which is Tk.15,216 more than brinjal.

Furthermore, the Benefit-Cost Ratio (BCR) of brinjal is 2.73 which is higher than tomato and cauliflower. The Benefit-Cost Ratio (BCR) of tomato and cauliflower is 1.75 and 1.77 respectively.

The value shows that brinjal is one of the most profitable vegetables due to its year-round availability and consumption. On the other hand, tomatoes and cauliflower are mainly popular as a winter vegetables in Bangladesh.

Figure 4 and 5 shows that cost of production of brinjal is Tk.70,262.40 which is lower than tomato and cauliflower. This results in a higher gross return of brinjal which is Tk.192,033.60. The return from tomato and cauliflower is Tk.137,200 and Tk.151,200. As per the result, the net margin of tomato is Tk.58,696, and cauliflower has more net margin than tomato which is Tk.65,721.60. But brinjal has the highest net margin of 121,771 which is more than the other two vegetables.

### *Vegetable Export in Bangladesh*

Although Bangladeshi vegetables are still not well known to foreigners, we seemed to have high projections for the export of vegetables for its high demand in foreign ethnic markets. Moreover, the export of fresh vegetables is more profitable due to its high-value addition. (Hoq et al., 2012).

Table 3 represents that in the fiscal year 2017-18, the export value of vegetables was \$106 million which was 0.4 percent of total export. In the next fiscal year 2018-19, the value of export increased to \$116 million resulting in 9.43 percent export growth. The country's vegetable exports showed strong performance in the fiscal year 2019-20 which was \$163 million ensuring a 40.51% growth in export value. In this year the amount of vegetable export was 0.6 percent of total exports. In the current fiscal year 2020-21, we find an export value of \$214 million which is more than the previous year but the export growth in value is 31.28% which is 9.23% less than the fiscal year 2019-20. Moreover, in the current fiscal year percentage of total export amount on vegetables increased to 0.7% of total export.

### *Existing Supply Chain of Vegetables*

#### *A. Number of Markets*

There are broadly four types of markets in the existing supply chain of vegetables in Bangladesh. These are.

#### *Rural Primary Markets*

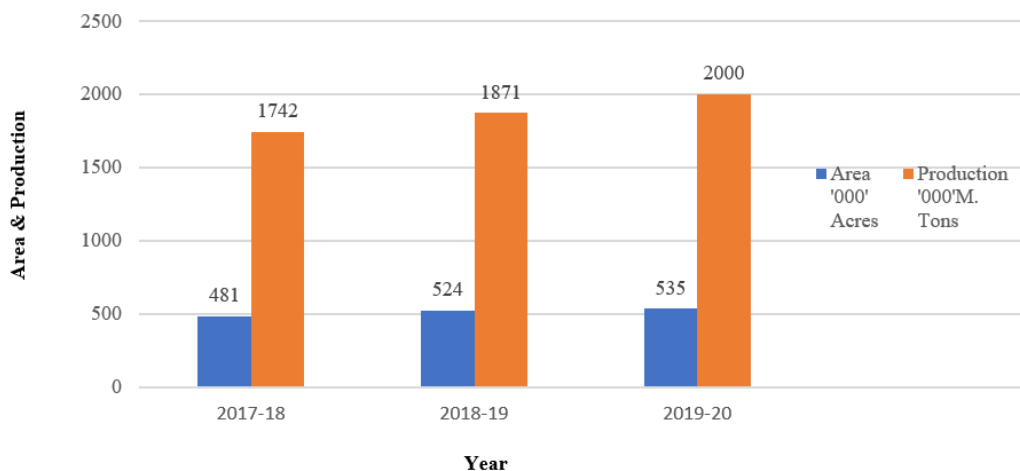
The primary market is held once or twice a week and often processes products demanded by local rural populations. In this market, vegetables are sold directly to local consumers. The basic producer of primary markets at the village level is the hats, where trade is characterized by the direct sale of small amounts of produce by farmers to village traders or by retail to rural consumers.

#### *Assembly and Secondary Markets*

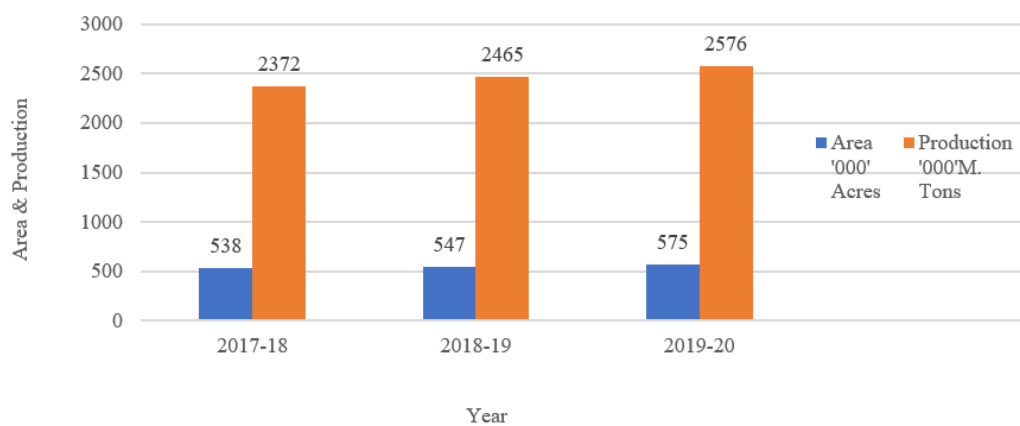
These are larger markets where larger quantities of products are sold by the farmers themselves or by village traders. These markets are usually located in larger metropolitan areas and, in addition to functioning periodically for aggregation purposes, they can function as day-to-day retail markets, serving neighboring urban populations.

#### *Terminal Markets*

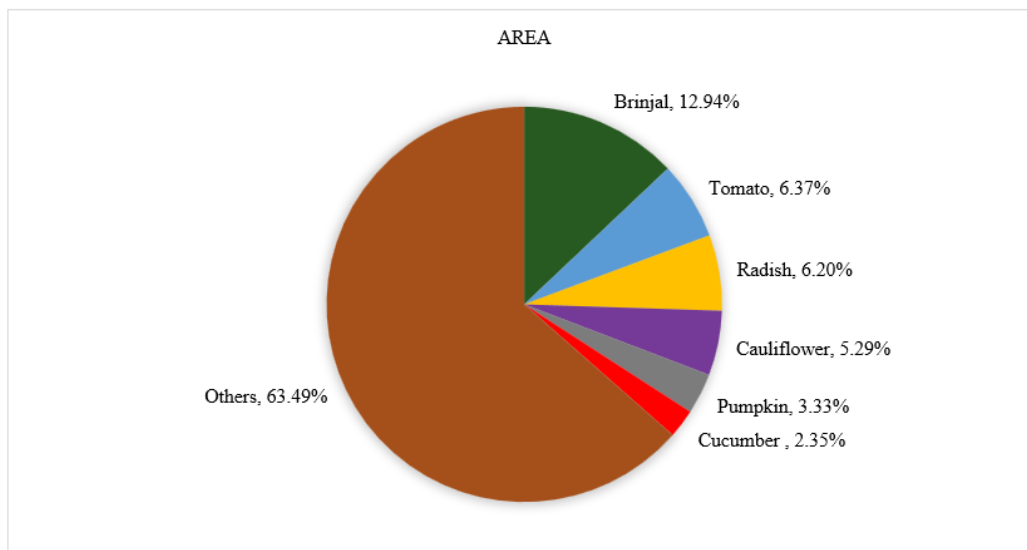
Urban wholesale, wholesale and retail markets are located close to major consumption areas. For retail markets, permanent retailers primarily handle transactions. In wholesale markets, transactions are carried out by wholesalers or commission agents, and only the largest producers and marketing cooperatives can bring the products. These are the central or wholesale markets from which distribution begins.



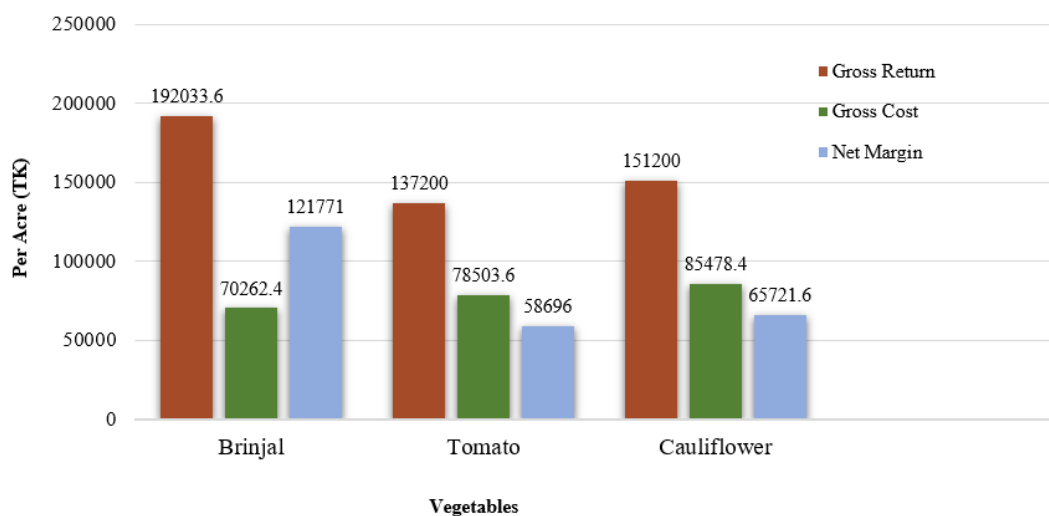
**Fig. 1:** Production of summer vegetables (2017 to 2020) (Source: YAS, 2020)



**Fig. 2:** Production of winter vegetables (2017 to 2020) (Source: YAS, 2020)



**Fig. 3:** Percentage of the area under different vegetables (Source: YAS, 2020)



**Fig. 4:** Per Acre costs and returns of some vegetable production (Source: Hoque *et al.*, 2018)

**Table 1:** Vegetables production during 2013-14 to 2018-19

Fiscal Year	Vegetable Area (million hectares)	Production (million tons)
2013-14	0.97	19.40
2014-15	0.99	21.04
2015-16	1.06	20.00
2016-17	1.08	23.60
2017-18	1.17	25.63
2018-19	1.25	26.70

**Table 2:** Per Acre costs and returns estimates of selected vegetable production

Items	Brinjal	Tomato	Cauliflower
A. Gross Return (Tk)	192033.00	137200.00	151200.00
B. Variable Cost (Tk)			
Human (family and hired)	33363.20	39200.00	42000.00
Tillage (Animal, Power tiller)	2860.00	3360.00	5040.00
Seed	5070.00	5600.00	7000.00
Fertilizer and Manure	11993.80	11200.00	12600.00
Pesticide/Insecticide	5444.40	6300.00	5040.00
Irrigation	2633.80	2800.00	3360.00
Total	61365.20	68460.00	75040.00
C. Fixed Cost (Tk)			
Land Use Cost	5200.00	5600.00	5600.00
Interest on operating capital	3697.20	4443.60	4838.40
Total	8897.20	10043.60	10438.40
D. Gross Cost (B+C)	70262.40	78503.60	85478.40
E. Gross Margin (A+B)	130668.20	68470.00	76160.00
F. Net Margin (A-D)	121771.00	58696.40	65721.60
Benefit-Cost (A/D)	2.73	1.75	1.77

**Table 3:** Export performance of fresh vegetables during FY 2017-18 to FY 2020-21

Fiscal year	Export value (in Million US\$)	Export growth on value (%)	Total export amount (%)
2017-18	106	-	0.4
2018-19	116	(+) 9.43	0.4
2019-20	163	(+) 40.51	0.6
2020-21	214	(-) 31.28	0.7

### *Other Markets*

In the case of horticultural commercialization, there are channels other than markets, including direct sale to the farm and the use of pre-harvest contractors who buy the products still in the trees and organize the collection, packaging, and transport to the wholesale point of sale.

#### *B. Number of Middlemen*

There are five categories of middlemen from farm gate to the ultimate consumer. They help the vegetables reach from growers to consumers. They are Faria, Bepari, Aratdar, Paiker, and Retailer.

#### *Farias*

The Farias are small rural traders who buy vegetables from producers both in the village and at primary markets and sell them to local beparies or retailers.

#### *Beparies*

Beparies are rural assemblers who typically buy vegetables from secondary markets or directly from producers via Farias in the village and transport them to central wholesale markets for urban consumption through retailers.

#### *Aratdar*

Aratdar is a commissionaire who charges commissions to both Bepari and Paiker. They have permanent staff and establishments in wholesale markets and organize the sale of vegetables from bepari to paiker who then sell vegetables to retailers.

#### *Paiker*

Paiker is regular traders who usually buy vegetables from beparie through aratdar and sell vegetables to retailers or consumers.

#### *Retailers*

Retailers generally buy vegetables from beparies through aratdar and sell them directly to the consumer. They either have a permanent store in the retail market or have outdoor markets outside of the markets called trails. However, in rural areas, retailers buy vegetables directly from producers and sell them to rural consumers.

So, in general, the vegetable supply chain begins with the vegetable producers. The bepari buy their vegetables from them. Many bepari, the aratdar, buy vegetables which then resell them to the paikers. Thus, retailers buy vegetables from paiker and sell them to the consumer. In this way, the vegetables arrive from the market gardeners to the end consumers.

### *Domestic Supply Chain of Vegetables*

The vegetable supply chain is categorized by a large number of market actors and outlets like farmers, input

sellers, traders, wholesalers, commission agents, retailers, transporters and exporters, and several other smaller actors. Each of them has great emphasis on a specific stage in the supply chain. A generalized supply chain map of vegetables at the local market reflecting the participants involved in the vegetable supply chain is shown in Fig. 6.

So, in general, the farmers sell their vegetables to Faria, bepari, and other selected agents who accumulate vegetables from the farmers and local markets and then send them to distant Firstly, inputs are supplied to the growers and the produced vegetables are marketed locally with the help of Faria. Sometimes Faria assembles the vegetables and with the addition of a certain amount of commission sells the vegetables to bepari. Then the product moves to aratdar. Here, Aratdar can sell these vegetables directly to retailers. On the other hand, aratdar can also move these to wholesalers followed by Faria then to retailers. From retailers, the vegetables finally reach the hand of final consumers. bigger markets for profit.

### *Proposed Vegetable Supply Chain*

The proposed supply chain is an integration of activities of involved participants like farmers, banks, NGOs, etc. Figure 7 shows that farmers have to form an association including financial institutions like banks and NGOs which will deal with other stakeholders. Representatives of farmers will deal with local authorities and other related parties. At the pre-harvesting level, the farmers' association will facilitate loan collection and repayment. By this means, the dependency on local loan lenders who charge higher will decrease and the early selling tendency of farmers will also decrease. After post-harvesting, the farmers' association will contact various middlemen including urban retailers and supermarkets to supply the harvested vegetables. While selling those vegetables, the representatives of the farmers' association will collect information about vegetable demand and price and other necessary information. This will ensure a suitable price for vegetable growers.

In simple words, an integrated supply chain will increase profitability and will also save farmers from the exploitation of middlemen in terms of price. Export potentiality of vegetables will increase and farmers will also know about new markets opportunity.

### *Constraints of Vegetables Production and Marketing*

Vegetable producers/suppliers and intermediaries involved in the vegetable supply chain face several impediments during vegetable production and marketing. The type and degree of the problems differ from trader to trader, place to place, and market to market.

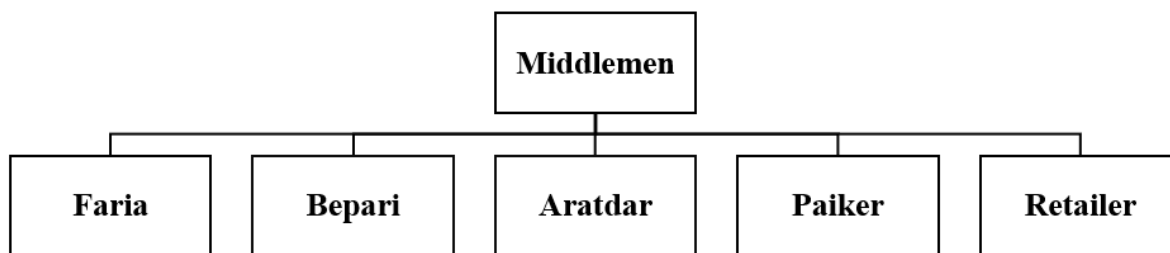


Fig. 5: Middlemen in Supply Chain of Vegetables (Source: Jahangir, 2010)

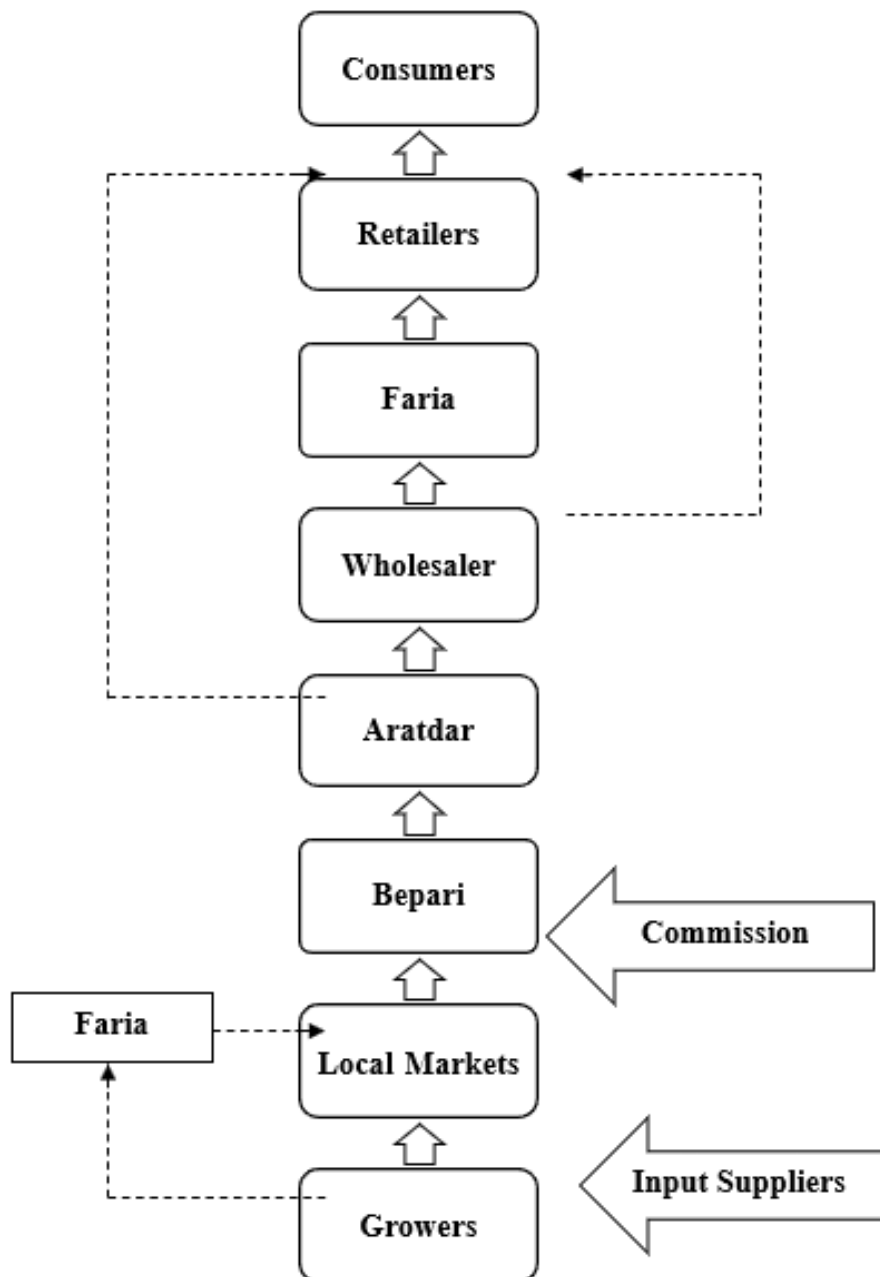


Fig. 6: Generalized supply chain map of vegetables at a domestic market (Source: BFTI, 2016)

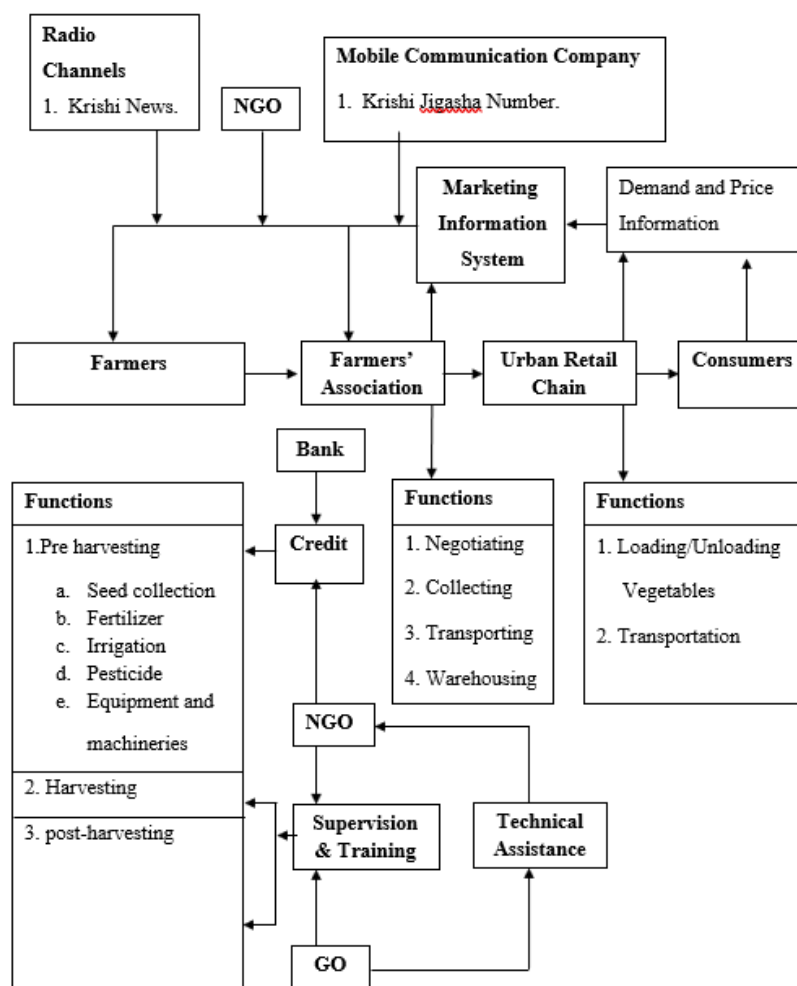


Fig. 7: Proposed Vegetable Supply Chain (Source: Hossain *et al.*, 2013)

### Poor and Conventional Production Methods

A majority of the vegetable farmers in Bangladesh still follow primitive production methods. Vegetables produced using traditional methods often fail to meet the worth standards of export markets and thereby lose their capability to remain competitive.

### Insufficient Processing Capacity

Existing vegetable markets have few processing capacities. Harvested vegetables are not graded or sorted or packed in a standard way which decreases the bargaining power of vegetable growers.

### Lack of Effective Linkages Among Stakeholders

One of the core problems for agribusiness development in Bangladesh is the lack of effective linkages among stakeholders. As there are many middlemen between vegetable growers and consumers, growers often lack information about the current market

situation. As a result, farmers do not often get a reasonable price for cultivated vegetables. At the same time, consumers have to pay a high price due to markups at the various stages of the existing supply chain.

### Lack of Infrastructure

Common assembling vegetable markets lack concrete (Pacca) floor, cold storing facility, adequate drainage facility, water and sanitary facility, pack house, shed, and short-time storage facility which is a major constraint, especially in the stock of vegetables.

### Inadequate Transport Facilities

Delay in transportation and sale is a common problem in vegetable marketing, but the seriousness of this issue is varied from trader to trader. It happens mainly due to traffic jams, political unrest, and trouble with ferry service. A bad condition of the road creates shaking in the vegetable packets that cause heavy damage as well as creates a postharvest loss of vegetables to a great extent.



### *Higher Transportation Cost*

Higher conveyance costs in the supply chain are one of the main reasons for the higher price of vegetables at retail markets.

### *Price Fluctuation*

Vegetable growers suffer from the seasonal fluctuation of prices which become a losing concern to the vegetable traders. It occurred due to an unbalanced supply of vegetables in the market, political unrest, and strikes in the transportation sector.

### *In Equilibrium in Supply and Demand of Vegetable*

Production of vegetables is not evenly distributed in all parts of the country due to agro-ecological limitations. Due to the lack of policy intervention to ensure an equal supply of vegetables during the year, it becomes difficult to ensure a stable price for vegetables throughout the whole year.

### *Inadequate Credit for Vegetable Production*

Although vegetable production is highly expensive and there exists a high degree of risk and uncertainty of natural calamities and hazards, there is no adequate policy support for institutional credit exclusive for the production of vegetables.

### *Informal Tolls*

In the existing vegetable supply chain, middlemen have to provide various informal tolls while transporting vegetables from growers to urban retailers. Transporting vehicles in the path are stopped several times to provide informal tolls to several authorities. (The Daily Star, 2008).

The other important constraints are mainly the existence of syndicate in price control, the supremacy of repair in the supply chain, higher market toll, absence of modern marketing tools and equipment, lack of market information, lack of labor, and lack of adequate knowledge and skills which need to be addressed.

### *Possible Solution to Vegetable Production and Marketing Constraints*

Based on the findings, several procedures are needed at farm and market levels to reduce losses and to ensure a safe and quality supply of vegetables for the consumers.

### *Support for Good Agricultural Practice (GAP)*

Farm-level postharvest misfortune is mostly due to pre-harvest practices. To encourage good agricultural practices (i.e., use of the improved variety, disease-free seedlings, less use of pesticides, use of more organic and less chemical fertilizers, use of sex pheromone traps as well as bio-pesticides, use of clean containers during

harvest, etc.) farmers must be provided with hands-on training, diseases resistant variety, IPM technologies, bio pesticides and premium price of organic vegetables.

### *Cooperative Marketing*

Farmers need to be organized through a cooperative marketing society for selling their produces which can lead to suitable negotiating power for ensuring fair output price of their produces.

### *Adequate Infrastructure Facilities*

The status of physical infrastructure at market premises is very underprivileged. Therefore, the government should construct a packed house, well drainage facility, water, and sanitation facility, rest room for distant Paris, and concrete market floor at market premises.

### *Effective Transport Facilities*

Construction and renovation of village roads are important for dropping postharvest losses of vegetables to some extent. Therefore, the transportation system should be well constructed in remote rural areas.

### *Crop Insurance and Loan*

Crop insurance should be introduced especially in areas that are disaster-prone to save the small and marginal farmers in those areas. SME loans should be expanded in the marketing of agricultural products through the different state-owned banks.

### *Effective Government Program*

Government should take immediate action against hoarders and market manipulators to control the country's marketing system. Government can also issue improved seeds at a subsidized price to the small and marginal farmers. Moreover, the public procurement system should be extended to remote areas which are deprived of any support from the government in marketing their products and the poor farmers should get the ultimate benefit from the program instead of the middlemen.

Finally, Facilities of information technology should be provided to the farmers to a large extent. Moreover, continuous research is vital to mitigate diverse problems prevailing in the vegetable supply chain in Bangladesh. Therefore, Miah *et al.* (2018) suggested Bangladesh agricultural research institutions and Agricultural Universities in Bangladesh should strengthen their existing capacity in terms of preharvest and postharvest research and development. (Source: Miah *et al.*, 2018)

## **Conclusion**

Vegetable production is in increasing trend but the marketing system is problematic and unorganized in Bangladesh. Effective production of vegetables has

potentialities to increase the profits level of the people who are engaged in different parts of the marketing channel. The usual supply chain is that the middlemen collect vegetables from growers at a cheaper price and then sell it to the general consumers with a markup. But there is almost a complete absence of specialized facilities and equipment for handling vegetables in the market which makes the market structure unstable. Marketing of vegetables can be made effective with cooperative and integrative efforts from various quarters by addressing farmers, middlemen, researchers, and administrators in the supply chain. So, it is high time to bring significant strategies in agricultural marketing with innovative and creative approaches to bring fruits of labor to the farmers. The lack of facilities like warehouses or processing centers reduces the bargaining power of vegetable growers. As a result, the cultivated vegetables do not reach end consumers efficiently and effectively. Therefore, Proper assistance and other incentives at the production level need to be ensured for farmers.

Finally, it can be concluded that the Vegetable sub-sector plays an important role in the growth of Bangladesh. It is, therefore, important to have a profitable, sustainable, and environment-friendly agricultural production and marketing system to ensure long-term food security.

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## Authors Contributions

**Fatima Khatun:** Drafted the article or revised it critically for important intellectual content.

**Mashrat Jahan:** Conception and design of the article.

**Shahadat Hossain:** Interpreting the relevant literature.

## Ethics

This article contains secondary information and it is a review paper. The corresponding author confirms that the other author read and approved the manuscript and that no ethical issues were involved. All the sources were acknowledged and well cited in the reference section.

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