



## Original Article

# Existing Value Chain Assessment of Mungbean Marketing in Selected Areas of Bangladesh

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| ARTICLE INFO   | ABSTRACT  |
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| <p><b>Article history</b><br/>           Received: 18 Jul 2021<br/>           Accepted: 09 Oct 2021<br/>           Published: 31 Dec 2021</p> <p><b>Keywords</b><br/>           Mungbean,<br/>           Value chain,<br/>           Value addition,<br/>           Constraints of mungbean marketing</p> <p><b>Correspondence</b><br/>           Md. Monjurul Islam<br/>           ✉: <a href="mailto:mmislam.rdv@bsmrau.edu.bd">mmislam.rdv@bsmrau.edu.bd</a></p> <p> OPEN ACCESS</p> | <p>Mungbean is an important indigenous vegetable legume providing protein for the rural and urban poor in South and Southeast Asia. This study was conducted to analyze the value chain, determine the value addition at different levels of value chain of mungbean and identify some constraints of mungbean marketing in Bangladesh. Using a structured questionnaire with face to face interviews, 120 samples were surveyed which were collected from Barisal and Patuakhali district of Bangladesh during the period of 2017-18. The stratified random sampling technique was used in selecting the sample. This study found that the main actors of mungbean marketing were farmer, arathder, wholesaler, retailer and consumer. The study also revealed that mungbean production was found profitable. The study revealed that the cost of mungbean production of a farmer was Tk 2037/maund on full cost basis and Tk. 1395/maund on cash cost basis. The average gross return of a farmer was Tk. 2472/maund and net return was found Tk. 436/maund on full cost basis and Tk. 1078/maund on cash cost basis. Value addition of arathder and wholesaler was Tk 80/maund and Tk 190/maund respectively and value addition of retailer was Tk 410/maund. In the study area farmers and traders mentioned some problems at production and marketing level such as shortage of capital, lack of labour, insecticides, severe attack of insects, dominance of intermediaries, syndicate, lack of adequate market facility etc. So, government should take proper initiative to solve these problems.</p> |
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## Introduction

Mungbean is widely grown in Bangladesh. It contains 19.5% to 28.5% protein (AVRDC, 1988). Major area of mungbean is replaced by cereals (Abedin, et al., 1991). Mungbean is an annual and cereal crop. Mungbean is cultivated after harvesting of rabi crops such as wheat, mustard, lentil, etc. and it is cultivated in rotation with cereals.

Mungbean is an erect plant which is highly branched and is about 60 to 76 cm tall (Oplinger, et al., 1990). We know that mungbean looks more like a garden bean than like a soya bean plant. The mungbean has been grown in India since ancient times. It is still widely grown in Southeast Asia, Africa, South America and Australia. Mungbean (*Vigna radiata* (L.) Wilczek) is a

pulse crop that is particularly attractive for farmers in South Asia because of its short duration and decent performance under adverse climatic conditions such as heat, drought and salinity (Hanumantha et al., 2016; Farnworth et al., 2021). Mungbean is one of the warm season crops. It requires 90–120 days from planting to maturity (depending on the variety). The optimum temperature range for growth is between 27 °C and 30 °C. This means that the crop is usually grown during summer season.

Mungbean is a popular pulse in the diet because it is easily digestible, free from flatulence and easy to cook. Rich in easily digestible protein (24%), mungbean adds much-needed diversity to the cereal-based diets of the poor (Thirumaran and Seralathan, 1988; Depenbusch et al., 2020). Dekker (2003) analyzed that a value chain

## Cite This Article

Mandal, A.K., Khan, M.A., Alamgir, M.S., Hoq, M.S., Kundu, N.D., Islam, M.M., 2021. Existing Value Chain Assessment of Mungbean Marketing in Selected Areas of Bangladesh. *Journal of Bangladesh Agricultural University*, 19(4): 521–527. <https://doi.org/10.5455/JBAU.97136>

analysis (VCA) is a useful tool to meet the provision of information for the coordination and optimization of activities across firms in a value chain. A value chain typically consists of inbound distribution or logistics, manufacturing operations, outbound distribution or logistics, marketing and selling, and after-sales service. (De Silva 2011). Mungbean contains vitamin A (94 mg), iron (7.3 mg), calcium (124 mg), zinc (3 mg) and folate (549 mg) per 100 g dry seed. Islam et.al (2012) showed that most of the farmers follow the level of technology adoption for both input use and agronomic practices. Mungbean production was found profitable. Habib et al., (2014) found that the output-input ratios mungbean variety of AZRI-06, NM--1-106 and NM-98 were 3.05, 2.79 and 2.41 with revenue crop day<sup>-1</sup> acre<sup>-1</sup> of Rs.451, Rs.368 and Rs.318, respectively. The benefit cost ratio (BCR) was 2.22 on full cost basis. (Islam et al., 2011). Nair et al., (2002) found that mungbean is easily digestible free from flatulence, rich in protein and iron. Mutations were induced in two mungbean varieties, K-851 and PS-16 using EMS and gamma rays as mutagens. (Khan and Goyal 2009). Jeung et al., (2011) concluded that the more mungbean powder was added, the more the luminance and hunter's a values of Cheongpomook samples were decreased, but in hunter's a values was reverse. Mungbean sprout is also widely used in East and Southeast Asia. Mungbean cakes are popular in East Asia while a variety of colorful pastries in the shape of fruits and vegetables are common desserts in Thailand. In fact, mungbean porridge, soups and drinks are recommended for sick and convalescent people (He et al., 1988). The value of the welfare generated due to improved mungbean varieties and technologies in Pakistan has been estimated to be around US\$ 20 million (Ali et al., 1997).

Agricultural research has often been confused with innovation. Value-chain concepts in agriculture denote an important change in thinking about development and the relationships among producers, traders, processors, and consumers (Nang'ole et.al., 2011). This approach in agricultural development helps identify weak points in the chain and actions to add more value (Raj, S.P. 2011; Devaux et al., 2018). It also provides valuable insights into policy formulation and implementation. (Kaplinsky, 2000). Therefore, mungbean value chain is gaining high value day by day among the farmers and traders. Now it is essential to know the existing value chain assessment of mungbean marketing in the southern region of Bangladesh. Besides, sustainability of any crop cultivation is mainly depends on its economic aspect and value addition but limited study was done on mungbean in this regard. In view of the discussion, the present study finds out the value chain, determine value addition and identify some

constraints of mungbean production and marketing in Bangladesh.

## Materials and Methods

### Sampling technique

#### Study area

Two districts (Barisal and Patuakhali) were selected as a study area for the present study. The study was conducted in two upazila (Bakergonj and Dumki) which is under Barisal and Patuakhali district. Study area was selected on the basis of intensity of mungbean production and marketing area.

### Sampling procedure

Stratified simple random sampling techniques were followed for the selection of upazila, and market for the collection of data. Then the populations were grouped into different strata like; farmer, arathder, wholesaler, retailer etc. and the simple random sampling technique was used for drawing the desired sample from each strata.

### Sample size

From two districts (Barisal and Patuakhali) 120 respondents consisting of 40 farmer and 80 traders were selected as a sample size. In selecting the types of traders a list of intermediaries were prepared with the help of different types of intermediaries or market authorities existing in the market. Then the required amounts of traders were collected from the list for interview. At each district, production and marketing information were collected from 20 farmers, 10 arathdars, 10 wholesalers, and 20 retailers.

### Analytical technique

#### Cost and return analysis

Following profit equation was employed to assess the profitability of mungbean production.

Net return/ Value addition of mungbean producer

$$\Pi = P_m \cdot Q_m - (TVC + TFC)$$

Where,  $\Pi$  = Profit of mungbean producer (Tk/maund)

$P_m$  = Per unit price of mungbean (Tk/Maund)

$Q_m$  = Quantity of mungbean (Maund)

TVC = Total variable cost of mungbean producer (Tk/maund)

TFC = Total fixed cost of mungbean producer (Tk/maund)

### Value chain analysis

#### Value addition by traders

Value Addition = Gross margin – Marketing cost

Gross Margin = Sale price - Purchase price

## Results and Discussion

### Value chain of mungbean marketing

A value chain consists of all stages of a technical production process as well as of the interaction between these stages. The production process starts from input supply. Then it covers production, processing and marketing and ends with the consumption of a certain product. We know that it is a complex process of a value chain of mungbean marketing. The market supply of mungbean starts from small farmers. This supply does not pass directly from producer to the final consumer. Rather it is separated from the demand of consumers in time, place, form and size of the product. As defined by AMA (1960), marketing is the performance of business activities that direct the flows of goods and services from the producer to consumers. The major market participants identified in mungbean marketing in Bangladesh are producers, local assemblers, wholesalers, brokers and retailers. There are no large scale mungbean producing farms in this region. That means small holder producers are the only suppliers of mungbean. Farm traders are the main buyers of the grain in the country side. Trading is a part time job for the purpose of gaining additional source of income. Assemblers play an important role in the marketing system by pushing up the product from the remote rural surplus markets to the towns, deficit areas and urban centers where the product is demanded. Wholesalers are the central figure in the marketing channel. By definition the wholesalers of the given commodity are involved in wholesale trade, rarely selling directly to consumers. But in mungbean marketing, in the area the job of wholesalers and retailers is mixed up. The mungbean wholesalers get

their supplies from producers, assemblers and from retailers and working with a combination of other grain. The following major channels involved in the mungbean production and marketing.

Channel i: Producer – consumer

Channel ii: Producer –Retailer– consumer

Channel iii: Producer–Arathder - Wholesaler –Consumer

Channel iv: Producer –Arathder – Wholesaler - Retailer– consumer

Channel v: Producer – Arathder - Retailer – Consumer

#### *Value addition of mungbean marketing*

#### *Cost of mungbean production*

Costs are the expenses in organizing and carrying out the production process. The cost of production included different cost items like land preparation, seed, pesticides, labour cost in harvesting, interest on operating capital, land use cost, etc. Both cash expenditure and imputed value of family supplied inputs were included in the analysis and are shown in Table 1. It revealed that highest cost was incurred for human labour for harvesting (29%) ,land preparation (24%) and seed cost (3%) when family supplied inputs were valued at market rate. The average cost of production in full cost basis was found to be Tk. 40955/ha, which was found slightly higher in Barisal than Patuakhali due to more cost involvement in land use cost and labour cost in harvesting. In the study area fertilizer and manures was not use in mungbean production.

**Table 1.** Cost of mungbean cultivation in the study areas

| Cost Items                                      | Tk/hectare |         |             |
|---|------------|---------|-------------|
|   | Patuakhali | Barisal | All         |
| <b>Variable Cost</b>                            |            |         |             |
| Land preparation                                | 10240      | 9520    | 9880 (24)   |
| Seed  | 1300       | 1170    | 1235 (3)    |
| Fertilizers                                     | -          | -       | -           |
| Urea  | -          | -       | -           |
| TSP   | -          | -       | -           |
| MoP   | -          | -       | -           |
| Manures   | -          | -       | -           |
| Pesticides                                      | 7200       | 6796    | 6998 (17)   |
| Own   | 2500       | 1616    | 2058        |
| Hired   | 4700       | 5180    | 4940        |
| Labour cost in harvesting                       | 11000      | 13000   | 12000 (29)  |
| Interest on operating capital (8% for 6 months) | 1580       | 1580    | 1580 (4)    |
| <b>Fixed Cost</b>                               |            |         |             |
| Land use cost                                   | 9024       | 9500    | 9262 (23)   |
| <b>Total cost</b>                               |            |         |             |
| Full cost basis                                 | 40344      | 41566   | 40955 (100) |
| Cash cost basis                                 | 27240      | 28870   | 28055       |

Source: Field survey 2018. Figures in the parentheses are percentage of total cost

*Trader marketing cost*

The arathders was the commission agents who negotiate the selling function between producers and wholesalers. For performing these functions, they had to incur some costs. The total mungbean marketing cost of arathder was estimated at Tk. 320 per maund (Table 2). Rent and electricity was the highest cost item comprising 35.00 percent of the total marketing cost. The next highest cost item was labour cost which accounted for 31.00 percent of the total marketing cost. The other cost items in descending order were transportation (25.00%), Jute bag/Poly bag (3.00), telephone bill (3.00%), and personal expenses (3.00%).

Wholesaler/Bepari collects mungbean from different mungbean producer or local assembler. The total marketing cost of wholesaler/bepari was estimated Tk 210/maund where rent and electricity were the highest cost item (39.00%) and lowest cost item was market toll, arathder commission, wastage, and personal expenses (2.00%). The retailers generally purchased mungbean from the producer and wholesaler/bepari through arathders and sold to the consumers at different markets. The total marketing cost of retailer was estimated at Tk. 190 per maund.

**Table 2.** Trader marketing cost

| Particulars          | Tk/Maund  |                   |           |
|----------------------|-----------|-------------------|-----------|
|                      | Arathdar  | Wholesaler/Bepari | Retailer  |
| Labour cost          | 100 (31)  | 50 (24)           | 40 (21)   |
| Jute Bag/Poly Bag    | 10 (3)    | 10 (5)            | 15 (7)    |
| Transportation       | 80 (25)   | 50 (24)           | 40 (21)   |
| Market toll          | -         | 5 (2)             | 5 (3)     |
| Rent and electricity | 110 (35)  | 80 (39)           | 80 (42)   |
| Telephone Bill       | 10 (3)    | -                 | -         |
| Arathdar commission  | -         | 5 (2)             | -         |
| Wastage              | -         | 5 (2)             | 5 (3)     |
| Personal expenses    | 10 (3)    | 5 (2)             | 5 (3)     |
| Total                | 320 (100) | 210 (100)         | 190 (100) |

Source: Field survey 2018. Figures in the parentheses are percentage of total cost

*Net return and value addition analysis of different intermediaries*

Table 3 revealed that the sample farmers received, on an average, 805 kg/ha of mungbean, which was lower than national average of 823 kg/ha (BBS, 2019) due to severe infestation of insects. But Islam et al. observed yield 928 kg/ha in 2007. The average gross return from mungbean production was found to be Tk. 49775/ha or Tk 2472/maund and net margin was found Tk. 8820/ha on full cost basis and Tk 21720/ha on cash cost basis or Tk. 436/maund on full cost basis and Tk 1078/maund on cash cost basis. Value addition of different intermediaries is shown in Table 4. We found that mungbean purchase price of arathder was Tk. 2000/maund and sale price was Tk 2400/maund. Thus, gross margin of arathder was Tk. 400 per maund. The total marketing cost of arathder was Tk.320/ 40 kg of mungbean.

So value addition of arathder was Tk 80/maund. The value addition of wholesaler and retailer was Tk 190/maund and Tk 410/maund respectively. Here we found that the value addition of retailer was the highest which was Tk 410 per maund because his marketing cost was low and he sold small volume of product. So he earned huge amount of profit per maund.

*Constraints of mungbean production*

Although mungbean was observed a profitable crop in the study area, but there were found several constraints to its higher production. The constraints are shown in Table 4. Most of the farmers (67%) opined that incidence of diseases as a top ranked problem of mungbean production. Other major constraints were untimely rainfall (58%), and lack of quality seed (46%). Besides, lack of capital, lack of training, lack of labour and lack of suitable land were also opined as the problem of mungbean cultivation.

**Table 3.** Net return/ value addition of mungbean producer/farmer

| Items                    | % farmers respond |         |       |
|--------------------------|-------------------|---------|-------|
|                          | Patuakhali        | Barisal | All   |
| Total Cost (Tk/ha)       |                   |         |       |
| Full cost basis          | 40344             | 41566   | 40955 |
| Cash cost basis          | 27240             | 28870   | 28055 |
| Total cost (Tk/maund)    |                   |         |       |
| Full cost basis          | 2035              | 2038    | 2037  |
| Cash cost basis          | 1374              | 1415    | 1395  |
| Fixed cost (Tk/ha)       | 9024              | 9500    | 9262  |
| Fixed cost (Tk/maund)    | 455               | 466     | 461   |
| Variable cost (Tk/ha)    |                   |         |       |
| Full cost basis          | 31320             | 32066   | 31693 |
| Cash cost basis          | 18216             | 19370   | 18793 |
| Variable cost (Tk/maund) |                   |         |       |
| Full cost basis          | 1580              | 1572    | 1576  |
| Cash cost basis          | 919               | 949     | 934   |
| Yield (Kg/ha)            | 793               | 816     | 805   |
| Gross return (Tk/ha)     | 45443             | 54107   | 49775 |
| Gross return (Tk/maund)  | 2292              | 2652    | 2472  |
| Gross margin (Tk/ha)     |                   |         |       |
| Full cost basis          | 14123             | 22041   | 18082 |
| Cash cost basis          | 27227             | 34737   | 30982 |
| Gross margin (Tk/maund)  |                   |         |       |
| Full cost basis          | 712               | 1080    | 896   |
| Cash cost basis          | 1373              | 1703    | 1538  |
| Net return (Tk/ha)       |                   |         |       |
| Full cost basis          | 5099              | 12541   | 8820  |
| Cash cost basis          | 18203             | 25237   | 21720 |
| Net return (Tk/maund)    |                   |         |       |
| Full cost basis          | 257               | 614     | 436   |
| Cash cost basis          | 918               | 1237    | 1078  |

*Gross margin = Gross return – Total variable cost*

*Net return = Gross return – Total cost*

**Table 4.** Constraints of mungbean production

| Items                 | % farmers respond |         |     |
|-----------------------|-------------------|---------|-----|
|                       | Patuakhali        | Barisal | All |
| Incidence of diseases | 64                | 70      | 67  |
| Untimely rainfall     | 60                | 56      | 58  |
| Lack of quality seed  | 49                | 43      | 46  |
| Lack of training      | 45                | 35      | 40  |
| Lack of labour        | 38                | 26      | 32  |
| Lack of capital       | 22                | 26      | 24  |
| Lack of suitable land | 20                | 16      | 18  |

*Source: Field survey 2018*

#### *Constraints of mungbean marketing*

We know that there were several problems of mungbean cultivation as well as marketing problem (Table 5). Ninety two percent (92%) respondent opined dominance of intermediaries as a top ranked problem of mungbean marketing, the second highest constraints (78%) opined farmers were syndicate and price differentials between markets, and 75% trader noticed

that lack of adequate market facility was one of the major problems of mungbean marketing. Price differentials between traders (77%), lower price of mungbean (75%), low bargaining power (69%), high transportation cost (68%) and payment on credit (39%) were the constraints of mungbean marketing in the study area.

**Table 5.** Constraints of mungbean marketing

| Items                               | % farmers and traders respond |         |     |
|-------------------------------------|-------------------------------|---------|-----|
|                                     | Patuakhali                    | Barisal | All |
| Dominance of intermediaries         | 95                            | 89      | 92  |
| Syndicate                           | 76                            | 80      | 78  |
| Price differentials between markets | 80                            | 75      | 78  |
| Price differentials between traders | 75                            | 78      | 77  |
| Lack of adequate market facility    | 80                            | 70      | 75  |
| Lower price of mungbean             | 80                            | 70      | 75  |
| Low bargaining power                | 70                            | 67      | 69  |
| High transportation cost            | 71                            | 65      | 68  |
| Payment on credit                   | 50                            | 28      | 39  |

Source: Field survey 2018

### Conclusion

Mungbean is an important pulse consumed all over the world, especially in Asian countries and has a long history of usage as traditional medicine. It has been known to be an excellent source of protein, dietary fiber, and minerals. As a result, it becomes a popular functional food in promoting good health. We see that mungbean production in the study areas is profitable and value addition of retailer is higher than other intermediaries. Mungbean farmers received higher return on its investment. If modern variety of seed, timely rainfall, proper training and production technology is available to the farmers, yield and production can be increased which may help to increase their income. And if proper market facility and good governance of intermediaries will ensure then traders value addition will be increased. So, government and other related organization should provide different facilities for increasing value addition.

### Author Contributions

Conceptualization, AKM, MAK, NDK, and MMI.; methodology, AKM, MAK, and MSH.; formal analysis, AKM, MAK, MSA, and MSH.; investigation AKM, MSA, MSH, NDK, and MMI.; writing—original draft preparation, AKM, MSH, and MMI.; writing-review and editing, AKM, MSA, MSH, and MMI.; All authors have read and agreed to the published version of the manuscript.

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