PRODUCTION AND VALUE CHAIN ANALYSIS OF LENTIL IN SOME SELECTED AREAS OF BANGLADESH

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ABSTRACT

The study assessed the value chain analysis of lentil in some selected areas of Bangladesh. Data were collected from 96 randomly selected lentil farmer, local trader, arathder, retailer and dal miller from Jashore, Jhenaidah and Kushtia district. The results indicated that most of the farmer of the study areas were cultivated BARI masur-8, BARI masur-7 and BARI masur-6 which were popular and prominent variety release from BARI. On an average, total production cost of lentil was Tk. 66373.83/ha, whereas variable cost was Tk. 35404.16/ha and fixed cost was Tk. 30969.68/ha. Average yield of lentil was 1.632 ton/ha in the study areas. Gross return was Tk. 35404.16/ha and fixed cost was Tk. 30969.68/ha. Benefit cost ratio was 1.75 that means the lentil cultivation was profitable. Milling of 1 MT lentil at dal mill then it get 725 kg pulse (lentil) and 200 kg was husk (bran). Marketing cost of faria, bepari, wholesaler and retailer was Tk. 855/mt, Tk. 750/mt, Tk. 5295/mt and Tk. 1580/mt respectfully. Retailer net margin was highest (Tk. 4945/mt) but they sold daily average 9.28 kg lentil only. Retailer was the highest value added Tk.6525/mt (44.85%) followed by wholesaler Tk.5525/mt (37.97%), faria (10.31%) and bepari Tk. 1000/mt (6.87%) respectfully. Total value added at different actors was Tk. 14550/mt. Bad weather and disease infestation were the major problems in the lentil cultivation.

Contribution/Originality: This study is one of very few studies which have investigated on the value chain, value addition and intermediaries involved in lentil value chain system of Bangladesh. This study also document about which variety of lentil was cultivated and profitability of lentil cultivation in Bangladesh.

1. INTRODUCTION

Pulses are the important crops cultivated all over the Bangladesh. It plays a vital role in the Bangladesh diet as a cheap source of protein. Eight kinds of pulses, such as lentil, mungbean, blackgram, grasspea, chickpea, cowpea, filed pea and pigeon pea are grown in Bangladesh (Bakr, Rahman, & Miah, 1997). Pulses cultivation cover 2.22% of the total cultivated land in Bangladesh (BBS, 2019). Among the pulses, lentil (Lens culinaris) commonly known as “masur” is a popular pulse crop in Bangladesh and occupied 40.23% cultivation of pulse crops getting first position (BBS,2019). It contains more protein than any other agricultural produce, and is nearer to animal flesh in food value for which it is often called poor man’s meat. Lentil is a winter pulse of temperate and subtropical region. Its contribution to pulse production of the world is 2.4%. Being legume, lentil is restorative in nature and its seed
contains average 25.7% protein, which is almost three times higher than that of cereals (Erskine & Witecombe, 1984) and 59% carbohydrate (Bakhsh, Gafoor, Zubair, & Iqbal, 1991). The per capita pulses consumption required for balance diet as given by FAO is 15 gm. Lentil ranks first among the pulses in terms of area (40%) and consumer preferences (Miah & Rahman, 1991). The country is deficit in meeting her lentil demand. So, local markets are also being influenced by import quantity and prices. Different markets are there at different levels of distribution process. So, local markets with domestic products may not be much integrated as import markets which also influence price formation. As the markets were (monthly) segmented, price policy if any, for lentil improvement should be considered regionally for the effectiveness of such policies. Efforts need to be taken for market development throughout the country. Pulses are vital components in diversification of Bangladesh’s predominantly rice-based cropping system. Lentil is the highest most important pulse crop in terms of area (142510 ha) and production (175384 MT) and ranks the highest in consumer preference and total consumption (BBS, 2019). Lentil seed is a rich source of protein and several essential micronutrients (Fe, Zn, β-carotene) (Bhatty, 1988). The area and production of lentil in study areas are shown Table 1 which indicate the major lentil cultivated areas in Bangladesh. BARI lentil varieties were occupied 98 % of lentil cultivated lands (Rahman, Hossain, Sarker, & Bakr, 2012). BARI has developed a good number of high yielding varieties which preferred by farmers in different parts of Bangladesh.

| Year   | Jashore | Jhenaidah | Kushtia |
|--------|---------|-----------|---------|
|        | Area (ha)| Production (MT) | Area (ha) | Production (MT) | Area (ha) | Production (MT) |
| 2007-08 | 20060   | 16073     | -        | -              | 9967     | 10095           |
| 2008-09 | 20324   | 18190     | -        | -              | 9893     | 9473            |
| 2009-10 | 20926   | 19878     | -        | -              | 9538     | 1001            |
| 2010-11 | 20704   | 20625     | -        | -              | 11877    | 14047           |
| 2011-12 | 20431   | 18275     | -        | -              | 10665    | 12460           |
| 2012-13 | 20902   | 20314     | -        | -              | 11562    | 15882           |
| 2013-14 | 8969    | 9253      | 11045    | 14642          | 5901     | 8417            |
| 2014-15 | 10550   | 12564     | 12169    | 17050          | 5936     | 8784            |
| 2015-16 | 11337   | 11455     | 12609    | 12826          | 7108     | 9696            |
| 2016-17 | 11870   | 13849     | 13894    | 19481          | 7783     | 12921           |
| 2017-18 | 10284   | 11999     | 11579    | 16383          | 8572     | 13687           |
| 2018-19 | 10336   | 11905     | 11321    | 15987          | 8564     | 12577           |

A value chain analysis describes all the activities which are included from the production to the consumption which included the primary producer, a processor (packaging, transforming of product etc.) and a retailer (Kaplinsky & Morris, 2001). Value chain analysis has the potential to influence marketing decisions by the producers, processors, consumers, traders, investors and others. In each of these links there is a process of value adding and these can be called value added links. Most of the earlier studies in Bangladesh related to lentil based on production and technical efficiency. Matin, Islam, and Huque (2018) analyzed profitability of lentil; Tithi and Barmon (2018) analyzed the comparative advantages of lentil and mustard. A few studies such as Meera, Singh, Rahman, Bairwa, and Meena (2018); USAID/Nepal (2011) conducted abroad were on value chain analysis of lentil. But these studies were not fully covered value chain analysis of lentil. With this background, a study on the lentil value chain gives information about production, marketing and value adding activities which will be helpful for the farmers and other market actors for decision making. Therefore, the present study was undertaken with the objectives of production and marketing system, marketing cost and margin and value chain analysis of lentil.
2. METHODOLOGY

2.1. Selection of the Study Area

The present study was conducted at three district viz. Jashore, Jhenaidah and Kushtia which were purposively selected because these districts are leading lentil producing areas in Bangladesh. Jashore Sadar upozila from Jashore, Kaligonj upozila from Jhenaidah and Kushtia Sadar upozila were selected for primary data collection. Marketing data were from different local and district main market of those district of the study areas. Total sample farmer was 60 where 20 farmer from each district. For value chain information 30 traders of different intermediaries and 6 millers were selected from study areas. Among the traders 9 farias (local traders), 9 arathdar cum bepari, 6 wholesaler and 6 retailers were selected. Necessary information regarding this study was collected based on socio economic characteristics of the farmers, agronomic management, production, marketing system, processing, market chain etc. Data were collected through pre-designed and pre-tested interview schedule during May-June, 2020. Field investigators under the direct supervision of the researcher collected field level data.

2.2. Analytical Techniques

Data were randomly collected from farmers and traders by the experienced field investigators with direct supervision of the researchers using a pre-tested interview schedule. Collected data were edited, summarized, tabulated and analyzed to fulfill the objectives of the study. Descriptive statistics using different statistical tools like averages, percentages and ratios were used in presenting the results of the study. Following profit equation was employed to assess the profitability of lentil production.

$$\Pi = P_l Q_l - (TVC + TFC)$$

Where, \(\Pi\) = Profit of producer per hectare.

\(P_l =\) Per unit price of lentil (Tk/mt).

\(Q_l =\) Quantity of lentil (ton/ha).

\(TVC =\) Total variable cost of lentil.

\(TFC =\) Total fixed cost of lentil.

Marketing margin: The marketing margin of different intermediaries were determined by the following formula,

$$MM = SP - PP$$

Where, \(MM\) = Marketing margin (Gross value addition).

\(SP =\) Selling price.

\(PP =\) Purchase price of lentil.

Net margin = MM - MC.

Where, \(MC\) = Marketing cost.

Value addition = Gross value addition - Marketing cost.

3. RESULT AND DISCUSSION

3.1. Socioeconomic Characteristics of Farmer

Socioeconomic status was the mirror of the society where it can gather knowledge about the present status of farmer. Average age of farmer was 44.22 years that means they become very young in age and capable of doing farming as their average farming experience was 14 years. Average lentil cultivated areas was 0.22 ha which was very few as its total cultivated land (0.59 ha). Average family member was 4.75 which were equal to national average. Most of the farmer was more or less educated Table 2.
Table 2. Socioeconomics characteristics of lentil farmer.

| Particulars                      | Jashore | Jhenaidah | Kushtia | All areas |
|----------------------------------|---------|-----------|---------|-----------|
| Age (years)                      | 40.85   | 44.6      | 47.2    | 44.22     |
| Own land (ha)                    | 0.49    | 0.83      | 0.44    | 0.59      |
| Lentil cultivated land (ha)      | 0.15    | 0.35      | 0.16    | 0.22      |
| Farming experience (years)       | 10.5    | 13.8      | 17.8    | 14.03     |
| Lentil farming experience (years)| 9.25    | 12.55     | 13.8    | 11.87     |
| **Family size**                  |         |           |         |           |
| Male                             | 1.8     | 1.75      | 1.75    | 1.77      |
| Female                           | 1.75    | 1.65      | 1.7     | 1.7       |
| Children                         | 1.29    | 1.65      | 1.59    | 1.51      |
| Total                            | 4.55    | 4.8       | 4.9     | 4.75      |
| **Education level (%)**          |         |           |         |           |
| Can sign                         | 10.00   | 35.00     | 30.00   | 25.00     |
| Primary                          | 25.00   | 20.00     | 25.00   | 23.33     |
| SSC                              | 40.00   | 15.00     | 15.00   | 23.33     |
| HSC                              | 15.00   | 25.00     | 25.00   | 21.67     |
| Degree & above                   | 10.00   | 5.00      | 5.00    | 6.67      |

Source: Field survey, 2020.

Table 3. Agronomic management of lentil farming.

| Particulars                          | Jashore | Jhenaidah | Kushtia | All areas |
|--------------------------------------|---------|-----------|---------|-----------|
| Variety (%)                          |         |           |         |           |
| BARI masur-6                         | 25      | 30        | 30      | 28.33     |
| BARI masur-7                         | 30      | 15        | 45      | 30.00     |
| BARI masur-8                         | 45      | 55        | 25      | 41.67     |
| Sowing time (%)                      |         |           |         |           |
| November (1-15)                      | 80.00   | 60.00     | 70.00   | 70.00     |
| November (16-30)                     | 20.00   | 40.00     | 30.00   | 30.00     |
| Seed rate (kg/ha)                    | 50.12   | 47.06     | 48.12   | 48.43     |
| Source of seed (%)                   |         |           |         |           |
| Own                                  | 20.00   | 25.00     | 15.00   | 20.00     |
| Buy                                  | 80.00   | 75.00     | 85.00   | 80.00     |
| Seed sowing method (%)               |         |           |         |           |
| Line                                 | 5.00    | 5.00      | 10.00   | 6.67      |
| Broadcasting                         | 95.00   | 95.00     | 90.00   | 93.33     |
| Seed treatment before sowing (%)     |         |           |         |           |
| Yes                                  | 70.00   | 65.00     | 80.00   | 71.67     |
| No                                   | 30.00   | 35.00     | 20.00   | 28.33     |
| Intercultural operation              |         |           |         |           |
| Ploughing and laddering (PT and Tractor) (No.) | 5.05   | 4.55      | 4.00    | 4.53      |
| Weeding (No.)                        | 1.00    | 1.00      | 1.00    | 1.00      |
| Spray fungicide and pesticide-yes (%)| 100.00  | 100.00    | 100.00  | 100.00    |
| Average number of spraying           | 2.55    | 2.20      | 2.40    | 2.38      |
| Spray schedule (%)                   |         |           |         |           |
| Morning                              | 70.00   | 65.00     | 80.00   | 71.67     |
| Evening                              | 30.00   | 35.00     | 20.00   | 28.33     |

Source: Field survey, 2020.

3.2. Production Technology of Lentil Cultivation

Lentil is a most popular pulses crops cultivated in the Jashore region. It mainly cultivated in the robi season. The most appropriate planting time was 1st week of November to mid November Table 3. About 70 percent farmer sowing lentil seed at this time. Suitable sowing time of lentil was last week of October to Mid November (Azad et al., 2020). Farmer cultivate BARI masur-8 (41.67%), BARI masur-7 (30%) and BARI masur-6 (28.33%) lentil variety which were Bangladesh Agricultural Research Institute (BARI) developed lentil variety in the study areas. BARI has developed nine lentil varieties. All the farmer sowing seed with broadcasting (93.33%) and some are line sowing (6.67%) which were very few so that they require more seed then recommendation seed rate.
About 80% farmers collect seeds from local markets and only twenty percent farmers kept their own necessary seed which was lower than the other pulse (78.44% in case of BARI Cowpea, Uddin, Rashid, and Begum (2020)). Average per hectare seed used by the farmer was 48.43 Kg/ha. They treated seed (71.67%) before sowing at field with Provax-200WP which was an effective fungicide. Farmer ploughing and laddering about 4.53 times their land with power tiller and tractor for land preparation. Once they weeded their fields to keep weed free. Irrigation done if necessary but much irrigation hampered the production of the lentil fields. All the farmer spray their fields and on an average 2.38 times spray fungicide and pesticide. Spraying was mostly done in the morning (71.67%).

3.3. Post Harvest Management of Lentil

Lentil was harvested in the months of February-March. After harvest, they clean it properly for sale in the market. They sell almost all the product in the market but some amount was kept for their consumption and sowing seed for next year. About eighty five percent farmers sold out the whole lentil after harvest Table 4. Farmers sold their products immediately after harvest. Some farmers stored lentil for next year seed purpose and sold it to other farmers at cultivating season with high price. Storing it for a few days then it gets high profit and generating their income (Baksh, Rossi, Momin, Hajong, & Tiwari, 2017). They did not crush the lentil. Some farmers sold lentil to bepari at local market and some one at arathdar. If the farmer kept lentil for consumption then they milling lentil from local dal mill which cost Tk. 6/kg for small amount. If farmer kept lentil for seed purpose then they kept it at air tight plastic drum with Dursban powder for next season.

Table 4. Post harvest management of lentil farming.

| Particulars                                      | Jashore | Jhenaidah | Kushtia | All areas |
|--------------------------------------------------|---------|-----------|---------|-----------|
| Sale after harvest of whole lentil (%)            |         |           |         |           |
| Yes                                              | 85.00   | 80.00     | 90.00   | 85.00     |
| No                                               | 15.00   | 20.00     | 10.00   | 15.00     |
| Sale after crushing lentil (%)                    |         |           |         |           |
| Yes                                              | 10.00   | 10.00     | 5.00    | 8.33      |
| No                                               | 90.00   | 90.00     | 95.00   | 91.67     |
| Selling place where farmer sale the lentil after harvest (%) |         |           |         |           |
| Home                                             | 25.00   | 35.00     | 15.00   | 25.00     |
| Market                                           | 75.00   | 65.00     | 85.00   | 75.00     |
| Lentil seed store at home (%)                     |         |           |         |           |
| Yes                                              | 90.00   | 40.00     | 10.00   | 26.67     |
| No                                               | 70.00   | 60.00     | 90.00   | 73.33     |
| Seed store in which medium (%)                    |         |           |         |           |
| Drum                                             | 100.00  | 100.00    | 100.00  | 100.00    |

Source: Field survey, 2020.

3.4. Cost of Lentil Cultivation

Cost is the expenses for organizing and carrying out the production process. The cost of production was included all variable cost items like human labor, land preparation, seed, manure, fertilizers, insecticides and irrigation. Besides, interest on operating capital was also considered as variable cost. Family labor and rental value of land was considered as fixed cost for the estimation of cost of production. Total cost of lentil cultivation was Tk. 66373.83/ha, where as variable cost was Tk. 35404.16/ha and fixed cost was Tk. 30969.68/ha Table 5. Interest on operating capital was calculated at the rate of 9 percent with four months of cultivation period. Land use cost was calculated Tk. 44880.00/ha per year which was lease value of land at the study areas. Among the cost item highest cost was hired labor Tk. 8850.54/ha (13.36%) followed by land preparation cost Tk. 7286.34/ha (10.98%), fertilizer Tk. 6505.75/ha (9.80%), pesticide Tk. 3936.06/ha (5.93%) etc.
Table 5. Cost of lentil cultivation in the study areas (Tk./ha).

| Cost item                  | Jashore  | Jhenaidah | Kushtia  | All areas | Percentage of cost |
|----------------------------|----------|-----------|----------|-----------|-------------------|
| A. Variable cost           |          |           |          |           |                   |
| Land preparation cost      | 7713.75  | 6967.35   | 7177.90  | 7286.34   | 10.98             |
| Seed                       | 6014.17  | 5646.83   | 5774.34  | 5811.78   | 8.76              |
| Hired labor                | 9148.50  | 8940.58   | 8462.53  | 8850.54   | 13.33             |
| Fertilizer                 | 6379.47  | 6329.69   | 6608.08  | 6505.75   | 9.80              |
| Manure                     | 2212.41  | 2068.56   | 1666.55  | 1982.51   | 2.99              |
| Pesticide                  | 4891.54  | 3936.06   | 3541.45  | 3936.06   | 5.93              |
| Interest on operating capital | 1096.80 | 999.85    | 996.93   | 1031.19   | 1.55              |
| Total variable cost        | 37656.64 | 34328.05  | 34227.78 | 35404.16  | 53.34             |
| B. Fixed cost              |          |           |          |           |                   |
| Land use cost              | 14960.00 | 14960.00  | 14960.00 | 14960.00  | 22.54             |
| Family labor               | 15763.47 | 13384.66  | 18880.90 | 16009.68  | 24.12             |
| Total fixed cost           | 30723.47 | 28344.66  | 33840.90 | 30969.68  | 46.66             |
| Total cost (A+B)           | 68380.11 | 62672.72  | 68068.68 | 66373.83  | 100.00            |

3.5. Profitability of Lentil Cultivation

Profitability is one of the major criteria for determination of acceptance of a crop. The returns came from the sale of lentil seed which was consume by consumer as pulses. Average yield of lentil was 1.632 ton/ha in the study areas Table 6. But BARI developed lentil varieties BARI masur-8 yield was 2.10-2.20 ton/ha (Azad et al., 2020). Gross return was Tk. 115863.29/ha and net return was Tk. 49489.46/ha. Benefit cost ratio was 1.75 that means the lentil cultivation was profitable.

Table 6. Profitability of lentil cultivation in the study areas.

| Particulars     | Jashore  | Jhenaidah | Kushtia  | All areas |
|-----------------|----------|-----------|----------|-----------|
| Yield           | 1.669    | 1.631     | 1.595    | 1.632     |
| Gross return    | 115825.35| 115830.16 | 113234.37| 115863.29 |
| Total cost      | 68380.11 | 62672.72  | 68068.68 | 66373.83  |
| Net return      | 50145.24 | 53157.44  | 45165.69 | 49489.46  |
| BCR             | 1.73     | 1.85      | 1.66     | 1.75      |

Note: Price: Tk.71.00/kg.

3.6. Value Chain

Value chain is the alternative roots of products flow from producer to consumers. A value chain is a sequence of related business activities (functions) from provision of specific inputs for a particular product to primary production, transformation and marketing, up to the final sale of a particular product to the consumer (GTZ Value Links, 2008). It also includes the number of intermediaries performing different functions, like producers, processors, traders and distributors of a particular product linked by a channel through which the product passes from primary producers to the end consumers. Thus, value chain actors, responsible for movement of materials, information and/or services, share an interest in the end-product was considered for analysis, because changes in the end-market affect them both collectively and simultaneously. In the study areas lentil are moved from producer to consumer in the different market through different intermediaries, such as beparies, arathdar, paiker and retailers. Lentil value chain map included in Figure 1. After harvest of lentil farmer sold their product to faria and local arathdar. Again local arathdar sold it to far wholesaler, wholesaler to retailer and ultimately at consumer.
3.7. Actors Involved in Marketing Chains

Farmer: Farmer is a producer of the lentil and first actor of the channel. Some farmers sell their products to local traders at their homes and some are sold to the local arathdar. If a farmer sells its products at his home, then he gets a lower price, but if he sells his products at a local market by incurring some costs, he may get a good price.

Local traders (Faria): Faria is a middleman who purchases lentil from farmers in the village and sells his products to the local arathdar.

Bepari cum local arathdar: Bepari is a professional wholesale trader who makes purchases from local farmers, local markets, stocks the product, and sells it to other city wholesalers or arathdar. This type of trader is locally called Bhusi maler arath. Sometimes they mill the whole pulse and sell their products to retailers.

Paiker: Wholesalers in consuming areas are known as paiker and arathdar, who purchase whole pulses from different local arath and store and crush (milling) the whole pulse from dal mills and sell it in different retail outlets.

Miller: Millers are not directly involved in the lentil marketing but have significant value. They mill the whole pulse with charges paid by other traders and also by their own stocks. Consumers and retailers also mill directly from dal mills and pay for the mill. Millers keep and sell the by-product (bhusi) to different traders and consumers.

Retailer: The retailer is the last link in the marketing channel and collects from arathdar and sells the products directly to consumers.

3.8. Marketing Cost

The cost of marketing represents the cost of performing various marketing functions and operations by various agencies involved in the marketing process (Kohls & Uhl, 2005). In other words, the costs incurred to move the product from producers to consumers are ordinarily known as marketing costs. Marketing costs of different intermediaries are stated in the following Table 7. Lentil needs milling before selling it to consumers. Average milling cost Tk. 4000.00/mt of lentil. If 1 mt raw lentil is milled in the dal mill, then it gets 725 kg pulse (lentil) and 200 kg husk (bran). Sometimes farmers sell their products directly at local markets and so that they experience some cost for marketing. Highest marketing cost was wholesalers (Arathdar/paiker) who were involved...
processing of raw lentil to consumable pulses (dal) which was Tk. 5295/mt. Faria total cost was Tk. 855/mt, bepari cum local arathdar was Tk. 750/mt and retailer cost was Tk. 1580/mt.

| Table-7. Marketing cost of different intermediaries (Tk./ton). |
|---------------------------------------------------------------|
| **Cost item**                                                 | **Farmer/Faria** | **Bepari cum Local arathdar** | **Arathdar/Paiker** | **Retailer** |
| Transportation cost                                          | 250              | 0                             | 800                 | 250          |
| Loading                                                      | 125              | 125                           | 0                   | 125          |
| Unloading                                                    | 125              | 0                             | 125                 | 0            |
| Market toll/tax                                              | 75               | 50                            | 20                  | 75           |
| Milling cost                                                 | 0                | 0                             | 4000                | 0            |
| Wages and salaries                                           | 0                | 125                           | 100                 | 0            |
| Packaging                                                    | 0                | 200                           | 0                   | 300          |
| Personal expenses (Mobile bill, daily expenses etc.)          | 80               | 50                            | 50                  | 400          |
| Miscellaneous cost (Electricity, subscription, weighing loss etc.) | 200             | 100                           | 50                  | 250          |
| **Total cost**                                               | 855              | 750                           | 5295                | 1580         |

3.9. Marketing Margin

Marketing margin is the difference between the price paid by the consumer and price received by the producers. Marketing margin has two components marketing cost and net margin or profit. After milling of the pulse then it get consumable pulse and barn (husk). Prices were determined at the time of sale considering the prevailing market rate (Hajong, Moniruzzaman, Mia, & Rahman, 2014). This husk has also value and it sell Tk. 15.00/kg (Tk. 15000.00/kg). Arathder/ paiker/ miller were milling the lentil and then they sell lentil pulse and its husk to the retailer. Arathder cum wholesaler were act as a processor. Processor was the highest value added actor in the value chain system (Hajong, Mondal, Sikder, Paul, & Saha, 2016). Paiker sell mainly milled pulse to retailer so it calculated 725 kg out of 1000 kg (1 MT) of lentil. Faria net margin was Tk. 645/mt, bepari cum local arathdar was Tk. 250 and arathdar cum wholesaler was Tk. 230/mt. Retailer net margin was highest (Tk. 4945/mt) but they sold daily average 9.28 kg lentil only Table 8.

| Table-8. Marketing margin of different intermediaries (Tk./MT). |
|---------------------------------------------------------------|
| **Particulars**                                               | **Farmer/Faria** | **Bepari cum local arathdar** | **Arathdar cum wholesaler** | **Retailer** |
| A. Average sales price                                       | 71000            | 72500                         | 73500                         | 79025        |
| B. Average purchased price                                  | 72500            | 73500                         | 79025                         | 85550        |
| C. Gross margin (A-B)                                       | 1500             | 1000                          | 5525                          | 6325         |
| D. Marketing cost                                            | 855              | 750                           | 5295                          | 1580         |
| E. Net margin (C-D)                                         | 645              | 250                           | 230                           | 4945         |
| **Average daily transaction**                                | 13.70            | 113.33                        | 225.00                        | 9.28         |

Source: Field survey,2020.

3.10. Distribution of Value Addition

Value addition is the difference in sales price and purchase price at each stage of the value chain. Each of the lentil value chain actors adds value to the product passes from one actor to another. In a way, the actors change the form of the product through processing or improve the grade by cleaning or create space and time utility. Lentil producer reported lower price of Tk. 71,000.00/mt by adding Tk. 1500.00/mt which was 10.30% of total value added in the study areas Table 9. Retailer was the highest value added Tk.6525/mt (+4.83%) followed by wholesaler Tk.5525/mt (37.97%), faria (10.31%) and bepari Tk. 1000/mt (6.87%) respectfully. Total value added at different actors was Tk. 14550/mt.
Table 9. Distribution of value addition among different intermediaries (Tk/ton).

| Value chain         | Farmer/Faria | Bepari local arathdar | Arathdar cum wholesaler | Retailer | Consumer |
|---------------------|--------------|------------------------|-------------------------|----------|----------|
| Sales price         | 71000        | 72500                  | 73500                   | 79025    |          |
| Purchase price      | 72500        | 73500                  | 79025                   | 85550    |          |
| Gross value added   | 1500         | 1000                   | 5525                    | 6525     |          |
| % of total value added* | 10.31      | 6.87                   | 37.97                   | 44.85    |          |

Note: Total value added = Tk. 14550.00.

3.11. Problems of Lentil Cultivation

For lentil cultivation weather is very important. Foggy weather was threaten for lentil cultivation. Most of the farmer claim that bad weather and disease infestation were the problems in the lentil cultivation. Disease such as root rot (Sclerotium rolfsii) and leaf rot (Stemphylium blight) were the threaten for lentil cultivation and it hamper and lessen lentil production. Insect pest attack was another problem for lentil cultivation. Because of high demand farmer did not face any marketing problem (Hajong, Sikder, Mondal, & Islam, 2018).

4. CONCLUSION

Lentil was the most popular pulses crops cultivated in the South western region of Bangladesh and it has great demand at the farmer and consumer. This region has convenient environment and suitable land for lentil cultivation. Improved varieties of lentil developed by BARI were increase both production and yield in those areas and make highly profitable for lentil farmer. It has a great scope to increase the acreage to fulfill the local demand and export to abroad. In lentil value chain millers has important role that they process and crushing the whole pulse and make consumable for consumer. Lentil value chain did not follow traditional marketing channel. Farmer sometimes itself sold its product directly to local arathdar where as local faria can not role play. Retailer margin was high as they deal in very small amount in daily transaction. Bad weather and disease infestation such as Stemphylium blight is the major constraint to develop lentil cultivation. Short duration and disease resistant improved lentil varieties are pre-requisites for expanding the cultivation throughout the country. Therefore, continuous effort should be given by the breeders for developing high yielding and stress tolerant lentil varieties.

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