VALUE CHAIN ANALYSIS OF POTATO IN SELECTED AREAS OF MUNSHIGANJ DISTRICT

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DEDICATION

This thesis is dedicated to my parents and wife.

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I am solely responsible for errors and omissions in this study, if any.

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ABSTRACT

A series of value-generating activities associated with product marketing from farm level to the ultimate consumer referred to as the value chain. In Bangladesh potato value chain starting from producer then there may have many intermediary channels like potato producer, *Faria*, *Bepari*, Wholesaler, Retailer, and Consumer etc. . The study was conducted at sirajdikhan upazila under Munshiganj distric

to identify the actors involved in value chain and their function in potato marketing, to estimate the value addition of potato by the actors in potato market, to estimate the seasonal price fluctuation of potato in the study area, to identify the constraints of potato marketing and suggest measure for the improvement of potato marketing in the selected area. The selected samples included 65(faria-15, bepari-15,wholeseller-15,retailer-20). In the study areas there are five value chain included. In this study cost and margin analysis of potato, cost of production, variable cost, fixed cost, gross cost, gross return, gross margin, net return, value addition, marketing cost, storage cost, market price calculated. value addition of retailer is 26.13 percent, wholesaler is 32.16 percent, bepari is 26.13 percent and faria is 15.58 percent. Marketing cost of retailer is 19.56 percent, wholesaler is 45.57, bapari is 30.81 and faria is 4.06 percent.Net marketing margin of retailer is 39.19 percent, wholesaler is 5.49,bapari 16.85 percent and faria is 38.47 percent. Proper credit facility, fertilizer supply, seed supply, irrigation facilities, electricity supply and transport facility should be improve for potato development in Bangladesh.

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CHAPTER I

INTRODUCTION

1.1 Introduction

Potato is one of the important crops and very common vegetable in Bangladesh. Potato is one of the main agricultural crops in Bangladesh. It is both a vegetable crop as well as cash crop. In many countries it is considered as a staple food. Potato is cultivated as a staple food crop in at least 40 countries (Islam, 1987). It is an important food crop from the very beginning of human civilization and occupying its position just after wheat and rice both in respect of production and consumption (Thompson and Kelly, 1957). In Bangladesh potato occupied the first position among all the vegetables in respect of area coverage and production and contributed 65.65 per cent of the total production of vegetables in Bangladesh in 2015(BBS, 2015). In Bangladesh the production of potatoes as well as its many fold uses has increased over the last few years. In Indian sub-continent the cultivation of potato was probably started during the 17^{th} century (Ahmed, 1977). In Bangladesh the cultivation of potato was started in the late 19^{th} century (Siddique and Hussain, 1988). But the cultivation was started as a cash crop after 1920 (Hoque, 2004). A least in 100 countries it is the most important vegetable crop.

1.2 Value Chain Analysis of Potato Marketing

A series of value-generating activities associated with product marketing from farm level to the ultimate consumer referred to as the value chain. In Bangladesh potato value chain starting from producer then there may have many intermediary channels like potato producer, *Faria, Bepari*, Wholesaler, Retailer, and Consumer etc.

It concentrates on the linkages between each of the actors along the value chain, from potato producer, through to the final consumer and all the value added products derived from potato. While providing a detailed breakdown of the costs, profits and margins along each level of the chain, the analysis identifies the key constraints and linkages at each level of the chain.

Some time a long value chain and traders are the obstacles for potato price instability. As to why it is very important to analyze is the value chain of potato to identify the

causes of price variation or rising of potato and its probable solution. Value chain analysis will help us to make appropriate marketing strategy and pricing policy of potato.

1.3 Importance of Potato in the Economy of Bangladesh

Potato is an important cash crop and a multipurpose food crop of Bangladesh (Siddique and Hossain, 1988). It is used not only in human diet but also in other purposes. Besides it is used as food and vegetable, it is highly used in industry for various purposes. It is used for making gum, starch for adhesives and other purposes, in textile and paper industries, for processing ink, dyes, toys, soap and for leather processing. Glucose and dextrose are prepared from potato for use in medical treatment. Lactic acid, alcohol and some other chemicals are now being produced from potato. In terms of nutritional potential, it ranks first among the 10 major food crops in calories production per unit area of land. It is also considered as an excellent source of vitamin B and C.

The role of potato in relieving food shortage in the country deserves special attention. In Bangladesh potato is still considered merely as a vegetable, i.e. as a complementary food with rice and wheat but not as a staple food it is regarded as one of the world's leading food crop (Akter, 1973). It is now well recognized that to meet the demand for food for increased population, dependence on rice and wheat has to be reduced and the food habit of the masses have to be diversified. The food problem is one of the most critical aspects of Bangladesh struggle to achieve economic growth, rate of inflation, poverty and nutrition, the trade balance and the Government's fiscal position.

Food grains are a main consumption item in Bangladesh accounting for about 35 percent of total consumption expenditure and provide more than 80 percent of the total calorie intake. Bangladesh has long been striving to achieve food self-sufficiency by setting production targets through the successive five year plan. Virtually, cereal production stood at approximately 28.7 million tons in 2012-2013 and the country attained self-sufficiency in the recent past. Potato has been perceived to play an important role in improving this situation by providing more balanced diets to increase nutritional quality of food. The world per hectare yield of potato is about eight times that of rice and wheat and it can also produce over twice as much as dry

matter and calories on a unit area of land in shorter period of time compared to rice and wheat. Besides, due to the scarcity of cultivable land, it is not possible to increase the area of any crop without affecting other crops. This means that the additional food requirement for a growing population has to come from vertical expansion. Potato has a good prospect on food expansion program depending on the strategy adopted to increase food supply of the country.

Increased potato production will provide more low-priced calories food for human consumption. The adoption of potato as wheat flour substitute for bread would be beneficial to the Bangladesh economy particularly in its nutritional value. It will increase supply availability for starch and processed food. It can replace important cereals such as rice and wheat thereby reducing the foreign exchange requirements. It can contribute to create rural employment opportunities through the development and expansion of potato industry.

1.4 Uses of Potato

In Bangladesh, potato is primarily used as a vegetable, although in many countries of the world it constitutes the staple food and contributes more than 90% of the carbohydrate food source. Millions of tons of potatoes are processed annually in Europe into starch, alcohol, potato meal, flour, dextrose and other products. Some are processed into potato chips, dehydrated mashed potatoes, French fries and canned potatoes. Large quantities of potatoes in the Netherlands, Ireland, Germany and other countries of Europe are grown specifically for the manufacture of alcohol, starch, potato meal or flour, and for livestock feeding. Europeans consume much larger quantities of potato than the North Americans. Asian countries consume more rice than potato for carbohydrate foods.

In Bangladesh, although the principal use of potatoes is to make potato curry along with fish, meat, and eggs, there exists a great diversity in the consumption of potatoes. Notable among potato-based food items are the boiled potato, fried potato, mashed potato, baked potato, potato chop, potato vegetable mix, potato *singara*, potato chips, French fry etc. In recent years, bakeries and fast food shops have started preparing a wide variety of potato-based food delicacies.

1.5 Nutritional Value of Potato

The nutritional value of potato along with its taste and ease of cooking has made it the most popular vegetable in the entire world. There was a time when none ate even a single dish containing potato whereas on an average, an American consumes 62 kg of potatoes each year. The people consumed almost one spud of potato a day. The people consumed so many potatoes as potato is a good source of nutrition.

Natural potato is a good source of calories. In poor countries, many people who cannot afford high calorie diet such as milk and milk products, meat and pulses, used potato as their prime source of calorie. In the seventh century potato became famous across Europe as a crop that could save people during famines.

Given below are some nutrient facts, information and nutritional value of potatoes:

Mineral content: If you eat potatoes regularly, you ensure a good supply of water and ions in your body. This is because, potato is rich in potassium. The concentration is being higher in the skin and just beneath it. So, eating the potato with its skin is always beneficial. Potato also contains calcium, iron, and phosphorus.

Vitamin content: Natural potatoes are known for the large amounts of Vitamin C present in them. Typically, 100 gm of potato contain about 17 mg of Vitamin C. In addition to this, natural potato also contains Vitamin A, B and P.

Water content: Potato looks big in size, but water accounts for about 70-80 percent of the weight of a potato. So the belief that one becomes fat by eating potatoes is a misconception. Of course if potato servings contain large quantities of butter, or if one can't keep away from those high-in-fat-and-cholesterol French fries, one is bound to become overweight.

Starch content: Potato contains about 17% starch and it is one of the best natural sources of starch. Potato sprouting leads to conversion of starch into sugar and hence one should avoid eating sprouted potatoes.

The potato plant is a herbaceous annual, normally propagated by planting pieces of tubers that bear two or three eyes. Nutritionally, the tuber is rich in carbohydrates or starch and is a good source of protein, vitamin C and the B vitamins, potassium,

phosphorus, and iron. Most of the minerals and protein are concentrated in a thin layer beneath the skin, and the skin itself is a source of food fiber.

1.6 Area, Production and Yield of Potato in Bangladesh

The land and climatic condition of Bangladesh with abundant water and humid temperature is ideally congenial to the cultivation of potato. The area, production and yield of potato have increased significantly during the last three decades. Area under potato cultivation has increased about three and a half folds and production of potato has increased more than five and a half times during the same period.

Figure1 shows the area, production and yield of potato which increased significantly during the last three decades from 1979-80 to 2008-09. During the thirty years potato area increased from 96.3 thousand hectare in 1979-80 to 395.4 thousand hectares in 2008-09 while production of potato rose from 903 thousand metric tons in 1979-80 to 5268 thousand metric tons in 2008-09. The average yield per hectare for the country also increased from 9.44 metric tons to 13.32 metric ton. (Source: BBS, 2015, See Appendix Table I)

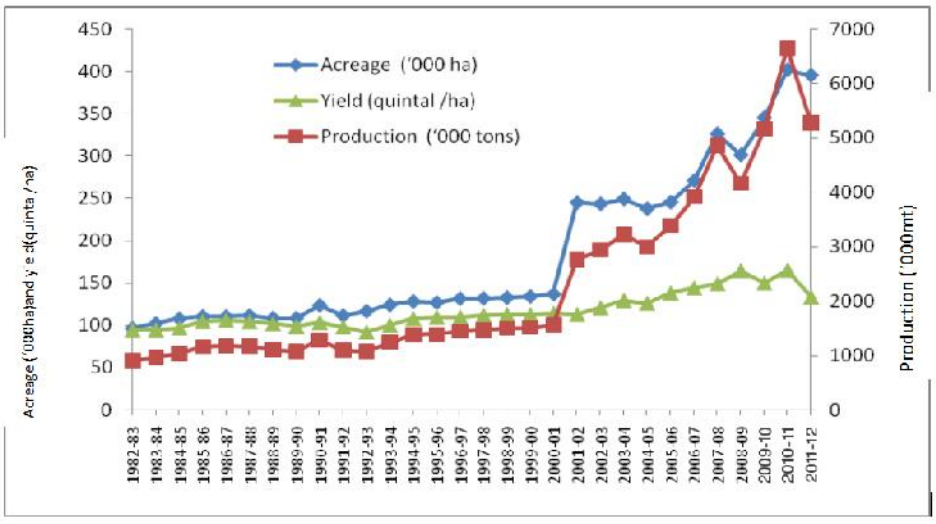

Figure 1.1: Trend of area, production and yield of potato in Bangladesh

1.7 Varieties of Potato

Different varieties of potatoes are grown in the world. These differ in appearance, tuber structure, size and color, time of maturity, cooking and marketing qualities, yield, and resistance to pests and diseases. A variety that grows well in one area may do poorly in another area. Potato varieties that are cultivated in Bangladesh are

broadly categorized into two groups, local and high yielding. The so-called local varieties are in fact, not strictly native. In the distant past those were brought to this part of the subcontinent but in the absence of varietal improvement efforts, gradually degenerated, showing poor yield performance. In spite of poor yields, some of the local varieties are still being cultivated because of their taste and cooking qualities.

There are about 27 local varieties of potatoes cultivated in different parts of the country. They are familiar with local names. It is estimated that local varieties were cultivated in about 11, 3540 acres of land, producing 3, 09, 800 m tons of tubers during 1997-98 (Source: See Appendix Table I).

The familiar local varieties are

(a)diamond- Mostly cultivated in Munshiganj District.
(b) *SheelBilatee*- mostly cultivated in Rangpur. The tuber is oblong, reddish. Each tuber weighs about 30 g.
(c) *LalSheel*- primarily cultivated in Bogra with tubers rounded, reddish, each having a weight of about 55 g. This variety is also known as *LalMadda* and *Bograi*.
(d) *LalPakri* - cultivated widely in Dinajpur, Bogra and Sirajganj districts with tubers reddish and round, each weighing about 30 g.
(e) *Du Hajari* - mostly cultivated in the Chittagong area. Tubers appear round and pale, each weighing about 25g. Among other indigenous varieties *JhauBilatee* and *Suryamukhi* are notable.

In the last few decades, several dozens of high yielding varieties (HYV) of potato were brought to Bangladesh and tried experimentally under local conditions before being recommended for general cultivation. During the 1970s, about 16 varieties were initially selected, but subsequently 10 were dropped. Through constant evaluation of the traits, varietal performance, and considerations of other characteristics, about 10 HYV have been released for cultivation in the country. However, huge amount of potato seeds are imported every year by the Bangladesh Agricultural Development Corporation (BADC) for distribution among farmers. Bangladesh Agricultural Research Institute (BARI) has also established a farm at Debiganj in Panchagar district for production of HYV seed potatoes. Among the high yielding popular varieties the following are notable: (a) *Cardinal*- probably most popular among the

foreign varieties with oblong, reddish tubers, shallow eyes, and smooth skin. The variety has been introduced from Holland and has yield potential of 20-25 m tons per ha. (b) *Diament* - another Holland variety with oval to oblong, pale yellow tubers, skin smooth, and eyes shallow. It is quite disease resistant. Per hectare yield ranges from 18-24 m tons. (c) *KufriShindhury* - tubers reddish, round, and eyes deep with rough skin. This variety was introduced from India and is comparatively less susceptible to pests and diseases. It has a yield potential of 18 to 22 m tons per ha. Other notable exotic varieties are Patronis, Alpha, Archa, Multa, Ukama, Hira, Maurin, Origo, Alisa, etc.

In recent years, the Tuber Crops Research Centre of BARI has collected many new varieties of potato from the International Potato Research Centre, Peru, and from other sources. These are being tested under Bangladesh field conditions, to determine whether they can be recommended for cultivation in the country. The Centre has already made good contribution towards the development of some high yielding potato varieties.

Potato is widely cultivated in all the districts of Bangladesh during winter season. Of the total 3,36,740 acres (1,36,332 ha) of land used for potato cultivation during 2012-13, 1,13,540, 2,18,445, and 4,755 acres were for local, high yielding, and Indian varieties respectively. Well-fertilized, sunny land with sufficient moisture in soil is appropriate for potato plantation. The first fortnight of November is the right time. In certain northwestern areas, farmers even plant potato in October to harvest the crop early. Virtually all potatoes in this country are planted manually. On the basis of the soil quality and potato variety farmers determine the spacing in between the seed tubers and the adjacent rows. Row spacing is usually from 45 to 60 cm. Optimum depth of planting depends on temperature and moisture of the soil, probable weather following planting, and mode of conducting field operations later. If planting is shallow and only about 5 cm deep, the soil must be gradually ridged over the row incidental to cultivation. This ensures that the developing tubers are well covered with soil to protect them from light and pests. Mulching is frequently done over the rows with water hyacinth, straw etc. to preserve the soil moisture and to prevent the growth of weeds.

1.8 Potato Storage in Bangladesh

Storage plays an important role in agricultural marketing because agricultural products have some special characteristics. The special characteristics are seasonality of production, perishability, inelastic demand, and uncertainty of production, insect pest and disease attack, fluctuation of prices causing uncertainty in achieving maximum returns. Storage is important to add time utility for many agricultural products and also for form utility for many products which are to be used as raw materials later on for finished products. Farm products are stored to make them available in the market throughout the year to balance periods of plenty and periods of scarcity and sometimes to make them more used (USDA, 1954). The ownership of modern storage facilities is sometimes an issue in the less developed countries. Merchants in control of the limited storage available from speculative operations and many countries are turning increasingly to public ownership of storage facilities (Rahman, 1970).

There are generally two different types of storage for agricultural products, namely traditional storage and cold storage for storing perishable products like potato. Farmers usually have a small dwelling house and they have no separate house for storing potato. They store potato on the kutcha floor with sand or with gunny bags. But mainly farmers store their potato in Macha made by bamboo and wood just after harvesting of potato. They store potato in cold storage and dispose it during the month of May, June and July. But storage of perishable crops like potato requires relatively larger space since congested storage causes huge damage. Besides, dwelling houses are not congenial to store such a large quantity of perishable crops for a long period. Even if the perishable crops are stored in a fairly spacious store house there is quick deterioration in terms of volume and quantity (Ahsan, 1964).

Perishable crops like potato immediately after harvesting becomes subject to the process of decomposition caused by enzymes which at first reduces the volume of the product and later on can make it completely valueless. Storage of potato under traditional system cannot keep well for a long period especially in a hot and humid climate condition prevailing in Bangladesh. The process of decomposition may, however, be reduced to a large extent by storing these products in cold storage plants where temperature and humidity can be controlled according to the requirement of the products.

However due to the seasonality in production, temporal price variation is more prominent for perishable commodities than many other agricultural products. Fluctuations of price create uncertainty about the market prices and hence risk in production. Proper storage of agricultural products therefore becomes necessary to maintain orderly marketing and uniform supply in the market during off- season ensuring higher prices to the products.

1.9 Potato Marketing in Bangladesh

Among the vegetables, potato is the only item which sells cheapest in the local markets. At wholesale level, it now sells at Tk 7.0 per kilogram (kg) while at retail levels; the price varies between Tk 10 to Tk 12 in the market. This is full potato season and the supply throughout the country is abundant. However, the potato price was Tk 24-30 per kg during the last season and the government had to import from the neighboring country. While the rice price is increasing both in the domestic and international markets, potato price in the country remains stable. There is a chance that the price might go down further if there is a surplus production and the country's cold storages fail to accommodate additional potato harvest.

Although consumers are now happy, growers are not. Due to low price of the potato, they are not getting even their production cost. In order to save the farmers from widespread losses, experts say that a portion of the harvest should be exported immediately and storage capacity in the cold storages, be enhanced. A study found that speedy export of a consignment might save a substantial quantity of potato from possible damage, as there is little space available in the country's cold storages. Earlier, the Potato Advisory Board expressed its opinion that the government should help farmers erect bamboo shelves at some convenient places to store surplus potato for the next three months of the dry season.

Sensing growing demand for potato starch in international market, local entrepreneurs have now started setting up 100 per cent export-oriented factory of potato starch in a bid to diversify international trade. Potato starch, which has a lot of potentials in country's trade, is being used as raw materials in textile, pharmaceutical and paper industry. Though country's climate is favorable for potato cultivation, Bangladesh has to import about 6,000 tonnes of potato starch every year to meet the local industry's demand as raw materials. Already buyers from Australia, New Zealand, Europe,

Japan and European countries have contacted local entrepreneurs to buy potato starch as the production of potato has been increasing every year.

Market watchers say higher bank interest rates between 10 and 12 per cent and lack of diversified use are major roadblocks to creating a viable market for potato in the country. The industry people also blame the government for its poor support for potato-based industry and exports. The country's around 350 cold storages have a capacity of preserving 2.5 million tonnes, whereas in ideal situation the storage capacity should not have been more than 1.5 to 1.6 million tonnes. As per international practices, one-third of the total output of a perishable product should be preserved for meeting off-season market demand. Last year, farmers at the grassroots level claimed that due to unfavorable weather and high cost of seeds, fertilizer and insecticide, potato production had declined but the production cost had gone up substantially. Government sources, however, did not agree to such a contention saying that there was a bumper potato production last season as well and that there was no reason to believe that the production cost should be so high as compared to other commodities.

The problems arising out of bumper production of vegetables are not new in Bangladesh. The country is severely burdened with price hikes of some essential items due to increase in international prices of these items. Though potatoes are being exported in small quantities to some countries in the Middle East, Malaysia and some EU countries, its export could not reach the desired level due to inadequate attention given by the governments in the past. There are fairly big markets in the Middle East, UK, USA, South Korea and Malaysia. The Bangladeshi workers in those countries may prefer to buy vegetables from Bangladesh because of sentiment, and the taste of the items. As an immediate measure, the government may hold talks with cold storage owners and potato exporters to find out new markets for potato. In addition, the ministries of food, agriculture and commerce should monitor the trend of domestic consumption of potato. The government may even make a passionate appeal to the people to consume more potatoes and less rice, and explain to them the objectives of such a plea.

1.10 Justification of Present Study

Potato has been cultivated as an important food crop in Bangladesh. Every year Bangladesh produces a huge amount of potato. A relatively high yield and low cost of production of the crop with the introduction of modern technologies have perhaps provided an incentive to the farmers to increase the area as well as production of potato and thereby raise the marketable surplus of potato in Bangladesh. But due to lack of proper marketing facilities farmers do not get fair price even sometime they cannot afford to recover production cost. The growers have to sell major part of their produces immediately after harvesting at a very low price due to lack of storage facilities and cash need of the farmers. Farmers are compelled to spoil potato in the most potato growing areas of Bangladesh. But it has been observed that in some areas potato price is very high during off season and even in the peak season.

If farmers fail to sell their produce at an incentive price they are likely to discontinue its production, which may adversely affect the economy. So it is very important to make the market efficient for the sake of both farmers and consumers. Value chain analysis of potato marketing can be used for identifying the various issues related to marketing problems of potato and may help to identify probable solution.

The present study intends to find out some of the shortcomings of the existing potato marketing system so that continuous increase in its production can be maintained. It is widely believed that potato growers do not get fair price due to lack of economic and scientific storage facilities, existence of stronger middlemen, inefficient transportation facilities, and lack of proper marketing information and urgent requirement of money immediately after the harvesting period by the farmers. The seasonal character of potato arrivals is greatly influenced by the farmer's failure to reliant them owing to its semi perishable nature which leads to post harvest market glut.

Thus, there is a strong need for an efficient marketing system in order to accelerate and sustain potato production and thereby promote agricultural growth in the country. Marketing efficiency to producers whose role is crucial for the benefit of ultimate consumers. The present study has been designed to examine the various features of potato marketing in Munshiganj district with a view to assess the marketing performance by analyzing marketing margins of intermediaries, net share of

producers, marketing cost, marketing efficiency and the existing problems in potato marketing. On the basis of findings of the study specific recommendations will be made to help producers, consumers, intermediaries (traders) and policy makers in the formulation of viable policies regarding production and marketing of potato in Bangladesh.

1.11 Objectives of the Study

The overall objective of the study is to analyze and appraise the value addition of potato in various marketing steps. The specific objectives of the study are as follows:

- To identify the actors involved in value chain and their function in potato marketing;
- To estimate the value addition of potato by the actors in potato market;
- To estimate the seasonal price fluctuation of potato in the study area ;
- To identify the constraints of potato marketing and suggest measure for the improvement of potato marketing in the selected area.

1.12 Limitations of the Study

Some limitations were involved in collecting the necessary information of the study. Firstly, this study was restricted to a limited area, the area where more quantity of potato was grown.

Secondly, the researcher had to work with small size of samples because of the constraints of time. However, the data were analyzed quite exhaustively but a large sample might have strengthened the findings.

Thirdly, there were the limitation of time and financial resources, all data and other necessary information were collected within the shortest possible time.

Fourthly, a very important limitation of the study was that for collecting necessary information the researcher had to depend solely on the memory of the potato growers and traders because they did not keep written records. Therefore, growers and value chain actors were interrogated within the limits of their memory could recollect the correct answers to the questions put to them.

Fifthly the processors of potato are not included in this study. Through they are important actors in the value chain. The researcher believes that if they were included obviously it would add more value in this study.

The findings of the study are based on the data of some selected areas of Munshiganj district of Bangladesh. So, the study may not be representative of the whole Bangladesh.

Moreover, during data collection some difficulties were faced in eliciting answers from a number of both potato traders and cold storage authorities. First they hesitate in providing actual information in the fear of enhanced income taxes which was especially true for the latter. However, they were ultimately convinced to report the facts.

The various limitations were handled paying consciously attention to minimize all vocal errors.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to provide reviews of studies, which are related with the present study. There are some studies on marketing of vegetables in Bangladesh. But there are only a few specific studies on the marketing of potato in the country. The Bangladesh Agricultural Research Institute (BARI) and some private and foreign agencies have done a few empirical works on vegetables. Brief reviews of the studies on potato marketing are given below.

Akter (1973) conducted a study on potato marketing in Comilla Sadar Upazila and he studied some structural and functional features of potato marketing.

Sabur and Gangwar (1984) carried out a study on production and price structure of potato in Bangladesh and showed that the growth rate of potato in terms of production, area and productivity during the proliferation period. The study also showed that the growth rates in terms of area, production and productivity for the western districts were higher than those for the northern districts.

Sabur (1986) conducted a study on marketed surplus of potato in two districts of Bangladesh and found that production and marketed surplus of potatoes moved in same direction and land under potatoes was the most important factor determining the marketed surplus. He showed that the average production cost per hectare was Tk.29637.57 which was the lowest medium farmers and net returns and benefit cost ratio were calculated at Tk.30947.82 per hectare and 1: 2.25 respectively which were the highest for medium farmers in both the areas. Regional Agricultural Research station, Jamalpur under the Farm Research Division of BARI, Joydebpur conducted a research on "Improvement of existing fanning system through holistic approach". They summarized the findings in a report (1992-93). They found that the yield per hectare of HYV potato was 9.25 tones and cost per hectare was Tk. 17,000.00. They observed that the net return depended largely on the harvest price of potato

Islam (1987) carried out a study on potato preservation in cold storage in Bangladesh including the marketing aspects. He found that price spread per tonnes of potato appropriated by traders was higher in the case cold stored potato than that of non-stored potato.

Sarkar (1990) conducted a research on potato marketing in Bangladesh. His study expounded that only few growers store their potato in cold storage plants due to high storage charge. His study revealed that communication system should be developed to transport potato from production area to the terminal market to strengthen the economic condition of the potato growers. Storage facilities should be improved at the primary and secondary markets by establishing public as well as private cold storage plants at different points of potato marketing channel. His study emphasised on the improvement of ordinary storage in scientific manner as well as innovation of low-cost storage technique which would not only ensure timely availability of quality seed but also better price at reduced storage costs throughout the year by enlarging storage period at farm level.

Siraj et al (1992) studied seed marketing in Bangladesh under the Dutch Executing Agency of crop Diversification programmers (CDP). They undertook the study on some selected areas which were traditionally known as potato producing areas and they showed that potato was a profitable winter crop. They observed that the per hectare net return of HYV potato was higher in Dinajpur region than in Jessore region in 1990-91. They also found that lack of capital and high costs of production were two major problems faced by HYV potato growers.

Arif (1998) conducted a study on potato in selected areas of Comilla district. He showed that the per hectare gross returns were Tk.101, 858.56; 102,358.56 and 101,358.56, gross costs were Tk.64, 251.10; 65,179.58 and 64,741.42; net returns were Tk. 37,607.46; 37,178.98 and 36, 6617.14 for small, medium and large categories of farmers respectively.

Saklayen (1999) investigated that the potato marketing in selected areas of Munshiganj district. This study was mainly based on Sadar Upazila and Tongibari Upazila of Munshiganj district. The sample included 30 farmers and 30 market intermediaries of Munshiganj Sadar Upazila and Tongibari Upazila. He found that

the marketing cost per quintal of potato incurred was Tk 43.46 and Tk 44.36 for farmers of Munshiganj Sadar Upazila and Tongibari Upazila respectively. The marketing costs incurred per, quintal potato were Tk 60.95, Tk 56.87, Tk 133.60 and Tk 37.81 for Beparis, Paikers, cold storage owners and retailer of Munshiganj bazar respectively. The marketing costs incurred per quintal were Tk 45.42, Tk 61.21, Tk 134.64 and Tk 37.32 for Beparis, Paikers, Cold storage owners and retailers of Tangibari bazar respectively. The net margins of per quintal potato of Beparis, paikers, the cold storage owners and retailers of Munshiganj bazaar were calculated at Tk 21.73, Tk 21.50, Tk 19.57 and Tk 23.28 respectively. The net margin of per quintal potato of Beparis, Paikers, the cold storage owners and retailers of Tongibari bazar were calculated at Tk 30.02, Tk 26.91, Tk 25.62 and Tk 21.94 respectively.

Kawsar (2001) carried out a-study entitled "An Economic Analysis of Diamant Potato Production in Some Selected Areas of Bangladesh". The study was mainly designed to analyze the socio-economic characteristics of farmers and to estimate the costs and returns of Diamant variety of potato and to determine the factors affecting yield and returns. One hundred thirty nine farmers were purposively selected from 5 Upazilas of five districts Bogra, Comilla, Munshiganj, Rangpur and Thakurgaon. Findings showed that Diamant potato production is profitable considering the selected farm categories both in East and North Bengal. Per hectare gross margin was the highest for Rangpur whereas net returns were the highest for Munshiganj. Both gross margin and net return were higher for North Bengal. On the other hand, medium farmers obtained the highest amount of gross margin and net return.

Hossain (2004) investigated that the potato marketing in selected areas of Bogra district. This study was mainly based on Sadar Upazila of Bogra district. The sample included 30 farmers and 30 intermediaries. Production cost, yield, marketing cost, marketing margin and net margin of potato farmers and intermediaries were calculated in this study.

Saiyem (2007) investigated the potato marketing system and price behavior in selected areas of Rangpur district. The samples include 60 sample farmers and intermediaries. In this study production cost, yield, marketing cost, marketing

margin, net margin and price behavior of potato farmers and intermediaries were estimated.

Hajong (2011) found many intermediaries are involved such as Farias, Beparis,Paikars, retailers and cold storage owners in the production and marketing system of potato. The farmers distribute their production for family consumption, gift and kind payment to relatives, seed and maximum portion for sell. Again some potatoes were damaged and loss during storage. Storing of potato in the cold storage plants certainly reduces the excessive losses of potato but all farmers can not avail the facility of cold storages due to several reasons, such as high cold storage charge, uncertainty of future market price, financial insolvency, bad communication and inadequate transport facilities and lack of any provision in getting compensation for damage of potato in the cold storage plants.

The aforesaid reviews reveal that studies were undertaken exclusively on the marketing aspect of potato. A few studies on value chain of potato marketing have been undertaken in Bangladesh. So the existing research has been undertaken to make an in depth study to provide knowledge in the field of potato marketing. The findings of the study might help farmers, value chain actors and consumers to take decision in production, trading and consuming potato.

CHAPTER III

METHODOLOGY

3.1 Introduction

This chapter presents a detail description of the methods adopted at different stages of the study. Methodology is an indispensible and integral part of any research. This chapter presents the methodology followed in the study, which included the selection of the study area, selection of samples, preparation of survey schedule, method of data collection, period of survey, editing and tabulation of data and analytical techniques. The tools and methods used and followed for the study with considering the specific objectives of the study are given below.

3.2 Selection of Study Area

As the selection of the study area is an important step and it largely depends upon the objectives of the study. Therefore, careful thought was placed on the selection of the study area. In order to make an assessment of the value chain of marketing of potato, the study was conducted in selected areas of Munshiganj district. Munshiganj district is the leading zone in respect of potato production in Bangladesh. Sirajdikhan upazilla especially is the leading potato producing area of Munshiganj district. The study area has some favorable characteristics like topography, soil and climate condition for producing potato.

Figure 3.1: Munshiganj district

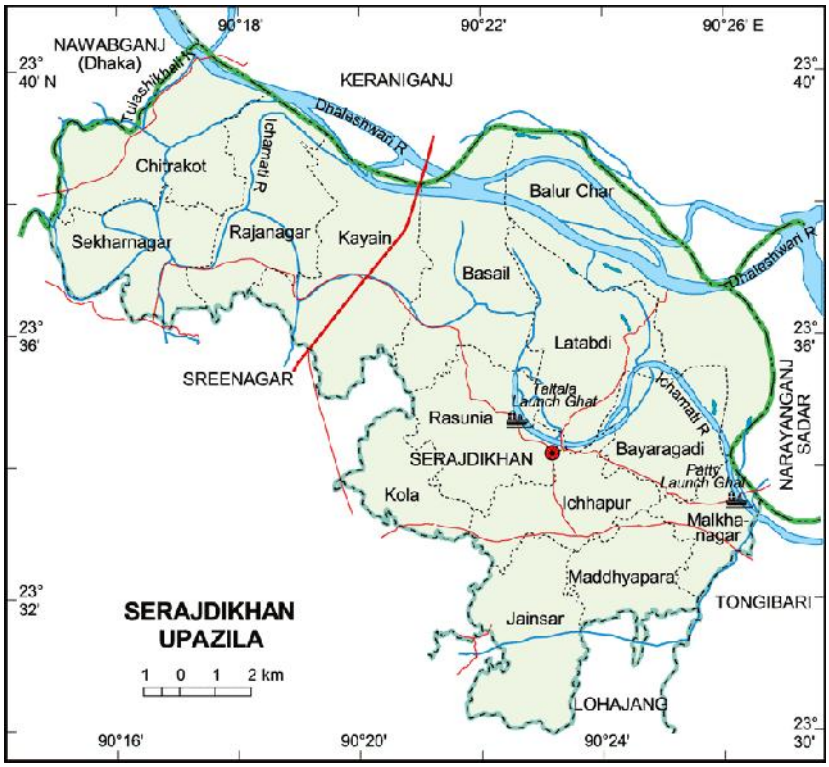

Figure 3.2: Sirajdikhan Upazila

The following factors were considered in selecting the study area:

- Munshiganj is one of the high yielding and widely potato producing district of the country. Here, all kinds of value chain actors needed for the study are available.
- Easy accessibility and good communication system of the study area.
- Farmers are well known to produce potato and preserve it in traditional and cold storage methods.
- There is huge number of potato growers with different farm sizes.

Therefore, the availability of potato growers and traders in the district of Munshiganj were the main criteria for selecting as the study area for the present study.

3.3 Selection of Period of Study

The present study covered 12 months from January to December 2015. Data were collected during the period from February to April, 2015 through face to face interview with potato growers, potato traders, and cold storage owner using structured survey schedule. For collecting supplementary data the researcher personally visited the area.

3.4 Selection of Samples and Sample Technique

Thirty potato growers, Sixty five other value chain actors (potato traders, *Faria*, *Bepari*, wholesaler and retailer) and five cold storage owners were selected from the study area in the following manner.

3.4.1 Selection of potato growers

The potato growers of the selected areas were considered as major part of the study. A list of potato growers of the selected areas was prepared through a preliminary survey. Considering the limitation of time and fund, the sample size for potato grower was fixed at 30, taking from the selected villages' i.e. Bujarhati, and Bashaile. Out of 30 selected growers, 10 from Bashaile and 10 from Bujarhati, 5 were from Patharghata and 5 from Sofurchor were selected in Sirajdikhan upazila of Munshiganj district through simple random sampling technique by using random number table for the present study.

3.4.2 Value chain actor of potato

Sixty Five value chain actors of potato from each of two retail markets Ramkrisnodi Bazar and Guakhola Bazar were selected from Sadar upazila. In addition, two Haats such as Bujarhati Haat and Bashaile Haat were chosen from Sirajdikhan upazila of Munshiganj district by applying purposive sampling technique for the present study.

In the selected areas potato farmers and intermediaries were considered as the population of the study.

Table 3.1 Different actors and size of sample

Value chain actors	Sample size
Faria	15
Bepari	15
Wholesaler	15
Retailer	20
Total	65

3.4.3 Cold storage plants

Five cold storage plants comprising about 20% percent of the total number of cold storage plants located in the study area were selected through simple random sampling technique by applying lottery method for the present study. Five out of twenty plants from Munshiganj district was selected through simple random sampling technique.

3.5 Preparation of the Survey Schedule

For this purpose, Five separate types of interview schedules were prepared for collecting necessary data from different types of samples. An interview schedule contains questions about the production, storage, marketing and disposal of potato at the grower's level. An interview schedule was prepared for collecting data from potato traders and including question related to buying, storage and selling of potato. The third number of interview schedule was prepared for obtaining data from owners and/or authorities of the selected plants relating to potato preservation, pattern of plant utilization, expenditure incurred for it and revenue earned from cold storage plants for the year and various problems encountered by the cold storage plants. All the

schedules were pretested and finally prepared after careful modifications. Interview schedules were prepared on the basis of specific objectives of this study.

3.6 Data Collection

The researcher himself collected the relevant data from the selected samples through face to face interview. Before taking actual interviews the whole academic purpose of the study was clearly explained to the sample farmers, traders and cold storage owner. Initially, they were hesitated to answer the questions; but when they were assured that the study was purely an academic one and it would not affect any way, they were convinced to cooperate with the researcher. At the time of interview, the researcher asked questions systematically and explained the question whenever it was felt necessary. Farmers were requested to provide correct information as far as possible. Many did not any records of their businesses and activities. This problem was confronted by memory recalling technique. Data were also collected from potato traders like *Faria, Bepari,* wholesaler and retailer.

In addition to primary data, secondary data were also collected from various publication like journals, different organization like Department of Agricultural Marketing of Bangladesh and website searching.

3.7 Tabulation and Analysis of Data

The first step was taken to examine the data of each and every schedule to find out any changeability or omission in the data collection and to avoid irrelevant information. The data were edited carefully to eliminate possible errors contained in the schedules while recording information. Processed data were transferred to excel spread sheet and compiled with a view to facilitating tabulation. Information was collected initially in local units. After checking them these were converted into quantitative form by using suitable scoring. Necessary tables were prepared by shortening the data. The collected data were analyzed according to the objectives of the study. Inconsistencies in the data were removed. Analysis was done using the concerned software Microsoft Excel version.

3.8 Analytical Technique

An agribusiness study could be judged by the appropriate analytical technique. Data were analyzed with the purpose of achieving the objectives of the study. The probable techniques used were as follows:

3.8.1 Gross return and net return of the farmer

Gross return was calculated by multiplying the total volume of output of an enterprise by the average price in the harvesting period (Dillon and Hardaker, 1993). It consisted of sum of the volume of main product and by product. The following equation was used to estimate gross return:

$GR=\sum Qm.Pm$

Where:

GR= Gross return from product

Qm = Quantity of product

Pm=Avg. price of product

Net return was calculated by deducting all costs (variable and fixed) from gross return. To determine the net return of potato production the following equation was used in the resent study:

Π= Gross return – (Variable cost + fixed cost)

Here,

Π= Profit per cycle

Gross return = Total production * per unit price of potato

Variable costs,

- Production cost of potato

Fixed costs,

- Land use cost
- Interest on operating capital

Marketing cost of potato

- License fee
- Loading and unloading
- Power and electricity charge

- Telephone charge
- Market toll
- Transportation
- Grading
- Storage cost
- Personal expenses
- Unofficial payment

3.8.2 Marketing margin and net margin of value chain actors

The marketing margin and net margin of different value chain actors were estimated by the following formula:

- Marketing Margin=Sales price – Purchase price
- Net marketing margin =Marketing margin – Marketing cost
- Value Addition (%) $= \frac{(\text{sales Price} - \text{Purchase Price})}{\text{Purchase Price}} x\ 100$
- Interest on operating capital= Amount of operating capital× Interest rate (%)× Time required (in years) /2
- Variable cost of potato production was considered as operating capital.

The important methods of measuring seasonal movements are:

- Method of simple average;
- Ratio to trend method;
- Ratio to moving average method; and
- Link relative method.

In the present study ratio to moving average method was applied to examine the price fluctuation of potato considering the following factors.

a. It is an improvement over the ratio to trend method.

b.It is the most satisfactory and popular method and is widely used for estimating the seasonal variations because it eliminates both trend and cyclical components from the indices of seasonal variations

3.9 Problems Encountered in Collecting Data

Though the respondent potato growers were available in the village, collection of required data was not an easy task. The researcher of the study had to face certain problems during data collections, which are noted below:

- Education of the respondents was a pre-requisite factor for having accurate data. Since most of the respondents were not well educated they were suspicious of outsiders and therefore, they were likely to be less co-operative;
- Some respondents did not keep any written records of the faring activities. Therefore, the researcher had to depend upon their memory;
- Respondents from all categories were often unable to recall the exact information, say, income, sales volume, cost, total production etc. Reliability of data therefore, posed some confuting ;
- There was the limitation of time and personnel and inadequate information about potato production and marketing aspects and for this reasons data and other necessary information had to be collected within the shortest possible time;
- Since the respondents remained busy at their work, they were not always available at home. For this, frequent visits were made to get information from them;
- Cold storage owner and maximum value chain actor was avoiding information about their loan and tax.

CHAPTER IV

ACTORS INVOLVED IN VALUE CHAIN

4.1 Introduction

In potato market attempts have been made to identify the actors in the potato value chain to develop value chain map and to examine the value addition by potato producers, value chain actors of potato and cold storage owners. Value addition is mainly interpreted as the difference between total expenses involved in making or buying of a commodity and the total revenue accruing from its sales.

Value addition activities are mainly concerned with the changes of utilities. When product passes through distribution channels, it creates place, time and possession utilities. For this reason this chapter deals with identifying the actors involved in value chain and their functions of potato marketing.

4.2 Actors Involved in Potato Value Chain

The chain of actors through which the transaction of goods takes place between producer and consumer is known as a marketing channel. Marketing channels plays an important role in achieving the marketing objectives of any organization. Considering that potato is an important vegetable in Bangladesh, the product moved from the sellers to consumers through the same chains i.e. through some market actors like *Faria*, *Bepari*, wholesaler, retailer and cold storage owner. The study revealed that there had a movement of potato from the point of production to the point of consumers through some actors forming a chain in the potato market in the study area.

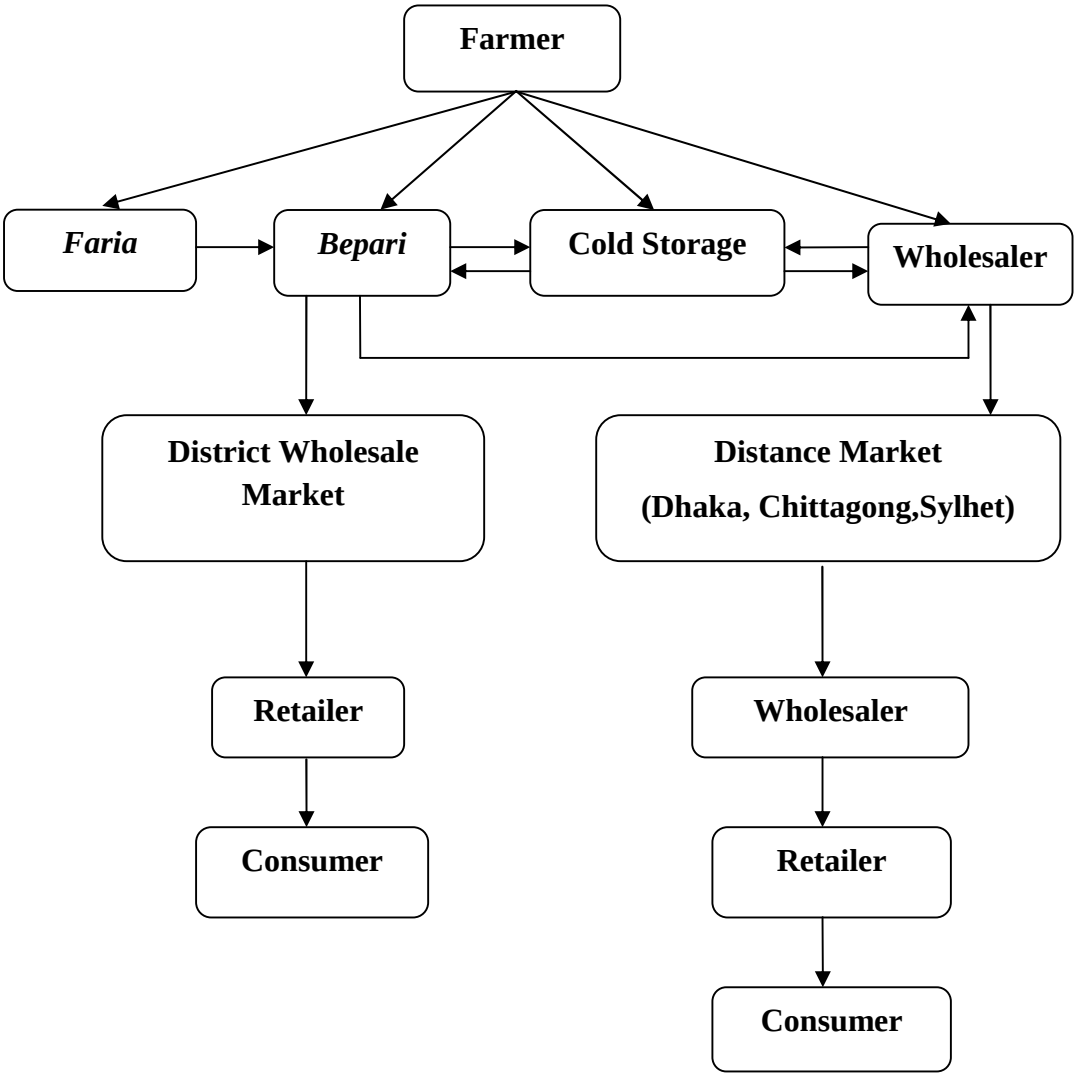

Figure 4.1: Value chain actors of potato in Munshiganj district and distant markets

From **Figure 4.1**, it is found that the potato in Munshiganj district is moved through the following chains:

Chain I: Farmer→ *Faria* → *Bepari* → District Wholesaler → Retailer → Consumer.

Chain II: Farmer → *Bepari* → District Wholesaler → Retailer → Consumer.

Chain III: Farmer → *Faria* → Bepari → Wholesaler → Distance Wholesaler → Retailer → Consumer.

Chain IV: Farmer → *Bepari* → Wholesaler → Distance Wholesaler→ Retailer → Consumer.

Chain V: Farmer → Wholesaler → Distance Wholesaler → Retailer → Consumer.

The analysis reveals that marketing of potato in Munshiganj district is moved from the hands of producers to the hands of consumers through five separate chains. **Chain III** is the longest value chain. In this chain the major marketing actors were the farmer, *Faria, Bepari*, wholesaler, distance wholesaler and retailer who added value in the marketing channels. They took a portion of margins at each stage of value addition activities.

It is clear that along with the farmers, a number of actors participated in the marketing of potato from the production point to the consumer point. The main actors involved in the potato value chain, their roles and inter relationships are discussed below.

The value chain actors perform the basic functions of the value chain. Typical actors of the potato value chain in the studies include farmers, traders such as *Faria, Bepari*, wholesaler and retailer. They are in common become owners of the product at certain stage in the value chain of potato marketing. The service providers are being subcontracted by the value chain actors. One of the important service providers in the study area was the cold storage owners.

4.4.1 Producer-seller

The producer-sellers were the farmers who after harvesting the produce performed the role of a seller in marketing potato. Potato producers were the main actor and played an important role in the potato value chain. They produced potato independently and sold them to the local traders or urban traders.

Figure 4.2: Farmer in Sirajdikhan upazila

In the study area the producers used to sell potato to the market actors such as *Faria*, *Bepari*, cold storage owner, and retailer either at the markets or at the farmyard.

4.4.2 *Faria*

The *Farias* were non-licensed traders. They were small traders and they handed relatively small volume of potato than that done by other traders. They were independently organized. They had no permanent staff and permanent shop in the market and did their petty business in cash. More than half of the *Faria* was engaged in potato trading for more than 5 years.

Figure 4.3: *Faria* in Sirajdikhan upazila

The *Faria* purchased potato from the farmers in the local market and sold it direct to *Bepari* and wholesalers in the same market.

4.4.3 *Bepari*

The *Beparis* were also non-licensed traders. The *Beparis* were relatively medium traders and they handled relatively larger volume of potato than that done by other traders. They were independently organized. They had no fixed business premises. Most of the *Bepari* had no permanent shop and staff. Cage sale or purchase was very common practice for *Bepari*.

Figure 4.4: *Bepari* in Sirajdikhan upazila

There is strong competition among the *Bepari* at entry to this type of business is not rather easy. As a result, *Bepari* could not make high profit in their business. The *Beparis* were professional traders who purchased potato from the farmers, *Farias* at the local market and sold it to district wholesalers and local wholesalers. They themselves financed their business and accepted loan in rare case.

4.4.4 Wholesaler

The wholesalers were licensed traders. The wholesalers were relatively big traders and they handled relatively larger volume of potato than that done by the other traders. They had fixed business premises. Most of the wholesalers were independently organized and self-financed.

Figure 4.5: Wholesaler in Sirajdikhan upazila

They employed both labors and other staff on daily wage basis for performing various functions. They had no permanent staffs. The wholesalers purchased potato from the producer, *Bepari, Faria* and sold it to the distance market (Dhaka, Sylhet, Chittagong, etc) through wholesaler in different markets. The wholesalers sometimes used to borrow money from different bank, NGO, other financial institute and other non-institution (like friends and relatives and other traders) for a short period in rare cases. Among other things, space in the market was the important barrier to enter the wholesale market. In both the markets, there is an association of the wholesalers. Association acted as barriers to new entrants. They also involved in grading, sorting, washing and packaging of potato.

4.4.5 Retailer

The retailers were the last link in the marketing of potato. They were the specialized sellers who were directly connected with the consumers. Retailers were the small types of all traders. Sometimes, they purchased potato from the wholesalers at the district level. They bought the potato in small volume on the basis of open bargaining and sold it directly to the ultimate consumers at their retail shops. The retailers were the professional traders who used to sell their purchased potato to consumers directly. Most of the retailers were independently organized having permanent shops usually in the open market place and labor for performing retailing activities. There were some retailers who had no permanent shop usually use open market place for their sale. Most of the retailers (both Munshiganj) had been doing business for more than 5 years. In spite of being self-financed they borrowed money from friends, relatives and other non-institutional sources at the time of need.

4.4.6 Cold storage owner

The cold storage of perishable commodities for periods longer than eight is practiced for the following reasons (GOEP, 1969):

- To extend the period of marketing;
- To ensure even supplies of raw materials used in processing plants;
- To reduce the wide fluctuation between the prices in the peak harvesting period and in the lean supply period or off-season;
- To enable the farmers to get better return from their produce;
- To allow fruits and vegetables to be placed on distant markets and
- To sustain the good quality of seed for better production.

The purpose of storing potato in cold storage is to maintain tubers edible condition and to provide uniform supply of potato to the market during off season. Cold storage helps in orderly marketing of perishable items by eliminating or reducing storage loss and extending marketing periods narrowing seasonal fluctuation in supply and prices. Cold storage plays a very important role in increasing production of potato by supplying quality seed potato in time (GOEP, 1969).

The cold storage owners possessed cold storage plants for potato storage and rendered storage facilities to the potato traders and farmers on receipts of storage charges. They store potato more then 7 to 8 months in the year. They also bought potato from farmer and *Bepari*, stored the same in their plants and sold to the distributing *Bepari* and wholesaler.

CHAPTER V

VALUE ADDITION OF POTATO

5.1 Introduction

One of the objectives of the present study is to estimate value added by the actors of value chain, particularly the potato growers and various traders. Value addition activities are mainly concerned with the changes of utilities. In economics, value added is the difference between the sale price of a product and the cost of materials to produce it. In national accounts used in macroeconomics, it refers to the contribution of the factors of production, i.e., land, labor, and capital goods, to raising the value of a product and corresponds to the incomes received by the owners of these factors. The national value added is shared between capital and labor (as the factors of production), and this sharing gives rise to issues of distribution. Value added refers to the additional value of a commodity over the cost of commodities used to produce it from the previous stage of production. The value added to any product or service is the result of a particular process.

A broad definition of value addition is to economically add value to a product and characteristics more preferred in the market place. There are two main types of value addition, innovation and coordination. Innovation focuses on improving existing processes, procedures, products or service. The enhancement added to a product or service by a company before the product is offered to customers.

Hence this chapter is concerned with the estimation and analysis of costs, returns and value addition of potato production. Here the value addition of potato cultivation was computed Tk per 100 kg. In potato cultivation cost of inputs like human labor, land preparation cost, seed cost; fertilizer and manure cost, insecticide cost, irrigation cost and some fixed cost like land rent and interest on operating capital were required. Marketing cost is also estimated at different stages of value chain.

5.2 Cost and Margin Analysis of Potato

The cost incurred in providing the commodity and markets received by various traders are discussed below.

5.2.1 Cost of production

Costing is an important part of running a business successfully. This section aims at identifying and quantifying different costs, which are incurred by the farmers in production process. The cost involved in potato cultivation can be subdivided in two ways: variable cost and fixed cost.

5.2.2 Variable cost

The variable costs are the costs of using the variable inputs. These costs vary with the level of production. Higher the production more will be the variable costs, lower the production, lower will be the variable costs.

5.2.3 Fixed cost

Fixed assets include the items, which are permanent in nature and last longer than the duration of the crop. Fixed assets are those, which do not change and are incurred even when production is not undertaken. Fixed cost of potato cultivation includes rent of land and interest on operating capital.

5.2.4 Gross cost

In order to estimate gross cost per kg and per 100 kg all the resource uses in potato cultivation have been recaptured together.

5.2.5 Gross return

Gross return was calculated by multiplying the total amounts of products by average sales price.

5.2.6 Gross margin

Gross margin is the gross return over variable cost. Gross margin is obtained by deducting total variable cost from gross return.

5.2.7 Net return

Net return is very useful tool to analyze or compute performance of enterprises. It is calculated by subtracting gross cost from gross return.

5.2.8 Value addition

When any product creates utility then it adds value. The difference in the price at the farm level (price received by the farmer) and that at the retail level (price paid by the consumer) may be used to measure the value added (Acharya and Agarwal, 2004, p.388)

5.2.9 Marketing cost

The cost of marketing represents the cost of performing the various marketing functions. It also said about operations by various agencies involved in the marketing process. In other words the cost, which incurred to move the product from producers to consumers are generally known as marketing cost. Marketing cost of potato at the actors, at intermediaries' level includes the expenses incurred by different actors for movement of the product through the value chain. Major items of marketing cost of actors of all the types were transportation, storage, wastage, grading, market toll, loading and unloading, commission, license, personal expenses, unofficial payment and others cost (i.e., electricity charge, stationary item like papers, pad, weighing charge, entertainment and tips etc.).

5.2.10 Storage cost

Storage is an important function of marketing. It creates time utility. The storage function is primarily concerned with making goods available at the desired time. Proper storage facilities are essential in order to minimize quantitative and qualitative losses of agricultural commodities. All the cold storage owners of the study areas stored potato in their own cold storage from April to November (8 months) under controlled temperature of 0-2 degree Celsius.

5.2.11 Market price

Pricing is an important function in buying and selling of any commodity. Fixing potato price through open bargaining was commonly practiced in the study areas. The price was fixed by eye estimation of the product. Price of potato depends on its color,

size and variety. Both demand and supply affected the price, which indicated that potato market was more or less competitive. It was found that the best quality potato sold at higher prices.

5.3 Cost and Return Analysis of Potato Farmer

Table 5.1 Average production cost and return of potato for 40 Kg

	Cost Items	Cost(TK. /100 Kg)
Variable cost	Human and labor cost	91.86
	Land Preparation	37.10
	Seed	42.18
	Fertilizer	24.08
	Insecticides	19.35
	Irrigation	25.93
	Total	**240.50**
Fixed costs	Rental value of Land	409.20
	Interest on operating capital	3.75
	Total	**412.95**
Total production cost(TK./100Kg)		**653.45**
Marketing cost	Grading, washing, sorting	57.75
	Transportation cost	34.33
	Loading and unloading	16.93
	Market toll	15.00
	Personal expense	20.00
	Unofficial payment	17.38
	Total	**161.38**
Total cost		**814.83**
Cold storage charge		357.15

Summation of the costs of variable inputs made total variable costs, which was Tk. 240.50 per 40kg of potato. Summation of the costs of fixed inputs made total fixed costs, which was Tk. 412.95 per 40kg. Interest on operating capital was Tk.3.75 per

100 Kg of potato. Total production cost of potato was Tk. 653.45 per 100 kg. The marketing cost of farmers included the cost of grading, washing and sorting, transportation, loading and unloading, market toll, personal expense, and unofficial payment. It was estimated per 100kg of potato Tk. 161.38. If the marketing cost is included than total cost becomes Tk. 814.83. It was showed that cold storage charge per 100kg of potato was Tk. 357.15; farmers store their potato as seed (**Table 5.1**).

Gross return was calculated by multiplying the total amounts of products by average sales price. It was seen that gross return per 100kg of potato was Tk.1225.95 and Tk. 12.26 per kg respectively. Variable cost per 100kg of potato was Tk. 240.50 and Tk. 2.41 per kg respectively. Total cost per 100 kg of potato cultivation (with marketing) was Tk. 814.83 and Tk8.15per kg respectively. Gross margin was obtained by deducting total variable cost from gross return. Gross margin per 100 kg of potato was Tk. 985.45 and Tk.9.96 per kg respectively. Net return was estimated by subtracting total cost from gross return. Net return per 100 kg of potato was Tk. 428.25Tk.4.28 per kg respectively (**Table 5.2**).

Table 5.2 Profitability of potato farmer

Particulars		Tk. Per 100 Kg	Tk. Per Kg
i.	Gross return	1225.95	12.26
ii.	Variable cost	240.50	2.41
iii.	Total cost	814.75	8.15
v.	Gross margin (i-ii)	985.45	9.85
vi.	Net return (i-iii)	411.13	4.11

Farm gate price is that price which farmer gets through selling their produce at the farm yard. The average farm gate price of potato was Tk. 988.43 per 100 kg. Average market price per 100 kg of potato was Tk.1225.95. The estimated average marketing cost per 100 kg of potato incurred by the farmers was Tk. 161.38. Value addition per 100 kg of potato was Tk. 237.53 and Tk.2.38 per kg respectively. Among the value addition farmers covered the 24.03 per cent of total value addition (**Table 5.3**).

Table 5.3 Value addition of potato by farmer

Average farm gate price Tk. per 100 Kg	Market price Tk. per 100 Kg	Average marketing cost Tk. per 100 kg	Value addition Tk. per 100 Kg	Value addition Tk. Per Kg	Value addition (%)
988.43	1225.95	161.38	237.53	2.38	24.03

5.4 Cost and Margin Analysis of *Faria*

The amount of average transaction per day of potato by *Faria* was 980 kg. Average total return of potato was Tk.13269.20 per day. The average purchase price per 40kg of potato was Tk 491.60 and sales price was Tk. 541.60 and per Kg of potato was Tk. 12.29 and Tk. 13.54 respectively. Value addition per 40kg of potato was Tk.50.80 (marketing margin) and value addition per kg of potato was Tk. 1.27 (**Table 5.4**).

Table 5.4 Daily transactions and value addition incurred by Faria

Particulars	Amount (Kg)	Tk. Per Kg	Tk. Per 100 Kg	Total return (Tk.)
Average Transaction (Per Day)	980	_	_	_
Average Purchase Price	_	12.29	1229.00	_
Average Sales Price	_	13.54	1354.00	33173.00
Value Addition	_	1.27	127.00	_

Faria mainly sold potato to the *Bepari* or wholesaler. After collecting potato from the growers from the market they sold it directly to the end *Bepari* or wholesaler. The estimated average marketing cost per kg of potato incurred by the *Faria* was Tk. .55. Among the cost items market toll covered the highest cost representing 68.18 percent of total cost. The second highest cost item was personal expanses which was 18.18 per cent of total cost. Among other cost items, telephone bill and others was 9.09 per cent and 4.55 per cent respectively (**Table 5.5**).

Table 5.5 Marketing cost incurred by Faria

Cost items	Average cost (Tk./kg)	Per cent of total cost
Personal expenses	0.04	18.18
Telephone charge	0.02	9.09
Market toll	0.15	68.18
Others	0.01	4.55
Total	0.22	100

The average purchase price per 40kg of potato was Tk1229.00 and sales price was Tk. 1354.00 and it was Tk. 12.29 and Tk. 13.54 per kg, respectively. The amount of value addition per 100kg of potato was Tk.127.00 (marketing margin) and value addition per kg of potato was Tk. 1.27. Among the value addition *Faria* covered the 10.17 per cent of total value addition. The average marketing cost per 100 kg of potato was Tk. 22.00. Here *Faria* was not involved in storage activities (**Table 5.6**).

Table 5.6 Value addition and marketing margin of potato incurred by Faria

Particulars	Tk. Per 100 Kg	Tk. Per Kg	Value addition (%)
Purchase Price	1229.00	12.29	
Sales Price	1354.00	13.54	
Value Addition (ii-i)	127.00	1.27	10.17
Marketing Cost	22.00	0.22	
Net Marketing Margin (iii-iv)	105.00	1.05	

5.5 Cost and Margin Analysis of *Bepari*

The amount of average transaction per day of potato by *Bepari* was 2500 kg. Average total return of potato was Tk. 98750.00 per day. The average purchase price per 100kg of potato was Tk. 1367.00 and per Kg was Tk. 13.67 and sales price per 100kg of potato was Tk.1580.00 and per Kg was Tk. 15.80. The amount of value addition per 100kg of potato was Tk.213.00 (marketing margin) and value addition per kg of potato was Tk. 2.13 (**Table 5.7**).

Table 5.7 Daily transactions and value addition incurred by Bepari

Particulars	Amount (Kg)	Tk. Per Kg	Tk. per 100 Kg	Total Return (Tk.)
Average Transaction (Per Day)	2500	_	_	_
Average Purchase Price	_	13.67	1367.00	_
Average Sales Price	_	15.80	1580.00	98750.00
Value Addition	_	2.13	213.00	_

Bepari mainly sold potato to the local market wholesalers and district wholesale market. After collecting potato from the growers and *Faria* they sold it directly to the end wholesaler. The estimated average marketing cost per kg of potato incurred by the *Bepari* was Tk.1.67. Among the cost items transportation covered the highest cost representing 44.31 percent of total cost. The second highest cost item was storing of potato which was 34.13 per cent of total cost. Among other cost items, market toll, rent of store, telephone charge, unofficial payment, and personal expenses were 8.98 per cent, 0.00per cent, 1.18 per cent, 0.02 per cent, and 1.80 per cent respectively (**Table 5.8**).

Table 5.8 Marketing cost incurred by Bepari

Cost items	Average cost (Tk./kg)	Per cent of total cost
Market toll	0.15	8.98
loading and unloading	0.16	9.58
Transportation	0.74	44.31
Rent of store	0.00	0.00
Storage cost	0.57	34.13
Telephone charge	0.02	1.18
Unofficial payment	0.00	0.02
Personal expenses	0.03	1.80
Total	1.67	100

The average purchase price per 100kg of potato was Tk. 1367.00 and sales price was Tk.1580. The amount of value addition per 40kg of potato was Tk. 213.00 (marketing margin) and value addition per kg of potato was Tk. 2.13. Among the value addition *Bepari* covered the 15.58 per cent of total value addition. The average market cost per 100 kg of potato was Tk. 167.00. Here *Bepari* was involved in storage activities. The storage cost per 100kg of potato was Tk. 57.00 per month (**Table 5.9**).

Table 5.9 Value addition and marketing margin of potato incurred by Bepari

Particulars	Tk. Per 100 Kg	Tk. Per Kg	Value addition (%)
i. Purchase Price	1367.00	13.67	
ii. Sales Price	1580.00	15.80	
iii. Value Addition (ii-i)	213.00	2.13	15.58
iv. Marketing Cost	167.00	1.67	
v. Net Marketing Margin (iii-iv)	46.00	0.46	
vi. Storing Cost (Per Month)	57.00	0.57	

5.6 Cost and Margin Analysis of Wholesaler

The amount of average transaction per day of potato by wholesaler was 7000 kg. Average total return of potato was Tk. 322525.00 per day. The average purchase price per 100kg of potato was Tk. 1587.00 and per Kg was Tk. 15.87 and sales price per 100kg of potato was Tk. 1843.00 and per Kg was Tk. 18.43. The amount of value addition per 100kg of potato was Tk. 104.80 (marketing margin) and value addition per kg of potato was Tk. 2.62 (**Table 5.10**).

Table 5.10 Daily transactions and value addition incurred by Wholesaler

Particulars	Amount (Kg)	Tk. per Kg	Tk. per 100 Kg	Total return (Tk.)
Average transaction(Per Day)	7000	_	_	_
Average purchase price	_	15.87	1587.00	_
Average sales price	_	18.49	1843.00	322525.00
Value addition	_	2.62	262.00	_

Wholesaler mainly sold potato to the distance wholesaler. After collecting potato from the farmer, *Faria* and *Bepari* sold it directly to the distances wholesale markets (Dhaka, Chittagong, Sylhet). The estimated average marketing cost per kg of potato incurred by the wholesaler was Tk.2.47. Among the cost items transportation cost covered the highest cost representing 25.49 percent of total cost. The second highest cost item was storage cost which was24.68 percent of total cost. Among other cost items license, loading and unloading, market toll, grading, telephone charge, personal expenses, unofficial payment and others were 0.08, 8.90, 5.26, 20.63, 4.45, 6.06, 1.21 and 3.24 percent respectively (**Table 5.11**).

Table 5.11 Marketing cost incurred by Wholesaler

Cost items	Average cost (Tk./kg)	Per cent of total cost
License	0.002	0.08
loading and unloading	0.22	8.90
Transportation	0.63	25.49
Storage cost	0.61	24.68
Market toll	0.13	5.26
Grading	0.51	20.63
Telephone charge	0.11	4.45
Personal expenses	0.15	6.06
Unofficial payment	0.03	1.21
Others	0.08	3.24
Total	2.472	100

The average purchase price per 100kg of potato was Tk.1587.00 and sales price was Tk1849.00. The amount of value addition per 100kg of potato was Tk.262.00 (marketing margin) and value addition per kg of potato was Tk.2.62. Among the value addition wholesaler covered the 16.51 per cent of total value addition. The average market cost per 100 kg of potato was Tk.247.00. Here wholesaler was involved in storage activities. The storage cost per 100kg of potato was Tk. 61.70 per month (**Table 5.12**).

Table 5.12 Value addition and marketing margin of potato incurred by wholesaler

Particulars	Tk. Per 100 Kg	Tk. Per Kg	Value addition (%)
i. Purchase Price	1587.00	15.87	
ii. Sales Price	1849.00	18.49	
iii. Value Addition (ii-i)	262.00	2. 62	16.51
iv. Marketing Cost	247.20	2.47	
v. Net Marketing Margin (iii-iv)	14.80	0.15	
vi. Storing Cost (Per Month)	61.70	0.61	

5.7 Cost and Margin Analysis of Retailer

The amount of average transaction per day of potato by retailers was 75.30 kg. Average total return of potato was Tk.3891.13per day. The average purchase price per 100kg of potato was Tk.1854.00 and per kg of potato was Tk.18.54 and sales price per 100kg of potato was Tk.2067.00 and per kg of potato was Tk.20.67. The amount of value addition per 100kg of potato was Tk.213.00 (marketing margin) and value addition per kg of potato was Tk. 2.13 (**Table 5.13**).

Table 5.13 Daily transactions and value addition incurred by Retailer

Particulars	Amount (Kg)	Tk. per Kg	Tk. per 100 Kg	Total return (Tk.)
Average transaction (Per Day)	75.30	_	_	_
Average purchase price	_	18.54	1854.00	_
Average sales price	_	20.67	2067.00	3891.13
Value addition	_	2.13	213.00	_

Retailers mainly sold potato to the ultimate consumers. After collecting potato from the district wholesale market and they sold it directly to the end users. The estimated average marketing cost per kg of potato incurred by the retailers was Tk. 1.06. Among the cost items license cost covered the highest cost representing 22.64 percent of total cost. The second highest cost item was electricity which accounted for 19.81 percent

of total cost. Among other cost items loading and unloading, telephone charge, market toll, personal expenses and unofficial payment were 11.32, 10.38, 11.32, 16.04 and 1.89 percent respectively (**Table 5.14**).

Table 5.14 Marketing cost incurred by Retailer

Cost items	Average Cost (Tk. /kg)	Per cent of total cost
License	0.24	22.64
Loading and unloading	0.12	11.32
Electricity charge	0.21	19.81
Telephone charge	0.11	10.38
Market toll	0.12	11.32
Personal expenses	0.17	16.04
Unofficial payment	0.02	1.89
Others	0.07	6.60
Total	1.06	100

The average purchase price per 100kg of potato was Tk.1854.00 and sales price was Tk.2067.00. The amount of value addition per 100kg of potato was Tk.213.00 (marketing margin) and value addition per kg of potato was Tk.2.13. Among the value addition retailer covered the 11.49 percent of total value addition. The average market cost per 1000kg of potato was Tk.106.00. Here retailers were not involved in storage activities (**Table 5.15**).

Table 5.15 Value addition and marketing margin of potato incurred by Retailer

Particulars	Tk. Per 100 Kg	Tk. Per Kg	Value addition (%)
i. Purchase price	1854.00	18.54	
ii. Sales price	2067.00	20.67	
iii. Value addition (ii-i)	213.00	2.13	11.49
iv. Marketing cost	106.00	1.06	
v. Net marketing margin (iii-iv)	107.00	1.07	

5.8 Cost and Margin Analysis of cold storage owner

The total cost of cold storage owner was Tk.447655 per month and large cost item is tpower and electricity charge Tk.316666.67 per month and lowest cost item is cold storage rent. Among other cost items salary and wage, repair and maintenance, license fee and others cost were Tk. 120000, Tk. 7222.22, Tk. 694.44 and Tk. 2916.67 respectively. The cold storage charge was Tk.175 per month (**Table 5.16**).

Table 5.16 Cost and margin of cold storage owner

Cost item (Per month)	Tk.
i. Salary and wage	120000.00
ii. Power and electricity	316666.67
iii. Repair and maintenance	7222.22
iv. License fee	694.44
v. Cold storage rent	155.00
vi. Others	2916.67
vii. Cold storage charge (100 Kg)	437.50

The average capacity (100Kg) of cold store was 8266680.00, starting month of the storage is 1st March and release month is November. Price of the potato during the production period was Tk. 812.50(100kg), price during the harvesting period was Tk.875.00 (100kg) and price during the storage was Tk. 950 (100Kg) (**Table 5.17**).

Table 5.17 Information on cold storage

Average capacity (Kg)	Month of storage	Month of release	Price before harvesting (Tk. / 100 Kg)	Price during harvesting (Tk. / 100 Kg)	Price during storage (Tk. / 100 Kg)
8266680	1st March	November	950	1025	1200

The average storage amount of table potato of farmer was 1453320 Kg and seed potato was 3194520 Kg, average storage amount of table potato of *Bepari* and wholesaler was 2680000 Kg and 938840 Kg respectively. Both the actors start their storage in the month of March and release in the month of November. The average cold storage charge was Tk. 437.50 (100Kg) for both value chain actors (**Table 5.18**).

Table 5.18 Information on storage of different value chain actors

Actors	Table potato (Kg)	Seed potato (Kg)	Duration of the storage		Cost of storage (Tk. / 100Kg)
			Table potato	Seed potato	
Farmer	1453320	3194520	March to November	March to November	437.50
Bepari	2680000	_	March to September	_	437.50
Wholesaler	938840	_	March to June	_	437.50

Table: 5.19 Value addition, marketing cost and net marketing margin of different market actors of potato

Actors	Value addition (Tk. per Kg)	Marketing cost (Tk. per Kg)	Net marketing margin (Tk. per Kg)
Faria	1.27	0.22	1.05
Bepari	2.13	1.67	0.46
Wholesaler	2.62	2.47	0.15
Retailer	2.13	1.06	1.07

Following two diagrams **(Figure 5.1** and **Figure 5.2)** were made according to the above table (**Table 5.19**).

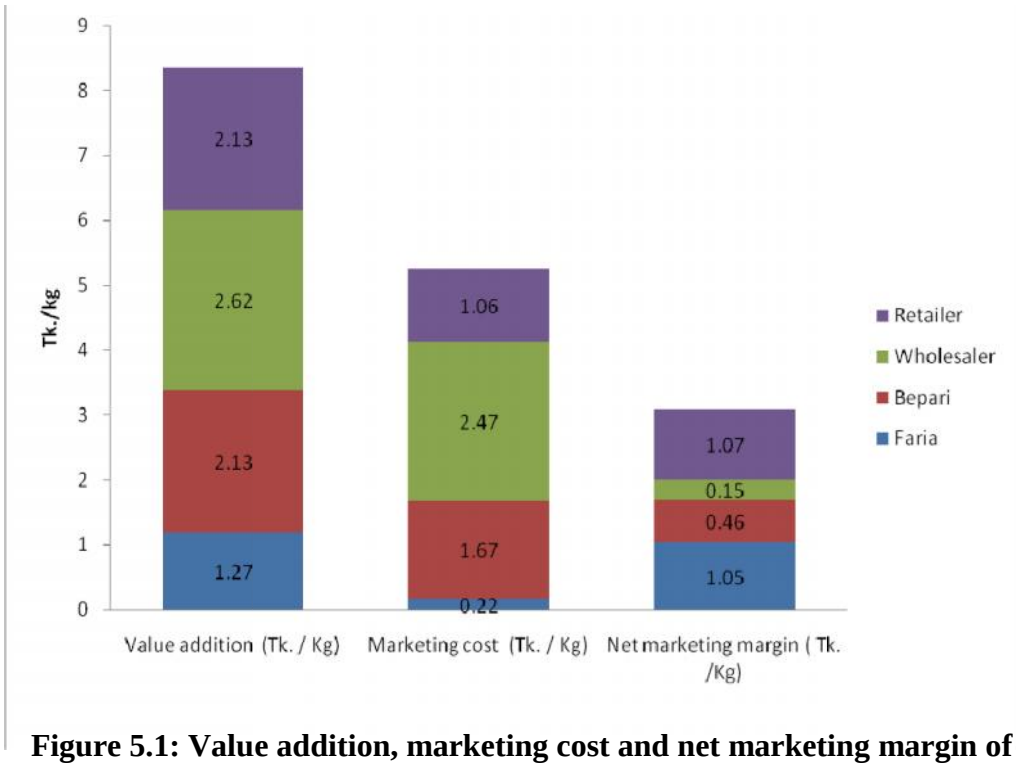

Figure 5.1: Value addition, marketing cost and net marketing margin of different market actors in potato marketing

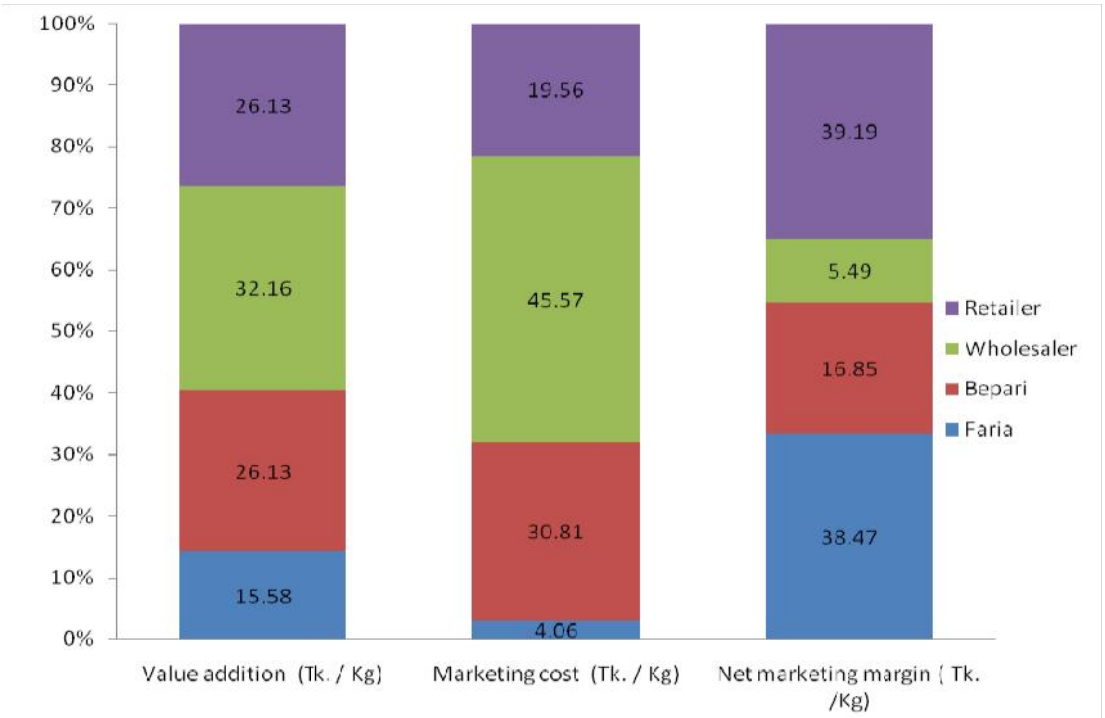

Figure 5.2: Share of different actors in value addition, marketing cost and net marketing margin of potato

Among the different actors, *faria* incurred lowest (in percentage) marketing cost but earning second highest net marketing margin (near to highest net marketing margin); on the other hand wholesaler incurred highest marketing cost but earning lowest net marketing margin (**Figure 5.2**).

CHAPTER VI

SEASONAL PRICE FLUCTUATION OF POTATO

6.1 Introduction

Price is the key component in guiding production, consumption, government policies and it governs production decision of producers and buying decision of consumers to a large extent. Agricultural commodity price are much volatile than those of most non-farm goods and services. The biological nature of agriculture production is the principal cause of price instability (Tomek and Robinson, 1990). So, stability of price is an important factor in taking economic decisions in agriculture.

The seasonal price fluctuation in prices arises from seasonal production, poor storage facilities and lack of retention power of the producers. Due to insufficient storage facilities potato arrived in the market, which created glut in the market resulting in lowering down in price. Seasonal price fluctuation is an important element of the time series data. So, seasonal price fluctuation is examined in this study.

6.2 Seasonal Price Fluctuation

Prices of agricultural commodities varied over time are the result of complex mixture of changes associated with seasonal, cyclical and irregular factors. The most common in agricultural prices is a seasonal pattern of change. Seasonal price behavior is regularly repeating price pattern that is completed once in every twelve months. Such a regular pattern might arise from seasonality in demand, seasonality in supply and marketing pattern or a combination of both. Most agricultural products are characterized by some seasonality in production arising from climatic factors and the biological growth of the plant (Tomek and Robinson, 1990, pp.157-159).

Average monthly wholesale prices of selected potato in Munshiganj market was collected from the report of weekly wholesale price published by the Department of Agricultural marketing (DAM) during the period from 2001 to 2011.

6.3 Importance of Measuring of Seasonal Price Fluctuation

The measurement of seasonal price variation is required to measure the short-time fluctuations in the time series data. Because, seasonal variations are short time fluctuations that occur within a year, which are presented in the data recorded on daily, weekly, monthly or quarterly basis. It is usually seen in business and economic data. Their measurements are necessary to isolate them to determine the effect of seasons on the size of variable. It helps a business or sales manager or farmer for planning future production and in scheduling purchase, inventory control, selling and advertising programs. The determination of the seasonal fluctuation is also necessary for increasing business efficiency and for a smooth production program.

Potato is grown once a year and consumed throughout the year. It is perishable goods but available in the market throughout the year because of cold storage facilities. Many factors influence the seasonal price of potato. And these prices vary seasonally. Availability, storage cost, weight loss, transportation costs, prices of substitute goods are the main factors of seasonal price variation of potato. It is important for the farmers as well as traders to know the amount of prices of potato that can prevail in the different months of a year so that they can take proper decision of selling (or buying) their potatoes.

6.4 Method Used in Present Study

The important methods of measuring seasonal movements are:

- Method of simple average;
- Ratio to trend method;
- Ratio to moving average method; and
- Link relative method.

In the present study ratio to moving average method was applied to examine the price fluctuation of potato considering the following factors.

b. It is an improvement over the ratio to trend method.
c. It is the most satisfactory and popular method and is widely used for estimating the seasonal variations because it eliminates both trend and cyclical components from the indices of seasonal variations.

6.5 Price Variation of Potato

Monthly wholesale price of potato in Munshiganj and Dhaka market during the period from 2001 to 2011 was used for examining seasonal price variation. It is evident from Table 6.1 that seasonal price index of potato was the highest 134. 74 in Munshiganj district and 136.33 in Dhaka district in the month of December i.e. price becomes about 35percent higher than the average price in this month and lowest 65.33 of Munshiganj district and 67.45 of Dhaka district in the month of February i.e. price becomes 35 percent lower than the average price in this month. Prices began to increase by April and reached the peak in December. During the harvest period, potato price remained low and then it gradually rose up to the start of next harvesting period. The coefficient of variations (21.84, 20.08) between Munshiganj and Dhaka market are near about same that means in that period, price of potato in Munshiganj and Dhaka district were relatively correlated. A figure 6.2 shows that ranges of seasonal price variation by months are greater in Munshiganj than that of Dhaka market most of the cases but in case of December, range of seasonal price variation is greater in Dhaka market than Munshiganj market.

Table 6.1 Seasonal price variation of potato

Month	Seasonal price index in Munshiganj District	Seasonal price index in Dhaka District
January	88.50	90.93
February	65.33	67.45
March	70.46	71.27
April	75.98	84.27
May	90.72	88.08
June	102.17	103.08
July	109.48	111.49
August	115.20	108.16
September	110.25	109.05
October	113.72	110.52
November	123.45	118.98
December	134.74	136.33
Maximum value	134. 74	136.33
Minimum value	65.33	67.45
Range	69.42	68.89
Coefficient of Variation (%)	21.84	20.08

Source: Own calculation by using data from DAM. For detail calculation, see appendix (**Table II** and **III**).

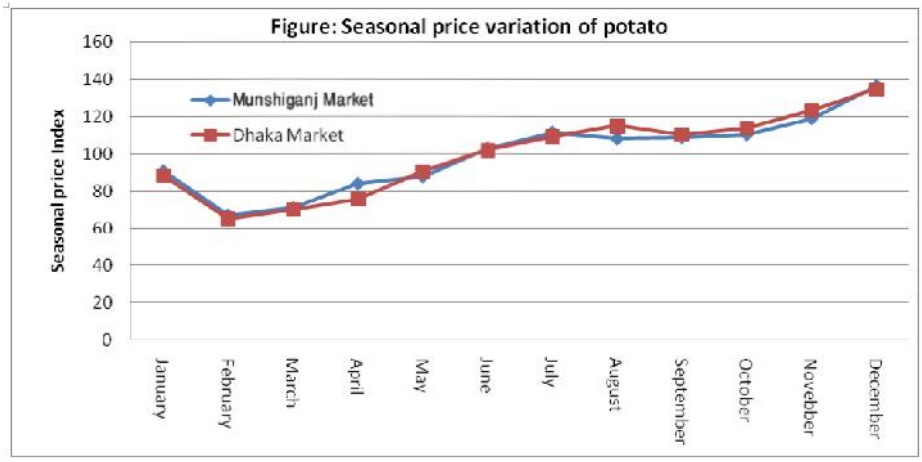

Figure 6.1: Seasonal price variation of potato

Table 6.2: Range of seasonal price variation of potato in Munshiganj ***and Dhaka market***

Month	Range of price variation at Munshiganj (%)		Range of price variation at Dhaka (%)	
	High	Low	High	Low
January	140.94	46.70	115.25	59.65
February	113.98	49.56	92.78	53.38
March	105.64	54.78	96.53	52.73
April	95.14	52.13	110.42	60.95
May	110.63	62.05	108.16	65.68
June	118.00	64.80	126.87	78.71
July	126.65	85.93	127.96	94.77
August	138.17	94.83	123.10	87.09
September	129.97	78.45	133.69	89.98
October	144.21	76.53	152.09	67.41
November	163.78	79.83	147.36	78.85
December	187.84	101.30	244.19	71.87

Following diagram (**Figure 6.2**) was made according to the above table (**Table 6.2**).

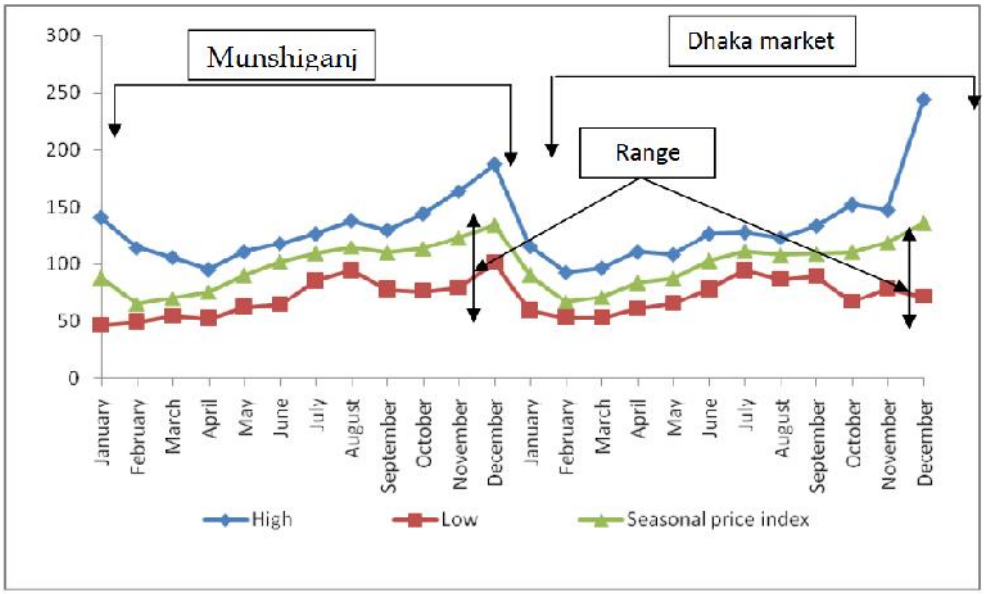

Figure 6.2: Range of seasonal price variation of potato between Munshiganj and Dhaka market

In general it was found that the price of potato fluctuated in different seasons. The causes of this fluctuation might be:

i. Supply of potato comes to an end in November-December especially in November but the demand remains unchanged and also rises.

ii. Also in the part of the season, the farmers store seed potato. So the price of table potato begins to rise.

iii. The cause of falling prices of potato in February is that the supply of potato was higher (because of harvesting season) than its demand. In this time other winter vegetables become easily available and the price of potato begins to fall gradually.

iv. Cost of storage also increases the price of potato.

CHAPTER VII

PROBLEMS OF POTATO VALUE CHAIN

There were many problems which were faced by farmers and actors in the value chain of potato. The problems that are faced by the selected farmers and actors in the production and marketing of potato and the solutions to these problems as suggested by them are discussed below:

7.1 Problems Faced by Producers

The potato producers in the study areas were facing various problems which are broadly classified into production problems and marketing problems. Some of the production problems were inadequate capital, diseases and pest attacks, shortage of good quality seed, lack of availability of adequate inputs and high cost of inputs. Marketing problems were related to transportation cost, lower price of potato, shortage of marketing facilities, high cold storage charge and dominance of value chain actors etc.

7.2 Production Problems

There were some major production problems faced by farmer. Those were as follows:

7.2.1 Inadequate capital

In the study areas potato producers reported that production of potato needs proper application of fertilizers, water and other inputs, in addition to special care with respect to timely agronomic practices. The production cost of potato was high since input requirements were high. It was difficult to manage required capital on the part of the producers. The **Table 7.1** shows that about 80 percent producers (out of 30 farmers) were faced inadequate of capital as a production problem.

7.2.2 Diseases and pest attack

In the study areas disease and pest attack was a major problem which producers faced in potato cultivation. They also reported that they were not well trained about pest and diseases control measure on their potato cultivation. From **Table 7.1** it was observed that about 75 percent producers (out of 30 farmers) were adversely affected in their potato cultivation.

7.2.3 Shortage of good quality seed

In the study areas majority of the producers reported that shortage of good quality seed was one of the major problems. They could not get the required quality of good seed, as its supply was insufficient to meet the demand of the buyers. For this reason, the producers used own preserved seeds and sometimes local variety of seeds. As a result, they received low yield of potato. **Table 7.1** shows that about 92 percent producers (out of 30 farmers) complained that good quality seed was not available in the market during potato planting time.

7.2.4 Lack of availability of adequate inputs

In the study areas producers also reported that lack of availability of adequate input was a major problem for potato cultivation. **Table 7.1** indicates that about 97 percent producers (out of 30 farmers) faced this problem.

7.2.5 Higher cost of inputs

In the study area, high cost of inputs was one of the most important problems faced by the producers in their potato cultivation. **Table 7.1** indicates that about 96 percent producers faced this problem.

7.1 Problem faced by farmers in production and marketing of potato.

Problem faced by producers	Percent
Production problem	
Inadequate capital	80
Diseases and Pest attack	75
Storage of good quality seed	92
Lack of availability of adequate inputs	97
Higher cost of input	96
Marketing problems	
High transportation cost	75
Low price of potato	99
Shortage of marketing facilities	71
High cold storage charge	57
Dominance of value chain actors	54

7.3 Marketing Problems

There are various marketing problem faced by value chain actors. Some major problems are discussed below.

7.3.1 High transportation cost

Transportation cost was very high in the study area. The primary and secondary markets were not directly connected with the villages. Due to high transportation cost and poor communication facilities, the farmers were bound to sell potato in local markets at low prices. About 75 percent of producers stated that high transportation cost and inadequate communication facility were problem in transporting their produce to the markets (**Table 7.1**).

7.3.2 Low market price of potato

All the sample farmers reported that low price was a major problem in potato marketing. Due to lack of remunerative price of potato, the farmers of the selected areas did not get fair returns from potato cultivation. **Table 7.1** shows about 99 percent producers (out of 30 farmers) faced this problem.

7.3.3 Lack of market facilities

In the study areas, there was no shed to protect the producers and their potato from rain or sunshine and the producers had to sell their produce standing in the open place. So, lack of market facilities was mentioned as a problem by 71 percent producers (**Table 7.1**). Lack of pucca floor, drainage facility, supply of water and electricity in the market place also affected the farmers in selling potato at the markets.

7.3.4. High cold storage charge

In the study areas majority of the producers reported that high cold storage charge was a major problem in case of potato storage. **Table 7.1** also shows that about 57 percent producers (out of 30 farmers) reported high cold storage charge as a problem which adversely affected potato cultivation.

7.3.5 Dominance of value chain actors

Value chain actors in the study area were small in number but they were well organized. Whereas the farmers were scattered but in large number. The value chain actors always dominated the marketing system and they were in better position in setting the prices of potato. As a result most of the producers were compelled to sell their potato at a lower price because there was no way to bring back the product from market as it involved extra cost of transportation and risks of potato damage. More than 54 per cent producers (out of 30 farers) reported this as a problem.

7.4 Measures Suggested Solving for the Problems

- The measures suggested by the producers for solving the above mentioned problems are as follows:

- Institutional credit facilities should be made available to the potato farmers for increasing the volume of production. The Government should provide this facility through Bangladesh Krishi Bank (BKB) and other commercial banks.

- Adequate amount of inputs including HYV seeds should be supplied by the government at subsidized prices in the potato producing areas.

- Transportation facilities should be improved in the study areas. On the basis of priority village roads should be developed at least brick bedded roads should be made so that the rickshaws or other motor vehicles can move easily. It would also help in reducing the transportation cost. Local Government administration may develop such facilities.

- Low cost storage facilities should be developed at the primary and secondary markets by the local Government authority to provide storage facilities to the farmers.

- Farmers' organization may be established which might improve the bargaining power of the farmers and enable them to face the value chain actors and ensure better return for potatoes.

7.5 Problems Faced by Value Chain Actors

In the study area the value chain actors were asked to mention the problems they faced in potato business. Table 7.2 the problems reported by actors are presented below.

Table 7.2 Problems faced by actors in value chain

Problems	Actors
Inadequate good transport	82%
Inadequate capital	72%
Inadequate storage facilities	68%
Inadequate market facilities	70%
Inadequate marketing information	75%
High cold storage charge	56%

7.5.1 Inadequate good transport

Table 7.2 shows that about 82 percent value chain actors reported poor communication and transportation facilities as a marketing problem of potato. A large amount of marketing cost was incurred by traders while carrying their potato to the desired places due to poor communication and transportation facilities.

7.5.2 Inadequate capital

Table 7.2 indicates that about 72 percent value chain actors reported inadequate of capital as a major marketing problem. They had to borrow money from the non-institutional sources at high interest rate in some special moment.

7.5.3 Inadequate storage facilities

Table 7.2 shows that about 68 percent value chain actors reported absence of storage facilities as problem they faced in potato business. Value chain actors complained that maximum amount of purchased potato was spoiled due to lack of proper storage facilities.

7.5.4 Inadequate marketing facilities

Table 7.2 further shows that inadequate marketing facilities were considered as a problem reported by 70 percent value chain actors. They mentioned that there was no specific market place for potato marketing, not to speak of shed and other market facilities.

7.5.5 Inadequate market information

Market information played an important role in potato trading. There was inadequate market information in potato business in the study area. About 75 percent of intermediaries reported lack of market information as one of the major problems they faced in potato business (**Table 7.2**).

7.5.6. High cold storage charge

The value chain actors mentioned that the rate of cold storage charge was high though some of them had to preserve potato in cold storage having no low-cost storage facilities as alternative. High rate of commission and taxes also badly affected the value chain actors in marketing potato in the study area. About 56 percent value chain actors faced problem due to high cold storage charge (**Table 7.2**).

7.6 Measures Suggested for Improving Marketing of Potato

The problems stated in **Table 7.2** always hampered the sound marketing of potato. The value chain actors, who identified their problems, also provided some suggestions for improving the existing potato marketing system.

The value chain actors needed much more cash money for conducting their businesses. They suggested that provision should be made by the Government for adequate and easy loan from institutional sources against the security of their produce.

The value chain actors suggested especially for the improvement of transportation as well as communication system in the study area. Availability of adequate number of transports would also increase marketing efficiency by lowering cost.

They suggested that storage facilities should be increased with lower charge of preservation by the Government.

The price of potato in different terminal markets should be disseminated through radio, television and newspapers which could reduce the uncertainty of price. To ease the communication system to different terminal markets necessary effort should be taken to reduce marketing cost.

High rate of transportation cost was a serious problem for potato business. So, the value chain actors suggested that reasonably low rate of commission and tax should be charged for marketing their potato.

Other remedial measures which would greatly facilitate the marketing operation in the study areas including building pucca floor in the market place, electric connection to the market places, and dissemination of market information were also suggested by the value chain actors.

CHAPTER VIII

SUMMARY, CONCLUSION AND RECOMMENDATION

8.1 Summary

Potato is an important cash and multipurpose food crop of Bangladesh. In Bangladesh both the poor and the rich people use potato as food as well as vegetable. Therefore, its potentiality for solution of chronic food problem of the country cannot be under estimated. Potato as a cash crop is grown for both sale and consumption. This crop has the desirable characteristics of high yield, nutritious and a palatable food item. A large number of people are involved in the production and marketing of potato. A number of actors like *Faria, Bepari*, wholesaler retailer and cold storage owner are involved in the value chain of potato marketing system. They played an important role in moving potato to the consumers but at cost sharper the present study investigate different value chain in which the actors acted as intermediate with their cost and margins. The study caused lights on the following specific objectives.

- To identify the actors involved in value chain and their function in potato marketing;
- To estimate the value addition of potato by the actors in potato market;
- To estimate the seasonal price fluctuation of potato in the study area ;
- To identify the constraints of potato marketing and suggest measure for the improvement of potato marketing in the selected area.

The study was confined to a particular area where potato production was concentrated. The study was confined to two villages in the Sirajdikhan Upazilla of Munshiganj district. The villages were purposively selected for collecting data from the potato farmers. For convenience, the sample size of farmers was fixed at 30 from four villages. Out of the total 30 farmers, 10 were

collected from Bujarhati village and 10 were collected from Bashaile, 5 were ghatar chor from and 5 were from guakhola village in Sirajdikhan Upazilla. Data were also collected from some actors who worked in the valuation of marketing of potato in study areas. The actors involved in the marketing of potato included *Farias, Beparis*, wholesalers, retailers and cold storage owners. A total of 65 actors including 15 *Farias*, 15 *Beparis*, 15 wholesalers from Sirajdikhan upazila and 20 retailers from Munshiganj sadar in some selected primary markets were selected purposively for the study. Three cold storage plants comprising of about 20% of the total number of cold storage plants located in the study area were selected through simple random sampling technique for the present study. Primary data were collected from the respondent farmers and different actors by using separate interview schedules. Secondary data were collected from various books, Journals, different organization like Department of Agricultural Marketing of Bangladesh, website searching and government publications. Both the tabular and descriptive techniques were used for analyzing data.

Considering that potato is an important vegetable in Bangladesh, the product moved from the sellers to consumers through several changes i.e. through some market actors such as *Faria, Bepari*, wholesalers and retailers, since potato needs to move a long distance from the point of production to the consumers.

In Sirajdikhan Upazila potato is moved from the hands of producers to the hands of consumers through five separate chains. Chain III is the longest marketing chain. In this chain the major marketing actors were the Farmers, *Farias, Beparies*, wholesalers, distant wholesalers and retailers who performed value adding functions and took a portion of marketing as their potato.

Grading was roughly done according to size and quality of the product by the farmers and actors mostly on the basis of visual estimate. Most of the farmers and actors were self-financed for production as well as in the value chain activities.

Farm gate price of potato received by farmers per 100Kg was Tk. 988.43 and highest purchase price per 100Kg of potato paid by retailers was Tk. 1854.00. Highest sales price per 100Kg of potato as received by retailer was Tk. 2067.00 and the lowest sales price as received by farmers was Tk. 1225.95.

Interest on operating capital for farmer was TK. 3.75 per 100Kg of potato. Gross return, gross margin and net return received by farmer per 100Kg of potato was Tk. 1225.65, Tk. 985.45 and Tk. 411.13, respectively.

Highest average transaction of potato received by wholesaler was 7000 Kg per day and lowest average transaction of potato received by retailer was 73.20 Kg per day. Highest marketing cost received by wholesaler was Tk. 247.20 per 100Kg of potato and lowest marketing cost received by *Faria* per 100Kg of potato was Tk. 22.00. On an average highest storage cost per 100Kg of potato for wholesaler was Tk. 61.70 per month and lowest storage cost per 100Kg of potato for farmer was Tk. 50.60 per month.

Among the value addition highest value added by wholesaler per 100Kg of potato was Tk. 262.00 of total value addition and lowest value added by *Faria* per 100Kg of potato was Tk. 127.00 of total value addition. As a percentage form of value addition highest value added by wholesaler was 32.16 percent and lowest value added by *Faria* was 15.58 percent of the total value addition.

Seasonal price fluctuation of potato was more prominent than that of many other field crops. The price becomes very low during peak harvesting period while it becomes too high before planting period. Frequent undue price fluctuations created uncertainty about at the market price and enhanced risks in potato production as well as potato business. Comparison of price fluctuation of potato in Munshiganj and Dhaka market was relatively correlated.

Farmers of both study areas faced many problems in the production and marketing of potato. The major problems faced by them included lack of capital, shortage of good quality seed, disease and pest attack, lack of

availability of adequate input, low price of potato, transportation problem, shortage of market facilities, high cold storage change, shortage of storage facilities and dominance of value chain actors.

The study identified some major problems faced by the actors in the potato value chain. The major problems faced by them included lack of capital, unavailability of loan, high interest rate, high transportation cost, inadequate communication facilities, low price, shortage of storage facilities, high storage charge and inadequate marketing facilities.

The cold storage owners in the study area faced many problems in operating their activities. The major problems faced by them included inadequate capita, high interest rate on loan, uncertainty of electricity supply and income tax payment was too high. As a result, they avoid the information about their loan and tax.

8.2. Conclusion

Based on the findings of the study it can be concluded apparently that considerable scope exists to increase the productivity of potato and to develop the value chain. Expanded potato cultivation can upgrade the living standard of the function areas of value chain.

Potato is not only a source of nutrients but also a source of cash income for farmers. A large number of people are involved in the production and marketing of potato. So, the farmers and actors could certainly be benefited financially if production and marketing system of potato are well developed.

For stabilizing potato prices, forecasting of potato prices and target production should be made in time before sowing, so that the farmers can adjust potato acreage accordingly. With successful operation of a buffer stock, price instability may be reduced. Government intervention in potato marketing is necessary to ensure fair price to the farmers by controlling such unexpected price fluctuations.

Farmer engaged in potato production was not very solvent to make the full utilization of value chain opportunity. They could not store potato for better price in the off season. Credit facilities should be made available at low interest rate by government. Processing opportunities were not available in the study area. Some local and traditional methods were applied by the processor. So, if there were any technological and financial support in processing industries more value could be added efficiently. Grading and standardization facilities should be utilized properly for efficient value chain of potato market. Lack of timely and proper market information was a great problem. So, market information should be available and ease accessible for the producers also for other value chain actors.

Finally agro-processing industries especially for study area were badly needed. For making efficient value chain of potato marketing all the actors including farmer should have proper knowledge, financial assistance and also good transportation system.

8.3. Recommendation

There are many problems in the potato production supply chain and marketing, here some probable solutions are discussed.

- Capital facilities should be increased to improve production and marketing of potato in Bangladesh. Different finanacial organization and government should come forward to solve this problem.
- In the study areas disease and pest attack was a major problem which producers faced in potato cultivation. They also reported that they were not well trained about pest and diseases control measure on their potato cultivation. Disease are very common in potato production. Farmers facing different types of new diseases and pest management is

very important for potato. BADC and other organization can solve the probleme by giving proper support to the farmer.

- In the study areas majority of the producers reported that shortage of good quality seed was one of the major problems. They could not get the required quality of good seed, as its supply was insufficient to meet the demand of the buyers. For this reason, the producers used own preserved seeds and sometimes local variety of seeds. As a result, they received low yield of potato. Good quality seed is very initial for the potato. Quality seed are not available in Bangladesh . During the cultivation season supply of quality seed should be increased.

- Adequate input facilities have to be increased to the producer. Adequate input means fertilizers,seed,irrigation and other facilities needed for potato.

- Input cost should be minimize. Higher input cost is obstacle to potato production. Input cost minimizing will increase the production and control the market.

- Transportation cost is very high and for this the marketing cost is very high. Transportation cost plays vital role in potato marketing. Transportation cost should be minimize for minimize the cost of potato in the market.

- All the sample farmers reported that low price was a major problem in potato marketing. Due to lack of remunerative price of potato, the farmers of the selected areas did not get fair returns from potato cultivation. In the season every year potatos price fall and the growers face very crucial probleme. Government shuold develop the market policy to support the growers and marketing releted people in Bangladesh.

- Market facilities are not available in Bangladesh. Markets are not available in in the season for potato. Market facilities have to be increased in Bangladesh for improving the potato production and development.

- In the study areas majority of the producers reported that high cold storage charge was a major problem in case of potato storage. About 57 percent producers (out of 30 farmers) reported high cold storage charge as a problem which adversely affected potato cultivation. Cold storage charge should be reduce.

- Value chain actors in the study area were small in number but they were well organized. Whereas the farmers were scattered but in large number. The value chain actors always dominated the marketing system and they were in better position in setting the prices of potato. As a result most of the producers were compelled to sell their potato at a lower price because there was no way to bring back the product from market as it involved extra cost of transportation and risks of potato damage. More than 54 per cent producers (out of 30 farers) reported this as a problem. Value chain actors dominancy have to be reduce.

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Appendix Tables

Appendix Table I: Acreage, production and yield of potato in Bangladesh during the period from 1982-83 to 2011-12

Year	Acreage ('000 ha)	Production ('000 tons)	Yield (quintal /ha)
1982-83	110.1	1149	104.4
1983-84	110.1	1166	105.9
1984-85	111.3	1159	104.1
1985-86	108.4	1102	101.7
1986-87	108.4	1069	98.6
1987-88	123.4	1276	103.4
1988-89	111.3	1089	97.8
1989-90	116.5	1066	91.5
1990-91	123.8	1237	99.9
1991-92	127.9	1379	107.8
1992-93	126.6	1384	109.3
1993-94	131.2	1438	109.6
1994-95	131.5	1468	111.6
1995-96	132.3	1492	112.8
1996-97	133.9	1508	112.5
1997-98	136.4	1553	114
1998-99	244.8	2762	112.8
1999-00	243.2	2933	120.6
2000-01	248.9	3216	129.2
2001-02	237.5	2994	126
2002-03	245.2	3386	138
2003-04	270.7	3908	144.2
2004-05	326.2	4856	149
2005-06	301.1	4161	164.9
2006-07	345.2	5167	149.7
2007-08	401.8	6648	165.5
2008-09	395.4	5268	133.2
2010-11	1137	8326	73.2
2011-12	1063	8206	77.2

Source: BBS, 2012.

Appendix Table II. Year wise monthly average wholesale prices of potato in Munshiganj district (Tk. / quintal).

Name of month	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
January	393.75	477.5	840	649	406.25	877.5	702.5	980	1525	1187.5	1017
February	237.5	303.75	900	410	328.75	505	850	950	1500	668.7	400
March	262.5	382.5	610	461	323.75	667.5	1325	950	1825	675	431.2
April	337.5	529	510	510	467.5	890	1456.2	970	1750	575	418.7
May	266.25	724.4	490	529	490	1336	1710	1125	2008	743.7	525
June	273.75	847.5	529	600	577.5	1349.75	1725	1318.7	2350	1010	525
July	331	865	865	865	666.25	1482.5	1750	1421	2100	825	575
August	511	907.5	925	925	605	1481.25	1750	1358	2250	850	575
September	470	925	800	800	517.5	1762.5	1787.5	1142	2300	875	725
October	480	900	900	900	542.5	1768.78	1725	1038	2567	900	625
November	510	1015	1250	950	646.25	1860	2087.5	1138	1892	1017	455
December	507.5	975	1350	718	1525	1793.78	2062.5	1525	2200	1000	425

Appendix Table III. Year wise monthly average wholesale prices of potato in Dhaka district (Tk. / quintal).

Name of month	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
January	531	459	981	768	413	975	931	1068	1675	1181	1675
February	393	356	612	554	400	725	949	981	1056	800	1056
March	390	368	631	550	482	748	1250	991	1209	750	1209
April	386	541	682	800	460	1026	1361	1022	1695	750	1695
May	369	700	802	591	446	1310	1694	1000	1875	750	1875
June	367	812	818	764	713	1383	1740	1200	2081	853	2081
July	524	893	936	892	850	1523	1682	1343	2125	1050	2125
August	573	900	922	925	681	1520	1685	1356	2355	1080	2355
September	507	922	864	875	710	1844	1680	1150	2535	1100	2535
October	585	918	891	1102	610	1842	1745	1100	2488	1138	2488
November	571	1163	1025	1038	780	1797	2100	1285	2369	1592	2369
December	1475	991	1290	583	1145	1750	1975	1225	2270	1650	2270

Interview Schedule for Farmer

1. **Identification :**

Name :	Age :
Occupation :	Village :
Upazilla :	Mobile :

2. **Identification of land :**

Types of land	Area (Decimals)
Owned Cultivated	
Taken for share cropping	
Rented in	

3. **Cost of Potatos Cultivation :**

Cost Items	Cost (Tk / 40 kg)
Variable Cost	
I. Human and labor cost	
I. Land Preparation	
I. Seed	
/. Fertilizer	
/. Insecticides	
I. Irrigation	
Fixed Cost	

Rented value of land	
Interest on operating capital	

4. After Production cost :

Cost Items	Cost (Tk / 40 kg)
1. Gradling, washing, sorting	
2. Transportation cost	
3. Loading and unloading	
4. Market toll	
5. Personal expense	
6. Unofficial payment	
7. Cold storage change.	

5. Problem about potato :

6. Probable Solutions of your problem:

7. Production :

Signature : Date :

Interview Schedule for cold storage owner:

1. **Identification :**

Name :	Age :
Occupation :	Village :
Upazilla :	Mobile :

2. **Name of the cold storage ?**

3. **When did you stant your business ?**

4. **From where do you buy Potato ? Farmer / Bepari / N.S/ Aratdar**

5. **Cost of cold storage owner**

Cost Items	Cost
11. Salery and wage	
11. power and electisicity	
11. Repair and maintainace	
11. License fee	
11. Cold storage rent	
11. Cold storage change (40kg)	
11. Others	

6. **Average capacity of your storage ?**

7. **Month of storage ?**

8. **Month of release ?**

9. **Price before harvesting ?**

10. **Price during harvesting ?**

11. **Price during storage ?**

12. **Problem about your storage ?**

13. **Probable solution ?**

Signature :

Date :

Interview Schedule for Wholesaler:

1. **Identification of respondent :**

Name :	Age :
Occupation :	Village :
Upazilla :	Mobile :

2. **When did you start your business ?**

3. **From where do you buy potato ? Farmer / Bepari / W.S / Aratdar**

4. **Does the price vary for different sellers ? Yes / No**

5. **Cost of Potato Purchase (Farmer / Faria / wholesaler)**

Cost Items	**Cost**
1. License	
2. Loading and unloading	
3. Transportation	
4. Storage cost	
5. Market cost	
6. Grading	
7. Mobile charge	
8. Personal expenses	
9. Unofficial expeses	

10. Purchase price	
11. Sales price	
12. Others	

6. **Where do you sell your potato ?**

7. **How do you set selling price ?**

    a) Purchase + cost + fixed amount of profit

    b) Price set by government

    c) Market price

    d) Others

8. **Are you involved in storing ? Yes / No**

9. **Hou much time do you store potato ?**

10. **What are the main problems of your business ?**

11. **What are the solutions ?**

Signature :

Date :

Interview Schedule for retailer:

1. **Identification of respondent :**

Name :	Age :
Occupation :	Village :
Upazilla :	Mobile :

2. **When did you start your business ?**

3. **From where do you buy potato ? Farmer / Bepari / W.S / Aratdar**

4. **Does the price vary for different sellers ? Yes / No**

5. **Cost of Potato Purchase (Farmer / Faria / wholesaler)**

Cost Items	**Cost**
1. License	
2. Loading and unloading	
3. Transportation	
4. Storage cost	
5. Market cost	
6. Grading	
7. Mobile charge	
8. Personal expenses	
9. Unofficial expeses	

10. Purchase price	
11. Sales price	
12. Others	

6. **Where do you sell your potato ?**

7. **How do you set selling price ?**

    a) Purchase + cost + fixed amount of profit

    b) Price set by government

    c) Market price

    d) Others

8. **Are you involved in storing ? Yes / No**

9. **Hou much time do you store potato ?**

10. **What are the main problems of your business ?**

11. **What are the solutions ?**

Signature :

Date :