

**EXPLORATION OF MARKETING PROBLEMS OF POTATO FARMERS IN
TETULIA UPAZILA UNDER PANCHAGARH DISTRICT**

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CERTIFICATE

This is to certify that the thesis entitled, “*EXPLORATION OF MARKETING PROBLEMS OF POTATO FARMERS IN TETULIA UPAZILA UNDER PANCHAGARH DISTRICT*” submitted to the Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka, in the partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE (MS) in AGRICULTURAL EXTENSION**, embodies the result of a piece of *bonafide* research work carried out by **Most. Tania Tabasum**, Registration No.14-06344 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that such help or source of information, as has been availed during the course of this investigation has been duly acknowledged and style of this thesis have been approved and recommended for submission.

Dated- December, 2015
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DEDICATED
To
My Beloved Parents

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ABBREVIATIONS AND ACRONYMS

BBS	: Bangladesh Bureau of Statistics
FAO	: Food and Agriculture Organization
DAE	: Department of Agriculture
Tk.	: Taka
MT	: Metric Ton
ha	: hectare
SPSS	: Statistical Package for Social Sciences

ABSTRACT

Agriculture is the backbone of the economy of Bangladesh. Potato production has increased rapidly in Bangladesh over the past two decades, but continued growth is constrained by marketing imperfections. The purpose of the study was to explore the extent of marketing problems faced by the potato growers. Besides, attempt was made to estimate the contribution of the selected characteristics of the potato growers to their marketing problems. The study was conducted at Tetulia upazila under Panchagarh district. Data were collected from randomly selected 114 potato farmers by using an interview schedule. Majority (51.8%) of the potato farmers faced high marketing problems of potato, while 48.2 percent had medium marketing problems. Multiple regression method was administered and 10 independent variables namely: age, education, annual income, organizational participation, investment in potato cultivation, land under potato cultivation, use of post harvest practices in potato cultivation, farm to market distance, storage facilities, and accessibility of marketing information were fitted together in enter multiple regression analysis. Multiple regression exposed that among the selected characteristics, education, annual family income, use of post harvest practices in potato cultivation, storage facilities and accessibility to market information were negatively significant and age and farm to market distance were positively significant and combinedly provided 51.80 percent contribution to marketing problems of potato while organizational participation, investment in potato cultivation and land under potato cultivation were insignificant contribution to their marketing problems of potato.

CHAPTER I

INTRODUCTION

1.1 General Background

Potato (*Solanum tuberosum*) popularly known as ‘The king of vegetables’, has emerged as fourth most important food crop in Bangladesh. Bangladeshi vegetable basket is incomplete without potato. Potato is a staple food in the developed countries and which accounts for 37% of the total potato production in the world (FAO and CIP, 2008). The cost of potato cultivation is high compared with that of other crops, but the return of potato is also high (Eliaset al., 84).

Bangladesh ranks 11th in the world in terms of potato production in 2008 (Hossain and Miah, 2010). In 2013-2014, about 86,03,120 metric tons of potatoes have been produced from 4,44,135 hectares of land in Bangladesh (BBS, 2014). The area and production of potatoes are increasing day by day due to its higher demand and profitability. The annual growth rates of area, production and yield of potato were estimated at 7.14%, 9.90% and 2.76% during 1989-1990 to 2008-2009, respectively (Miah et al., 2011). It was the major crop for the original Americans. It is now one of the staple foods in Bangladesh. Bangladesh is mainly an agro-based country. Considering the trend of population growth and consequently the increased demand for food in the country and dwindling cultivable land area, the potato is likely to play a vital role in the future. Potato is a popular and important vegetable in Bangladesh. For the whole year, it is used as the main vegetable.

Potato being a high productivity crop, it produces more dry matter per unit area and time than the major cereal crops. The dry matter production in potato is 47.6kg/ha/day, whereas in wheat, rice and maize it is 18.1, 12.4 and 19.1 kg/ha/day respectively (AICRP Annual Report, 1986-87). The quality of carbohydrate in potato is higher than vegetables. Potato is the major contributor

of the required calories to the people of Bangladesh. The potato is a good source of high quality protein. This is of considerable importance in a developing country like Bangladesh where energy supplies are more readily available than the proteins. The average proteins content in potato is approximately 20% on the fresh weight basis. Potato protein content is comparable (10% on a dry weight basis) with that of the cereals. Rice and wheat, the two leading staple food, do not contain vitamin A and vitamin C. On the other hand, potato contains some vitamin A and large amount of vitamin C. Usually 100g boiled potato with its skin can provide half of the daily requirement of vitamin c that supplied by 3 apples, 1 tomato, 1 mango and 1 orange (Hussain, 2000). The quantity of fat in potato is lesser than rice and wheat. Potato is also an important source of fiber. Boiled potato contains more fiber than rice and wheat. Potatoes form a good source of iron and its iron content is comparable to most other vegetables. Potato contains more iron than white rice on either dry or cooked basis. There are only a few foods as versatile as the potato. It can be cooked in many ways. Potatoes can be boiled, fried, roasted, toasted, baked or steamed. Potatoes can be easily processed into chips, French fries, flakes, granules, patties etc. They can also be processed into dehydrated and canned products.

There are many varieties of potato developed by BARI such as Diamont, Cardinal, Binella, Granola, Multa etc. Potato is cultivated in every district of the country. Potato production in Bangladesh in the fiscal year (FY) 2012-2013, hit a new record of 8.603 million tones surpassing the record of 8.38 million tons in FY'11. The Government statistics provider, Bangladesh Bureau of Statistics (BBS) in its latest release, said potato, the most consumed vegetable item of the country was cultivated on 0.444 million hectares of land in FY'13. The acreage had increased by 14,000 hectares compared to that of FY'12 which also helped achieve a higher output. In recent years, potato has occupied an important position because of its highest yield among major food and vegetable crops of Bangladesh. The present potato growing area in

Bangladesh with its production and yield in the year 2012-2013 and 2013-2014 are presented in Table 1.

Table 1.1. Estimation of potato, 2012-2013 and 2013-2014 per division

Division	Estimates (in .ton)	
	2012-2013	2013-2014
Chittagong	584091	656825
Sylhet	45766	49847
Dhaka	1544198	1730193
Barisal	118306	156317
Khulna	272529	262803
Rajshahi	2912087	2872645
Rangpur	3126142	3221393

Source: Estimation of potato, 2012-2013 and 2013-2014 per division (BBS, 2014)

It is evinced from Table 1 that in every division estimates of potato in 2013-2014 have increased in comparison to fiscal year 2012-2013.

However, the policy makers and planners were emphasizing further to increase the coverage and production of potato for long years. To increase the production and quality of potato an amount of efforts being made through research and extension delivery system in the country. But a large amount of potato deteriorated its quality due to the lack of marketing and storage facilities. The findings of this study can be a key indicator to highlight the exploration of marketing problems of the potato growers in the country. The characteristics of potato farmers on their marketing problems are essential to plan and execute program for increasing the yield of potato. With this end in view, the author was keenly interested to undertake the present study.

According to the geographic distribution of the country's vegetable producers as well as the informal organization of the trade, vegetables pass from farmer to final user in different ways. Three principal types of marketing channels for vegetables exist: local, regional and inter-regional. Local marketing channels are characterized by the intervention of fewer middlemen between vegetable producers and consumers. Vegetable are sold to consumers, local traders, rural assemblers, wholesaler/commission agents or cold storage operators or in a nearby urban area by the growers under local marketing channels. Regional marketing channels consist of an extended chain of intermediaries between producer and consumer. Inter-regional marketing channels are the most lengthy, because a number of traders are involved in the system (BARI, 2012).

Market intelligence provides information relating to some market forces such as demand, supply, prices, transportation, storage etc. Dissemination of market information is a useful tool for making competition among producers and traders. In the developing economies, greater specialization, diversification and commercialization depends upon the timely movement of agricultural inputs and finished products. Storage is necessary to reduce the seasonal and regional fluctuation of prices. The storage facilities are very inadequate and insufficient in Bangladesh, which is also perceived as an important marketing problem at the grass root level.

The major constraints to the development of marketing in Bangladesh are production shortage, high domestic price, non-availability of export quality produce, seasonality of domestic supply, lack of proper sorting and grading facilities, absence of improved packaging materials, absence of an efficient transportation system, inadequate cargo space and high air freights (BARI, 2012). There are three principal markets: 1. hipping point markets; 2. wholesale markets; and 3. retail markets. This marketing system is undergoing change as a result of vertical integration, decentralization, new handling and transportation methods, and the growth of the away-from-home and direct

farmer consumer markets. The principle according to which farm produce and farm income are distributed is followed by a look into the problems of agricultural marketing. Surplus cropping operations necessitate the emergence of marketing problems in the agricultural sphere (Alam, 2002).

Marketing system is essential for any farm products. In consideration of potato it is also most important. Because potato mainly used year round, but easily deteriorated its quality. The government has no way to control of potato marketing. Mainly its marketing depends on consumers demand and supply of trades. All the problems for marketing of potato may not be addressed timely. But it is necessary to acquire knowledge on different problems of potato marketing process (Mizanur, 1992).

Potatoes grown in the nearby homestead land are usually sold by the growers at the local markets to itinerant traders. In most cases the growers do not have proper market information. In the absence of information on price and supply existing at the big consuming centers, they cannot bargain with the traders and are compelled to sell at the prices dictated to them. Many remote growing villages do not have proper link roads with nearby markets. Thus, the growers face problem of carrying potato to the assembling markets. Proper packing and handling systems have not been adequately developed in the country. There are 836196 population live in Panchagarh district (Bangladesh Population Census 2011, BBS). Potato cultivation is increased in Panchagarh district and simultaneously farmers are facing problems in potato marketing. In this research, the researcher tried to explore the marketing problems of potato farmers in Panchagarh district of Bangladesh. The findings of the present study may provide valuable direction for the researchers, planners, policy makers and other Government organization for further study.

1.2 Statement of the Problem

Agricultural marketing is the crux of the problem of agricultural improvement in Bangladesh. Each country and each product have unique marketing problems. Marketing of perishable crop in Bangladesh like potato is affected by its nature, climatic conditions, availability of transportation facilities and size of market demand and the inefficiency of information system.

In recent year's seasonal variability in potato arrivals and prices has created serious marketing problems to its farmers, consumers, traders and policy makers in potato growing regions of the country. This seasonal and semi-perishable nature of potatoes is reflected in gluts in harvest season and acute scarcity in off-season resulting in uneconomic prices to its growers during harvest season and high prices to the consumers in off-season. The potato growers face more trouble in marketing than in production.

In view of the above problematic situation, potato needs a highly developed marketing system to make it available to consumers throughout the year. But like the general inefficiency of the agricultural marketing system in Bangladesh, potato marketing is also found to be inefficient due to existence of the some problems concerning marketing systems. There is hardly any systematic study to find out the marketing problems of potato. That is why, the researcher initiated the present study to search answer to the following research questions:

1. What is the extent of problems being confronted by the potato growers in potato marketing?
2. What are the selected characteristics of the potato growers in respect of potato marketing?
3. What are the similarities or dissimilarities among severity of different marketing problems faced by the potato growers?
4. To what extent the selected characteristics of the potato growers contribute to their marketing problems?

1.3 Specific Objectives of the Study

In view of the problem as stated above, the following specific objectives were formulated for giving proper direction to the present study:

1. To determine the extent of marketing problems faced by the potato growers;
2. To describe the influential characteristics of potato growers in respect of marketing. The selected characteristic are:
 - a. Age
 - b. Education
 - c. Annual family income
 - d. Organizational participation
 - e. Land under potato cultivation
 - f. Investment in potato cultivation
 - g. Use of post harvest practices in potato cultivation
 - h. Farm to market distance
 - i. Storage facilities
 - j. Accessibility to market information;
3. To compare the severity of various marketing problems faced by the potato growers;
4. To estimate the level of contribution of the selected characteristics of the potato growers to their marketing problems.

1.4 Justification of the Study

Bangladesh made a remarkable progress in the production of potato. Total area under potato crop has been estimated 11, 41,727 acres (4, 62,032 hectares) in 2012-2013 compared to 10, 97,503 acres (4, 44,135 hectares) of the year 2013-2014. Total potato production has been estimated 89,50,024 metric tons in 2012-2013 compared to 86,03,120 metric tons of the year 2013-2014 which is 4.03% higher (BBS, Estimation of potato, 2013-2014). With the increasing of production, potato growers face some problems in potato marketing. But there was no conclusive research work on the problems of potato marketing. Therefore, the researcher felt necessity to conduct a research work on "Exploration of Marketing Problems of Potato Farmers in Tetulia Upazila under Panchagarh District."

It is expected that the findings of the study would be of great value to researcher's extension service providers, students, policy makers and planners in formulating and designing marketing policy of potato in a more befitting manner.

1.5 Scope of the Study

The present study was designed to have an understanding of the problems confronted by the farmers in potato marketing and to explore the contribution of the potato growers to their marketing problems.

The findings of the study will be applicable to Panchagarh district. However, the findings may also be applicable to other areas of Bangladesh where socio-cultural, psychological and economic situation do not differ much than those of the study area.

The findings may be also helpful to the field works of agricultural marketing service providers to improve strategies of action for adopting potato marketing. Lastly, it is assumed that the recommendation of this study will be helpful in formulating necessary action for improving the marketing status of potato.

1.5 Assumptions of the Study

The researcher had the following assumption in mind while undertaking this study.

1. The respondents selected for the study were capable of furnishing proper responses to the questions included in the interview schedule.
2. The responses provided by the respondents were valid and reliable.
3. Information sought by the researcher revealed the real situation and was the representative of the whole population of the study area to satisfy the objectives of the study.
4. The researcher was well adjusted to herself with the social and cultural environment of the study area. Hence the collected data from the respondents free from interviewer's bias.
5. The selected characteristics and the marketing problems of the potato farmers of the study were normally and independently distributed.

1.7 Limitations of the Study

In order to make the study manageable and meaningful, it became necessary to impose some limitations as stated below:

- I. The study was confined to one union under Tetulia upazila of Panchagarh district.
- II. Characteristics of the farmers are many and varied, but only 10 characteristics of the farmers were selected for the research work.
- III. The researcher had to manage proper rapport with the respondents to collect maximum accurate information.
- IV. Sometimes actual information is not possible to get due to illiteracy of potato growers.
- V. Various problems in adopting potato marketing were likely to be faced by the farmers. However, only 9 problems have been considered for investigation.

1.8 Definition of Terms

Some terms which have been frequently used throughout the thesis are defined and interpreted below:

Age

Age of a respondent was defined as the span of his/ her life and is operationally measured by the number of years from his/her birth to the time of interviewing.

Education

Education referred to the development of desirable knowledge, skill, attitude, etc. of an individual through the experiences of reading, writing, observation and related matters..

Annual Family Income

Annual income was defined as total earning of a farmer and the members of his family from farming and other sources (business, services etc) during a year. In fact, it was gross family income and was expressed in taka.

Organizational participation

Organizational participation of an individual referred to his participation in various organizations as ordinary member; execute committee member and president/secretary. Organizational participation of a respondent was measured on the basis of the nature and duration of their participation in different organizations.

Post harvest practices

Post harvest practices meant the doing of component technology of potato production in recommended way after harvesting.

Distance of market place

Distance of market place meant how far away the markets are situated from the residence of potato growers.

Storage facilities

Storage facilities referred to convenient places to keep the potato for different periods before marketing. Storage facilities may be for short term, medium term and long term.

Marketing information

Marketing information meant the different information like as demand, supply and marketing price of specific products.

Problems

Problem meant any difficult situation which requires some action to minimize the gap between “what ought to be” and “what is”.

Problems faced

Problems faced indicated the arguments, altercation or conflict that acts as barrier in potato marketing.

Marketing

Marketing meant the process of handover goods or products from growers to consumers either directly or through some channels.

Potato marketing

The participants in potato marketing activities included large scale local buyers, itinerant traders, commission agents, wholesalers, cold storage operators and retailers including the groups themselves.

CHAPTER II

Review of Literature

This Chapter is devoted to a brief review of the results of some of the previous studies which are related to marketing. The relevant information regarding this problem is limited in number. However, the researcher tried her best to collect needful information through searching relevant studies. Unfortunately, few research works were found directly related to the problem faced in potato marketing. However, research works related to the problem faced by the farmers in different aspects of marketing of some important crops are presented below.

2.1 Problem Faced by the Farmers in different Aspects of Marketing

Rahman (1995) in his study identified that farmer faced several problems in cotton cultivation. Non-availability of quality seed in time, unfavorable and high cost of fertilizer and insecticides, lack of operating capital, not getting fair weight and reasonable price according to grade, effects of cattle in cotton field, lack of technical knowledge, lack of storage facility, stealing from field at maturity stage, and late buying of raw cotton by Cotton Development Board were identified as major problems of cotton farmers in Mymensingh district.

Faroque (1997) found that female rural youth in Bhaluka (Mymensingh) lacked cash for buying seeds, seedling and fisheries and devoid of necessary knowledge in improved vegetable cultivation. He further added that the majority of female rural youth faced very high (54%) problems related to marketing.

Yadav *et al* (2000) conducted a survey during 1996 -1997 in the Basti district of Uttar Pradesh, India, among farmers of 6 selected villages who were classified based on the size of their farmland: below 1 ha (38 farmers), 1-2 ha (33) and 2 ha above (19). Three potato disposal channels (I: producer-consumer, II: producer-retailer-consumer and III: producer-wholesaler-retailer-consumer)

were used. Under channel III., 3 storage systems were used: without storage, storage by producer and storage by wholesaler. Tabulated data were presented on (1) the pattern of potato disposal by size of farmland, (2) potato price spread in Basti vegetable markets for the 3 channels and (3) inter-channel comparisons as a whole. Potato marketing problems can be overcome by cooperative marketing.

Islam (2001) conducted a study on farm youth of haor area of Mohangonj upazila. Study revealed that there were three top problems in rank order such as (I) no arrangement of loan for the farm youth for fishery cultivation, (II) lack of government programs in agriculture for the farm youth and (III) absence of loan giving agencies for establishing farm.

According to Holloway and Ehui (2002) marketing cost is refers to those costs which are incurred to perform various marketing activities in the transportation of goods from producer to consumers. Marketing costs includes handling cost (packing and unpacking), costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (official) to reach an agreement, transferring the product, monitoring the agreement to see that its conditions are fulfilled, and enforcing the exchange agreement.

Erbe and Neubauer (2002) observed that potato production area in Germany increased by 2.1% to 288000 ha in 2002 compared to production area in 2001. The area reduced in 2001 because of marketing problems. The greatest reduction (14%) was in Sachsen-Anhalt. The main varieties are Agria (7.3% of total area), Juars (5.4%), Cilena (4.1%) Marabel (3.9%) and 20 other varieties. Seventeen new varieties were approved for 2002, including 1 very early, 3 early (5 for consumption and 5 for processing), and 3 semi-late and late ripening, while 5 varieties were removed from the German national list.

Salam (2003) in his study observed constraints in adopting environmentally friendly farming practices. Top six identified constraints according to their

rank order were : (I) low production due to limited use of fertilizer, (II) lack of organic matter in soil, (III) lack of Government support for environmentally friendly farming practices, (IV) lack of capital and natural resources for integrated farming practices, (V) lack of knowledge on integrated farm management and (VI) marketing facilities.

Uddin (2004) in his study revealed five aspects of constraints in commercial cultivation of vegetables viz. seed constraints, disease and insect infestation constraints, field management constraints marketing of vegetable constraints and extension work constraints. Among these aspects of constraints they revealed marketing problem severely faced by the farmers.

Yulafci and Cinemre (2007) conducted a study to explore marketing structure of fresh fruits and vegetables, which are produced in Carsamba plain (Turkey), to determine marketing problems and to put forward solution suggestions. According to brokers, the most important problem of fresh vegetable and fruit marketing was not being able to find quality crops. Producers had only limited power in setting the prices of vegetables and fruits which in the market was estimated around 6-7 percent. The most important problem in the market was said to be not having enough standard size. In addition to this, there were some deficiencies related with infrastructure of the market area.

According to Chhina (2009) it was found that low marketing cost expressed as a percentage of the consumers' price is not an indicator of high efficient market and similarly the marketing cost expressed as a percentage of the consumers' price is always not an indicator of low efficiency market system.

According to Chhina (2009) and Hassan *et al.* (2012) studying marketing margins is very important for several reasons such as to study marketing efficiency, compare different markets, improve marketing system, study the role of the middlemen, and implement different government policies. Role of middlemen is an important aspect in influencing the marketing costs and margins. If the results of marketing margins of the different middlemen

indicate that there are certain unreasonable charges, and inefficiency in the services of the middlemen, those can be improved accordingly. Another important aspect of marketing margin analyses is the implementation of government policy. The government formulates policies with the objective of improving the efficiency of the marketing.

Hassan *et al.* (2012) indicated various middlemen perform different functions in the process of marketing and they charge fees for the services they provide. These charges include costs for packaging, loading, unloading, sorting, grading, market fees, commission etc. In the case of the profit of the middleman, beginning from the sale of the produce from the fruit growers till it reaches the consumers different actors like Faria', Bepari', commission agent, wholesalers, retailers, and so on handle produce and they earn profit by adopting this profession. Their profit is included in the price of the commodity and it also becomes a part of the market margins.

2.2 Selected Characteristics of the Farmers and Their Problem Confrontation in Marketing

2.2.1 Age and problem faced

Rahman (1995) studied that the relationship between the personal characteristics and constraints facing in cotton marketing of Muktagacha Thana under Mymensingh district. He found that there was no significant relationship between the age of the farmers and their constraints in cotton cultivation and marketing. Similar findings were obtained by Ali (1999), Rashid (1999), Pramanik (2001), Ahmed (2002), Hossain (2002), and Salam (2003) in their respective studies.

Bhuiyan (2002) observed a positive and significant relationship between age of the farmers and their constraints in banana cultivation and marketing. A similar finding was obtained by Rahman (1996) in his respective study.

Rashid (2008) observed that age of the rural youth had significant negative relationship with problem faced in selected agricultural production activities and marketing.

2.2.2 Education and problem faced

Mansur (1989) revealed that education of the farmers had significant negative effect on their in marketing. Similar findings were obtained by Rahman (1995), Haque (1995), Rahman (1996), Karim (1996), Pramanik (2001), Ahmed (2002), Hossain (2002) and Salam (2003) in their respective studies.

Hoque (2001) observed a significant negative relationship between education and problem faced of the FFS farmers in product marketing.

Islam (2001) in his study found that there was no significant relationship between education and problem faced of farm youth in product marketing.

2.2.3 Annual family income of farmers and problem faced

Saha (1983) found a significant positive relationship between income of farmers and their poultry problem faced in his study.

Hossain (1989) found a significant positive relationship between and constraints faced by the landless laborers.

Rahman (1995) found that a negative and substantially significant relationship between annual income of the farmers and their faced constraints in cotton cultivation and marketing.

2.2.4 Organizational participation and problem faced

Rashid (1975) concluded in his study that organizational participation of the farmers had no significant relationship between with their problem faced.

Kashem (1977) found that there was a negative relationship between organizational participation of the landless labors and their constraints faced. There was however, a negative trend between the two variables.

Ali (1978), Saha (1983) and Mansur (1989) found in their studies that organizational participation of the farmers had a significant negative relationship with the agricultural constraints faced. On the other hand Islam (1987) and Raha (1989) found no significant relationship with their agricultural constraints faced.

Rahman (1995) found in his study that there was no relationship between organizational participation of the farmers and their faced constraints in cotton cultivation.

Rashid (1979) in his study revealed that the organizational participation of the rural youth had no relationship with their willingness for undertaking selected agricultural entrepreneurships in their self-employment and their problem perceived for undertaking selected agricultural entrepreneurships in their self-employment. A similar finding was obtained by Hossain (1989) in his respective study. Similar findings were obtained by Rahman (1996), Faroque (1997), Pramanik (2001), Bhuiyan (2002), Ahmed (2002), Salam (2003) and Halim (2003) in their respective studies.

2.2.5 Land under potato cultivation

Anower (2012) in his study showed that large farm group managed the source financial support for potato cultivation by them; they did not take any loan for this purpose. Small farm group managed the source financial support (25%) for potato cultivation by taking loan from various source. They repay their loan after harvest by selling potato at low price during harvest period. So they face challenge severely. On the other hand, Medium farm group managed the source of financial support (9.37%) for potato cultivation by taking loan from various source. Therefore the large farm group has the risk taking capacity of the farmers in potato cultivation. So, they did not take any loan for this purpose.

2.2.6 Investment in potato cultivation

Hamisi (2011) in his study showed that the issue of investments is critical before the processing sector can really take off. There are good examples in Tanzania of private investor contributions improving farming possibilities with other crops. So far there are not big investors involved in the potato business in Tanzania, except in the Iringa region where Tanzanian Mtanga Farms Limited, in collaboration with Nigeria-based company Tonny Elumelu Foundation, will invest in a 2200-hectare farm to produce seed potatoes.

Juhani (2012) revealed in his study that investments are expected to help the potato sector, particularly in the processing sector.

2.2.7 Use of post-harvest practices and problem faced

Gitomer and Charles (1996) studied in a study that post-harvest for potato is the critical sector for employment and potato farmers' basic interests. Globalization and free trade pose a challenge to the economies of the developing countries. The potatoes are one of the most sensitive agricultural commodities to open competition, especially on postharvest process, because of its social and technical implications.

Medagoda (2011) observed in a study that a very low percentage of total produce is consumed as a food amounting 30 percent and greater percentages, amounting to about 70 percent is lost in the form of pre and post-harvest losses. The major constraint reported in marketing were the absence of properly organized marketing structures, lack of processing plants and the poor demand in local market for jack products. An integrated approach would improve productivity, quality and income from jack cultivation contributing to poverty alleviation in the rural sector to a considerable extent.

Tsubota (1999) studied in a study that the postharvest processing of potato is a major practice for adding value to this crop through traditional processing 10

modern technologies in developing countries. Most of the processing is done on a commercial basis as a business. Recently many potato chips industries have established in Bangladesh. There are other indigenous post-harvest practices used for processing of potato in rural and peri-urban areas. These processing technology increases the income of the rural people. This enhances the use of potatoes during the harvesting season and reduces the pressure of storage of potato in cold storage.

2.2.8 Distance of the market place and problem faced

Rahman (1993) conducted a study in Munshigonj and Narayangonj to investigate the comparative cost and return as well as loss arising from storing potato under traditional as well as cold storage and marketing channel. A fact that emerged is gross return as well as net return was higher under nearer distance to the long distance. Although total cost of storing potato in cold storage plants was higher than the traditional method, the former is more profitable than the other method.

Faroque (1997) found that female rural youth in Bhaluka (Mymensingh) lacked cash for buying seeds, seedling and fisheries and deprived of necessary knowledge in improved vegetable cultivation. He further added that the majority of female rural youth faced very high (54%) problems related to marketing due to distance.

2.2.9 Facilities of storage and problem faced

Rahman (1993) conducted a study in Munshigonj and Narayangonj to investigate the comparative cost and return as well as loss arising from storing potato under traditional as well as cold storage. A fact that emerged is that gross return as well as net return was higher under cold storage system compared to traditional storage system. Although total cost of storing potato in

cold storage plants was higher than the traditional method, the former is more profitable than the latter.

Hossain (2009) found in a study that average post-harvest losses in the household and restaurant levels were 3.24, and 4.52%, respectively of purchased potato. This loss comprised rotten loss and processing loss. Total losses of traditional stored 6 potatoes including consumers' loss were found to be 27.65% where for cold stored potatoes it was 23.11%. Total losses excluding consumer losses for traditional stored and cold stored potatoes were found to be 24.61% and 19.90%, respectively.

Hossain (2009) identified two different types of potato marketing that were traditional stored and cold stored potato marketing. In the case of traditional stored potato, Bepari and Faria bought potatoes from farmer. The share of purchasing potato by Bepari (60.9%) was higher than the Faria (36.2%). Bepari bought a large amount of potatoes from farmers and directly sold to Paiker (38.9%), retailers (26.2%) and Aratdar (21.6%). Similarly, Faria bought potatoes directly from farmers and mostly sold them to Bepari (25.8%) and a small portion (10.4%) to retailer through Aratdars. Paiker bought a major portion of potato directly from Bepari (38.9%) and a very small amount from farmers (2.1%). They also bought a good amount of potatoes (20.9%) from Faria and other Beparis through Aratdars. Paikers sold their entire potatoes directly to the retailers. Retailers sold their whole quantity (100%) of potatoes to consumers. For cold stored potato marketing, Bepari and Paiker bought potatoes from cold storage (farmer/Stockiest). The share of purchasing potato by Bepari (73.2%) was higher than the Paiker (24.4%). Paiker also bought some potatoes (1.8%) from Bepari. Aratdarbought all of his potatoes of Bepari) from Bepari and sold 42.1% to the Paiker and 29.3% to the retailer. Paiker sold maximum amount (68.1%) of potato to retailer and a very small quantity too directly to consumer (0.2%). Retailer sold his whole quantity of (100.0%) but 99.8% of the channel of potatoes to the consumers. The average losses at

traders' level for traditional and cold stored potatoes were 11.95 and 9.61%, respectively.

2.2.10 Accessibility to market information and problem faced

A study conducted by Pandey (1995) examined the onion and garlic export problems and prospects. Following a description of onion and garlic production in India, a review of the problems and opportunities facing the export sector was presented, trends in exportation of the two products were described and the principal export markets were identified. The constraints to increase exports included the differing quality requirement of world market, storage and packaging, inadequate market information, poor transport infrastructure and pricing structure strategies to overcome these problems were discussed.

Bakhsh and Ahmad (2006) estimated the technical efficiency in potato production by employing the Cobb-Douglas stochastic production frontier approach in Pakistan. The results indicated that potato farmers were 84% technically efficient, implying significant potential in potato production that can be developed. By shifting the average farmer to the production frontier, the average yield would increase from 20.825 mt/ha to 24.75mt/housing the available resources.

2.3 The Conceptual Framework of the Study

According to Rosenberg and Hovland (1960), the conceptual framework is kept in mind while framing the structural arrangement for the dependent and independent variables. This study was concerned with the extent of marketing problems of potato farmers as dependent variable and selected characteristics of the farmers as independent variables. Based on this above discussion and the review of literature, it was observed that all of the earlier studies were to explore relationship between farmers' selected characteristics with their marketing problems of potato. But the present study was mainly targeted to explore contribution of the selected characteristics of the farmers to their marketing problems of potato. Considering the above mentioned discussion a conceptual framework has been developed for this study, which is diagrammatically presented in the following Figure 2.1.

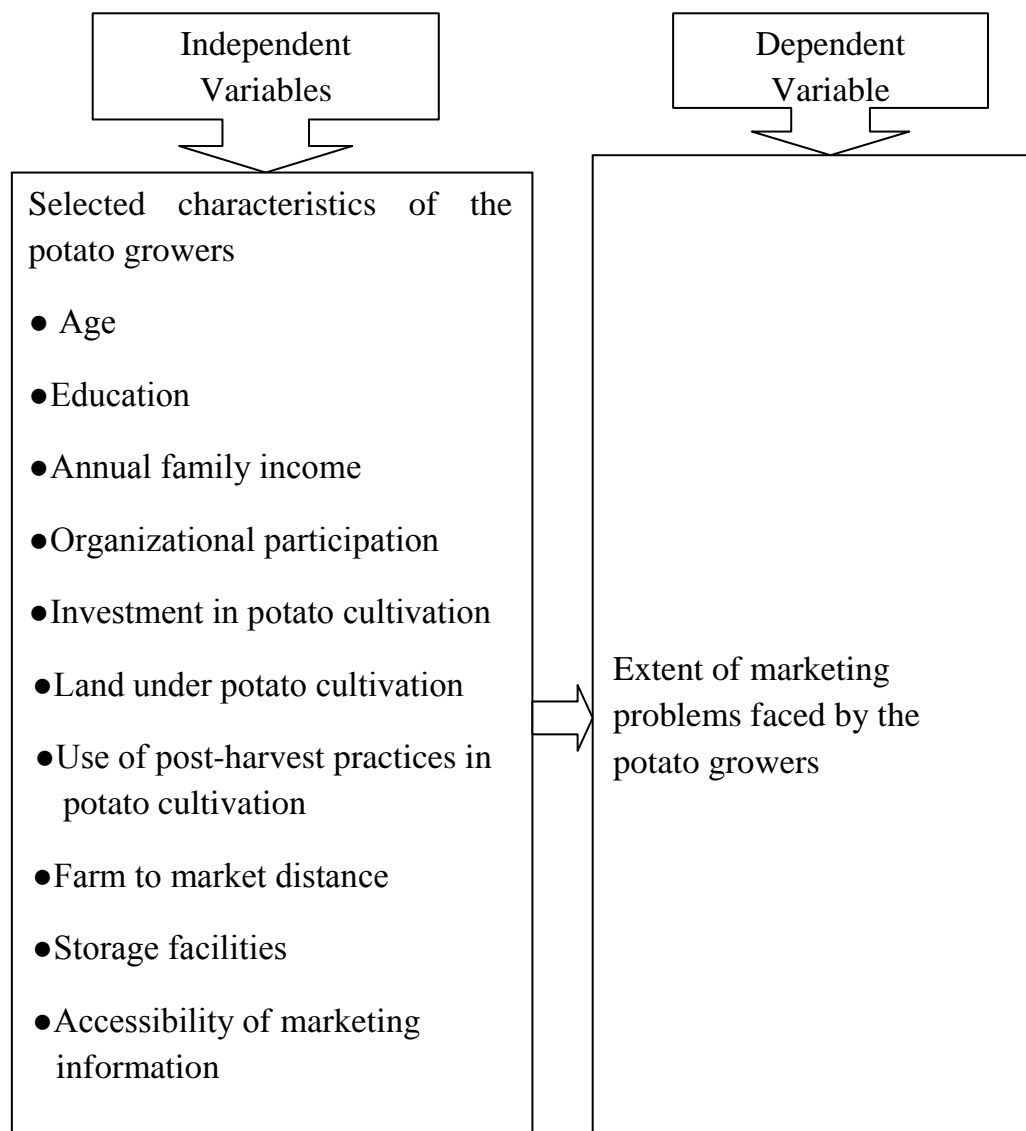


Figure2.1. The conceptual framework of the study

CHAPTER III

METHODOLOGY

Methodology plays an important role in any scientific research. Appropriate methodology enables the researcher to collect valid and reliable information in order to arrive at a meaningful conclusion. Keeping in this point of view, the researcher had taken intensive care for using proper methods in all aspects of the investigation. Methods and procedures followed in conducting this research work have been described in this Chapter.

3.1. Locale of the Study:

The study was conducted among the potato growers of five villages of Buraburi union of Tetulia upazila under Panchagarh district. Out of seven unions of this upazila, Buraburi union was purposively selected because potatoes are grown plenty in this union. From this union, five villages (Haradighi, Sarkarpara, Katapara, Noyabari and Mandulpara.) were selected randomly from 12 villages of this union. A map of Panchagarh district showing Tetulia upazilla and a map of Tetulia upazilla showing the study area have been shown in Figure 3.1 and 3.2, respectively.

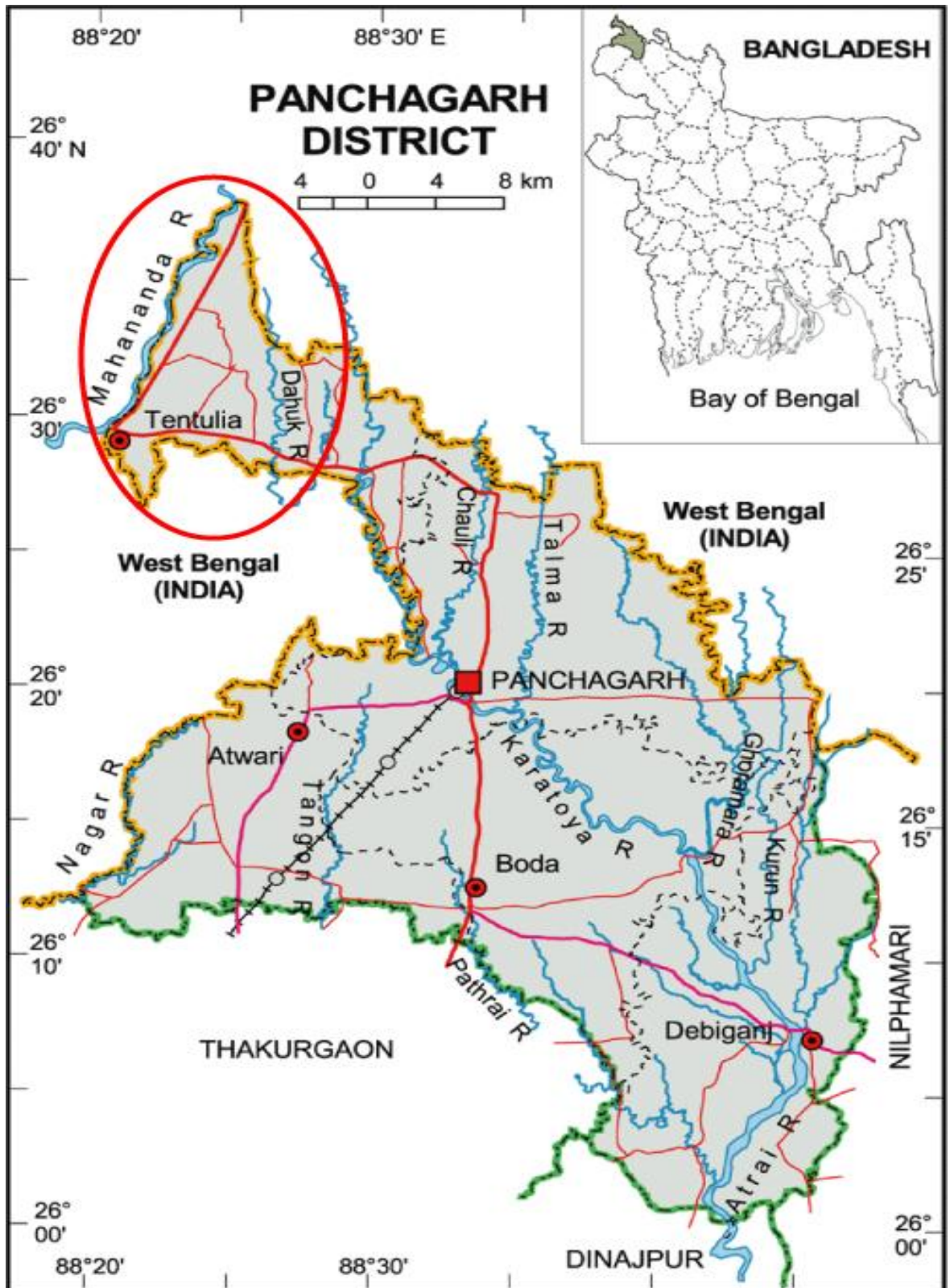


Figure 3.1 A map of Panchagarh district showing Tentulia upazila



Figure 3.1 A map of Tentulia upazila showing the study area

3.2. Population and Sample of the Study

All enlisted potato growers from five selected villages of Buraburi union in Tetulia upazila constituted population of the study. An update list of 460 potato growers from the selected villages was prepared with the help of Sub-Assistant Agriculture Officer (SAAO). According to Yamane's (1967) formula, sample size was determined as 114. In calculating sample size from the following formula, 8% precision level, 50% degree of variability and $Z=1.96$ at 95% confidence level were chosen. Then 114 farmers were selected as sample from the population by using proportionate random sampling technique. The formula is given below:

$$n = \frac{Z^2 P(1-P)N}{Z^2 P(1-P) + Ne^2}$$

Where,

n = sample size

N = population size

e = the level of precision

z^2 = the value of the standard normal variable given the chosen confidence level

p = the proportion or degree of variability

Besides this, 15.0 percent of the sample size was selected randomly from the population which was included in the reserve list so that the respondents of this list could be used for interview if the respondents included in the original sample were not available at the time of data collection. The distribution of the population sample and number of farmers in the reserve list are shown in Table 3.1.

Table 3.1 Distribution of the population, sample and reserve list for the study

Villages	Population	Sample size	Reserve list
Haradighi	80	20	3
Sarkarpara	94	23	3
Katapara	95	24	4
Noyabari	101	25	4
Mandulpara	90	22	3
Total	460	114	17

3.3. Instruments for Data Collection

In order to collect relevant information from the respondents an interview schedule was prepared focusing the objective of the study. Both open and closed form questions were designed to obtain information. Pre-testing of draft interview schedule with 15 farmers was accomplished. Based on the pre-test result, necessary corrections and modifications were made for the purpose of finalization of the interview schedule. A copy of the interview schedule is presented in appendix-A.

3.4. Collection of Data

Data for this study were collected by the researcher herself. To build rapport and motivation in the interview situations, the researcher endeavored to provide conditions that maximized trust, maintained each respondent's interest and minimized status differences. However, it was not possible to collect data from all the sample farmers in those villages due to their non-availability in the time of interview despite several attempts to contact them. Therefore, the researcher had to collect data from 114 farmers. The data collection took place during September to October 2016.

3.5 Selection of Variables

The success of a research depends on appropriate selection of variables. Improper and inconsistent selection of variables may lead error in result. The researcher took adequate care in selection of the variables for the study considering personal, psychological, social and economical factors of the rural people.

3.6 Measurement of Variables

A variable is any characteristics, which can assume varying or different values in successive individual cases (Ezekiel and Fox, 1959). An organized piece of research usually contains at least two variables viz., dependent and independent variable. The variables that can take different values and can cause corresponding changes in other variables. The explanatory variables of the study were 10 selected characteristics of the potato farmers. These were age, education, annual income, organizational participation, investment in potato cultivation, land under potato cultivation, use of post-harvest practices in potato cultivation, farm to market distance, storage facilities, and accessibility to market information. The variables those would be affected during research are called dependent variables. In this study, the dependent variables has been considered as extent of marketing problems faced by the potato growers. The methods and procedures in measuring these variables are presented below:

3.6.1 Measurement of independent variables

The independent variables were operationalized as follows:

3.6.1.1 Age

Age of a farmer referred to the period of time from his/her birth to the time of interview. It was measured in terms of actual years on the basis of his/her statement. One (1) score was assigned for each year of his/her age.

3.6.1.2 Education

Education was measured by the year of schooling. Educational level of the respondent farmers was measured on the basis of completed years of schooling in an academic institute. If a respondent did not attain formal education, his score was assigned as zero (0). A score of 0.5 was assigned to a respondent who only could sign his/her name. A score of one (1) was assigned for each year of schooling, i.e. 10 for S.S.C, 12 for H.S.C., and so on

3.6.1.3 Annual family income

The annual family income has been used to refer to the total earnings of the respondents and the members of his family both from agricultural and non-agricultural sources during a year. It was expressed in Tk. To measure this variable, the total earning in taka of a respondent was converted to score. A score of one (1) was given for each one thousand taka.

3.6.1.4 Organizational participation

The organizational participation score was computed for each respondent on the basis of his/her membership with seven different types of organizations. The following scale was used for computing the organizational participation score.

Categories of participation:	Score
No participation	0
Participation as ordinary member	1
Participation as executive member	2
Participation as executive officer	3

Each membership category was multiplied by duration of membership. If a respondent had membership in two or more organizations his scores were

computed by adding the scores obtained for each organization according to the categories of his membership. Organizational participation score of a respondent for each organization was obtained by adding the scores according to the formula mentioned below:

$$\text{Organizational Participation} = \sum P \times D$$

Where,

P= Participation score

D= Duration score

Finally, organizational participation score was measured by the scores obtained from all the nine selected organizations.

3.6.1.5 Investment in potato cultivation

Investment in potato cultivation has been used to refer to the total investments that are expended in different sector for potato cultivation during a year. It was expressed in Tk. To measure this variable, the total taka of a respondent was converted to score. A score of one (1) was given for each thousand taka.

3.6.1.6 Land under potato cultivation

Land under potato cultivation has been used to refer to the size of land where potato has been cultivated. It was expressed in hectare. To measure the variable, the total land of a respondent that the information was collected as local unit was converted to hectare.

3.6.1.7 Use of post-harvest practices in potato cultivation

Post-harvest practices means the doing of component technology of potato production in recommended way during harvesting to marketing. Use of post-harvest practices in potato cultivation was measured by computing a score on the basis of potato grower's responses to six questions. The score obtained by a respondent for responses of the entire six questions were added together to compute their use of post-harvest practices. Scores were assigned for use of post-harvest practices in potato cultivation were 4, 3, 2, 1 and 0 for regularly,

often, occasionally, rarely and not at all, respectively. Thus, the use of post-harvest practices in potato cultivation score of the respondent could range from 0 to 24, where '0' indicated no use of post-harvest practices and '24' meant the high use of post-harvest practices.

3.6.1.8 Farm to market distance

Farm to market distance was measured by asking the question "what is the distance of market place from your farm or home"? The respondents replied based on their idea. It was expressed in kilometer.

3.6.1.9 Storage facilities

Storage facilities of potato growers were identified as field store, at home and cold store. Scores assigned for storage facilities were 4, 3, 2, 1 and 0 for very high, high, moderate, low and not at all, respectively. Thus, the score of the storage facilities score could range from 0 to 12.

3.6.1.10 Accessibility to market information

Accessibility of marketing information of the respondent was measured by computing a score on the basis of potato growers' reply to six questions. The score obtained by a respondent for responses of the entire six questions were added together to compute their accessibility of marketing information scores. Scores assigned for accessibility to market information were 4, 3, 2, 1 and 0 for highly, fairly, moderately, low and not accessible at all respectively. Thus the score of the accessibility of marketing information respondent could range from 0 to 24, where '0' indicated not accessible of any to market information and '24' meant the highest accessible of respondent to market information.

3.6.2 Measurement of dependent variable

Marketing problems of potato growers was the only dependent variable of this study. Nine problems were selected for the study after thorough consultation with relevant experts and farmers. Besides, review of literature was searched for identifying marketing problems. The respondents were asked to respond to five responses as 'very high problem', 'high problem', 'moderate problem', 'low problem' and 'no problem' for each of nine selected problems based on their extent of problem confrontation. Scores were assigned to those alternative responses as 4, 3, 2, 1, and 0, respectively. Score of problem faced in potato marketing of a respondent was computed by adding all the scores obtained by those responses from all the nine problem items. Thus, the problem faced in potato marketing of the potato growers could range from 0 to 36 where '0' indicated no problem and '36' indicated highest problem in potato marketing.

To compare severity among different problems, a Problem Confrontation Index (PCI) was measured as follows:

$$PCI = (P_{vh} \times 4) + (P_h \times 3) + (P_m \times 2) + (P_l \times 1) + (P_n \times 0)$$

Where,

PCI = Problem Confrontation Index

P_{vh} = Number of potato growers faced very high problem

P_h = Number of potato growers faced high problem

P_m = Number of potato growers faced moderate problem

P_l = Number of potato growers faced low problem

P_n = Number of potato growers faced no problem.

3.7 Hypothesis of the Study

Goode and Hatt (1952) defined hypothesis as “proposition which can be put to a test to determine its validity”. It may prove to be correct or incorrect in any event, however, it leads to empirical test. Hypothesis may be divided into two categories such as research hypothesis and null hypothesis.

3.7.1 Research hypothesis

The following research hypothesis was put forward to test contribution of the selected characteristics of the farmers to their exploration of marketing problems of potato. The research hypothesis was “Selected characteristics of the potato grower had significant contribution to their potato marketing problems”.

3.7.2 Null hypothesis

In order to conduct statistical tests, the research hypotheses were converted to null form. Hence, the null hypotheses were as follows:

“The selected characteristics of the potato growers had no contribution to their marketing problems of potato”.

3.8 Data Processing and Analysis

For data processing and analysis the following steps were followed:

3.8.1 Compilation of data

After compilation of field survey, data from all the interview schedules were compiled, tabulated and analyzed according to the objectives of the study. In this process, all the responses in the interview schedule were given numerical coded values. Local units were converted into standard units and qualitative data were converted into quantitative data by assigning suitable scores whenever necessary. The responses of the question in the interview schedule

were transferred to a master sheet to facilitate tabulation. Tabulation was done on the basis of categories developed by the investigator herself.

3.8.2 Categorization of respondents

For describing the various independent and dependent variables, the respondents were classified into various categories. In developing categories the researcher was guided by the nature of data and general consideration prevailing in the social system. The procedures have been discussed while describing the variable in the subsequent sections of next Chapter.

3.9 Statistical Techniques Used

Data collected from the respondents were compiled, coded, tabulated and analyzed in accordance with the objectives of the study. Various statistical measures such as frequency counts, percentage distribution, average and standard deviation were used in describing data. SPSS (version 20) computer program were used for analyzing the data. The categories and tables were used in describing data. The categories and tables were also used in presenting data for better understanding. To find out the contribution of identified selected characteristics of the potato growers to their marketing problems of potato, multiple regression was used. Throughout the study, at least five percent (0.05) level of probability was used as basis of rejecting a null hypothesis.

CHAPTER IV

RESULTS AND DISCUSSION

This Chapter deals with the result and discussion of present research work. Necessary explanations and appropriate interpretations have also been made showing possible and logical basis of the findings. However, for convenience of the discussions, the findings are systematically presented in the following sections.

4.1 Selected Characteristics of the Respondent Potato Farmers

The ten selected characteristics of the respondent potato growers were age, education, annual income, organizational participation, investment in potato cultivation, land under potato cultivation, use of post-harvest practices in potato cultivation, farm to market distance, storage facilities, and accessibility of marketing information.

4.1.1 Age

The age of the potato growers ranged from 24 to 55 years with a mean and standard deviation of 38.69 and 9.00, respectively. However, based on their age the respondents were classified into three categories namely young, medium and old aged. The distribution of potato growers according to their age are presented in Table 4.2.

Table 4.2 Distribution of the respondent potato farmers' according to their age

Categories	Frequency	Percent	Mean	SD
Young aged (<35)	45	39.40	38.69	9.00
Middle aged (35-50)	52	45.60		
Old aged (>50)	17	15.00		
Total	114	100.00		

Data represented in Table 4.2 indicate that the highest proportion (45.6%) of the potato growers belonged to middle aged, while 39.4 percent belonged to young aged category and the lowest proportion were made by the old aged category (15.0%). Data also indicate that the young and middle aged potato growers constitute about 85.0 percent of the respondents. It is expected that the younger and middle aged farmers generally tend to involve in potato production than the older. The age distribution of this area influences the production trend. Because young and middle aged group people are innovative and risk bearing. Generally, young and middle aged people completed all task of production effectively and timely in order to attain with more and appropriate production.

4.1.2 Education level

Education score of the respondent's ranged from 0 to 12 with a mean and standard deviation of 4.74 and 3.79, respectively. However, based on their educational level, the potato growers were classified into four categories as shown in Table 4.3.

Table 4.3 Distribution of the respondent potato farmers 'according to Their education

Categories	Frequency	Percent	Mean	SD
Illiterate (0-0.5)	32	28.10	4.74	3.79
Primary level (1-5)	42	36.90		
Secondary level (6-10)	29	25.40		
Above secondary level (>10)	11	9.60		
Total	114	100.00		

Result shown in Table 4.3 mean that among the potato growers 36.9 percent had primary education compared to 28.1 percent illiterate, 25.4 percent had secondary level education and only 9.0 percent had above secondary level education. It was found that appreciable proportions (62.3%) of the potato growers were primary and secondary level educated. The situation might appear to be quite normal in a usual background of Bangladesh.

4.1.3 Annual family income

The annual family income of the potato growers ranged from 85.50 to 331 thousand Taka with a mean and standard deviation of 167.14 and 66.15 respectively. However, based on their annual income, the farmers were classified into three categories such as low, medium and high income. The distribution of potato growers according to their annual family income are presented in Table 4.4.

Table 4.4 Distribution of the respondent potato farmers' according to their annual family income

Categories	Frequency	Percent	Mean	SD
Low income (<102)	15	13.50	167.14	66.15
Medium income(102-233)	81	70.30		
High income (>233)	18	16.20		
Total	114	100.00		

Information contained in Table 4.4 reveal that the potato grower's family having medium income constitute the highest proportion (70.3%) and the potato growers family having low and high annual income constitute 13.5 percent and 16.2 percent respectively. Generally higher income gives an individual better status in the society. Therefore, the higher incomes increase the risk taking capacity of the farmers in potato cultivation (Anower, 2012).

4.1.4 Organizational participation

Organizational participation of the potato growers ranged from 1 to 14 with a mean and standard deviation of 5.75 and 2.91, respectively. However, based on their organizational participation, the farmers were classified into three categories viz. low level participation, medium level participation and high level participation on the basis of their observed score. The distribution of potato growers according to their organizational participation are presented in Table 4.5.

Table 4.5 Distribution of the respondent potato farmers' according to their organizational participation

Categories	Frequency	Percent	Mean	SD
Low organizational participation (<4)	29	25.50	5.75	2.91
Medium organizational participation (4-8)	66	57.80		
High organizational participation (>8)	19	16.70		
Total	114	100.00		

Data shown in table 4.5 indicate that the medium level organizational participation constitutes the highest proportion (57.8%), while 25.5 percent had low level participation and 16.7 percent had high participation. More organizational participation could create opportunity for receiving improved technology and information. The potato growers with more organizational participation lead to use more sources of information and facilities of potato marketing. The farmers who have low and medium organizational participation might face marketing problems negatively, but those who have high organizational participation could face marketing problems positively.

4.1.5 Land under potato cultivation

Land under potato cultivation of the potato growers ranged from 0.04 to 0.61ha with a mean and standard deviation of 0.18 and 0.10, respectively. The farmers were classified into three categories on the basis of their land under potato cultivation which are shown in Table 4.7.

Table 4.6 Distribution of the respondent potato farmers' according to their total land under potato cultivation

Categories	Frequency	Percent	Mean	SD
Small potato farm (<0.09)	25	22.10	0.18	0.10
Medium potato farm (0.09-0.27)	56	48.80		
Large potato farm (>0.27)	33	29.10		
Total	114	100.00		

Data shown in Table 4.7 indicate that the potato growers had medium potato farm constitutes the highest proportion (48.8%) followed by having large potato farm (29.1%) and 22.1 percent constitutes small potato farm.

4.1.6 Investment in potato cultivation

Investment in potato cultivation of the potato growers ranged from 3.40 to 48 thousand taka with a mean and standard deviation of 14.88 and 8.74, respectively. However, based on their investment in potato cultivation, the farmers were classified into three categories viz. low, medium and high level of investment. The distribution of potato growers according to their investment in potato cultivation are presented in Table 4.6.

Table 4.7 Distribution of the respondent potato farmers' according to their investment in potato cultivation

Categories	Frequency	Percent	Mean	SD
Low investment (<7.0)	19	17.00	14.88	8.74
Medium investment (7.0-23)	81	69.50		
High investment (>23)	14	13.50		
Total	114	100.00		

Information contained in Table 4.6 indicate that among the potato growers the medium level investment constitutes the highest proportion (69.5%) followed by low level investment (17%) and 13.5 percent had high investment.

Investment in potato cultivation is quite likely to be inter-linked with total land under potato cultivation and annual family income of the potato growers. In order to reduce marketing problems, the respondents should invest on the basis of their total land under potato cultivation. However, it was observed that 86.50 percent of the potato growers had low to medium level of investment in potato cultivation.

4.1.7 Use of post-harvest practices in potato cultivation

Use of post-harvest practices in potato cultivation of the potato growers ranged from 8 to 19 against the possible range of 0 to 24 with a mean and standard deviation of 14.06 and 2.05, respectively. The distribution of potato growers according to their use of post-harvest practices are presented in Table 4.8.

Table 4.8 Distribution of the respondent potato farmers' according to their use of post-harvest practices in potato cultivation

Categories	Frequency	Percent	Mean	SD
Low use (≤ 12)	30	26.4	14.02	2.08
Medium use(13-16)	74	64.8		
High use(>16)	10	8.8		
Total	114	100.0		

Data shown in Table 4.8 reveal that 64.8 percent of the potato growers fell under medium use of post-harvest practices category followed by low use of post-harvest practices category (26.4%), however only about 8.8 percent fell under high use of post-harvest practices category. Use of post-harvest practices in potato cultivation of the potato growers plays an important role in marketing of potato. The combined score of low and medium use of post-harvest practices constituted the highest proportion (91.2%) of the potato growers which might not help them to create a satisfactory situation for marketing of potato.

4.1.8 Farm to market distance

Farm to market distance expressed in the distance in kilometer from the farmers farm and also home. Farm to market distance of the potato growers ranged from 3 to 5 km with a mean and standard deviation of 4.44 and 0.69 respectively. The distribution of potato growers according to their farm to market distance are presented in Table 4.9.

Table 4.9 Distribution of the respondent potato farmers' according to their farm to market distance

Categories	Frequency	Percent	Mean	SD
Short distance (≤ 3)	16	14	4.44	0.69
Medium distance (4-5)	42	36.8		
Long distance (> 5)	56	49.1		
Total	114	100.0		

Table 4.9 indicated that about 49.1 percent potato grower's stayed in high distance and 36.8% were stayed in medium distance and 14 percent stayed in short distance. Long distance is not effective for marketing of any product. On the other hand, it is difficult to collect information from long distance place and requires transportation. Short distance of marketing place is more effective in consideration of marketing information and transportation.

4.1.9 Storage facilities

Storage facilities of the potato growers ranged from 2 to 4 kilometer with a mean and standard deviation of 2.78 and 0.71, respectively. The farmers were classified into three categories according to their storage facilities which are presented in Table 4.10.

Table 4.10 Distribution of the respondent potato farmers' according to their storage facilities

Categories	Frequency	Percent	Mean	SD
Very low storage facilities (≤ 2)	44	38.6	2.78	0.71
Low storage facilities (≤ 3)	51	44.7		
Medium storage facilities (> 3)	19	16.7		
Total	114	100.0		

Data contained in Table 4.10 indicate that 44.7 percent of the potato growers had low storage facilities, while 38.6 percent had very low storage facilities and 16.7 percent had medium storage facilities. Again findings show that a large amount of (83.30%) of potato growers had very low to medium storage facilities. When the farmers have the opportunities to store his potato then he gets the chance to sell his product in the off-season. From where he gets the high price. But unfortunately in the study area storage facility is not up to the mark.

4.1. 10 Accessibility to market information

The observed score of accessibility to market information of the potato growers ranged from 10 to 17 against the possible range of 0 to 24 with a mean and standard deviation of 13.03 and 1.49, respectively. However, based on their accessibility to market information, the farmers were classified into three categories such as low level market information, medium level market information and high level market information. The distribution of potato growers according to their accessibility to market information are presented in Table 4.11.

Table 4.11 Distribution of the respondent potato farmers' according to their accessibility to market information

Categories	Frequency	Percent	Mean	SD
Low accessibility (<12)	19	16.6	13.03	1.49
Medium accessibility (12-15)	90	79		
High accessibility (>15)	5	4.4		
Total	114	100.0		

Information contained in Table 4.11 indicate that the highest proportion (45.6%) of the potato growers were in medium accessibility group, while 37.7 percent respondents were in low accessibility group and 16.7 percent were in high accessibility group. Most of the potato growers of the study area had low to medium accessibility to market information but it is necessary to have available market information for attaining highest market price.

4.2 Marketing Problems of the Potato Farmers

Marketing problems of the potato growers was measured on the basis of 9 problem items. Marketing problems of the potato growers score of a respondent was determined by adding all the 9 problem items. Thus marketing problems score could range from 0 to 36, where 0 indicating no problem and 36 indicating high problem of potato marketing.

However, based on observed score of their marketing problems, the farmers were classified into two categories such as, medium problem and high problem. The distribution of potato growers according to their marketing problems are presented in Table 4.12.

Table 4.12 Distribution of the respondent potato farmers' according to their marketing problems

Categories	Frequency	Percent	Mean	SD
Medium problem (≤ 22)	55	48.2	22.29	1.71
High problem (> 22)	59	51.8		
Total	114	100.0		

Data shown in Table 4.12 reveal that among the potato growers the highest 51.8 percent belonged to high problem group followed by 48.2 percent in medium problem group and among the respondents there was no low problem group. The findings indicate that all the potato growers of the study area had medium to high marketing problems. The reason may be potato cultivation require higher level of education, high annual family income, high investment, increasing use of post-harvest practices, less farm to market distance, increasing storage facilities and increasing accessibility to market information. Most of the potato farmers in the study are lacking in all most all those motivating factors resulting to confront medium to high problems in potato marketing.

4.3 Comparison among Various Problems in potato marketing

To compare the severity among different problems in potato marketing, problem confrontation index (PCI) was calculated. The observed problem faced index in potato marketing ranged from 156 to 443 against the possible range of 0 to 456. The formula for determining PFI has been shown in Chapter 3. The selected nine problems faced by the respondents which were arranged in rank order according to their descending order of problem confrontation index (PCI) as shown in Table 4.13.

Table 4.13 Rank order of nine selected problems faced by the respondent potato growers in potato marketing

Problems	Extent of problem faced					PCI	Rank order
	Very high problem (4)	High problem (3)	Moderate problem (2)	Low problem (1)	No problem (0)		
Low price	412	27	4	0	0	443	1
Lack of cold storage facilities	348	81	0	0	0	429	2
Price fluctuation	40	189	82	0	0	311	3
Lack of marketing information	4	111	148	2	0	265	4
Lack of post-harvest knowledge	4	123	102	21	0	250	5
Repayment of loan or due	4	96	120	19	0	239	6
Lack of home storage facilities	0	54	160	16	0	230	7
Presence of middleman	0	21	160	27	0	208	8
Transportation problem	0	0	102	54	0	156	9

PCI = Problem Confrontation Index

N = 114

Information contained in Table 4.13 indicate that among the nine problems low price, lack of cold storage facilities and price fluctuation ranked highest three respectively. In the time of potato harvesting, the price of potato was so low and even the potato growers cannot found their actual money investment. Hence, low price of potato was one of the major problems in the selected area.

In the study area, lack of cold storage facilities was ranked second marketing problem. Because, among the five villages in the study area, two villages are deprived of electricity. On local market near to the study area, load shedding is a common problem. Hence, lack of cold storage facilities was also a major problem in the study area.

Another major problem was price fluctuation of potato. In the study area, the price of potato was so low during harvesting, because potatoes are available on the market on that period. But in off-season the price of potato had been increased as findings of the study indicate that a large amount of (83.30%) the potato growers had very low to medium storage facilities. When the farmers have the opportunities to store his potato then he gets the chance to sell his product in high in the off-season. But unfortunately in the study area storage facility is not up to the mark.

Among the nine problems transportation problem, presence of middleman and lack of home storage facilities ranked lowest three problems, respectively.

4.4 Contribution of the Selected Characteristics of the Potato Growers to Their Marketing of Potato

For this study 10 characteristics of the potato growers were selected and each of the characteristics was treated as independent variables. The selected characteristics were age (x_1), education(x_2), annual income (x_3), organizational participation (x_4), investment in potato cultivation (x_5), land under potato cultivation (x_6), use of post-harvest practices in potato cultivation (x_7), farm or to market distance (x_8), storage facilities (x_9), and accessibility to market information (x_{10}). Extent of marketing problems of potato farmers was the only dependent variable of this study.

Then full model regression analysis was initially run with the 10 independent variables. But it was observed that the full model regression results were misleading due to the existence of interrelationships among the independent

variables. So that, in order to avoid the misleading results and to determine the best explanatory variables, the method of multiple regressions was administered and 10 independent variables were finally fitted together in enter multiple regression analysis which shown in Table 4.13.

Table 4.14 Multiple regression analysis between the dependent variable and independent variables of the study

Dependent variable	Independent variable	Beta	P	R ²	Adj. R ²	F	P
Marketing problems of potato farmers	Age	0.256	0.002***	0.561	0.518	13.14	0.000***
	Education	-0.230	0.002***				
	Annual Family income	-0.195	0.046**				
	Organizational participation	-0.115	0.145				
	Land under potato cultivation	-0.219	0.492				
	Investment in potato cultivation	0.153	0.637				
	Use of post-harvest practices in potato cultivation	-0.183	0.011**				
	Farm to market distance	0.314	0.000***				
	Storage facilities	-0.255	0.000***				
	Accessibility to market information	-0.333	0.000***				

*** Significant at $p < 0.01$

** Significant at $p < 0.05$

Information contained in Table 4.14 show that there is a significant contribution of respondent's age, education, annual family income, use of post-harvest practices in potato cultivation, farm to market distance, storage facilities, and accessibility to market information to their marketing problems.

Of these, age, education, farm to market distance, storage facilities, and accessibility to market information were the most contributing factor (significant at 1% level of significance). Annual family income and use of post-harvest practices in potato cultivation were also the important contributing factors (significant at 5% level of significance) to their marketing problems.

56 percent ($R^2=0.561$) variation of the potato growers marketing problems can be attributed to their age, education, annual family income, use of post-harvest practices in potato cultivation, farm to market distance, storage facilities, and accessibility to market information making this an excellent model (Table 4.14). The F value indicates that the model is significant ($p<0.000$).

However, each predictor may explain some of the variance in respondents' marketing problem simply by chance. The adjusted R-square value penalizes the addition of extraneous predictors in the model, but values of 0.518 still show that the variance in respondents' marketing problem can be attributed to the predictor variables rather than by chance, and that both are suitable models (Table 4.14). In summary, the models suggest that the respective authority should consider the respondents' age, education, annual family income, use of post-harvest practices in potato cultivation, farm to market distance, storage facilities, and accessibility to market information and in this connection some predictive importance has been briefly discussed below:

4.4.1 Age

From multiple regression, it was concluded that age had significant positive contribution to their marketing problems of potato growers. This implies that with the increase in the age of the potato growers their potato marketing problem is increased.

Age play an important role in facing marketing problems. The findings showed that young to middle aged potato growers face low marketing problems than the old aged. The young to middle aged persons had frequent contact with printed materials and were exposed to various external sources which increase

the power of understanding. So, age of the potato growers does influence potato marketing and aged potato growers face more problem than the younger.

4.4.2 Education

Multiple regression showed that the education level of the potato growers had significant negative contribution to their marketing problems. This implies that with the increase of education level of the potato grower's potato marketing problem is decreased.

Findings show that most of the potato growers (71.90%) had access to any level of education. Education level of the potato growers does influence potato marketing and educated potato growers facing minimum problem than non-educated.

4.4.3 Annual family income

From multiple regression, it was found that annual family income had significant negative contribution to the marketing problems of potato growers. This implies that with the increase of annual income of the respondent's potato marketing problem is decreased.

In the study area overwhelming majority (86.50%) of the potato growers had medium to high annual family income. It means that farmers can spend some money on potato marketing. For example he can take his product to distant market (upazila, district) where the price is higher than the local market.

Annual family income helps a farmer to meet the challenges of potato marketing and higher annual income lead to fewer marketing problems of potato.

4.4.4 Use of post-harvest practices in potato cultivation

From multiple regression, it was found that use of post-harvest practices in potato cultivation had significant negative contribution to the marketing problems of potato growers. This means that with the increase of use of post-

harvest practices in potato cultivation of the respondent's potato marketing problem is decreased.

4.4.5 Farm to market distance

Multiple regression showed that farm to market distance had significant positive contribution to the marketing problems of potato growers. This means that with the increase of farm to market distance of the respondent's potato marketing problem is increased. So potato growers who had long farm to market distance face more problem than who had short distance.

4.4.6 Storage facilities

From multiple regression, it was found that storage facilities had significant negative contribution to the marketing problems of potato growers. This implies that with the increase of storage facilities of the respondent's, potato marketing problem is decreased. Storage facilities of the potato grower's doe's influence potato marketing and potato growers face more problems who have low storage facilities.

4.4.7 Accessibility to market information

Multiple regression showed that accessibility to market information had significant negative contribution to the marketing problems of potato growers. This means that accessibility to market information of the potato growers was an important factor in marketing problems and with the increase of accessibility to market information of the respondent's potato marketing problem is decreased.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This Chapter presents summary of findings, conclusions and recommendations of the study.

5.1 Summary of Findings

The major findings of the study are summarized below:

5.1.1 Selected characteristics of the potato growers

5.1.1.1 Age

The highest proportion (45.4%) of the potato growers belonged to middle aged category while 39.4 percent belonged to young aged category and only 15 percent were old aged category.

5.1.1.2 Education

The highest proportion (36.9 %) of the potato growers had primary level education, while 28.1 percent were illiterate and 25.4 percent had secondary level education and 11 percent had above secondary level education.

5.1.1.3 Annual family income

The potato grower's family having medium income constitute the highest proportion (70.3 %) and the potato growers family having low and high annual income constitute 13.5 percent and 16.2 percent respectively.

5.1.1.4 Organizational participation

Among the potato growers the medium level organizational participation constitutes the highest proportion (57.8%) followed by low level participation (25.5%) and 16.7 percent had high level participation.

5.1.1.5 Land under potato cultivation

The potato growers had medium potato farm constitutes the highest proportion (48.8%) followed by having large potato farm (29.1% and 22.1% constitutes small potato farm.

5.1.1.6 Investment in potato cultivation

Among the potato growers the medium level investment constitutes the highest proportion (69.5%) followed by low level investment (17%) and 13.5 percent had high investment

5.1.1.7 Use of post-harvest practices in potato cultivation

In consideration the observed score, 64.8 percent of the potato growers fell under medium use of post-harvest practices category followed by low use of post-harvest practices category (26.4%), however only about 8.8 percent fell under high use of post-harvest practices category.

5.1.1.8 Farm to market distance

About 49.1 percent potato grower's stayed in high distance and 36.8 percent were stayed in medium distance and 14 percent stayed in short distance.

5.1.1.9 Storage facilities

About 44.7 percent of the potato growers had medium storage facilities, while 38.6 percent had low storage facilities and 16.7 percent had storage facilities.

5.1.1.10 Accessibility to market information

The highest proportion (45.6%) of the potato growers were in medium accessibility group, while 37.7 percent respondents were in low accessibility group and 16.7 percent were in high accessibility group.

5.1.2 Extent of marketing problems of potato farmers

Among the potato growers the highest (51.8%) belonged to high problem group followed by 48.2 percent in medium problem group.

5.1.3 Comparison among different problems in potato marketing

Among the nine problems low price, lack of cold storage facilities and price fluctuation ranked highest three respectively and transportation problem, presence of middleman and lack of home storage facilities ranked lowest three problems respectively.

5.1.4 Contribution of the selected characteristics of potato growers to their marketing problems

Out of the 10 independent variables, only two variables namely age and farm to market distance had positive significant contribution to their marketing problems of potato and five variables namely education, annual family income, use of post-harvest practices in potato cultivation, storage facilities, and accessibility to market information had negative significant contribution to their exploration of marketing problems of potato.

5.2 Conclusions

Based on the findings and their logical interpretations in the light of relevant facts the researcher has drawn the following conclusions:

1. The findings of the study revealed that all of the respondents had medium to high potato marketing problems. Therefore, it may be concluded that there is high necessity to decrease the marketing problems of the potato growers.
2. Overwhelming majority of the potato growers were young and middle aged. Multiple regression show that age had positive significant contribution to their marketing problems of potato. In the view of above facts, it may be concluded that the young and middle aged potato growers faced less marketing problems than the old aged potato growers.
3. Multiple regression showed that farm to market distance had significant positive contribution to their marketing problems. Whereas overwhelming majority of the respondents had medium to high farm to market distance Therefore, it may be concluded that any arrangement to establish marketing facilities nearby the potato growers would ultimately decrease marketing problems of potato growers.
4. Vital part of potato growers were under the group of illiterate and primary education. Multiple regression show that education had negative significant contribution to their marketing problems of potato. Therefore, it may be concluded that educated farmers face less marketing problems of potato than non-educated farmers.
5. Multiple regression show annual family income had negative significant contribution to their marketing problems of potato. Therefore, it may be concluded that the farmers having high annual income face less marketing problems of potato.

6. From multiple regression, it was found that use of post-harvest practices in potato cultivation had significant negative contribution to the marketing problems of potato growers. Whereas majority of the potato growers used low to medium post-harvest practices in potato cultivation. Therefore it may be concluded that any arrangement to increase post-harvest knowledge of the potato growers would ultimately reduce their problems in potato marketing.
7. Overwhelming majority of the respondents had low to medium storage facilities. Therefore, it may be concluded that storage facilities was less satisfactory to the respondent's potato growers. From multiple regression, it was found that had storage facilities had negative significant contribution to their marketing problems of potato. Therefore, it may be concluded that potato growers having low storage facilities face high marketing problems of potato.
8. Huge number of the potato growers had medium access to market information of potato marketing. From multiple regression, it was found that access to market information had significant negative contribution to the marketing problems of potato growers. Therefore it may be concluded that any arrangement to increase access to market information would ultimately reduce their problems in potato marketing.

5.3 Recommendations

5.3.1 Recommendations for policy implications

The following recommendations were made on the basis of the findings and their logical interpretations:

1. Department of Agricultural Marketing (DAM) as well as government should take collaborative steps to minimize the marketing problems of the potato growers.
2. It is necessary to create scope for the old farmers for potato cultivation. As well as proper support (subsidy, loan etc) for the other aged potato growers is also necessary.
3. Education had significant negative contribution to the marketing problems of potato growers. A good amount of respondents in the study area had primary education and illiterate. To overcome this condition arrangement should be made for providing functional education as well as training facilities on different aspect of potato cultivation.
4. Proper steps should be taken for increasing the annual income of the potato growers by creating the opportunities of off farm income. The concerned authorities should also increase the availability of credit from any commercial bank or non-government organization.
5. Motivational campaigning to be arranged for the potato growers, so that they can adopt modern post-harvest technologies of potato to minimize marketing problem.
6. It is necessary to increase the marketing facilities near by the potato growers.

7. Storage facilities need to be improved to minimize marketing problems potato.
8. The concerned authorities should increase the accessibility to market information of the potato growers.

5.3.2 Recommendations for further study

The following suggestions are put forward for further research studies:

1. The present study was conducted in Tetulia upazila under Panchagarh district. So, similar studies should be undertaken in other parts of the country to get a clear view of the potato growers' marketing problem of the whole country which will be helpful for effective policy formulation.
2. Contributions of the ten characteristics of the potato growers to their marketing problems were investigated in this study. Further research should be conducted by taking other characteristics of the potato growers to explore their marketing problems.
3. Training exposure of the potato growers may be intensively investigated to indentify the potato grower's problems.
4. Organizational participation, investment in potato cultivation and land under potato cultivation had no contribution to their marketing problems of potato. Therefore, further research is necessary to verify the contribution of these characteristics.

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APPENDIX-A

English version of the interview schedule

DEPARTMENT OF AGRICULTURAL EXTENSION AND INFORMATION
SYSTEM

SHER-E –BANGLA AGRICULTURAL UNIVERSITY, DHAKA 1207

An interview schedule on

**“Exploration of Marketing Problems of Potato Farmers in Tetulia Upazila
under Panchagarh District”**

Serial No :
Name of respondent :
Village :
Upazila :
District :
Contact number :

Please answer the following questions. Secrecy will be strictly maintained

1. **Age:** How old are you?

Age..... Years

2. **Education:** What is the level of your education?

a. Illiterate b. Can sign only c. Have passed class.....

3. Annual Family income:

Please mention your annual family income in Taka from each of the following sources.

a) Agriculture:

1. Crops:

Name of The Product	Total Production	Price/unit (Tk)	Total price (Tk)
Rice			
Wheat			
Jute			
Maize			
Potato			
Vegetables			
Fruits			
8.Others			
Total			

2.Livestock:

Name of the product	Total production(local unit)	Price/unit (Tk)	Total Price (Tk)
Milk product			
Cow dung			
Goat rearing			
Poultry rearing (chick+duck)			
Eggs			
Others			
Total			

b) Non Agriculture:

Name of the Sources	Taka/month	Taka/ Year
Labor		
Van/ Rickshaw		
Small business		
Service		
Others		
Total		

Total annual family income =

a(1+2)+b=.....Tk

4. Organizational Participation: (Please furnished the following information)

Sl No.	Name of the organization	Nature of participation(year)			
		No participation	Ordinary member	Executive member	President/Secretary
1.	Eidgah Committee				
2.	School Committee				
3.	Mosque/Temple committee				
4.	Bazar committee				
5.	Co-operative society				
6.	NGO organized society				
7.	Deep tube well committee				
8.	Union Parishad committee				
9.	GO organized society				

5. Total Land under Potato Cultivation.....(ha)

6. Investment in Potato Cultivation

Sectors	Tk/Year
a. Seed	
b. Fertilizer	
c. Pesticide	
d. Irrigation	
e. Labour	
f. Transportation	
Total	

7. Use of Post-harvest Practices in Potato Cultivation: How frequently you use the following post-harvest technology

SL. No.	Items of quality control	Degree of use				
		Regularly	Often	Occasionally	Rarely	Not at all
a.	Halm pulling					
b.	Drying					
c.	Cleaning					
d.	Grading					
e.	Curing					
f.	Packaging					

8. Farm to Market Distance : (please mention the distance of market place from your farm or home)

Distance.....Km

9. Storage Facilities: (Please furnished the following information's)

SI. No.	Items	Degree of Facilities				
		Very high	High	Moderate	Low	Not at all
1.	Field storage					
2.	Home storage					
3.	Cold storage					

10. Accessibility to Market Information: (Please furnished the following information's)

SL. No.	Items	Highly	Fairly	Moderately	Low	Not accessible at all
a.	Information about market price					
b.	Information about ware housing					
c.	Information about quality inputs					
d.	Information related to production					
e.	Information about product demand					
f.	Information about marketing facilities					

11. Marketing Problems of Potato Farmers: Mention the extent of the following problems you face during marketing?

Sl. No	Problems	Very high	High	Moderate problem	Low	No problem
1.	Lack of cold storage facilities					
2.	Lack of home storage facilities					
3.	Price fluctuation					
4.	Low price					
5.	Presence of middleman					
6.	Repayment of loan or due					
7.	Transportation problem					
8.	Lack of post-harvest knowledge					
9.	Lack of marketing information					

Signature of the respondent

Date:

Signature of the interviewer

Date: