A COMPARISON BETWEEN CONTRACT AND NON CONTRACT POTATO FARMERS

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CERTIFICATE

This is to certify that the thesis entitled, ***A COMPARISON BETWEEN CONTRACT AND NON CONTRACT POTATO FARMERS*** *submitted to the* ***Faculty of Agriculture, Sher-e-Bangla Agricultural University, Dhaka-1207,*** *in partial fulfillment of the requirements for the degree of* ***MASTER OF SCIENCE IN AGRICULTURAL EXTENSION,*** *embodies the result of a piece of bonafide research work carried out by* ***DEBASHISH KAR, Registration No.: 09-03496*** *under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

I further certify that any help or source of information, received during the course of this investigation has been duly acknowledged.

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A LIST OF ABBREVIATIONS AND ACRONYMS

BADC		Bangladesh Agricultural Development Corporation
BBS	:	Bangladesh Bureau of Statistics
DAD		Deputy Assistant Director
DAE	:	Department of Agricultural Extension
DD		Deputy Director
et al.	:	And Others
GDP		Gross Domestic Product
GO	:	Government Organization
i.e.	:	That is
ISI	:	Informational Source Index
NGO	:	Non Government Organization
NS	:	Not-significant
SAAO		Sub Assistant Agricultural Officer
SAU	:	Sher-e-Bangla Agricultural University
SPSS	:	Statistical Package for Social Science
Tk.	:	Taka
UAO		Upazila Agricultural Officer
UNESCO		United Nations Educational, Scientific and Cultural Organization
viz.	:	Namely

*	:	Significant at 5% level of probability
**	:	Significant at 1% level of probability
***	:	Significant at 0.01% level of probability

ABSTRACT

The objective of the study was to identify differences in demographic and operational characteristics between contract and non contract potato farmers. Thirteen selected characteristics of both the contract and non contract farmers were studied. The focus was also to identify the influencing factors responsible for production related decisions and preferences of informational sources by the contract and non contract potato farmers. Data were collected during February, 2016 from 60 contract and 60 non contract farmers under Sadar upazila of Sherpur district. The descriptive statistics showed that there were huge differences between contract and non contract farmers in terms of their responses among various categories. On the other hand, independent sample *t*-test showed that there were significant differences between the contract and non contract farmers in respect of land under potato cultivation, income from potato cultivation, communication media exposure, training exposure, knowledge on potato cultivation and satisfaction towards potato cultivation. It also showed that, the influencing factors responsible for production related decisions varied between the contract and non contract farmers at various degrees of influences. Credit facilities influenced the contract farmers to the highest extent but it had no influence on potato cultivation by the non contract farmers. Whereas marketing facilities and success stories jointly hold the first rank as influencing factor to the non contract potato farmers. Besides those, among 10 specific informational sources, Deputy Assistant Director, BADC was preferred mostly by the contract potato farmers, whereas input dealers ranked 1st position in case of the non contract farmers.

INTRODUCTION

1.1 General Background

Bangladesh is one of the most densely populated countries in the world having a population of 149.77 million and area of 1,47,570 sq. km (Anonymous, 2014). Agriculture is the dominant economic activity in Bangladesh and regarded as the lifeline of the economy of Bangladesh. Its role is vital in enhancing productivity, profitability, income generation, employment and poverty alleviation in the rural areas for improving the livelihood of majority of the people. Agriculture sector contributes about 15.96 percent to the country`s Gross Domestic Product (GDP) (Economic Review, 2015). This sector employs more than 45 percent of total labor force (BBS, 2014). Economy of this country is almost entirely dependent on agriculture that supplies raw materials for industrial production and food-stuff for human and animal consumption. People got the opportunity to choose rice as the staple food because of this land. But increase in the production of rice has not been able to keep pace with the increase in population to feed them along with nutritional demand. In spite of dominance of agriculture in the national economy, Bangladesh is facing chronic food shortage due to rapid growth of population and has to import on an average 1.5 million tons of food grains in each year (BBS 2002). This was later planned to rise to 2.2 million metric tons which costs approximately 75 billion taka (1.1 billion USD) (WFP, 2010).

At present, potato is the second largest food crops in Bangladesh next to rice. The crop ranks first among the vegetables in Bangladesh both in respect of area and production (BBS, 2006). Potato is the third most important food crop in the world after rice and wheat in terms of human consumption (BADC, 2015). This crop is produced in 132 countries out of 193 independent countries of the world. At present, at least 40 countries eat potatoes as a staple food (Islam, 1987). Here, fertile land and moderate climate favors to the growth of various agricultural crops abundantly throughout the year. A variety of Agro Ecological Zones gives opportunity to cultivate various crops in

Bangladesh. Although cereals as well as other crops like potato grow well in this land, Bangladesh has to import huge amount of food grain and other commodities. This occurs because of several reasons. This country is over burdened with people and time to time this population is increasing. Along with is problem several natural calamities occur frequently in this land. So, keeping these problems on head, Bangladesh has to feed this increasing population, which is a big challenge. To face this challenge successfully, Bangladesh Government has taken multi fetched development programs, projects and action plans as a continuous basis for agricultural development through different organizations. Among those organizations, BADC was the pioneer organization which started green revolution in the country through supplying quality seed, fertilizer and irrigation to the farmers during sixties. BADC as a public organization is still providing basic agricultural inputs like seed, fertilizer and small scale irrigation to the farmers to a considerable extent. Now, seed sector of BADC has been strengthened remarkably as a policy of the Government to ensure food security of the country. BADC is still producing and marketing seeds of different crops in which potato is one of the major crops. The improvement of potato crop was started by importing "seed potato" at the Government level through BADC in early sixties. To reduce import of seed potato, 5 contract growers' zones were established in 1969. In 1985-86, potato production was brought under 0.11 million ha of land and produced 1.10 million tons (BBS 2000). With the increase of seed potato contract growers' zones, potato production jumped to 8.95 million tons covering an area of 0.46 million ha in 2013-14 (BBS 2014).

1.2 Statement of the Problem

Bangladesh is a developing country. Its resources are also limited. On the other hand, the literacy rate is also not satisfactory (61.5%) compared to other countries (UNESCO, 2015). There is a huge gap of technical knowledge of the farmers with regards to agricultural practices. They cultivate crops year after year mostly through the traditional way. The modern cultural practices are not

practiced by most of the farmers. Along with this, several improved cultivation practices are not suitable to this land. Bangladesh has to feed her people by mitigating these problems. Hence, the Government has to import huge amount of agricultural commodities from abroad. To get rid of this dependence on import of food grain, the higher authority has to look for possible ways for sustainable food security of the country. That's why Bangladesh Government is encouraging the farmers to grow more potato by supplying quality seeds and other various inputs through BADC.

At present, BADC is operating 16 seed potato contract growers' zones in 16 districts of Bangladesh. In the contract grower's zone, seed potato is being produced through contract farmers under the intensive supervision of the officials of BADC. It is experienced from the seed potato contract grower's zones that contract farmers can quickly learn modern practices of potato cultivation through technical supervision from the officials of BADC and initiate more potato cultivation beyond the contract. Other farmers, apart from contract growers have also started potato cultivation and their adoption of potato cultivation as well as cultivation technologies are diffused in the zone within short time. As a result, each zone became converted to potato production zone. The possible reasons may be that potato is a high value short duration crop, and potato cultivation is suitable for their cropping pattern as well as agro climatic conditions. It was evident that after establishing seed potato contract growers' zones in a particular area, farmers of that area are involved in potato cultivation and their socio-economic status are changed quickly. Therefore, the question may arise to give answers to issues like: how far the seed potato contract farming creates impact on socio-economic parameters of the farmers? In this study, the researcher made an attempt to find out the differences of contract and non contract potato farming as well as to identify the impact of seed potato contract farming on their socio-economic status. It may provide a valuable guideline for the researchers, planners, policy makers of the Government for programme development in order to ensure food security as well as upliftment of socio-economic status of the rural

people. In Sherpur district, farmers produce seed potato on contract basis with the Government organization like BADC since 2000. BADC is the only organization which is working with the farmers in terms of contract farming in the study area. About 16 years are passing but there was no single survey or any kind of research that have been conducted to find out the comparison of potato farming between the contract and non-contract farmers. This study was conducted to minimize this research gap. In this regard, this study attempted to find out the answers of the following research questions:

a. What are the differences between contract and non contract potato farmers in terms of their selected demographic and operational characteristics?
b. What are the mean differences between contract and non contract potato farmers in respect of their selected demographic and operational characteristics?
c. What are the influencing factors responsible for production related decisions by the contract and non contract potato farmers?
d. Which informational sources are preferred by the contract and non contract potato farmers in potato cultivation?

1.3 Objectives of the Study

The following specific objectives were framed out in order to give proper direction to the research work:

I. To compare between the contract and non contract potato farmers in order to describe their selected demographic and operational characteristics. The characteristics were:
    a. Age
    b. Level of education
    c. Farm size
    d. Suitable land for potato cultivation
    e. Land under potato cultivation
    f. Potato cultivation experience

g. Income from potato cultivation
h. Organizational participation
i. Communication media exposure
j. Training exposure
k. Knowledge on potato cultivation and
l. Satisfaction towards potato cultivation.

II. To measure the mean differences between the contract and non contract potato farmer in respect of their selected demographic and operational characteristics.

III. To identify differences in the influencing factors responsible for production related decisions by the contract and non contract potato farmers.

IV. To identify differences in informational sources preferred by the contract and non contract potato farmers in performing contract farming.

1.4 Assumptions of the Study

An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence (Carter, 1945). The researcher cherished the following assumptions keeping in mind while undertaking this study:

i. The respondents included in the sample for both contract and non contract potato farmers were capable of furnishing proper responses to the questions contained in the interview schedule.
ii. The information furnished by the respondents were valid and reliable.
iii. The respondents included in the sample were representative of the population of potato growers who cultivate through contract and non contract farming approach in the selected study area.
iv. The researcher who acted as interviewer was well-adjusted to the social environment of the study area. The data collection from the respondents was free from bias.

v. The selected characteristics of the respondents and 'the differences of contract and non contract farmers' of this study were normally and independently distributed with their respective means and standard deviation.

1.5 Scope and limitations of the Study

In the study area contract farming is being practiced in potato cultivation for quite sometimes. The findings of the study would be applicable to the potato growers of the area namely, Sadar upazila of Sherpur districts in particular but in general it would be applicable to other areas of Bangladesh where physical, socio-economic and cultural condition do not differ much from those of the study area. Thus the findings are expected to be useful to the researchers, planners and policy makers, extension workers and contract growers of BADC and other contractual organizations that raise potato through contract farming system. This might help to produce an important commodity like potato more effectively in future.

Due to various reasons, such as fund, time and other necessary resources available to the researcher and from the practical point of view, to make the study meaningful and manageable, this study has following limitations:

i. The study was confined in Sadar upazila of Sherpur district.
ii. There were many kinds of farmers in the study area, but only potato growers were considered for this study.
iii. Characteristics of the potato growers were many and diverse. But only 12 characteristics for each category of farmers were selected for investigation in this study.
iv. For information about the study, the researcher depended on data as furnished by the selected farmers during data collection.
v. Most of the respondents had a lower level of literacy which could be difficult to get accurate information as they do not keep written documents in respect to the variables.

1.6 Hypotheses of the Study

As defined by Goode and Hatt (1952), a hypothesis is a proposition which can be put to a test to determine its validity. It may seem contrary to or in accordance with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test.

The following research hypotheses "There are mean differences between the contract and non contract potato farmers in respect of their 12 selected demographic and operational characteristics" were put forward to test the mean differences of 12 selected characteristics. The selected characteristics were: age, level of education, farm size, suitable land for potato cultivation, land under potato cultivation, potato cultivation experience, income from potato cultivation, organizational participation, communication media exposure, training exposure, potato cultivation knowledge, satisfaction towards potato cultivation.

However, for statistical advantages, each of the research hypotheses was converted into null form which states that-

> "There are no mean differences between the contract and non contract potato farmers in respect of their 12 selected demographic and operational characteristics"

1.7 Definition of Important Terms

The following terms frequently used in this study are defined here for clarification of understanding.

Contract farming

According to Chaturvedi (2007), contract farming is defined as a system for the production and supply of agricultural/horticultural produce under forward contracts between producers/suppliers and buyers. The essence of such an arrangement is the commitment of the producer/seller to provide an agriculture commodity of a certain type, at a time and price, and in the quantity required

by a known and committed buyer. The basic elements of contract farming are pre-agreed price, quality, quantity and timely delivery of produce.

Non contract farming

Non contract farming is defined as a system for the production of agricultural commodities without any agreement with any organization or person. The basic elements of contract farming such as pre-agreed price, quality, quantity and timely delivery of produce is lacking here.

Contract farmers

The farmers who use contract farming system in producing crops. In this study, for producing potatoes.

Non contract farmer

The farmers who do not use contract farming system in producing potatoes.

Respondents

Respondents refer to the farmers who cultivate potato either in contract or non contract basis and provide required information to the researcher.

GDP

GDP measures the monetary value of final goods and services that is, those that are bought by the final user produced in a country in a given period of time (say a quarter or a year). It counts all the output generated within the borders of a country. GDP is composed of goods and services produced for sale in the market and also include some nonmarket production, such as defense or education services provided by the government. An alternative concept, gross national product, or GNP, counts all the output of the residents of a country (Tim Callen, December 2008).

Agro Ecological Zone (AEZ)

Agro Ecological Zone (AEZ), as applied in FAO studies, defines zones on the

basis of combinations of soil, landform and climatic characteristics. The particular parameters used in the definition focus attention on the climatic and edaphic requirements of crops and on the management systems under which the crops are grown. Each zone has a similar combination of constraints and potentials for land use, and serves as a focus for the targeting of recommendations designed to improve the existing land-use situation, either through increasing production or by limiting land degradation (FAO, 1996).

Age

Age of the respondent was defined as the period of time from his birth to the time of interview.

Education

Education in its general sense is the act or process of imparting or acquiring general knowledge, developing the powers of reasoning and judgment, and generally of preparing oneself or others intellectually for mature life.

Farm size

The farm size was defined as total amount of land owned by the respondents during the data collection period.

Suitable land for potato cultivation

The amount of land which was suitable for potato cultivation out of the total land during the year of data collection was considered as suitable land for potato cultivation.

Land under potato cultivation

Land under potato cultivation was defined as the total amount of land which was brought under potato cultivation during the year of data collection.

Potato cultivation experience

The period of time a potato farmer practices potato cultivation. It was

calculated in actual years at the time of interviewing.

Income from potato cultivation

Income from potato cultivation referred to the total earning of a respondent from potato cultivation during a year. It was expressed as thousand Taka.

Organizational participation

Organizational participation was defined as association of two or more persons which have at least one face to face meeting in a year. Participation in an organization referred to his taking part in the organization as ordinary member, executive member or executive officer.

Training exposure

Training exposure was defined as to take part in learning activity where production oriented practical knowledge on potato production is being provided by an expert or trainers from different GOs and NGOs.

Knowledge on potato cultivation

The practical or theoretical level of knowledge possessed by a respondent related to potato production activity. A total of 36 questions were asked to measure knowledge of the respondents on potato cultivation.

Satisfaction towards potato cultivation

Satisfaction towards potato cultivation was defined by the positive feelings of a respondent for being involved in potato cultivation. These were the likings and willingness of the respondents to be involved in potato cultivation based on 15 attributes or dimensions according to Item No. 12 of the Interview Schedule.

REVIEW OF LITERATURE

The purpose of this chapter is to describe pertinent research conducted in line of the major focus of this study. The researcher made an intensive search of reviews in different theses, journal and other publications. But relevant reviews of literature related to comparison of contract and non contract potato farmers were only a few. However, the available literatures in connection with this study are briefly discussed here in the following sections and sub-sections.

2.1 Review of Literature on Comparative Study in Different Aspects of Agriculture

Contract farming has been the focus of many studies since the late 1980. Minot (1986) finds that most studies suggest farmers benefit from contract farming because it provides them with inputs on credit, technical assistance, and often a guaranteed price, allowing them to produce a higher-value commodity than would otherwise be possible.

Little and Watts (1994) concluded that incomes from contract farming increased for a moderate [30-40 percent] to a high [50-60 percent] proportion among the participants.

Warning and Key (2002) in their study on contract farming in groundnuts in Senegal found that the increase in gross agricultural revenues associated with contracting was statistically significant and large, equal to about 55 percent of the average revenue of the non-contract farmers.

Birthal *et. al.*, (2005) found that vegetable contract farmers received prices that were 8 percent higher than non-contract farmers.

Another study, carried out in Indonesia by Simmons *et. al.*, (2005), examined contract growers of poultry, seed maize and seed rice. The contracts for poultry and seed maize resulted in improved returns to capital, whereas no significant impact was found in the case of seed rice. Simmons *et al.* conclude that the contracts increased income and welfare, reducing absolute poverty.

Saigenji and Zeller (2009) found that contract tea farming achieved significantly higher technical efficiency and income compared to non-contract farming in north-western Vietnam.

Bravo-Ureta and Evenson (1994) found that there was no strong relation between socio-economic characteristics and productivity of the farmers.

Saigenji and Zeller (2009) found that production under contract farming had a higher technical efficiency than farms without contracts.

A comparative analysis carried out by Kashem and Islam (1990) examined the knowledge, attitude and adoption of agricultural practices between the contact and non-contact farmers. They found that, there was a significant difference between the contact and non-contact farmers. Kashem and Islam concluded that the contact farmers had comparatively higher agricultural knowledge than non contact farmers. They had more favorable attitude towards technology and higher adoption of agricultural practices than the non contact farmers.

Ahmed (2009) conducted a comparative economic analysis of boro rice and potato production in some selected areas of Mymensingh district. Both boro rice and potato were profitable. Potato cultivation was more profitable than boro rice cultivation. Per hectare average yield of boro rice and potato were 6000 kg and 16302 kg, respectively. Per hectare total cost of production, gross margin and net margin of boro rice were Tk. 58202.74, Tk. 39402.2 and Tk. 24117.26, respectively. On the other hand, the corresponding figures for producing potato were Tk. 120221.71, Tk. 155436.23 and Tk. 142403.51, respectively.

It can be concluded from the review of the aforesaid literature that earlier researchers mainly focused impact of contract farming on income and production efficiency, but impact of contract farming on adoption of crop cultivation was not investigated. The present study therefore attempted to focus on adoption of potato cultivation along with income and production efficiency.

2.2 Studies on the Relationship between Selected Characteristics of the Farmers and Crop Cultivation

Studies on the relationship between contract and non contract farmers in terms of some selected characteristics were insufficient. Due to unavailability of direct studies the following studies were mentioned as they had some similarity and relevance with the present study.

According to Khalil (2014) the potato growers showed marked individual differences in their socio-economic characteristics and majority of them belonged to middle age category having small family size, primary level of education, small farm size, medium innovativeness, and medium contact with extension personnel. Education, farm size, subsistence pressure, annual income, contact with the sources of information, farming experience, attitude, and knowledge on potato production showed significant positive relationship with adoption of improved potato production technologies. The following sections reviewed some studies concerning selected characteristics of the respondents with their adoption of technologies.

2.2.1 Age with crop cultivation

Khalil *et. al.,* (2014) found a positive and significant relationship with adoption of recommended production technologies. Etoundi and Dia (2008) and Nwakor *et. al.,* (2011) also found similar findings.

Bhuiyan (2002) in his study found a positive and significant relationship between age of the farmers and their constraints in banana cultivation.

Salam (2003) in a study found that there was no relationship between the age of the farmers and their problem confrontation.

Rashid (2003) found that age of the rural youth had significant negative relationship with problem confrontation in selected agricultural production activities.

2.2.2 Education with crop cultivation

Kashem (1977) in his study found a significant negative relationship between education of the farmers and their problem confrontation.

Khalil *et. al.,* (2014) found that level of education and adoption of recommended potato production technologies were significantly and positively correlated. That is, the educated farmers were more interested in adoption of recommended potato production technologies. Amin and Islam (2009) and Hoque *et. al.,* (2010) also found similar result.

Haque (2001) found a significant negative relationship between education and problem confrontation of the Farmers Field School (FFS) farmers in practicing IPM.

Islam (1987) in his study found a significant and negative relationship between education of the farmers and their problem confrontation on artificial insemination. Similar findings were obtained by Mansur (1989), Rahman (1995), Haque (1995), Rahman (1996), Karim (1996), Faroque (1997), Pramanik (2001), Ahmed (2002), Hossain (2002), Bhuiyan (2002) and Salam (2003) in their respective studies.

2.2.3 Farm size with crop cultivation

Rashid (2003) found that farm size of the rural youth had no relationship with problem confrontation in selected agricultural activities.

Hoque (2001) revealed that a significant positive relationship existed between farm size and problem confrontation of the FFS farmers in practicing IPM.

Khalil *et. al.,* (2014) stated that farm size of the respondents had significant relationship with their adoption of recommended technologies which also supported by Hoque et al., 2010.

Hossain (1985) in his study found a significant relationship between farm size of the farmers and their problem confrontation.

Kashem (1977) found a significant negative relationship between farm size of the farmers and their problem confrontation.

2.2.4 Income with crop cultivation

Hossain (1985) found a significant relationship between income and problem confrontation of the farmers.

Islam (1987) reported that the relationship between income and artificial insemination problem confrontation was negatively significant.

Raha (1989) found in his study that income of the farmers had no significant relationship with their irrigation problem confrontation.

Annual income of the respondent had also significant positive relationship with the adoption of recommended technologies i.e., the higher is the annual income of the respondents, the more they adopted recommended technologies.

Khalil *et. al.,* (2014) in their study reported that the respondents having more income were able to procure more inputs for potato production. This indicated a positive relationshiop between t6he concerned variables.

Saha (1983) found in his study a negative relationship between income of the farmers and their poultry problem confrontation.

Kashem (1977) in his study examined the relationship between income of the farmers and their problem confrontation. Though the relationship was not statistically significant, the data indicated an appreciable negative trend between the two variables.

2.2.5 Knowledge with crop cultivation

Saha (1983) in a study on poultry problem confrontation reported that the relationship between poultry knowledge and poultry problem confrontation was negative.

Khalil *et. al.,* (2014) in their study found that knowledge on potato production technologies was positively correlated with adoption of potato production technologies.

Raha (1989) reported from his study that farmers' knowledge in irrigation of modern boro rice had no significant relationship with their irrigation problem confrontation. Anwar (1994), Karim (1996), Rashid (1999), Ismail (2001), Salam (2003), and Rashid (2003) found similar findings in their respective studies.

2.2.6 Extension communication with crop cultivation

Rahman (1995) in his study concluded that extension contact of the farmers had significant negative relationship with their faced problem in cotton cultivation. Similar findings were obtained by Rahman (1996), Faruque (1997), Pramanik (2001), Hossain (2002), Bhuiyan (2002) and Salam (2003) in their respective studies.

Khalil *et. al.,* (2014) in their study concluded that extension contact had significant positive relationship with their adoption of recommended potato production technologies. This finding was very consistent with several studies carried out by Amin and Islam (2009) and Hoque *et al.,* (2010).

The study of Ismail (2001) revealed that there was no significant relationship between extension contact of the farmers and their agricultural problem confrontation. Similar findings were obtained by Hoque (2001) in his study.

Raha (1989) found that extension contact of the farmers had no significant relationship with irrigation problem confrontation. However, the relationship showed a tendency in the negative direction.

2.2.7 Organizational participation with crop cultivation

Amin and Islam (2009) found a positive relation of organizational participation with technology adoption.

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

Rashid (1975) concluded in his study that social participation of the farmers had no significant relationship with their agricultural problem confrontation.

Ali (1978), Saha (1983), and Sarker (1983) found in their studies that social 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 of the social participation with their agricultural constraints faced.

2.2.8 Experience of crop cultivation

Khalil *et. al.,* (2014) found in their study that farming experience also had positive relation with adoption of potato technology which was also consistent with the study of Rahm and Huffman, (1984). Other variables like subsistence pressure, attitude towards potato production technologies were as well positively correlated with adoption of potato production technologies.

2.2.9 Effect of several production related factors

Hossain, (2014) stated that lack of quality seed was one of the most important limitations of producing garlic and boro rice in the study area. It was reported by the farmers that they were cheated by buying so called hybrid seeds from the local markets and from the seed dealers. Although modem agricultural technologies were being used in the study area; a large number of farmers had poor knowledge of right doses and methods of using modern inputs and technologies of producing their enterprises. During the investigation some farmers complained that they did not get any extension services regarding improved method of garlic and boro rice cultivation from the relevant officials of the Department of Agricultural Extension (DAE). Non-availability of inputs like seeds, fertilizers, insecticides, human labour etc. at fair price was a

problem in the way of producing enterprises. During the production period price of some inputs tend to rise due to their scarcity. Most of the farmers could not get reasonable return from their products because they had to sell a large portion of their product at the harvest period but price of garlic and boro rice remained low during harvest time because of ample supply. Although chemical fertilizers, insecticides and pesticides are the most important inputs of garlic and boro rice production but many farmers reported to have been cheated by applying adulterate fertilizers and pesticides in their crop field..

From the above discussion, it had been clear that only few studies were conducted on comparison of contract and non contract farmers, but no comparative study specifically on potato cultivation. As such, the present study was undertaken.

2.3 Conceptual Framework of the Study

It is evident from the past studies that every occurrence or phenomenon is the outcome of a number of variables, which may or may not be interdependent or interrelated with each other. In other words, no single variable can contribute wholly to a phenomenon. Variables together are the cause and the phenomenon is the effect and thus, there is cause-effect relationship everywhere in the universe.

This study was concerned with the comparison of contract and non contract potato farmers. The characteristics of the farmers were considered as the variables. It is not possible to deal with all the characteristics in a single study. It was therefore, necessary to limit the characteristics, which include age, education, farm size, suitable land for potato cultivation, land under potato cultivation, potato cultivation experience, income from potato cultivation, organizational participation, extension communication, training on potato cultivation, knowledge on potato cultivation, satisfaction towards potato cultivation and influencing factors for production related decisions. Based on

this discussion and review of literature the conceptual model of this study has been formulated and shown in Figure 2.1.

All the variables were independent variables and there was no dependent variable in this study. It would only reflect interpersonal relationships.

Demographic and Operational Characteristics of Contract Potato Farmers	**Demographic and Operational Characteristics of Non Contract Potato Farmers**
• Age • Education • Farm size • Suitable land for potato cultivation • Land under potato cultivation • Potato cultivation experience • Income from potato cultivation • Organizational participation • Extension communication • Training on potato cultivation • Knowledge on potato cultivation • Satisfaction towards potato cultivation • Influencing factors for production related decisions	• Age • Education • Farm size • Suitable land for potato cultivation • Land under potato cultivation • Potato cultivation experience • Income from potato cultivation • Organizational participation • Extension communication • Training on potato cultivation • Knowledge on potato cultivation • Satisfaction towards potato cultivation • Influencing factors for production related decisions

Figure 2.1 A simple conceptual framework for the study

It was conceptualized that these variables would have variable influences in the production related issues of potato cultivation, both among the contract and non contract farmers.

METHODOLOGY

Appropriate methodology is a necessity of good research. The scheme of any survey is predominantly determined by the nature, aims, and objectives of the study. It also depends on the availability of necessary resources, materials and time. A social research usually requires collection of primary data from the individual farmers. There are several methods of collecting data for this type of research. The type of primary data to be collected essentially depends upon the nature of the study. The selection of data collection methods within the limits is imposed by the resources available for the work (Dillon and Hardaker, 1993). For the present study, the farm survey method was used mainly due to two reasons: i. survey enables quick investigations of large number of cases, and ii. its results have wider applicability. On the other hand, this method does not require well trained personnel and sophisticated equipments as synthetic method does. The method is less costly in terms of money and time. The major drawback of the survey method is that the investigator has to rely upon the memory of the farmers. To overcome the difficulty, frequent visits in the area were made and in the case of any omission or contradiction the farmers were revisited to obtain the missing and correct information. The scheme of the survey for the present study involved the following steps.

3.1 Selection of the Study Area

Selection of the study area is an important phase for a descriptive survey regard which is also applicable in farm management research. “The area in which a farm business survey is to be carried out depends on the particular purpose of the survey and the possible cooperation from the farmers” (Yang, 1965). At first, a preliminary survey was conducted in Sadar upazila of Sherpur district which helped to design the objectives of this study.

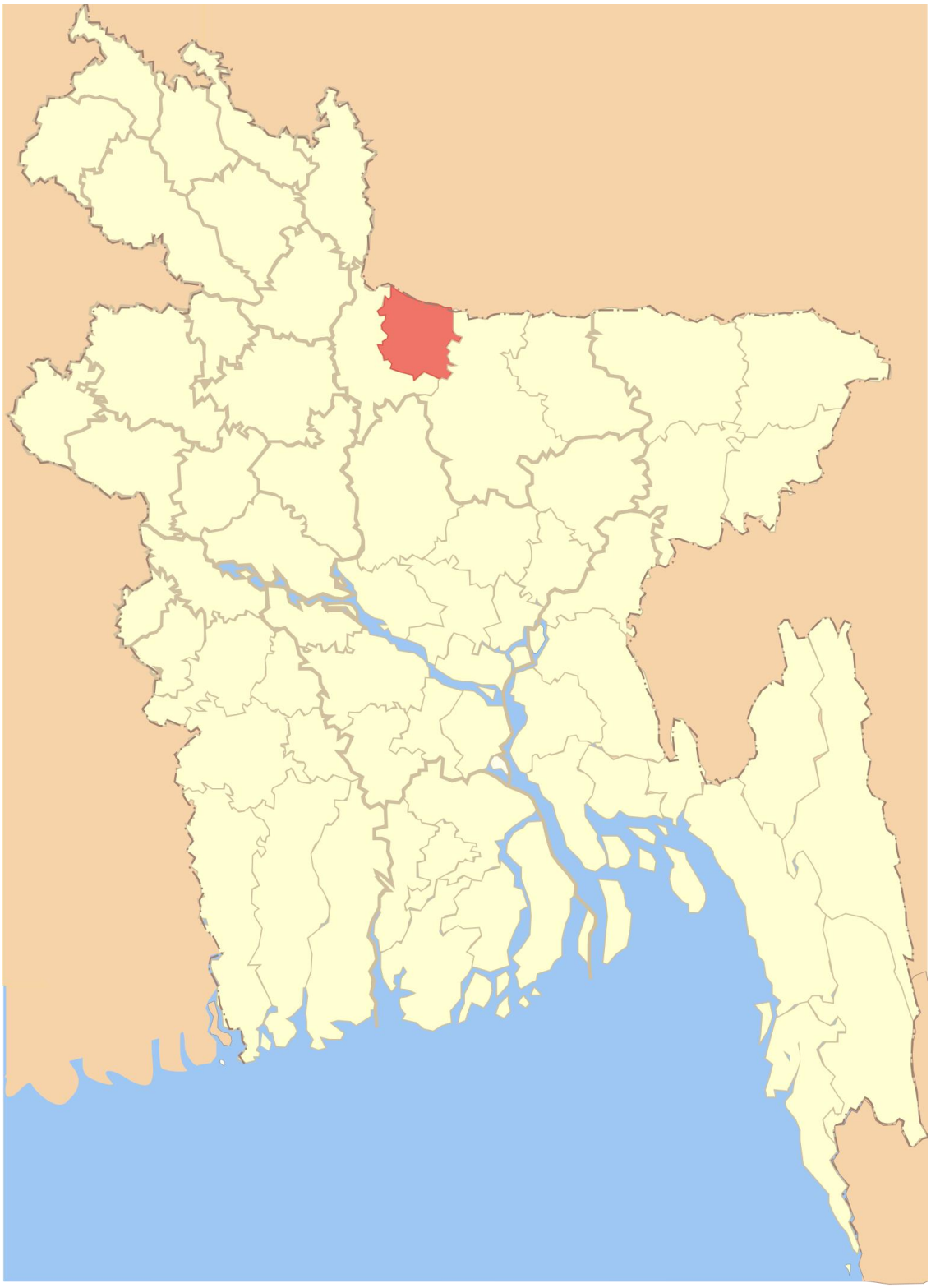

Figure 3.1 A map of Bangladesh showing the position of Sherpur district

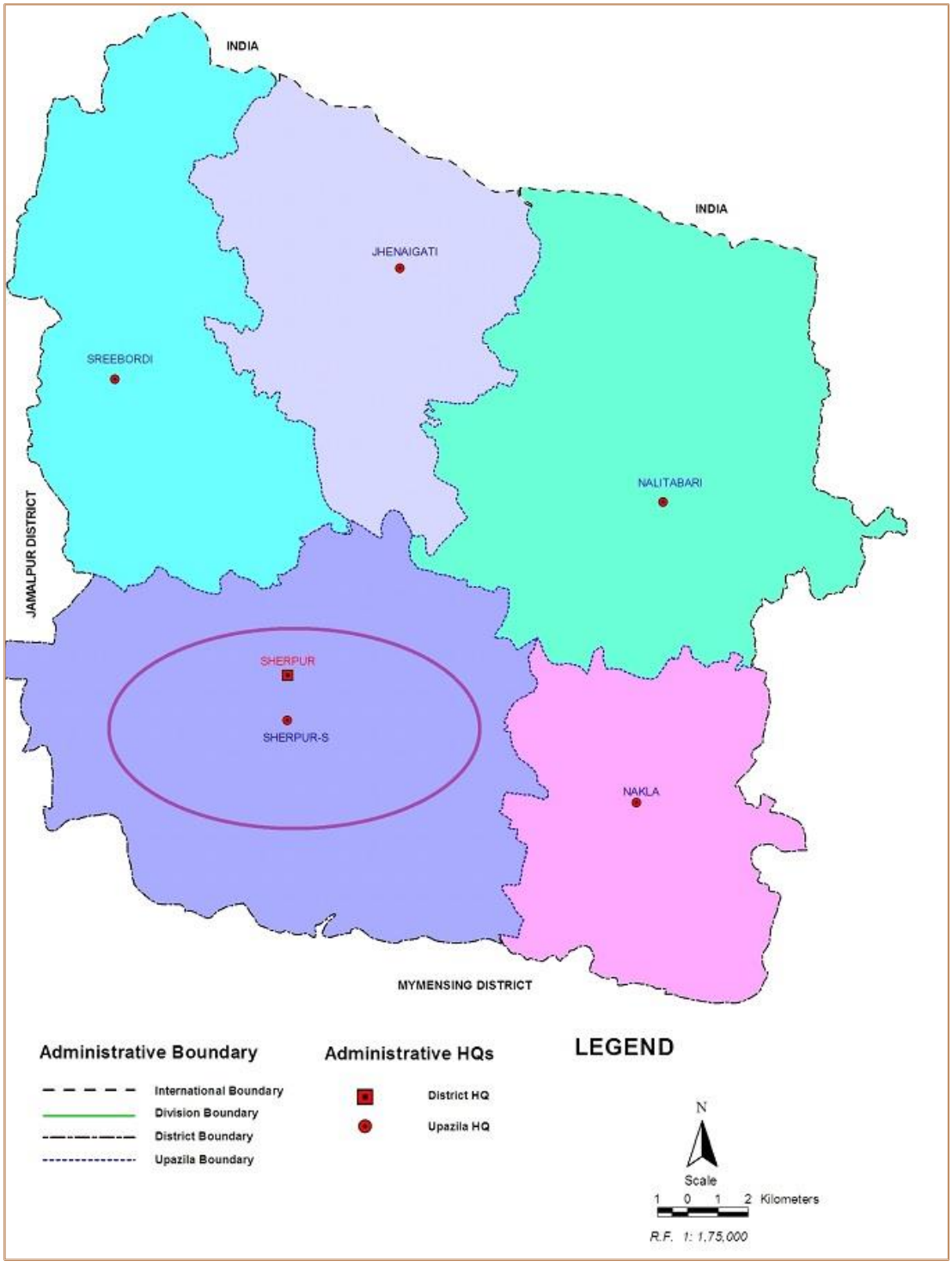

Figure 3.2 A map of Sherpur district showing the position of Sadar upazila

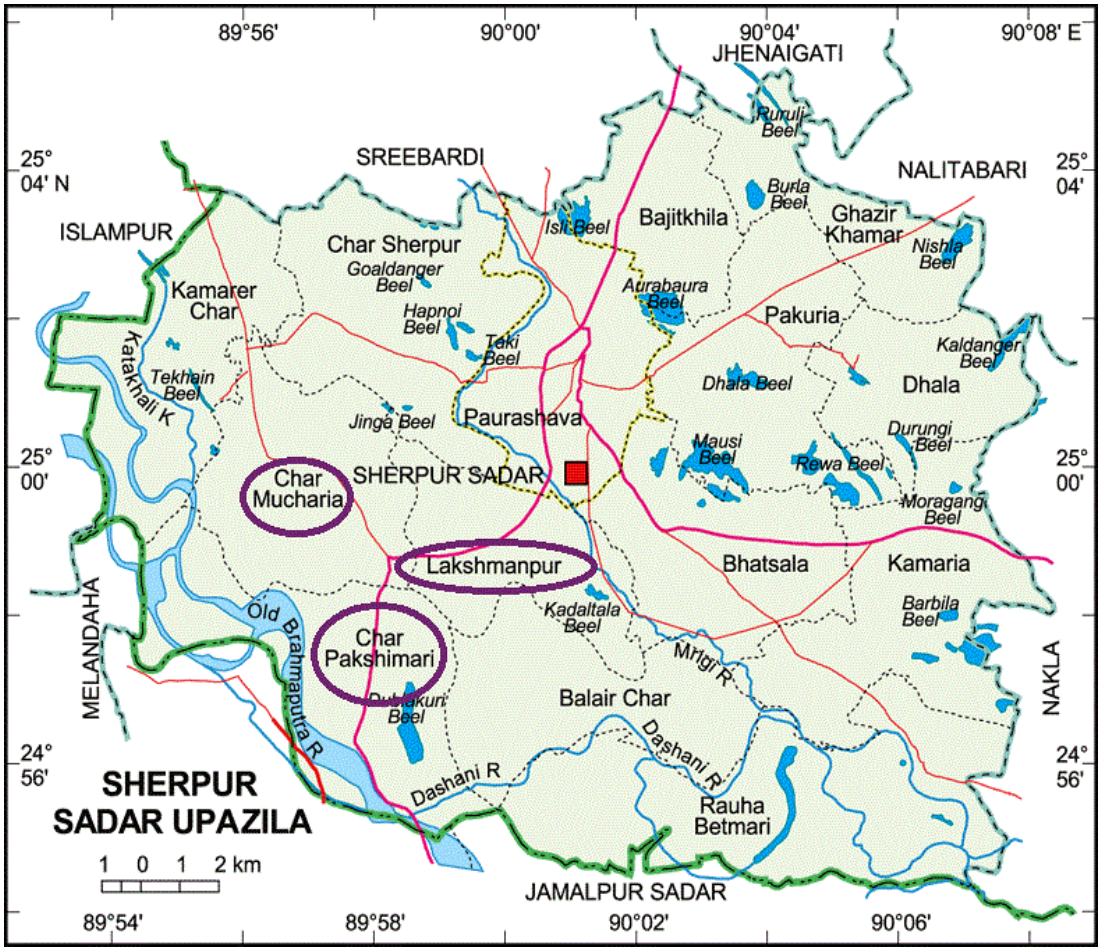

Figure 3.3 A map of Sadar upazila showing the position of selected unions

On the basis of that information, Lakshmanpur, Char Pakshimari and Char Mucharia unions were selected purposively because a large number of farmers grow potato in these unions. Here, Figure 3.1 shows the location of Sherpur district within the map of Bangladesh. Figure 3.2 shows the map of Sherpur district along with the position of Sadar upazila and Figure 3.3 shows the position of selected unions within the map of Sadar upazila. The other reasons for selecting the study area were as follows:

i. The area represented the same agro-ecological characteristics.
ii. These were typical potato growing villages with representative soil condition, topography and patterns.
iii. Selected unions were considered convenient in terms of accessibility and communication system.

iv. The researcher himself worked as the data enumerator. That's why it was expected that the inhabitants of the selected villages would be cooperative to the researcher as he was from the neighboring district and familiar with the local dialect, living experience, beliefs and other socio-economic characteristics of the area.

v. No similar study was conducted previously in this area. So, this study was likely to gain importance.

3.2 Population and Sampling Technique

In selecting samples for a study two factors need to be taken into consideration. The sample size should be as large as to allow for adequate degrees of freedom in the statistical analysis. On the other hand, administration of field research, processing and analysis of data should be manageable within the limitation imposed by physical, human and financial resources (Mannan, 2001). However, because of diversity in the technical and human environment, it is necessary to sample several numbers of the population before any conclusion can be drawn. Therefore, the purpose of sampling is to select a sub-set of the population that is representative of the population (Rahman, 1998). It was not possible to include all the farmers in the area studied due to limitation of time, money and personnel. A simple random sampling technique was followed in the present study to minimize cost, time and to achieve the ultimate objectives of the study.

The population for this study was 750 potato farmers from three selected unions under Sadar upazila of Sherpur district. Among the total population there were 300 contract farmers and rest 450 were non contract farmers. Twenty percent of the total contract potato farmers were selected randomly (i.e. 60 contract farmers from three selected unions) to form the sample of contract farmers. From 450 non contract farmers of the selected unions, an equal number of respondents were selected randomly to form the sample of non contract farmers. Thus the total sample size for the study was 120 (i.e. 60

contract farmers and 60 non contract farmers) and they were interviewed to achieve the ultimate objectives of the study.

3.3 Period of Study

Since farming is a seasonal one, a farm business survey should cover a whole crop year in order to have a complete sequence of crops (Hossain, 2014). The researcher must determine to what extent the information for a particular year represents normal or average conditions, particularly for crop yields, annual production and price level. Farmers generally grow potato within the month of November and harvest after three months. Data were, therefore, collected from 60 CFs and 60 NCFs during 14 February to 18 February, 2016.

3.4 Preparation of the Survey Schedule

To collect the necessary information from the respondents a set of comprehensive survey schedule was set by the researcher. All type of information related to potato cultivation was kept in mind by the researcher during the preparation of survey schedule to obtain the objectives of the study. Relevance of the question was verified through a pretest in the survey area. After that the survey schedule was finalized through a logical sequence by improving, rearranging and modifying in the context of practical experience of the researcher. Distribution of the respondents according to sample size is presented in Table 3.1.

Table 3.1. Distribution of the respondents according to sample size

Types of the farmers	No. of sample size
Contract farmers	60
Non contract farmers	60
Total no. of the respondents	120

3.5 Collection and accuracy of Data

Face to face interview method was used to collect the necessary data from the respondents. To overcome the conservative attitude of the farmers, the whole academic purpose along with the objective of the study were explained to the respondents. All possible efforts were made to create rapport with them. When it was assured that the farmers had no more hesitation the researcher requested the farmers to provide the accurate data so far they could provide from their experience and memory. The respondents were asked questions for several times and brief explanation of the questions was given where it was necessary. The interview schedule was rechecked after each interview to ensure the record of each question. If any question skipped the respondent was requested politely to repeat the answer and if any answer was contradictory to another one, that question was also checked in the same manner. To avoid botheration of the respondents, the interview was completed within the short possible duration and data were recorded in local unit which was later converted into standard unit. Besides those measures, the respondents were revisited randomly to create friendly atmosphere.

3.5.1 Measurement of age

The respondents were asked to answer the question, how old are they? The answer was recorded in the form of years. Age was computed in terms of complete years from their birth to the time of interview.

3.5.2 Measurement of level of education

Respondents were requested to mention their educational status. From the answer, the level of education was measured by their years of schooling. There were three options regarding this question. Assigned mark of the option ‘can’t read and write’ and can sign only was 0 and 0.5 respectively and if they had gone to school then their years of schooling was recorded as their educational status.

3.5.3 Measurement of farm size

The researcher as well as the data enumerator asked the respondents to mention their farm size in the form of local measuring unit. These data were later converted to hectare manually by the enumerator and was enlisted as data of these variables. To get the farm size of the respondent following formula was used:

Total farm size = A+B+(C+D)/2+E+F

Where,

A = Homestead area (including pond)

B = Own land under own cultivation

C = Own land given to others as borga

D = Land taken from others as borga

E = land taken from others as lease

F = Fallow land

3.5.4 Measurement of suitable land for potato cultivation

The researcher as well as the data enumerator asked the respondents to mention their suitable land for potato cultivation in the form of local measuring unit. These data were later converted to hectare manually by the enumerator and was enlisted as data of these variables. To get the suitable land for potato cultivation of the respondent following formula was used:

Total suitable land for potato cultivation = A+B+(C+D)/2+E+F

Where,

A = Homestead area (including pond)

B = Own land under own cultivation

C = Own land given to others as borga

D = Land taken from others as borga

E = land taken from others as lease

F = Fallow land

3.5.5 Measurement of land under potato cultivation

The researcher as well as the data enumerator asked the respondents to mention their land under potato cultivation in the form of local measuring unit. These data were later converted to hectare manually by the enumerator and was enlisted as data of these variables. To get the farm size of the respondent following formula was used:

Total land under potato cultivation = A+B+(C+D)/2+E+F

Where,

A = Homestead area (including pond)

B = Own land under own cultivation

C = Own land given to others as borga

D = Land taken from others as borga

E = land taken from others as lease

F = Fallow land

3.5.6 Measurement of potato cultivation experience

Respondents were asked to answer the question, how long they cultivate potato. This data was calculated from their answer in the form of years of engagement with potato cultivation.

3.5.7 Measurement of income from potato cultivation

Production of potato and price of per unit was asked to the respondents. Total amount of production was being multiplied by price per unit. The obtained data were considered as income from potato cultivation of the respective farmers and was expressed in Taka. A score of 1 was given for each thousand Taka of income.

3.5.8 Measurement of organizational participation

Respondents were asked to mention their nature of participation in 8 specific types of organization and their post position. A score of 0, 1, 2 and 3 was

assigned for no participation, participation as ordinary member, participation as executive member and participation as executive officer. Thus the range of assigned score was 0 to 24. From the answer of each respondent the organizational participation score was recorded.

3.5.9 Measurement of communication media exposure

To identify the communication media exposure, the respondents were asked to mention their extent of contact with several media. In this study 10 specific communication/contact channel/source were considered. Nature of extension contact was categorized under 5 categories viz. i. Regularly, ii. Often, iii. Occasionally, iv. Rarely and v. Not at all. The assigned score of these categories was 4, 3, 2, 1 and 0 respectively. The mark against each media/source was cumulatively put against each respondent as score. Thus, the assigned score ranged from 0 to 40. Besides, to compare preferences of informational sources by both contract and non contract farmers, an informational source index (ISI) was calculated. A total of 60 contract or non contract potato farmers gave their opinion on a 5 point (0-4) rating scale for particular information source. Thus, information source index (ISI) of a particular source could range from 0 to 240.

3.5.10 Measurement of training exposure

The researcher as well as the data enumerator asked the respondents to answer whether he had received any training on potato cultivation. There was two options i. Yes ii. No. When the respondent answered ‘No’ he got 0 score. On the other hand, when the respondent answered ‘Yes’ then he was requested again to mention the name of the training program, sponsoring organization and duration of the training in days. The cumulative days was enlisted as the score against the respective respondent in case of training exposure.

3.5.11 Measurement of potato cultivation knowledge

The respondents were requested to answer 36 specific questions regarding potato cultivation. Each question was assigned with specified score and from the answer of the respondents the researcher put specific mark against the question. The summation of the obtained mark was considered the expression of respondent's knowledge regarding potato cultivation and enlisted as their knowledge score on potato cultivation.

3.5.12 Measurement of satisfaction towards potato cultivation

The researcher wanted to document the extent of satisfaction towards potato cultivation by the respondents against 15 specific sectors. The extent of satisfaction was categorized under 4 specific categories viz. i. Highly satisfied, ii. Moderately satisfied, iii. Less satisfied and iv. Not at all satisfied. These categories were assigned scores of 3, 2, 1 and 0 respectively. The sum total of scores from 15 aspects was considered as their score to measure this variable.

3.5.13 Measurement of the mean differences between the contract and non contract potato farmers in respect of their selected demographic and operational characteristics

The collected data were analyzed by the use of Statistical Package for Social Science (SPSS) software. To measure the mean difference between the contract and non contract potato farmers in respect of their selected demographic and operational characteristics, independent sample *t*-test was done by the researcher.

3.5.14 Measurement of influencing factors responsible for production related decisions

Previously determined 7 factors were presented to the respondents with 4 specific extent of influence category namely, i. Highly influenced, ii. Moderately influenced, iii. Less influenced and iv. Not at all influenced to

make production related decisions. 3, 2, 1 and 0 score was assigned respectively against each category. On request of the researcher, the respondents mentioned their extent of influence against each factor. To identify differences in the influencing factors responsible for production related decisions by both the contract and non contract potato farmers a production decision index (PDI) was calculated. A total of 60 contracts or non contracts potato farmers gave their opinion on 4 point (0-3) rating scale for particular decision making factor. Thus, production decision index (PDI) of a particular factor could range from 0 to 180.

3.5.15 Measurement of preferred informational sources by contract and non contract potato farmers

Previously determined 10 factors were presented to the respondents with 5 specific extent of communication category namely i. Regularly, ii. Often, iii. Occasionally, iv. Rarely and v. Not at all. A score of 4, 3, 2, 1 and 0 was assigned respectively against each category. On request of the researcher, both the category of respondents mentioned their extent of communication against each source. To identify preferred informational sources, an informational source index (ISI) was calculated. A total of 60 contracts and 60 non contracts potato framers gave their opinion on 5 point (0-4) rating scale for particular source of information. Thus, informational source index (ISI) of a particular source could range from 0 to 240 for both the categories.

3.6 Analytical Techniques for Processing Data

For processing data, they were compiled in a master sheet and analyzed through the software Statistical Package for the Social Sciences (SPSS). Descriptive and independent sample *t* test techniques were followed to obtain the result in accordance with the objectives. The null hypothesis was accepted or rejected at 5 percent level of probability.

RESULTS AND DISCUSSIONS

This Chapter had been designed to describe results and findings according to the objectives of the study. Data obtained from the respondents by interview were measured, analyzed, tabulated and statistically treated to fulfill the objectives. This Chapter contains four sections; the first section deals with the selected demographic and operational characteristics of the contract and non contract potato farmers. The second section deals with the mean differences between the contract and non contract potato farmers in respect of their selected demographic and operational characteristics. The third section deals with differences in the influencing factors responsible for production related decisions by the contract and non contract potato farmers. The fourth section deals with the differences in informational sources preferred by the contract and non contract potato farmers. These are presented below.

4.1 Selected Demographic and Operational Characteristics of the Contract and Non Contract Potato Farmers

The purpose of this section is to describe 10 selected demographic and operational characteristics of the contract and non contract potato farmers. A brief summary of the measuring unit and basic statistics are presented in Table 4.1 and subsequently it was discussed in order to make a comparison between the contract and non contract potato farmers. An overall view of different variables included in the study, their measuring units, possible and observed are presented in Table 4.1. It is more or less self-explanatory.

Table 4.1 A brief summary of the selected demographic and operational characteristics of the contract and non contract potato farmers

Categories	Measuring unit	Ranges			Mean		Standard deviation	
		Possible score range	Observed score range		Contract farmers	Non contract farmers	Contract farmer	Non contract farmers
			Contract farmers	Non contract farmers				
Age	No. of years	Unknown	28 - 75	25 - 65	44.5	42	10.26	10.71
Education	Years of schooling	Unknown	0 - 16	0 - 16	5.8	4.66	4.2	4.23
Farm size	Hectare	Unknown	0.25 - 5.33	0.33 - 4.86	1.82	1.5	1.26	1.16
Suitable land for potato cultivation	Hectare	Unknown	0.22 - 4.2	0.3 - 4.5	1.49	1.16	1.02	0.93
Land under potato cultivation	Hectare	Unknown	0.2 - 4	0.15 - 1.21	1.28	0.55	0.87	0.29
Potato cultivation experience	No. of years	Unknown	2 - 16	2 - 20	9.52	8.77	3.62	5.33
Income from potato cultivation	Thousand Tk.	Unknown	78.88 - 1543.65	63.91 - 494.77	527.43	219.47	355.29	115.68
Organizational participation	Scores	0 - 24	0 - 9	0 - 7	2.23	1.87	2.17	1.65
Communication media exposure	Scores	0 - 52	15 - 31	8 - 28	22.05	12.58	4.05	3.1
Training exposure	Scores	Unknown	0 - 6	0 - 2	2.23	0.37	1.49	0.52
Satisfaction towards potato cultivation	Scores	0 - 45	34 - 45	30 - 45	40.65	36.47	3.27	3.27
Knowledge on potato cultivation	Percent of scores	0 - 100	51.25 - 87.5	41.25 - 60	73.85	50.44	7.58	4.87

4.1.1 Age

The age of the respondents was analyzed for both contract and non contract farmers. The measuring unit was number of years and the possible score range was unknown. It was found that the age of the contract farmers ranged from

28 to 75 years with a mean of 44.5 and the standard deviation of 10.26. In case of non contract farmers, the age ranged from 25 to 65 with a mean of 42 years and the standard deviation of 10.71 (Table 4.1). From the obtained data of age, the farmers were classified into three categories as shown in Table 4.1.1.

Table 4.1.1 Distribution of the respondents according to their age

Categories	Contract Farmer		Non Contract Farmer		Total	
	No.	%	No.	%	No.	%
Young aged (≤35)	19.00	31.67	19.00	31.67	38.00	31.67
Middle aged (35-55)	38.00	63.33	35.00	58.33	73.00	60.83
Old aged (>55)	3.00	5.00	6.00	10.00	9.00	7.50
Total	60.00	100.00	60.00	100.00	120.00	100.00

The Table 4.1.1 shows that, maximum proportion that is 60.83% of the respondents of both contract and non contract farmers belonged to middle aged (35-55) category. Young aged category comprised 31.67% of the respondents followed by old aged category (7.50%). This table also shows that percentage of middle aged category of contract farmers comprised higher percentage of the respondents than non contract farmers. On the other hand, among non contract farmers, old aged category of the respondents' percentage was double than the contract farmer respondents.

4.1.2 Education

The education level of the respondents was analyzed for both contract and non contract farmers. The measuring unit was years of schooling and the possible score range was unknown. It was found that the education level of both contract and non contract farmers was ranged from 0 to 16. Mean of education level for contract farmers was 5.8 with a standard deviation of 4.2. On the other hand, non contract farmer's category had a mean of 4.66 with standard

deviation of 4.23 (Table 4.1). From the obtained data, level of education of the farmers was classified into four categories as shown in Table 4.1.2.

Table 4.1.2 Distribution of the respondents according to their education

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Illiterate (0-0.5)	15.00	25.00	24.00	40.00	39.00	32.50
Primary (1-5)	17.00	28.33	14.00	23.33	31.00	25.83
Secondary (6-10)	21.00	35.00	18.00	30.00	39.00	32.50
Above secondary (≥10)	7.00	11.67	4.00	6.67	11.00	9.17
Total	60.00	100.00	60.00	100.00	120	100.00

The Table 4.1.2 shows that, illiterate (0-0.5) and secondary category (6-10) comprised highest percentage of the respondents for contract and non contract farmer's jointly. Primary category (1-5) comprised 25.83% respondents followed by above secondary category ((≥10)) that is 9.17%. This table also shows that highest percentage (35%) of the contract farmers belonged to secondary category followed by primary (28.33%), illiterate (25.00%) and above secondary category (11.67%) respectively. On the other hand, highest percentage (40%) of the non contract farmers belonged to illiterate category followed by secondary (30%) primary (23.33%) and above secondary category (6.67%) respectively.

4.1.3 Farm size

The farm size of the respondents was analyzed for both contract and non contract farmers. The measuring unit was hectare and the possible score range was unknown. It was found that the farm size of contract farmers was ranged from 0.25 to 5.33 ha with a mean of 1.82 ha and the standard deviation of 1.26. On the other hand, the farm size of non contract farmers was ranged from 0.33 to 4.86 ha with a mean of 1.5 and the standard deviation of 1.16 (Table 4.1). From the collected data, farm size of the farmers was classified into three categories as shown in Table 4.1.3.

Table 4.1.3 Distribution of the respondents according to their farm size

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Small (<1.0 ha)	19.00	31.67	27.00	45.00	46.00	38.33
Medium (1- 3 ha)	27.00	45.00	26.00	43.33	53.00	44.17
Large (>3 ha)	14.00	23.33	7.00	11.67	21.00	17.50
Total	60.00	100.00	60.00	100.00	120.00	100.00

The Table 4.1.3 shows that highest percentage (44.17%) of the respondents had medium (1- 3 ha) farm size followed by small (<1.0 ha) farm size category (38.33%) and large (>3.01 ha) farm size category that is 17.50% respectively. This table also indicates that, highest percentage (45%) of contract farmers belonged to medium farm size category followed by small farm size category (31.67%) and large farm size category (23.33%) respectively. On the other hand, highest percentage (45%) of non contract farmers had small sized farm holdings followed by medium (43.33%) and large (11.67%) sized farm holdings respectively.

4.1.4 Suitable land for potato cultivation

Along with farm size, suitable land for potato cultivation of the respondents was also analyzed for both contract and non contract farmers. The measuring unit was hectare and the possible score range was unknown. It was found that the suitable land for potato cultivation of contract farmers was ranged from 0.22 to 4.2 ha with a mean of 1.49 ha and the standard deviation of 1.02. On the other hand, the suitable land for potato cultivation of non contract farmers was ranged from 0.3 to 4.5 ha with a mean of 1.16 and the standard deviation of 0.93 (Table 4.1). Suitable land for potato cultivation of farmers was also classified into three categories similar to farm size category as shown in Table 4.1.4.

Table 4.1.4 Distribution of the respondents according to their suitable land for potato cultivation

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Small (<1.0 ha)	22.00	36.67	31.00	51.67	53.00	44.17
Medium (1- 3 ha)	34.00	56.67	26.00	43.33	60.00	50.00
Large (>3.0 ha)	4.00	6.66	3.00	5.00	7.00	5.83
Total	60.00	100.00	60.00	100.00	120.00	100.00

The Table 4.1.4 shows that half of the respondents had medium (1-3 ha) farm holdings, suitable for potato cultivation followed by small (<1 ha) category i.e. 44.17% and large (>3 ha) category i.e. 5.83% respectively. This table also tells that, highest percentage (56.67%) of contract farmers belonged to medium farm size category followed by small farm size category (36.67%) and large farm size category (6.66%) respectively. On the other hand, highest percentage (51.67%) of non contract farmers had small sized farm holdings suitable for potato cultivation followed by medium (43.33%) and large (5%) sized farm holdings respectively.

4.1.5 Land under potato cultivation

Along with farm size and suitable land for potato cultivation, land under potato cultivation of the respondents was also analyzed for both contract and non contract farmers. The measuring unit was hectare and the possible score range was unknown. It was found that the land under potato cultivation of contract farmers was ranged from 0.2 to 4 ha with a mean of 1.28 ha and the standard deviation of 0.87. On the other hand, the land under potato cultivation of non contract farmers was ranged from 0.15 to 1.21 ha with a mean of 0.55 and the standard deviation of 0.29 (Table 4.1). Land under potato cultivation was also classified into three categories similar to previous farm size category as shown in Table 4.1.5.

Table 4.1.5 Distribution of the respondents according to their land under potato cultivation

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Small (<1 ha)	24.00	40.00	49.00	81.67	73.00	60.83
Medium (1- 3 ha)	33.00	55.00	11	18.33	44.00	36.67
Large (>3 ha)	3.00	5.00	0	0	3.00	2.5
Total	60	100	60	100	120	100

The Table 4.1.5 shows that, highest percentage (60.83%) of respondents had small (<1.0 ha) farm holdings under potato cultivation followed by medium (1-3 ha) category i.e. 36.67% and large (>3 ha) category i.e. 2.5% respectively. This table also tells that, highest percentage (55%) of contract farmers belonged to medium farm size category followed by small farm size category (40%) and large farm size category (5%) respectively. On the other hand, highest percentage (81.67%) of non contract farmers had small sized farm holdings under potato cultivation followed by medium (18.33%) category and no one non contract farmer belonged to large sized category.

4.1.6 Potato cultivation experience

The potato cultivation experiences of the respondents collected during data collection were also analyzed for both contract and non contract farmers. The measuring unit was number of years of potato cultivation and the possible score range was unknown. It was found that the potato cultivation experience of contract farmers was ranged from 2 to 16 years with a mean of 9.52 years and the standard deviation of 3.62. On the other hand, the experience of potato cultivation of non contract farmers was ranged from 2 to 20 years with a mean of 8.77 years and the standard deviation of 5.33 (Table 4.1). Potato cultivation experience was also classified into three categories as shown in Table 4.1.6.

Table 4.1.6 Distribution of the respondents according to their potato cultivation experience

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Low experience (<6 years)	10.00	16.67	26.00	43.33	36.00	30
Medium experience (6 - 11 years)	32.00	53.33	14.00	23.33	46.00	38.33
High experience (>11 years)	18.00	30	20.00	33.33	38.00	31.67
Total	60.00	100.00	60.00	100.00	120.00	100.00

The Table 4.1.6 shows that highest percentage (38.33%) of respondents had medium experience (6 - 11 years) on potato cultivation followed by high experience (>11 years) category i.e. 31.67% and low experience (<6 years) category i.e. 30% respectively. This table also tells that, highest percentage (53.33%) of contract farmers belonged to medium experience category followed by high experience category (30%) and low experience category (16.67%) respectively. On the other hand, highest percentage (43.33%) of non contract farmers had low experience on potato cultivation followed by high experience category (33.33%) and medium experience category (23.33%) respectively.

4.1.7 Income from potato cultivation

Income of the respondents from potato cultivation was analyzed for both contract and non contract farmers. The measuring unit was thousand taka and the possible score range was unknown. It was found that the income of the contract farmers from potato cultivation was ranged from 78.88 thousand tk. to 1543.65 thousand tk. with a mean of 527.43 and the standard deviation of 355.29. In case of non contract farmers, the income ranged from 63.91

thousand tk. to 494.77 thousand tk. with a mean of 219.47 and the standard deviation of 115.68 (Table 4.1). From the obtained data of income from potato cultivation the farmers were classified into three categories as shown in Table 4.1.7.

Table 4.1.7 Distribution of the respondents according to their income from potato cultivation

Categories according to income from potato cultivation	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Low income (<120 thousand Tk.)	6.00	10.00	10.00	16.67	16.00	13.33
Medium income (120 - 220 thousand Tk.)	10.00	16.67	31.00	51.67	41.00	34.17
High income (>220 thousand Tk.)	44.00	73.33	19.00	31.67	63.00	52.50
Total	60.00	100.00	60.00	100.00	120.00	100.00

The Table 4.1.7 shows that highest percentage (52.50%) of respondents had high income (>220 thousand Tk.) on potato cultivation followed by medium income (120 - 220 thousand Tk.) category i.e. 34.17% and low income (<120 thousand Tk.) category i.e. 13.33% respectively. This table also indicates that, highest percentage (73.33%) of contract farmers belonged to high income category followed by medium income (16.67%) and low income (10.00%) category respectively. On the other hand, highest percentage (51.67%) of non contract farmers had medium income on potato cultivation followed by high income category (31.67%) and low income category (16.67%) respectively.

4.1.8 Organizational participation

Organizational participation helps to come out from the shell of self-centered conservativeness of an individual. That's why organizational participation of the respondents was analyzed for both contract and non contract potato farmers. This variable was measured on the basis of scores and the possible score range was 0 to 24. It was found that the organizational participation of the contract farmers from potato cultivation was ranged from 0 to 9 with a mean of 2.23 and the standard deviation of 2.17. In case of non contract farmers, the organizational participation score was ranged from 0 to 7 with a mean of 1.87 and the standard deviation of 1.65 (Table 4.1). From the obtained data, organizational participation of the potato farmers was classified into three categories as shown in Table 4.1.8.

Table 4.1.8 Distribution of the respondents according to their organizational participation

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Very low participation (<2)	30.00	50.00	27.00	45.00	57.00	47.50
Low participation (2 - 4)	23.00	38.33	27.00	45.00	50.00	41.67
Medium participation (4 - 10)	7.00	11.67	6.00	10.00	13.00	10.83
Total	60.00	100.00	60.00	100.00	120.00	100.00

The Table 4.1.8 shows that highest percentage (47.50%) of respondents had very low participation (<2) on various organizational activities followed by low participation (2 - 4) category i.e. 41.67% and Medium participation (4 - 10) category i.e. 10.83% respectively. This table also indicates that, highest percentage (50 %) of contract farmers belonged to very low participation category followed by low participation (38.33%) and medium participation

(11.67%) category respectively. On the other hand, highest percentage (45%) of non contract farmers belonged to both very low participation and low participation category. followed by medium participation category (10%).

4.1.9 Communication media exposure

Communication with various media helps to increase the practical knowledge of an individual. Considering this impact the variable was kept in interview schedule and later the collected data was analyzed for both contract and non contract potato farmers. This variable was measured on the basis of scores and the possible score range was 0 to 52. It was found that the communication media exposure of the contract farmers from potato cultivation was ranged from 15 to 31 with a mean of 22.05 and the standard deviation of 4.05. In case of non contract farmers, this variable ranged from 8 to 28 with a mean of 12.58 and the standard deviation of 3.1 (Table 4.1). From the obtained data, communication media exposure of the potato farmers was classified into three categories as shown in Table 4.1.9.

Table 4.1.9 Distribution of the respondents according to their communication media exposure

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Low exposure (<12)	0.00	0.00	25.00	41.67	25.00	20.83
Medium exposure (12 - 22)	31.00	51.67	34.00	56.67	65.00	54.17
High exposure (>22)	29.00	48.33	1.00	1.67	30.00	25.00
Total	60.00	100.00	60.00	100.00	120.00	100.00

The above mentioned Table 4.1.9 shows that highest percentage (54.17%) of respondents had medium exposure (12 - 22) to communication media followed by high exposure (>22) category i.e. 25% and low exposure (<12) category i.e. 20.83% respectively. This table also shows that, highest percentage (51.67%)

of contract farmers belonged to medium exposure category followed by high exposure (48.33%) category and low exposure category had no respondent. On the other, hand highest percentage (56.67%) of non contract farmers belonged to medium exposure category followed by low exposure (41.67%) and high exposure category (1.67%).

4.1.10 Training exposure

Training helps a person to do the same thing through a different, innovative and right way. This variable was measured on the basis of scores and the possible score range was unknown to the researcher. It was found that the training exposure of the contract farmers was ranged from 0 to 6 with a mean of 2.23 and the standard deviation of 1.49. In case of non contract farmers, this variable ranged from 0 to 2 with a mean of 0.37 and the standard deviation of 0.52 (Table 4.1). From the obtained data, training exposure of the potato farmers was classified into four categories as shown in Table 4.1.10.

Table 4.1.10 Distribution of the respondents according to their training exposure

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
No exposure (0)	2.00	3.33	39.00	65.00	41.00	34.17
Very Low exposure (<2)	22.00	36.67	20.00	33.33	42.00	35.00
Low exposure (2 - 4)	30.00	50.00	1.00	1.67	31.00	25.83
Medium exposure (>4 - 10)	6.00	10.00	0.00	0.00	6.00	5.00
Total	60.00	100.00	60.00	100.00	120.00	100.00

The Table 4.1.10 shows that highest percentage (35%) of respondents had very low exposure (<2) on receiving training followed by no exposure (0) category i.e. 34.17%, low exposure (2 - 4) i.e. 25.83% and medium exposure (>4 - 10) category i.e. 5% respectively. This table also indicates that, half of

contract farmers belong to low exposure category followed by very low exposure (36.67%), medium exposure (10%) and no exposure (3.33%) category respectively. On the other hand, a greater number of the respondents (65%) of non contract farmers have no training on potato cultivation. Only one third of the non contract farmers belonged to very low training exposure followed by low training exposure (1.67%) category and no one had medium exposure level training.

4.1.11 Knowledge on potato cultivation

Knowledge helps to develop the sense of a person to differentiate whether s/he is in right track. Because of that, knowledge on potato cultivation of a farmer was investigated in this study. The collected data was analyzed for both contract and non contract potato farmers and the variable was measured on the basis of scores and the possible score range was 0 to 80. Which was later converted into percentage and the possible range was set newly to 0 to 100%. It was found that the percentage of knowledge of the contract farmers was ranged from 51.25 to 87.5% with a mean of 73.85% and the standard deviation of 7.58. In case of non contract farmers, this variable ranged from 41.2 to 60% with a mean of 50.44 and the standard deviation of 4.87 (Table 4.1). From the obtained data, percentage of knowledge of the potato farmers was classified into three categories as shown in Table 4.1.11.

Table 4.1.11 Distribution of the respondents according to their knowledge on potato cultivation

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Low (<55%)	1.00	1.67	44.00	73.33	45.00	37.50
Medium (55% - 75%)	33.00	55.00	16.00	26.67	48.00	40.83
High (>75%)	26.00	43.33	0.00	0.00	27.00	21.17
Total	60.00	100.00	60.00	100.00	120.00	100.00

Data in Table 4.1.11 indicates that highest percentage (40.83%) of the respondents had medium (55% - 75%) category knowledge followed by low (<55%) category i.e. 37.50% and high (>75%) category i.e. 21.17% respectively. This table also indicates that, more than half (55%) of contract farmers belong to medium category of knowledge followed by high category i.e. 45% and low category of knowledge on potato cultivation i.e. 1.67% respectively. On the other hand, a greater number of the respondents (73.33%) of non contract farmers have low level knowledge on potato cultivation. Rest amount of the non contract farmers (26.67%) had medium level knowledge. But no respondent had high level knowledge on potato cultivation.

4.1.12a Satisfaction towards potato cultivation

Satisfaction of individuals towards something prompt, one to be involved in it. That's why farmers' satisfaction towards potato cultivation had been counted on this study. The collected data was analyzed for both contract and non contract potato farmers and the variable was measured on the basis of scores and the possible score range was 0 to 45. It was found that the satisfaction score of the contract farmers ranged from 34 to 45 with a mean of 40.65 and the standard deviation of 3.27. In case of non contract farmers, this variable ranged from 30 to 45 with a mean of 36.47 and the standard deviation of 3.27 (Table 4.1). From the obtained data, satisfaction level of the potato farmers was classified into two categories as shown in Table 4.1.12a.

Table 4.1.12a Distribution of the respondents according to their satisfaction towards potato cultivation

Categories	Contract Farmers		Non Contract Farmers		Total	
	No.	%	No.	%	No.	%
Moderately satisfied (25 - 38)	17.00	28.33	46.00	76.67	63.00	52.50
Highly satisfied (>38)	43.00	71.67	14.00	23.33	57.00	47.50
Total	60.00	100.00	60.00	100.00	120.00	100.00

According to Table 4.1.12a, it was found that the highest percentage (52.50%) of respondents had moderate (25 - 38) category satisfaction towards potato cultivation whether 47.50% of the respondents were highly satisfied. This table also tells that, more than two third (71.67%) contract farmers belonged to highly satisfy category whether 28.33% contract farmers were satisfied at medium level. On the other hand, more than three fourth (76.67%) non contract farmers were moderately satisfied towards potato cultivation whether 23.33% were highly satisfied.

4.1.12b Rank order of different aspects of satisfaction towards potato cultivation

To get the rank order of satisfaction by the contract and non contract potato farmers towards different aspects of potato cultivation, a satisfaction index had been developed by summation of scores put by the respondents against each aspect of potato cultivation. It has been presented in Table 4.1.12b.

Table 4.1.12b Rank order showing different aspects of satisfaction of the contract and non contract potato farmers towards potato cultivation

Aspects of satisfaction	Contract farmers		Non contract farmers	
	Satisfac-tion index (SI)	Rank order	Satisfac-tion index (SI)	Rank order
Availability of fertilizers	180	1	180	1
Marketing facilities	177	2	176	2
Availability of pesticide	176	3	176	2
Availability of quality seed	172	4	166	6
Availability of irrigation facilities	170	5	155	8
Availability of harvesting machineries	168	6	176	2
Availability of improved machineries for land cultivation	166	7	175	3
Weather and climate for potato production	165	8	167	5
Credit facilities	162	9	25	13
Storage facilities for potato	159	10	173	4
Market price	158	11	162	7
Yield performance of existing varieties	155	12	152	9
Extent of cooperation from the extension agents	149	13	83	11
Availability of labour	146	14	150	10
Availability of potato production related information	136	15	72	12

Data in Table 4.1.12b indicate that the contract farmers were mostly satisfied towards availability of fertilizers as well as the non contract farmers remarked the same thing. Satisfaction index of fertilizer was 180 per group that means no one farmer was dissatisfied to the availability of fertilizers. This might be

due to the Government policy during the study period to make available fertilizer and other inputs for successful production. In terms of satisfaction, both contract (SI- 177) and non contract (SI- 176) farmers ranked marketing facilities in second position. This might be due to the forwardness of the region along with the cropping pattern. Most of the farmers cultivated potato during rabi season that's why the region might be developed as potato growing belt and the middle men as well as the businessmen bought potato from the field as well as from the local market. Besides that non contract farmer ranked availability of pesticide and harvesting machineries also in second position i.e. SI- 176. On the other hand, contract farmers ranked their satisfaction towards availability of pesticide in third position (SI- 176). These might be due to the active support from pesticide companies to the farmers. Along with that, lack of knowledge on modern harvesting machineries might be one of the causes of satisfaction towards harvesting machineries by the non contract farmers. On the other hand, the contract potato farmers were least satisfied towards availability of potato production related information. This might be due to the smartness of the contract farmers as they had several training and more knowledge than non contract farmers. As we know that, desire to know increases with knowledge. This might be occurred in this case. Second least satisfaction towards potato cultivation was availability of labours. This might be due to the increasing employment opportunities at various sectors like as garments and others industries. The increasing living standard of the people might be an important cause of less availability of labour. The contract farmers were 3rd least satisfied towards extent of cooperation from the extension agents. Although by a necked eye, this may be seem as silly. But the cause might be same as the satisfaction level towards availability of potato production related information as expectation increases with cooperation. Another cause might be the shortage of extension agent in that region. Besides these, non contract farmers were least satisfied toward credit facilities. This might be due to absence of contract with them from any contractual organization or the grapes might be sour. This category of farmers were 2nd

least satisfied towards availability of potato production related information. There was a logical cause behind this, which might be the ignorance of them to be related with the agents from contractual organizations or the lack of extension personnel in the locality. Extent of cooperation from the extension agents ranked as 3rd least satisfactory level by the non contract farmers. The cause might be more or less same with the previous one.

4.2 Mean Differences between the Contract and Non Contract Potato Farmers in Respect of their Selected Demographic and Operational Characteristics

In the previous sections, comparison between contract and non contract farmers were shown in descriptive format. In this section mean differences between contract and non contract farmers are shown from analysis of data through independent sample *t*-test. Independent sample *t* test was computed in order to find mean differences between the contract and non contract farmers in respect of their 10 selected demographic and operational characteristics which are shown in Table 4.6. To reject or accept the null hypothesis, 5% level of probability was used.

Table 4.2 Mean differences between contract and non contract potato farmers in respect of their selected demographic and operational characteristics

Characteristics	Mean score		Standard deviation		*t*-values (df = 118)	Tabulated *t* - values(df = 118) at 5%, 1% and 0.10% level of significance		
	Contract farmer	Non contract farmer	Contract farmer	Non contract farmer		5%	1%	0.10 %
Age	44.50	42	10.26	10.7	1.31^{NS}	1.98	2.62	3.37
Education	5.80	4.66	4.20	4.23	1.48^{NS}			
Farm size	1.82	1.50	1.26	1.16	1.46 ^{NS}			
Suitable land for potato cultivation	1.49	1.16	1.02	0.93	1.84 ^{NS}			
Land under potato cultivation	1.28	0.55	0.87	0.29	6.16***			
Potato cultivation experience	9.52	8.77	3.62	5.33	0.90 ^{NS}			
Income from potato cultivation	527.43	219.47	355.29	115.68	6.38***			
Organizational participation	2.23	1.87	2.17	1.65	1.04 ^{NS}			
Communication media exposure	22.05	12.58	4.05	3.10	14.37***			
Training exposure	2.23	0.37	1.49	0.52	9.17***			
Knowledge on potato cultivation	59.08	40.35	6.06	3.90	20.14***			
Satisfaction towards potato cultivation	40.65	36.47	3.27	3.27	7.01***			

*** **Significant at 0.10% level of probability**
**** Significant at 1% level of probability**
***Significant at 5% level of probability**
NS = Non significant

4.2.1 Mean differences between the contract and non contract potato farmers in respect of their age

In case of age, the mean difference between the contract and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between contract and non contract farmers in terms of

age". The computed value of t (1.31) was found lower than that of tabulated value of t (1.98) at 5% level of significance with 118 df (Table 4.6). Those findings mean that the null hypothesis was accepted at 5% level of significance. Therefore, it may be concluded that there was no significant difference between the contract and non contract farmers in terms of their age.

4.2.2 Mean differences between the contract and non contract potato farmers in respect of their education

In case of education, the mean difference between the contract and non contract potato farmers was examined by testing the following null hypothesis, "There was no mean difference between contract and non contract farmers in terms of education". The computed value of t (1.48) was found lower than that of tabulated value of t (1.98) at 5% level of significance with 118 df (Table 4.6). Those findings mean that the null hypothesis was accepted at 5% level of significance. Therefore, it may be concluded that there was no significant difference between the contract and non contract farmers in terms of their education.

4.2.3 Mean differences between the contract and non contract potato farmers in respect of their farm size

In case of farm size, the mean difference between the contract and non contract potato farmers was examined by testing the following null hypothesis, "There was no mean difference between contract and non contract farmers in terms of farm size". The computed value of t (1.46) was found lower than that of tabulated value of t (1.98) at 5% level of significance with 118 df (Table 4.6). Those findings mean that the null hypothesis was accepted at 5% level of significance. Therefore, it may be concluded that there was no significant difference between the contract and non contract farmers in terms of their farm size.

4.2.4 Mean differences between the contract and non contract potato farmers in respect of their suitable land for potato cultivation

In case of suitable land for potato cultivation, the mean difference between the contract and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between contract and non contract farmers in terms of suitable land for potato cultivation”. The computed value of t (1.84) was found lower than that of tabulated value of t (1.98) at 5% level of significance with 118 df (Table 4.6). Those findings mean that the null hypothesis was accepted at 5% level of significance. Therefore, it may be concluded that there was no significant difference between the contract and non contract farmers in terms of their suitable land for potato cultivation.

4.2.5 Mean differences between the contract and non contract potato farmers in respect of their land under potato cultivation

In case of land under potato cultivation, the mean difference between the contact and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between contract and non contract farmers in terms of land under potato cultivation”. The computed value of t (6.16) was found higher than that of tabulated value of t (3.37) at 0.10% level of significance with 118 df (Table 4.6). Those findings mean that the null hypothesis was rejected at 0.10% level of significance. Therefore, it was concluded that there was a significant differences between contract and non contract farmers in terms of their land under potato cultivation. Contract farmers use more land for potato cultivation than non contract farmers. This might be due to the facilities of contract farming in terms of information, knowledge and credit facilities provided by the contractual organizations.

4.2.6 Mean differences between the contract and non contract potato farmers in respect of their potato cultivation experience

In case of potato cultivation experience, the mean difference between the contract and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between contract and non contract farmers in terms of potato cultivation experience”. The computed value of t (0.90) was found lower than that of tabulated value of t (1.98) at 5% level of significance with 118 df (Table 4.6). Those findings mean that the null hypothesis was accepted at 5% level of significance. Therefore, it was concluded that there was no significant difference between the contract and non contract farmers in terms of their potato cultivation experience..

4.2.7 Mean differences between the contract and non contract potato farmers in respect of their income from potato cultivation

In case of income from potato cultivation (000’ TK), the mean difference between the contact and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between contract and non contract farmers in terms of income from potato cultivation”. The computed value of t (6.38) was found higher than that of tabulated value of t (3.37) at 0.10% level of significance with 118 df (Table 4.6). Those findings mean that the null hypothesis was rejected at 0.10% level of significance. Therefore, it was concluded that there was a significant differences between contract and non contract farmers in terms of their income from potato cultivation. The contract potato farmers’ income was found higher than the income of the non contract potato farmers from potato cultivation. This might be due to more land use by the contract potato farmers than non contract potato farmers. High price of seed potato might be another cause for getting high income by the contract farmers. The non contract farmers mostly cultivate only table potato which had low market value.

4.2.8 Mean differences between the contract and non contract potato farmers in respect of their organizational participation

In case of organizational participation, the mean difference between the contract and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between contract and non contract farmers in terms of organizational participation”. The computed value of t (1.04) was found lower than that of tabulated value of t (1.98) at 5% level of significance with 118 df (Table 4.6). These findings mean that the null hypothesis was accepted at 5% level of significance. Therefore, it was concluded that there was no significant difference between the contract and non contract farmers in terms of their organizational participation.

4.2.9 Mean differences between the contract and non contract potato farmers in respect of communication media exposure

In case of communication media exposure, the mean difference between the contact and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between the contract and non contract farmers in terms of communication media exposure”. The computed value of t (14.37) was found higher than that of tabulated value of *t* (3.37) at 0.10% level of significance with 118 df (Table 4.6). These findings mean that the null hypothesis was rejected at 0.10% level of significance. Therefore, it was concluded that there was a significant differences between contract and non contract farmers in terms of their communication media exposure. Communication media exposure of the contract farmers was found higher than the communication media exposure of non contract potato farmers. This might be due to high communication of contract farmers with the personnel from contractual organizations. The communication media exposure of the non contract potato farmers had not similar level of exposure like the contract farmers.

4.2.10 Mean differences between the contract and non contract potato farmers in respect of training exposure

In case of training exposure, the mean difference between the contact and non contract potato farmers was examined by testing the following null hypothesis, "There was no mean difference between contract and non contract farmers in terms of training exposure". The computed value of t (9.17) was found higher than that of tabulated value of t (3.37) at 0.10% level of significance with 118 df (Table 4.6). These findings mean that the null hypothesis was rejected at 0.10% level of significance. Therefore, it was concluded that there was a significant differences between contract and non contract farmers in terms of their training exposure. Training exposure of the contract farmers was found higher than the communication media exposure of the non contract potato farmers. This might be due to the contract of the farmers with the contractual organization to develop potato cultivation skill at a higher level.

4.2.11 Mean differences between the contract and non contract potato farmers in respect of their knowledge on potato cultivation

In case of knowledge on potato cultivation, the mean difference between the contact and non contract potato farmers was examined by testing the following null hypothesis, "There was no mean difference between contract and non contract farmers in terms of knowledge on potato cultivation". The computed value of t (20.14) was found higher than that of tabulated value of t (3.37) at 0.10% level of significance with 118 df (Table 4.6). These findings mean that the null hypothesis was rejected at 0.10% level of significance. Therefore, it was concluded that there was a significant differences between contract and non contract farmers in terms of their knowledge on potato cultivation. Contract farmers' knowledge on potato cultivation was found higher than the knowledge of non contract potato farmers. This might be due to more training and guidance of the contract farmers by the contractual organizations.

4.2.12 Mean differences between the contract and non contract potato farmers in respect of their satisfaction towards potato cultivation

In case of satisfaction towards potato cultivation, the mean difference between the contact and non contract potato farmers was examined by testing the following null hypothesis, “There was no mean difference between contract and non contract farmers in terms of satisfaction towards potato cultivation”. The computed value of t (7.01) was found higher than that of tabulated value of t (3.37) at 0.10% level of significance with 118 df (Table 4.6). These findings mean that the null hypothesis was rejected at 0.10% level of significance. Therefore, it was concluded that there was a significant differences between contract and non contract farmers in terms of their satisfaction towards potato cultivation. Contract farmers’ satisfaction towards potato cultivation was found higher than the non contract potato farmers. This might be due to the fact that different facilities an dimensions congenial to contract potato farmers rather than the non contract potato farmers.

4.3 Differences in the influencing factors responsible for production related decisions

Men live in society, so various factors of the society influence their activities. In order to document these influencing factors towards potato cultivation, this study was designed with this variable. The collected data were analyzed for both contract and non contract potato farmers and the variable was measured on the basis of scores and the possible score range was 0 to 3 against each factor. From the obtained data, an influencing factor index (IFI) was calculated. An influencing factor index for each of the factor could range from 0 to 180. On the basis of IFI, all of the factors have been arranged in rank order in Table 4.3. In case of contract farmer, the observed IFI ranged from 138 to 178 and in case of non contract farmer, the observed IFI ranged from 0 to 179.

Table 4.3 Rank order of the influencing factors for production related decisions

Factors	Contract farmer		Non contract farmer	
	Influencing factor index (IFI)	Rank order	Influencing factor index (IFI)	Rank order
Credit facilities from the contractual organizations	178	1	0	6
Success stories	176	2	179	1
Marketing facilities	173	3	179	1
Motivation from extension agent	163	4	56	5
Peer group affiliation	154	5	165	2
Result demonstration	153	6	57	4
Availability of improved seed	138	7	161	3

Table 4.3 shows that the credit facilities (IFI - 178) influenced the contract potato farmers to the highest extent followed by success stories (176) and marketing facilities (173). This occurred because the contract farmer got financial as well as input help from the contractual organization and a security of selling produces. The success stories influences the farmers to be successful himself too. On the other hand, marketing facilities (179) and success stories (179) jointly hold the first position in case of influencing non contract potato farmers followed by peer group affiliation (165), availability of improved seed (161). These might be due to security of selling produces and to be a successful one through potato cultivation. When peer group got benefitted from potato cultivation, the farmers tend to cultivate potato from their own will. This might happen to the non contract farmers. As better seed ensures better production, due to long time attachment the non contract farmers experienced it in the similar way. This might be another factor of influencing for potato cultivation.

4.4 Rank order of different information sources preferred by the contract and non contract potato farmers

Different information sources are used by the farmers in different phases of potato cultivation. The variable communication media exposure was organized in a way so that farmers' preferences of information source could be investigated in a short and easy way. To identify the preferences of information source by the farmers 10 sources were taken in count. The collected data were analyzed for both contract and non contract potato farmers and the variable was measured on the basis of scores and the possible score range was 0 to 4 against each informational source. From the obtained data, preference of the information source index (ISI) was calculated. An information source index (ISI) for each of the sources could range from 0 to 240. On the basis of ISI, all of the factors have been arranged in rank order in Table 4.1.9b. In case of contract farmers, the observed ISI ranged from 0 to 228 and in case of the non contract farmers, the observed ISI ranged from 0 to 170.

Table 4.4 Rank order of different information sources preferred by the contract and non contract potato farmers

Informational sources	Contract farmer		Non contract farmer	
	Preference of informational source index (PISI)	Rank order	Preference of informational source index (PISI)	Rank order
Deputy Assistant Director (DAD), BADC	228	1	55	6
Neighbors	215	2	166	2
Deputy Director (DD)/ Assistant Director (AD), BADC	209	3	8	9
Ideal potato farmers	181	4	150	3
Input dealers	165	5	170	1
Result demonstration	104	6	38	7
Agricultural TV program	80	7	66	5
SAAO, DAE	68	8	78	4
Leaflet/folders/ booklets	55	9	18	8
UAO/AEO, DAE	18	10	6	10

Data in table 4.1.9b reveal that the contract potato farmers preferred (ISI-228) Deputy Assistant Director, BADC as information source most. This might be due to the easy access and high level of communication with Deputy Assistant Director in respect of potato cultivation. On the other hand, Deputy Assistant Director functioned as the bridge between the contractual organization and the contract farmers. That's why contract farmers might feel free to communicate with them. On the other hand, they ranked neighbours (ISI-215) in second position. As contract farming was done on a block or community basis, the farmers shared their problems with farmers from the next field. As next door farmer or farmer from next field always keep in touch with another, that's why

it was found easier to communicate with them at any time. These might be the cause of the neighbours for their preference in the 2nd rank. On the other hand, the contract farmers least preferred to communicate with Upazila Agricultural Officer/ Agriculture Extension Officer. The communication barrier like the availability or access to them and less relevance of them with contract farming might be the cause of this result. Besides these, non contract farmers prefer to seek information from the input dealers (ISI-170) most (1st ranked), followed by neighbours (ISI-166). This was perhaps due to the communication gap of them with the extension personnel. Among the easily accessible media, they thought input dealers' knowledge level was high compared to others. The reason for preferring neighbours might be the same as contract farmers. On the other hand, non contract farmers preferred least to seek information from Upazilla Agricultural Office/ Agriculture Extension Officer of the Department of Agricultural Extension and 2nd least preference to seek information from Deputy Director/ Assistant Director, BADC. In both the cases, non-availability and accessibility to them and self-segregation might be the causes.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This Chapter deals with summary, conclusions and recommendations of the study and is segmented in three sections. The first section deals with summary of the findings.

5.1 Summary of the Findings

Findings in respect of 12 selected characteristics of the farmers are summarized below:

5.1.1 Age

In case of age of the contract potato farmers, the maximum proportion (63.33%) belonged to middle aged (35-55) category. On the other hand, the maximum proportion (58.33%) of non contract potato farmers belonged to middle aged (35-55) category. Middle aged category of contract farmers comprises higher percentage of respondents than non contract farmers.

5.1.2 Education

Regarding education of the contract potato farmers, the maximum proportion (35%) belonged to secondary (6-10) category. On the other hand, the maximum proportion (40%) of the non contract potato farmers belonged to illiterate (0-0.5) category.

5.1.3 Farm size

The maximum proportion (45%) of the contract farmers belonged to medium farm size (1- 3 ha) category. On the other hand, the maximum proportion (45%) of the non contract potato farmers belonged to small (<1.0 ha) category.

5.1.4 Suitable land for potato cultivation

In case of suitable land for potato cultivation, the maximum proportion (56.67%) of the contract farmers belonged to medium (1- 3 ha) category. On

the other hand, the maximum proportion (51.67%) of the non contract potato farmers belonged to small (<1.0 ha) category.

5.1.5 Land under potato cultivation

Majority (55%) of the contract potato farmers had medium (1- 3 ha) land under potato cultivation, but maximum (81.67%) of the non contract potato farmers had small (<1 ha) land under potato cultivation.

5.1.6 Potato cultivation experience

Regarding experience of the contract potato farmers, the maximum proportion (53.33%) belonged to medium experience (6 - 11 years) category. On the other hand, the maximum proportion (43.33%) of the non contract potato farmers belonged to low experience (<6 years) category.

5.1.7 Income from potato cultivation

In case of income of the contract potato farmers, the maximum proportion (73.33%) belonged to high income (>220 thousand Tk.) category. On the other hand, the maximum proportion (51.67%) of the non contract potato farmers belonged to medium income (120 - 220 thousand Tk.) category.

5.1.8 Organizational participation

Exactly half of the contract potato farmers (50%) had very low participation (<2) on various organizational activities, whereas maximum proportion (45%) of the non contract potato farmers belonged to very low participation (<2) and low participation (2 - 4) category.

5.1.9 Training exposure

In case of training exposure of the contract potato farmers, half of contract farmers belonged to low exposure (2-4) of training. On the other hand, the maximum proportion (65%) of the non contract potato farmers belonged to no exposure (0) category of training.

5.1.10 Knowledge on potato cultivation

In case of the contract potato farmers' knowledge, the maximum (55%) proportion of the contract farmers had medium (55% - 75%) knowledge. On the other hand, the maximum proportion (73.33%) of the non contract potato farmers belonged to low (<55%) category of knowledge.

5.1.11 Satisfaction towards potato cultivation

Regarding satisfaction, the highest percentage (71.67%) of the contract potato farmers was highly satisfied. On the other hand, more than three fourth (76.67%) non contract farmers were moderately satisfied towards potato cultivation.

5.1.12 Mean Differences between the Contract and Non Contract Potato Farmers in Respect of their Selected Demographic and Operational Characteristics

It was found that there was no significant difference between contract and non contract farmers in terms of age, education, farm size, suitable land for potato cultivation, potato cultivation experience and organizational participation at 5% level of significance. On the other hand, there were significant differences between contract and non contract farmers in terms of land under potato cultivation, income from potato cultivation, communication media exposure, training exposure, knowledge on potato cultivation and satisfaction towards potato cultivation at 0.10% level of significance.

5.1.13 Differences in Influencing Factors Responsible for Production related Decisions by the Contract and Non Contract Potato Farmers

Contract farmers were mostly influenced by the availability of credit facilities. On the other hand, marketing facilities and success stories jointly influenced non contract potato farmers mostly for taking production related decisions.

5.1.14 Differences in Informational Sources Preferred by the Contract and Non Contract Potato Farmers.

The computed information source index (ISI) for each of the sources showed that the contract potato farmers preferred Deputy Assistant Director, BADC as the mostly used information source. On the other hand, the non contract potato farmers preferred mostly the input dealers as information source.

5.2 Conclusions

Based on the findings of this study and their logical interpretations in the light of other relevant facts, the following conclusions were drawn.

1. The research findings indicate significant difference (0.05% level of significance) between contract and non contract farmers in terms of land under potato cultivation, income from potato cultivation, communication media exposure, training exposure, knowledge on potato cultivation, satisfaction towards potato cultivation. So, it can be concluded that, there was huge gap between contract and non contract farmers which affect potato production. There is huge scope to maximize the production of potato by reducing gap between contract and non contract farmers.
2. This study revealed that, about three fifth (60.83%) of the respondents had small (<1.0 ha) sized farm under potato cultivation. On the other hand, maximum number of contract farmers (55%) had medium farm size (1- 3 ha) under potato cultivation. More than 80 percent (81.67%) non contract farmers cultivate potato in small sized farm (<1.0 ha). This data leads to the conclusion that, non contract potato farmers did not bring their land in large scale under potato cultivation due to the backwardness in respect of contract potato farmers. So, there is a scope of horizontal expansion of potato production.
3. Income from potato cultivation was found high income category (>220 thousand Tk.) of highest percentage (52.50%) of respondents. Approximately three fourth (73.33%) of the contract farmers had high income whereas almost half (51.67%) of the non contract farmers' had medium income (120 - 220 thousand Tk.) from potato cultivation. This finding lead to the conclusion that, backwardness of the non contract potato farmers compare to contract potato farmers leads to lower income. Hence, there is huge scope to make the non contract potato farmers smart.

4. This study indicates that, communication media exposure varies significantly from contract to non contract farmers. More than fifty percent (54.17%) of the respondents had medium category exposure (12 - 22) to communication media. Which was more or less resembles to the contract (51.67%) and non contract (56.67%) potato farmers. But the difference was found acute in case of low (contract- 0.00%, non contract- 41.67%) and high exposure (contract- 48.33%, non contract-1.67%) category. This finding of the study concludes that, communication exposure makes a farmer smart. So, there is huge scope to make the farmers smarter which will encourage production.
5. Training exposure was found very low (35%) or no exposure (34.17%) category among more than two third (69.17%) respondents. Half of the contract farmers (50%) belonged to low exposure category and approximately two third (65%) non contract farmers had no training on potato cultivation. The research finding leads to the conclusion that, although training greatly influence the production there was a lacking of training among the farmers. There is huge scope of training to the farmers by the concerned authority like as DAE, BADC which will ultimately favor total production.
6. The study revealed that, only 40.83% of the respondents had medium (55% - 75%) category knowledge which covers highest percentage. However, more than fifty percent (55%) contract farmers had medium knowledge whereas about three fourth (73.33%) of the non contract farmers had low level knowledge on potato cultivation. Therefore, it may be concluded that production had greatly influenced by the knowledge level of the farmers. There is a good ground of extension work to increase the knowledge level of the farmers.
7. Satisfaction towards potato cultivation was found moderate among more than fifty percent (52.50%) respondents. Among the respondents, more than two third (71.67%) contract farmer was found highly satisfied whereas more than three fourth (76.67%) non contract potato

farmers were found moderately satisfied towards potato cultivation. This finding concluded that, satisfaction level decreases with the increase of knowledge. A farmer having lower level knowledge becomes satisfied with a small thing. So, there is huge scope of extension work to arise desire of the farmers for more production.

8. The findings observed that contract farmers along with non contract farmers were mostly satisfied towards availability of fertilizers and no one farmer was dissatisfied on fertilizer availability. Marketing facilities ranked second position in case of both contract and non contract farmers. Besides that, non contract farmer ranked availability of pesticide and harvesting machineries also in second position. On the other hand, the contract potato farmers were least satisfied towards availability of potato production related information. Besides these, Non contract farmers were least satisfied towards credit facilities. This finding leads to the conclusion that there was so much dissatisfaction among the farmers at various aspects. So, there is a huge field of extension work.
9. In terms of influencing factor identification, the study revealed that credit facilities influenced the contract potato farmers to the highest extent followed by success stories and marketing facilities respectively. Besides these, marketing facilities and success stories jointly held the first position in case of influencing non contract potato farmers followed by peer group affiliation and availability of improved seed respectively. Considering this finding, it may be concluded that agricultural subsidies encourage the farmers for more production. There is huge scope of government to increase the production of potato.
10. In case of preferences of informational sources, the contract potato farmers preferred Deputy Assistant Director, BADC most as informational source followed by neighbors. On the other hand, the contract farmers least preferred to communicate with Upazila

Agricultural Officer/ Agriculture Extension Officer. Besides these, non contract farmers prefer to seek information from input dealers most followed by neighbors. But they preferred least to seek information from Upazilla Agricultural Office/ Agriculture Extension Officer of Department of Agricultural Extension followed by Deputy Director/ Assistant Director, BADC. This finding concluded that, easily accessible sources are preferred by the farmers. So, there is huge scope of extension work to ensure easy accessibility by the farmers.

5.3 Recommendations

The following recommendations were drawn based on the findings and conclusions of the study and were presented below.

5.3.1 Recommendations for policy issues

The following recommendations for policy implication were made in view of the major issues supporting increased production of potato in Bangladesh.

1. The scope of organizational participation in the study area was at lower level. The concerned authority like BADC, DAE and some other private organizations should facilitate wider participation of the farmers in organizations at the field level. It would help farmers to be familiar with others in an easy way. It would also help to increase knowledge related issues of the farmers more effectively.
2. In the study area, scarcity of training facilities was found. To increase the competency of the farmers, BADC, DAE and other private organizations should provide necessary training facilities to the farmers in a continuous way. It would be beneficial for the farmer to bring desirable change in the long run. The knowledge level of the contract potato farmer was found moderate but it was not at all satisfactory for the non contract potato farmers. The above mentioned organizations have to provide need based training to increase sufficient knowledge of the farmers, so that they can cultivate potato in a scientific way.
3. Significant differences were found between contract and non contract potato farmers in terms of land under potato cultivation, income from potato cultivation, training exposure, knowledge on potato cultivation and satisfaction towards potato cultivation. This indicates that the contract farmers were getting benefitted by following appropriate steps suggested by the contractual organizations. The concerned authority like DAE, BADC and other organizations should provide necessary

facilities to the farmers to overcome this situation in order to minimize gap between contract and non contract farmers.

4. The contract potato farmers were influenced mostly by credit facilities provided by the contractual organizations. On the other hand, the non contract potato farmers were influenced mostly by marketing facilities and success stories. The concerned authority as DAE and BADC can not provide credit facilities to the non contract farmers. But there is a huge potentiality of growing potato on contract basis. So, it is necessary to involve some NGOs as contractual organizations to facilitate cultivation of potato on contract basis along with making other influencing factors more prominent. These could be highly beneficial to the economy of the country by reducing gap among the farmers in general as the area is suitable for potato cultivation.
5. The non contracting farmers were found to have lower contact with formal sources like extension experts. The concerned authority like DAE should undertake more programmes related to the farmers so that the farmers feel comfortable to communicate with various formal sources of information. In this way, the formal information sources could also increase their extent of contract with their contracting clients.

5.3.2 Recommendations for further studies

Some recommendation for further studies were also made as follows:

1. The present study was conducted on the population of the potato farmers of three selected unions of Sadar Upazila of Sherpur district. Findings of the study need to be verified by undertaking similar research in other potato growing zones of the country.
2. This study investigated the relationship between contract and non contract farmers in terms of 13 selected characteristics. But there are some other characteristics also related to other personal, social, psychological, cultural and situational factors. It is, therefore,

recommended that further study should be conducted involving other characteristics in this regard.

3. The current study was conducted to find the differences between contract and non contract potato farmers about contract farming. Therefore, it was recommended that further studies should be conducted to explore the differences between contract and non contract farmers for other crops.
4. One of the objectives of this study was to verify the preference of different information sources. Some future studies could be undertaken to verify what sources were more persuasive for different categories of farmers.

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APPENDICES

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 for a Research Study on

"A COMPARISON BETWEEN CONTRACT AND NON CONTRACT POTATO FARMERS"

Part-A

Serial No…….. Date……...……..

Name of the respondent……..

Village……. Union……...……...

Upazila…… District……

Cell Phone No...…….....

Part-B

(Please answer the following questions. Put tick mark where necessary. All your information will be kept secret)

1. Age

How old are you? ……. Years

2. Education

Please mention your educational status

( ) Can't read and write

( ) Can sign only

( ) Attended class up to ……..

3. Farm size

Please mention your farm size according to the following items:

Sl. No.	Type of Land	Local Unit	Hectare
A.	Homestead area (including pond)		
B.	Own Land under own cultivation		
C.	Own land given to others as borga		
D.	Land taken from others as borga		
E.	Land taken from others as lease		
F.	Fallow land		
Total Farm Size = A+B+(C+D)/2+E+F			

4. Land under potato cultivation

What amount of land do you use to cultivate potato?

Types of potato	Suitable land for potato cultivation		Land under cultivation	
	Local unit	Hectare	Local unit	Hectare
Seed potato				
Table potato				
Total				

5. Potato cultivation experience

Please mention how long do you cultivate potato: ……. Years

6. Income from potato cultivation

Types of potato	Production		Income
	Unit(kg)	Price per unit	
Seed potato			
Table potato			
Total			

8. Organizational participation

Please mention your nature and years of participation in the following social organization:

Sl. No.	Name of organization	No participation	Nature of participation		
			As ordinary member	As executive member	As executive officer
1.	Locally organized samiti				
2.	Bazar committee				
3.	Youth club				
4.	School/college committee				
5.	Religious committee				
6.	Union council				
7.	NGO organized samiti				
8.	GO organized samiti				

9. Communication media exposure

Please mention your extent of contact with the following communication media:

Sl. No.	Extension Personnel	Nature of extension contact				
		Regularly	Often	Occasionally	Rarely	Not at all
1.	Deputy Director(DD)/ Assistant Director, BADC	2 days/ season [ ]	1 Day/ season [ ]	1 Day/ 2 season [ ]	1 Day/ 3 Season [ ]	[ ]
2.	Deputy Assistant Director(DAD), BADC	≥8 days/ season [ ]	5-7 Days/ season [ ]	2 Day/ season [ ]	2 Days/ 3 Season [ ]	[ ]
3.	UAO/AEO, DAE	2 days/ season [ ]	1 Day/ season [ ]	1 Day/ 2 season [ ]	1 Day/ 3 Season [ ]	[ ]
4.	SAAO, DAE	≥8 days/ season [ ]	5-7 Days/ season [ ]	2 Day/ season [ ]	2 Days/ 3 Season [ ]	[ ]
5.	Ideal potato farmers	≥8 days/ season [ ]	5-7 Days/ season [ ]	2 Day/ season [ ]	2 Days/ 3 Season [ ]	[ ]
6.	Input dealers	≥6 days/ season [ ]	4-5 days/ season [ ]	2-3 day/ season [ ]	1 day/ season [ ]	[ ]
7.	Neighbours	≥3 days/ week [ ]	2 days/ week [ ]	1 day/ week [ ]	1 day/ 2 week [ ]	[ ]
8.	Agricultural TV program	≥5 days/ month [ ]	3-4 days/ month [ ]	2 days/ month [ ]	1 day/ month [ ]	[ ]
9.	Result demonstration	≥4 days/ season [ ]	3 Days/ season [ ]	2 Days/ season [ ]	1 Day/ season [ ]	[ ]
10.	Leaflet/ folders/ booklets	≥4 days/ season [ ]	3 days/ season [ ]	2 days/ season [ ]	1 day/ season [ ]	[ ]

10. Training exposure

Have you received any training on potato cultivation? (Put tick mark)

( ) Yes ( ) No

If yes, please give the following information:

Sl. No.	Name of the training program	Sponsoring organization	Duration (Days)
1.			
2.			
3.			
4.			
Total			

11. Knowledge on potato cultivation

Please answer the following questions regarding potato.

Sl. No.	Questions	Assigned Score	Obtained score
1.	What is the time of planting potato?	1	
2.	Name three popular varieties of potato in your locality?	3	
3.	How many types of potato seed are available in the market?	2	
4.	How to recognize/identify quality seed potato?	2	
5.	How to cut seed potato to sow in the field?	3	
6.	Mention the seed rate of potato per hectare according to grading of seeds.	2	
7.	Mention the plant spacing for potato cultivation.	1	
8.	How many ploughing, cross ploughing are needed for land preparation to cultivate potato?	1	
9.	What intercultural operations are needed during potato cultivation?	3	
10.	Mention Urea, TSP and MOP doses per decimal in potato cultivation.	3	
11.	Mention Boron and Zinc fertilizer doses in potato cultivation.	2	
12.	Mention fertilizer dose of gypsum.	1	

13.	Mention application method of fertilizer in potato cultivation.	2	
14.	How many times potato need irrigation within its lifetime?	1	
15.	Which stages of potato plant are critical for irrigation in potato cultivation?	2	
16.	What is earthing-up technique?	2	
17.	Which materials are used for earthing up?	3	
18.	What is solarization of potato? How can you protect solarization?	3	
19.	What are the benefits of earthing-up in the potato field?	2	
20.	What do you mean by potato seed treatment?	1	
21.	Mention three harmful insects of potato plants.	3	
22.	Mention the name of pesticide and its application dose for controlling cut worm.	3	
23.	Mention two viral diseases of potato with symptoms.	2	
24.	How do you control Aphid infestation in the potato field?	3	
25.	Which weather condition is vulnerable for the infestation of late blight of potato.	3	
26.	Mention the name of fungicide and its application dose for controlling late blight of potato.	3	
27.	Why haulm pulling is necessary before harvesting potato?	2	
28.	What are the maturity symptoms of potato?	3	
29.	How many days it takes for the maturity of potato?	2	
30.	What are the grades of potato?	2	
31.	What measures are taken during curing of harvested potato?	3	
32.	How do you store potato in ambient condition?	3	
33.	How many days the potatoes keep fresh without cold storage?	1	
34.	What is the storage cost of potato in cold storage (per kg, per month)?	2	
35.	What are the main diseases of potato during storage?	2	
36.	Mention the methods to control the potato diseases during storage condition.	3	
Total		80	

12. Satisfaction towards potato cultivation

Please mention your extent of satisfaction towards potato cultivation in the following:

Sl. No.	Dimensions	Extent of satisfaction			
		Highly satisfied	Moderately satisfied	Less satisfied	Not at all satisfied
1.	Availability of quality seed				
2.	Availability of improved machineries for land cultivation				
3.	Availability of labour				
4.	Availability of fertilizers				
5.	Availability of irrigation facilities				
6.	Availability of pesticide				
7.	Availability of harvesting machineries				
8.	Marketing facilities				
9.	Storage facilities for potato				
10.	Availability of potato production related information				
11.	Extent of cooperation from extension agents				
12.	Market price				
13.	Yield performance of existing varieties				
14.	Weather and climate for potato production				
15.	Credit facilities				

13. Influencing factors for production related decisions

Mention the extent of influence the following factors exerted while taking production related decisions:

Sl. No.	Factors	Extent of influences			
		Highly influenced	Moderately influenced	Less influenced	Not at all influenced
1.	Peer group affiliation				
2.	Motivation from extension agents				
3.	Result demonstration				
4.	Marketing facilities				
5.	Success stories				
6.	Availability of improved seed				
7.	Credit facilities from the contractual organizations				

Thanks for your cooperation.

.....

Signature of the Interviewer

Date

APPENDIX B: Tabulated values of *t* at different levels of significance

df	**0.1**	**0.05**	**0.02**	**0.01**	**0.005**	**0.002**	**0.001**
1	6.3138	12.7065	31.8193	63.6551	127.3447	318.4930	636.0450
4	2.1319	2.7764	3.7470	4.6041	5.5976	7.1732	8.6103
5	2.0150	2.5706	3.3650	4.0322	4.7734	5.8934	6.8688
8	1.8595	2.3060	2.8965	3.3554	3.8325	4.5008	5.0414
10	1.8124	2.2282	2.7638	3.1693	3.5814	4.1437	4.5869
15	1.7530	2.1314	2.6025	2.9467	3.2860	3.7328	4.0728
20	1.7247	2.0860	2.5280	2.8454	3.1534	3.5518	3.8495
25	1.7081	2.0596	2.4851	2.7874	3.0782	3.4502	3.7251
30	1.6973	2.0423	2.4572	2.7500	3.0298	3.3852	3.6459
35	1.6896	2.0301	2.4377	2.7238	2.9961	3.3400	3.5912
38	1.6859	2.0244	2.4286	2.7115	2.9803	3.3190	3.5657
40	1.6839	2.0211	2.4233	2.7045	2.9712	3.3069	3.5510
44	1.6802	2.0154	2.4142	2.6923	2.9555	3.2861	3.5258
45	1.6794	2.0141	2.4121	2.6896	2.9521	3.2815	3.5202
48	1.6772	2.0106	2.4066	2.6822	2.9426	3.2689	3.5051
50	1.6759	2.0086	2.4033	2.6778	2.9370	3.2614	3.4960
55	1.6730	2.0041	2.3961	2.6682	2.9247	3.2451	3.4764
60	1.6706	2.0003	2.3901	2.6603	2.9146	3.2317	3.4602
65	1.6686	1.9971	2.3851	2.6536	2.9060	3.2204	3.4466
70	1.6669	1.9944	2.3808	2.6479	2.8987	3.2108	3.4350
75	1.6654	1.9921	2.3771	2.6430	2.8925	3.2025	3.4250
78	1.6646	1.9909	2.3751	2.6404	2.8891	3.1980	3.4197
80	1.6641	1.9901	2.3739	2.6387	2.8870	3.1953	3.4164
84	1.6632	1.9886	2.3716	2.6356	2.8831	3.1901	3.4101
88	1.6623	1.9873	2.3695	2.6328	2.8795	3.1854	3.4046
90	1.6620	1.9867	2.3685	2.6316	2.8779	3.1833	3.4020
95	1.6610	1.9852	2.3662	2.6286	2.8741	3.1782	3.3959
100	1.6602	1.9840	2.3642	2.6259	2.8706	3.1738	3.3905
105	1.6595	1.9828	2.3624	2.6235	2.8675	3.1697	3.3856
108	1.6591	1.9822	2.3614	2.6221	2.8658	3.1674	3.3829
110	1.6588	1.9818	2.3607	2.6212	2.8647	3.1660	3.3812
115	1.6582	1.9808	2.3592	2.6192	2.8622	3.1626	3.3771
116	1.6581	1.9806	2.3589	2.6189	2.8617	3.1620	3.3764
117	1.6580	1.9805	2.3586	2.6185	2.8612	3.1614	3.3756
118	1.6579	1.9803	2.3583	2.6181	2.8608	3.1607	3.3749
119	1.6578	1.9801	2.3581	2.6178	2.8603	3.1601	3.3741
120	1.6577	1.9799	2.3578	2.6174	2.8599	3.1595	3.3735