

**FARMER'S PARTICIPATION AND MARKET LINKAGE THROUGH CONTRACT
FARMING IN SHIBPUR UPAZILA OF NARSINGDI DISTRICT**

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**FARMER'S PARTICIPATION AND MARKET LINKAGE THROUGH
CONTRACT FARMING IN SHIBPUR UPAZILA OF NARSINGDI DISTRICT**

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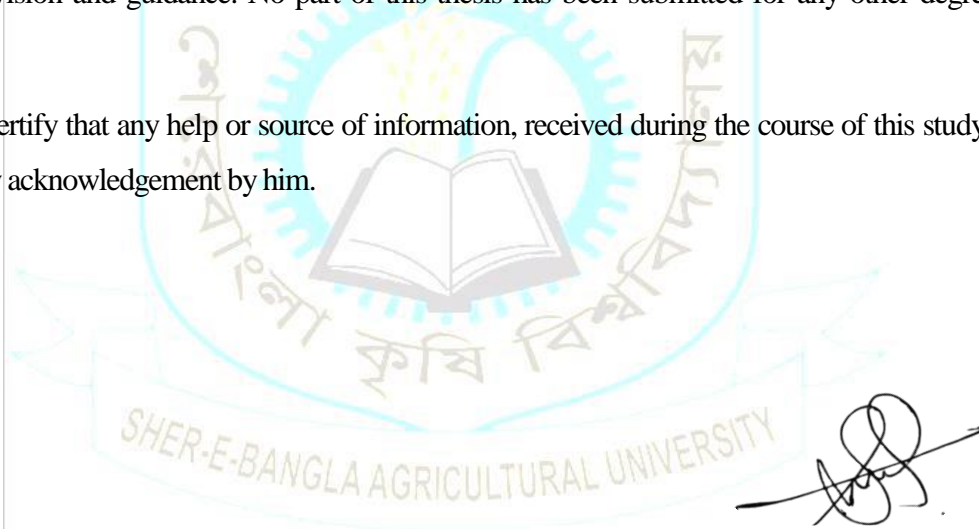
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CERTIFICATE

This is to certify that the thesis entitled, “**FARMER’S PARTICIPATION AND MARKET LINKAGE THROUGH CONTRACT FARMING IN SHIBPUR UPAZILA OF NARSINGDI DISTRICT**” submitted to the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka in partial fulfilment of the requirements for the degree of **Master of Science (MS) in Agribusiness and Marketing**, embodies the result of a piece of bona-fide research work conducted by **MD. SHAHRIAR RAHMAN, Registration no. 13-05644** under my supervision and guidance. No part of this 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 study has been dully acknowledgement by him.



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ABSTRACT

Contract farming (CF) has been used extensively to integrate agricultural value chain both in the developed and developing countries. Integrating value chain with the farmer may create a win-win situation for all, as well farmer, contractor, government, agro-processing industry, wholesaler, retailer, customer etc. Participation in CF is associated with increased farm productivity and farmer income. Therefore, the purpose of this study was to analyze socio-economic factors affecting farmers' participation in CF. The study used nationally-representative data of smallholder vegetable farmers in Shibpur upazila of Narsingdi district. The data were collected from 75 contract farmer and 125 non-contract farmers of Shibpur upazila. Binary logistic regression was used to analyze fifteen factors that potentially affected farmers' decision to participate in CF. The results showed that nine factors had statistically significant effects on farmers' decision to participate in CF. 'Household head's education, female head's occupation, family size, land type, size of land holdings, labor use, type of fertilizers being used, training or technical knowledge and average monthly income of the respondents had a positive influence on farmers' decisions. It was also found that contract farming ensure higher price of produces for farmer and reduces the retail price of bean. Besides those the study identified the problems and provide suggestions to increase contract farming participation.

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ABBREVIATIONS AND ACRONYMS

SME	Small and Medium Enterprises
SPSS	Statistical Package for Social Science
HIES	Household Income and Expenditure Survey
MDG	Millennium Development Goals
GDP	Gross Domestic Product
FAO	Food and Agriculture Organization
GAP	Good Agricultural Practices
NGO	Non-Governmental organization
IFAD	International Fund for Agricultural Development
BBS	Bangladesh Bureau of Statistics
WB	World Bank
UNDP	United Nations Development Program
etc	et cetera, and the other
ADB	Asian Development Bank
CF	Contract Farming
%	Percent

CHAPTER I

INTRODUCTION

1.1 Background of the study

Bangladesh is a developing country with a large population. About 62% of the population is living in the villages (World Bank, 2019). Among them, about 20.5% of people in the rural area living under the poverty line (BBS, 2019). Here, Agriculture is the main source of food, nutrition, employment, and income generation for the majority of rural people. The sector contributes 13.02 % to GDP and employs 50.3% of the labor force and the crop sub-sector alone accounts for 60.8% share of agricultural GDP (BBS, 2019-20). The performance of the agriculture sector regulates the GDP growth rate in Bangladesh. Historically, efforts to raise rural incomes have focused primarily on improving agricultural productivity. Indeed, most empirical evidence suggests that agriculture-led growth offers an unusually powerful vehicle for broad-based poverty reduction (Thirtle *et al.*, 2003). But without well-functioning agricultural markets, productivity gains on the farm lead to temporary production surges and price collapses.

Smallholder farmers in developing countries like Bangladesh are often trapped in a vicious cycle of low-intensity, subsistence-oriented farming, low yields, and insufficient profits to make beneficial investments. These factors contribute to high levels of poverty in many rural areas (FAO, 2018; FAO; 2019; Barrett, 2008).

Linking poor farmers to markets is one option to break this vicious cycle, but it requires overcoming various barriers and market imperfections (Barrett, 2008; World Bank, 2007). Smallholder farmers may face high risks while lacking the skills, technologies, and financial services to produce a marketable surplus—or to supply the quality, quantity, and types of commodities demanded by buyers (Reardon *et al.*, 2009). Contract farming—a preharvest agreement between farmers and buyers—is commonly understood as a useful tool to mitigate prevalent market failures and to reduce the risks facing smallholder farmers (Bellemare and Bloem, 2018; Bellemare and Lim, 2018; Grosh, 1994). Contract farming is therefore promoted by policymakers and development agencies (Ragasa *et al.*, 2018; Ba *et al.*, 2019). Contract farming is not a new phenomenon (Grosh, 1994; Key and Runsten, 1999);

the globalization of agricultural trade and the rapid modernization of agricultural value chains in developing countries (Reardon *et al.*, 2009), however, has generated renewed interest in the topic.

Numerous studies analyze whether farm households benefit from contract farming, which is important in light of increasing policy support. Most studies focus on profits and household income (Khan *et al.*, 2019; Miyata *et al.*, 2009, Maertens and Velde, 2017); some explore implications for other dimensions of household welfare (Bellemare and Novak, 2017; Mishra *et al.*, 2018; Dedehouanou *et al.*, 2013). Most studies find that contract farming improves welfare (Bellemare and Bloem, 2018; Wang *et al.*, 2014; Otsuka *et al.*, 2018; Ton *et al.*, 2018). Contract farming may affect household welfare through different channels. For example, contracts that specify the price or quantity of products to be delivered can reduce transaction costs and uncertainty around prices and marketing options, thus facilitating planning and investments (Bellemare and Lim, 2018; Key and Runsten, 1999; Mishra *et al.*, 2018). Contract farming may also improve farmers' access to extension, financial services, and farm inputs, thereby enabling farmers to increase productivity, improve product quality, or adopt more-profitable crops (Key and Runsten, 1999; Glover, 1984).

Several international studies have been conducted to assess the importance of contract farming (Bellemare & Bloem, 2018; Narayanan, 2014; Reardon & Timmer, 2014) and factors that affect the farmer decision to participate in CF (Bellemare & Lim, 2018; Khan *et al.*, 2019; Mishra, *et al.*, 2018; Odunze *et al.*, 2015). A particular study, such as Ntaganira *et al.*, (2017), discussed the effects of access to farm service on contract and non-contract dairy farmers in Rwanda. However, the paper did not further discuss its effect on the farmer's decision to participate in CF.

Currently, the CF participation rate in Bangladesh is relatively low compared to other developing countries. The study of CF is crucial since it is the precursor of agricultural transformation in developing countries. International Studies showed that CF can make the market linkage with smallholders and participation of farmers in CF depends on various factors. No previous studies have included socio-economic variables as predictors of farmers' participation in CF in Bangladesh.

Therefore, the purpose of this study is to analyze the supply chain to link smallholders in the market chain and find out socioeconomic factors affecting farmer's decision to participate in CF.

1.2 Statement of the problem

Poor farmers of Bangladesh, lack access to markets and struggle to make a livelihood from agriculture due to the salinity of land and unsustainable agricultural practices (Bhowmick *et al.*, 2016). This is leading to large-scale poverty and food insecurity. But these small farmers continue to contribute significantly to agricultural production, food security, rural poverty reduction, and biodiversity conservation despite the challenges they face in access to productive resources and service delivery (FAO, 2014). They confront new challenges on integration into high-value chains, adaptation to climate change, and market volatility and other risks and vulnerability (Uddin, 2011).

Access to guaranteed markets for produce and the acquisition of inputs is a major problem confronting poor farmers. Local commodity markets are characterized by high volatility. On the other hand, international markets as well as markets offered by agro-industrial firms are relatively more stable but are inaccessible without specific channels such as those provided by predetermined producer–buyer relationships (Baumann, 2000).

When market information and markets themselves are not accessible to the poor farmers, no matter if hard infrastructure exists, farmers capture little of the value that they create. The demand and supply remain highly unstable, and so are the distribution costs for goods produced in rural areas. Simply put, markets often do not work for smallholders.

Contract farming often involves a great number of variations and multiple objectives, which include welfare, political, social and economic criteria. Usually, this institution takes the form of central processing or exporting unit purchasing harvests of independent farmers, but also includes multipartite, nucleus estate and informal models (Eaton & Shepherd, 2001). The terms of the purchase are arranged through contracts that vary from case to case but are usually signed at planting time. Often the agribusiness provides credit, inputs, farm machinery and technical advice to the farmers in exchange for the commodity they produce (Glover, 1984; Grosh, 1994; Eaton & Shepherd, 2001).

The study of market linkages between small farmers and businessmen and factors influence the participation in CF is undoubtedly very critical for the development of small Bangladeshi farmers.

1.3 Key research questions

- a. What is the existing supply chain of Bean at Shibpur Upazila, Narsingdhi?
- b. How contract farming create a market linkage between farmers and businessmen?
- c. Which socioeconomic factors influence farmer's participation in contract farming?
- d. What are the problems contract farmer facing and suggestions for improving contract farming?

1.4 Objectives of the study

1.4.1 General objective

The overall objective of this study is to provide a better understanding of the impact of contract farming in the supply chain and the factor leads farmers to engage in contract farming at the Narsingdi district of Bangladesh.

1.4.2 Specific objectives

- a. To investigate the existing supply chain of Bean at Shibpur Upazila, Narsingdhi
- b. To analyze how contract farming creates market linkage to increase farmer's profit as well as decrease the final retail value
- c. To analyze the impacts of socioeconomic factors influencing farmer's participation in contract farming
- d. To address various problems faced by the contract farmers and suggestions for improving contract farming

The possible outcome of this thesis is to engage poor vegetable producers with contact farming that helps to create better market linkage so they can take advantage of market opportunities and invest their way out of poverty.

1.5 Scope of the study

The findings of the study will be particularly applicable to the Shibpur Upazila of Narsingdi district. These findings may also be applicable in other areas of Bangladesh where the environmental, cultural and socio-economic conditions are similar to the study area. Thus, the findings of the study may be beneficial for the policymakers, planners, extension personnel and field workers for successful planning to develop a modern agricultural farming system and especially for the farmers and to engage in contract farming that influences their income by linking themselves with demanding market.

1.6 Assumptions of the study

An assumption is, “the presumption that an apparent fact or principle is true in the light of available evidence” (Goode, 1945). The researcher had incorporated those assumptions at the top of the priority list while conducting the study:

- a. The respondents included in the sample were the real representative of the chosen population.
- b. The respondents incorporated into the sample of the study were sufficiently capable to fulfill the queries and could give their opinions.
- c. The reactions made by the respondents were substantial and reliable.
- d. The researcher, the interviewer, was well adjusted to the study area socially and culturally. The respondents were free from bias.
- e. The reactions of farmers, contractors and middlemen were pretty much cooperative while performing the interview.

1.7 Organization of the thesis

This report will be organized based on seven chapters. The first chapter will describe the background, problem statement, research questions, objectives, scope, assumptions, and related terms. The second chapter will represent a review of previous studies. The third chapter will consist of problems associated with the supply chain. Chapter four will explain the research methodology. Chapter five will demonstrate the discussion of results. Chapter six contains key findings and conclusions. Finally, chapter seven will present recommendations and limitations.

1.8 Related terms

1.8.1 Market

Kohls and Uhl (1985) defined market as an area for organizing and facilitating business activities and for answering the basic economic questions: what to produce, how much to produce, how to produce, and how to distribute production.

1.8.2 Marketing

It is about the flow of goods and services from their point of production to consumption (Abbott and Makeham, 1981) For Mendoza, marketing is a “system”, which comprises several and usually stable and interrelated structures that along with production, distribution and consumption, strengthen the economic process (Mendoza G., 1995). Usually, the marketing of agricultural products begins at the farm when the farmer plans his production to meet specific demand and market prospects (Abbott and Makeham, 1981).

1.8.3 Market chain

It is the term used to describe the various links that connect all the actors and transactions involved in the movement of agricultural goods from the producer to the consumer. The commodity chain is the chain that connects poor farmers to technologies that they need on one side of the chain and to the product markets of the commodity on the other side.

1.8.4 Marketable and marketed surplus

Marketable surplus is the quantity of the produce left out after meeting the farmers' consumption and utilization requirements for kind payments and other obligations such as gifts, donations, charity, etc. Thus, the marketable surplus shows the quantity left out for sale in the market. The marketed surplus shows the quantity sold after accounting for losses and retention by the farmers if any and adding the previous stock left out for sale. Thus, the marketed surplus may be equal to marketable surplus, it may be less if the entire marketable surplus is not sold out and the farmers retain some stock and if losses are incurred at the farm or during transit.

The importance of marketed and marketable surplus has greatly increased owing to the recent changes in agricultural technology as well as social pattern. To maintain the balance between demand for and supply of agricultural commodities with a rapid increase in demand due to higher growth in population, urbanization, industrialization and overall economic development, accurate knowledge on marketed/marketable surplus is essential in the process of proper planning for the procurement, distribution, export and import of agricultural products.

1.8.5 Competitive market

In a competitive market, each agent makes intertemporal choices in a stochastic environment. Their attitudes toward risk, the production possibility set, and the set of available trades determine the equilibrium quantities and prices of assets that are traded. In an "idealized" representation agents are assumed to have costless contractual enforcement and perfect knowledge of future states and their likelihood. With a complete set of state-contingent claims, agents can trade these securities to hedge against undesirable or bad outcomes. When a market is incomplete, it typically fails to make the optimal allocation of assets.

1.8.6 Transaction cost

Cost associated with the exchange of goods or services and incurred in overcoming market imperfections. Transaction costs cover a wide range: communication charges, legal fees, informational cost of finding the price, quality, and durability, etc., and may also include transportation costs. Transaction costs are a critical factor in deciding whether to make a product or buy it.

1.8.7 Information asymmetry

In economics and contract theory, information asymmetry deals with the study of decisions in transactions where one party has more or better information than the other. This creates an imbalance of power in transactions which can sometimes cause the transactions to go awry, a kind of market failure in the worst case.

1.8.8 Market linkages

It is a process where an organized community validates and consolidates its production in new markets in a sustainable way.

1.8.9 Broker

A broker is an individual or party (brokerage firm) that arranges transactions between a buyer and a seller, and gets a commission when the deal is executed. Brokers are referred to as individuals (or organizations) who facilitate product distribution by bringing buyers and sellers together but do not take title to goods (Crawford, 1997). Brokers earn income from the commission paid to them by their clients (buyers and sellers) for the services they offered. It is also possible that a broker acts as a seller or as a buyer (becoming a principal party in the business transaction) or, in some cases, acts on behalf of a principal (in both cases by taking title to goods). When they act as agents, they represent either the seller or the buyer, but not both at the same time.

1.8.10 Opportunity cost

It is the cost of any activity measured in terms of the value of the next best alternative foregone (that is not chosen). It is the sacrifice related to the second-best choice available to someone, or group, who has picked among several mutually exclusive choices. The opportunity cost is also the cost of foregone products after making a choice. Opportunity cost is a key concept in economics, and has been described as expressing "the basic relationship between scarcity and choice". The notion of opportunity cost plays a crucial part in ensuring that scarce resources are used efficiently. Thus, opportunity costs are not restricted to monetary or financial costs: the real cost of output foregone, lost time, pleasure or any other benefit that provides utility should also be considered opportunity costs.

1.8.11 Oligopsony

An oligopsony is a market form in which the number of buyers is small while the number of sellers, could be large. This typically happens in a market for inputs where numerous suppliers are competing to sell their product to a small number of buyers. (Wikipedia)

1.8.12 Opportunistic behavior

The process of a business using the Generally Accepted Accounting Procedures to alter their earnings figures in hopes of attaining a specific desired outcome. Although GAAP was created to enforce more honesty in financial disclosures of public companies, creative accounting techniques exist that can distort an earnings outcome in one period while sacrificing the outcome in another. (Elena & Natalia, 2016).

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

This chapter reviews some relevant literature review regarding smallholder contract farming. After defining smallholder farming and showing their importance, this chapter discusses the current scenario of smallholder farmers in Bangladesh, marketing constraints they face.

2.2 Small farmer

Many countries in the world have made great strides over the past two decades in tackling poverty and hunger, but much remains to be done. Poverty remains pervasive. Fighting poverty and hunger implies a greater degree of attention to agriculture, which is still employing 50% of the labor force in many developing countries. Smallholders demand particular attention because they dominate the farm area in developing countries that depend heavily on agriculture (World Bank, 2007).

Smallholder farmers are one of the main drivers of the economy though their potential is often not brought forward. Smallholder farmers are defined in various ways depending on the context, country and even ecological zone. Often the term ‘smallholder’ is interchangeably used with ‘small-scale’, ‘resource-poor’ and sometimes ‘peasant farmer’ (Glover, 1984; Grosh, 1994; Eaton & Shepherd, 2001). One of the main characteristics of production systems of smallholder farmers is simple, outdated technologies, low returns, high seasonal labor fluctuations and women playing a vital role in production (Glover, 1984; Grosh, 1994). Smallholder farmers differ in individual characteristics, farm size, resource distribution between food and cash crops, livestock and off-farm activities, their use of external inputs and hired labor, the proportion of food crops sold and household expenditure patterns. Smallholders can be viewed as a capable, proactive and rational entrepreneur who, under the right conditions, can take advantage of market opportunities and invest his/her way out of poverty.

Smallholder farmers can play an important role in livelihood creation amongst the rural poor. Even though Smallholder production is important for household food security, the productivity of this sub-sector is quite low. Poor yields may be one of the reasons why urban and rural households either abandon or are uninterested in agricultural production. There is therefore a need to significantly increase the productivity of smallholder farmers to ensure long term food security.

The most common measure of the small farm is farm size: many sources define small farms as those with less than 2 hectares of crop land. Others describe small farms as those depending on household members for most of the labor or those with a subsistence orientation, where the primary aim of the farm is to produce the bulk of the household's consumption of staple foods (Hazell *et al.*, 2007). Yet others define small farms as those with limited resources including land, capital, skills and labor. The World Bank's Rural Development Strategy defines smallholders as those with a low asset base, operating less than 2 hectares of cropland (World Bank, 2003). An FAO study defines smallholders as farmers with limited resource endowments, relative to other farmers in the sector (Dixon *et al.*, 2003).

In this paper, small farms have been defined as those with less than 2 hectares of land area and those depending on household members for most of the labor and lack of infrastructures.

It is estimated that about 87% of the world's 500 million small farms (less than 2 hectares) are in Asia and the Pacific region (Dorward *et al.*, 2004). China and India alone account for 193 million and 93 million small farms, respectively. Three other Asian countries with a large number of small farms are Indonesia (17 million), Bangladesh (17 million) and Viet Nam (10 million).

Agriculture in Asia is characterized by smallholders cultivating small plots of land. The average size of operational holdings (actual area cultivated) is only 0.5 hectares in Bangladesh, 0.8 hectares in Nepal and Sri Lanka, 1.4 hectares in India and 3.0 hectares in Pakistan. About 81% of farms in India have land holdings of less than 2 hectares, whereas their share in total cultivated area is about 44%. In China, 95% of farms are smaller than 2

hectares. In Nepal 93% of operational holdings are operated by small farmers (<2 hectares) covering 69% of the cultivated area. In Bangladesh, small farms account for 96% of operational holdings with a share of 69% of cultivated area. Pakistan is an exception, with a relatively high concentration of large landholdings. 58% of farms in Pakistan are of less than 2 hectares but they operate only 16% of the farm area. In contrast, farms of more than 10 hectares occupy 37% of total farm area (NCEUS, 2008).

The overall trend in Asia has been that of declining farm size over time. For example, in China farm size decreased from 0.56 hectares in 1980 to 0.4 hectares in 1999 (Fan and Chan-Kang, 2003); in Pakistan, it declined from 5.3 hectares in 1971-73 to 3.1 hectares in 2000; in the Philippines, the average farm size fell from 3.6 hectares in 1971 to 2 hectares in 1991; and in India, it declined from 2.2 hectares in 1950 to 1.8 hectares in 1980, to 1.4 hectares in 1995-96 and 1.33 hectares in 2000- 01 (Nagayets, 2005; Government of India, 2008). In Bangladesh, the average farm size declined from 1.4 ha in 1977 to 0.6 ha in 1996 (Anriquez and Bonomi, 2007).

2.3 Current situation of poor farmers in Bangladesh

Bangladesh's population is approximately 161.4 million (about 1,239 people per square kilometer), making it one of the most densely populated countries in the world (World Bank, 2018). The country's total land area is 147,570 sq km. Bangladesh is also one of the world's poorest countries with an estimated 20.5 percent of the population below the national poverty line (BBS, 2019).

Agriculture plays a dominant role in the economy of Bangladesh in terms of food security, value addition, and employment. The major crops grown in Bangladesh are rice, wheat, jute, sugarcane, pulses & oilseeds, potato, vegetables and fruits. But the production for pulse, oilseed, vegetables and fruits is in deficit to the requirement. The production of those crops has stagnated or declined during the last few years due to the overemphasis on rice. The high-value crops like vegetables and fruits are also termed as risky due to its perishable nature and the producers devote less area to those crops compared to rice and wheat.

In Bangladesh, small farms account for 96 percent of operational holdings with a share of 69 percent of cultivated area. And the average size of operational holdings (actual area

cultivated) is only 0.5 hectares. In Bangladesh, the average farm size declined from 1.4 ha in 1977 to 0.6 ha in 1996 (Thapa, 2009).

Small farmers of Bangladesh have lack access to markets and they struggle to make a livelihood from agriculture due to the salinity of land and unsustainable agricultural practices. This is leading to large-scale poverty and food insecurity. But these small farms continue to contribute significantly to agricultural production, food security, rural poverty reduction, and biodiversity conservation despite the challenges they face in access to productive resources and service delivery. They confront new challenges on integration into high-value chains, adaptation to climate change, and market volatility and other risks and vulnerability.

Poor farmers in Bangladesh are somewhat reluctant to explore new markets and prefer to sell their products in the hat inside the village even if the hats outside the village offer better prices for all agricultural products. Followings are the reasons for their lack of enthusiasm in exploring new markets:

- The difficulties and costs involved in handling the bulk quantity of agricultural produce
- The time involved in visiting distant markets
- The incomes foregone by traveling to other markets
- Members' produce is not harvested or ready for the market at the same time
- Small quantities of each product are produced by individual producers, making it difficult to fill a truck and make visits to more distant markets viable
- Farmers cannot keep up-to-date with fluctuations in prices at markets outside the village
- Insecurity and the risk of robbery when returning from distant markets with money.

2.4 Small farmers' objectives

- Provide food for family from their farms
- Make most of the income from farming
- Employ family members on their farm

- Create opportunities to have off-farm works
- Provide education of own children and other basic needs

2.5 Importance of small Farmers in the economy

Although poor farmers face marketing difficulties, they still produce and survive under adverse conditions. In addition to their ability to survive, poor farmers fulfill numerous functions in the agricultural economy. The sector is important for these functions. Such functions include food security commitment, fair income distribution and economic growth linking. Small farmers can benefit from flexibly motivated family labor resources to assign work to higher marginal income activities (Dorosh & Haggblade, 2003). Small farmers have the potential to contribute to the generation of rural poor incomes and employment (Nggagweni, 2000). Many countries have recognized this potential for creating rural employment, generating revenue, and contributing to food security. In the following sections, the contributions from poor farming are discussed broadly.

2.5.1 Poor farmer and poverty alleviation

Reardon and Barrett (2000) have explained that small-scale farming helps to alleviate poverty by lowering food prices and creating jobs. Small farms have the potential to create jobs because they are intensive in employment. In comparison to large farms, machinery is primarily used in production. Small farms suggest that more people have access to land; that means that they produce their food (Rosset, 1999). Moreover, more farmers lead to increased competition. The price of tradable agricultural products falls as a result of competitiveness and increase demand, which reduces consumer poverty.

2.5.2 Equitable distribution of income

Small farms provide a fairer income distribution since small farms allow relatively large numbers of households to produce themselves and this means that less will be spent on food purchases (Dorosh & Haggblade, 2003). Further clarification reveals that, in terms of wages, poor households producing food themselves are better off than people who buy food. Reardon and Barrett have also demonstrated that multiple poor farmers gain some

revenue by selling agricultural goods, which contributes to an increase in their welfare (Reardon & Barrett, 2000).

2.5.3 Linkages for economic growth

In areas where small farmers are efficient and successful, other non-farm economic activities usually emanate as a result (Haggblade, Hazell & Brown, 1990). Typically speaking, small-scale farms' growth allows for business development through forward and backward linkages. In support of these efforts, Jooste & Van Rooyen (1996) noted that performance increases as a result of investment in any specific sector of the economy raise demand for supply input from other sectors (backward connections). Output gains also increase sales and thus boost customer demand for other goods and services (forward linkages). Thus, successful small farmers create a demand for non-farm sector goods. These demand increases translate into higher output and thus higher profits in sectors where surplus capacity does exist.

2.6 Constraints faced by small farmers

The goal of this section is to identify key constraints faced in developing world poor farmers such as lack of physical infrastructure, market shortages and high transaction costs. In the current market setting, poor farmers find it hard to compete. In terms of physical access to markets, they face immense constraints. They often lack consumer knowledge, company and negotiation expertise and the ability to communicate with others (usually greater and stronger) intermediaries in equal parallel with their collective organization. It results in weak exchange conditions and little influence on what is offered (Heinemann, 2002). Below is a debate on the common marketing limitations faced by small-scale farmers, as revealed by international experience.

2.6.1 Lack of human resource

Poor farmers with limited technical abilities are often illiterate and can be a major obstacle to access useful formal institutions that disseminate technological knowledge. Many emerging producers are unable to meet the quality requirements set by fresh produce

markets and processors and have no financial or marketing skills. The lack of expertise in production contributes to poorer production quality.

2.6.2 Production constraints

Producing for the market calls for production resources including land, labor and capital, for the market. Poor access to these assets affects how small farmers can benefit from opportunities in agricultural markets, and especially in terms of the volume of products traded and the quality of those products (Bienabe, Coronel, Le Coq & Liagre, 2004). Due to inadequate access to production tools for small farms, their production is not consistent for markets.

2.6.3 High transaction costs

In general, weak infrastructure and communication systems in remote rural areas cause high transaction costs (D'Hease & Kirsten, 2003). Transaction costs also result from information inefficiencies and institutional problems such as the absence of formal markets (Makhura, 2001). The cost of transactions covers information costs, negotiating costs, supervision, planning and contract execution. There is no doubt that high transaction costs tend to discourage commercialization. Poor farmers are located in remote areas and far from productive markets and geographically scattered. Market distance, low infrastructure and limited access to knowledge and assets contribute to high business costs. Since small farmers are weak, the high transaction costs make it difficult for them to compete in lucrative markets. Higher-level traders are more likely to participate in capital-intensive marketing practices such as wholesalers and long-term transportation, whereas traders with weak social networks are faced with significant barriers to accessing lucrative segments of the market.

2.6.4 Lack of on-farm infrastructure

Poor farmers do not have access to farm infrastructures like warehouses and cold rooms to maintain good conditions for their goods after harvest. The lack of access to facilities like post-harvest, stock-making and processing is an obstacle to the entry into farm markets as buyers' focus is more on quality. Entry to storage facilities increases the flexibility of

farmers to sell their products as well as their bargaining power (Bienabe, Coronel, Le Coq & Liagre, 2004).

2.6.5 Asymmetry or a lack of market information

Rural producers, especially poor farmers, have little knowledge on the market demand, which is costly to obtain. . They may collect data by contacting other actors in the commodity chain, but their accuracy is not verified, as these actors might be exhibiting “opportunistic behavior” (Bienabe, Coronel, Le Coq & Liagre, 2004). Poor farmers have lack of knowledge on local commodity costs, quality needs, best places and times for the selling of their products, and potential buyers. In turn, it decreases their capacity to effectively trade their goods and to take full advantage of the marketable part of their production.

2.6.6 Low quantity and poor quality

The majority of poor farmers produce low-quality quantities of products because of their low low endowment in production factors such as land, water and properties, which results in their commodity being ignored by output markets. The rising concentration in the food value chain is the global trend induced by growing demand from consumers and food safety concerns, which tend to make it very difficult for poor farmers to enter high-value markets in light of the low quantity and poor quality of their products.

2.6.7 Inconsistency in production

Studies suggest that poor farmers do not have consistency in the supply of goods (quantity and quality) to the markets. Most small-scale farmers are not consistent in terms of producing products and supplying them to fresh produce markets and agro-processing industries. According to Luuw, Madevu, Jordaan and Vermeulen (2004), Many emerging farmers can only supply the fresh produce markets for 2-3 months a year, and can not maintain continuity on the market. For this reason, supermarkets are often hesitant to purchase. Reardon (2005) clarified that 'supermarkets tend not to deal with the peasants – they don't deliver (start/stop), don't invest (only spend once and don't keep up) and are a huge hassle of dealing with.'

2.6.8 Transportation problems

Most poor farmers are not able to transport their goods to markets. They have no means of transport. Problems of transport lead to quality losses and late delivery, resulting in lower prices, which is considered as the largest problem faced by developing farmers (Louw, Madevu, Jordaan, and Vermeulen, 2004).

2.6.9 Lack of markets in rural areas

According to Timmer (1997) most critical issue concerning farmers and markets is how rural decision-makers are responding to incomplete and poorly functioning markets. The lack of markets and imperfect information in remote areas are negatively affecting rural decision-makers. The majority of poor farmers are in rural areas where there are no formal agricultural or agro-processing markets. They are forced to sell their products in their areas for local communities or to ship their products to towns at higher costs.

2.6.10 Lack of bargaining power

Small producers have especially low negotiating power because they have poor access to market information and limited access to financial markets, blocking them from selling their products at the most profitable time. Their lack of bargaining power may lead to an overvaluation of production and a reduction in the value-added to the commodity chain. When they work in long supply chains, poor farmers have especially low negotiating power where the specificity of the product transformation assets leads to the creation of oligopsony. (Bienabe, Coronel, Le Coq & Liagre, 2004).

2.6.11 Regulatory barriers

Some poor farmers with the ability to export some of their products face international standards of regulation that they find difficult to follow. Farmers are now faced with new challenges that include products of high quality, knowledge of Good Agricultural Practices (GAP), the capacity to comply with market and regulatory requirements, new issues of conformity assessment, and traceability. This setup poses a major challenge for farm

producers, especially poor farmers, in their efforts to place themselves as business-driven competitors in a less-controlled global trading environment.

2.6.12 Technological barriers

Technological innovations have long been a major contributor to progress in agribusiness and will continue to influence the smooth running of a business in the agricultural value chain. Rapid dissemination of information and communication can lead to high-cost savings. E-commerce can be a good means of minimizing transaction costs in agribusiness by enabling the online buying and selling of products. In contrast to developed countries, poor farmers in developing countries are poor and have no access to information technology, with the majority being poorly linked to international trade due to technological barriers. Poor farmers' lack of access to technology harms their ability to access markets locally, nationally, and globally.

It is imperative to highlight that it may prove complicated to take the technological innovations that are applied in developed countries and match them to poor farmers in developing countries due to the prevailing financial constraints, as well as lack of human capital and technological know-how. The method is not seamless or cost-effective. All parties involved, government, the private sector and farmers themselves, must make huge investments and commitments.

As mentioned above, without access to support services, small farmer agricultural growth can not be achieved. Increased productivity in agriculture requires simultaneous solutions to all problems. Contract farming is one of the most effective means to improve growth in poor farming, creating food security, employment opportunities and incomes in the long term.

2.7 Reasons to focus on small farmers of Bangladesh

- In Bangladesh, small farms account for 96 percent of operational holdings (Timmer, 1997).
- Agricultural growth is at least twice as effective in reducing poverty as nonagricultural growth (WDR, 2008).

- Small farmers are often very efficient in terms of production per hectare, and they have tremendous potential for growth. Experience shows that helping poor farmers can contribute to a country's economic growth and food security (IFAD, 2009).
- Smallholder agriculture systems, particularly the commercial aspects, are increasingly managed by women (Jawaharlal Nehru, 2005).

2.8 Importance of linkage between poor farmers and market

The concept of linkages was first mooted by Hirschman (1958) in development economics literature to describe broadly, the complementarities and dependencies among industries in the development process. The modern usage of the concept covers agro-industry linkages, and systems approach adopted by firms to increase competitiveness. In the context of competition theory, linkages refer to cooperation between firms with similar operations (horizontal integration) or between enterprises at different levels of the supply chain (vertical integration) (Santacoloma & Rottger, 2003).

In small farmer growth, market access is crucial because it generates the demand required, offers compensatory prices and thus increases smallholder income. Improved market access incentives will lead to improved production and the consequent use of efficiency enhancement technology. That is why the drive to increase consumer access is essential to the growth of small-scale farming to minimize poverty.

Therefore, linking poor farmers in Bangladesh to markets (input as well as output markets) is an issue with relevance in that context. It is now increasingly recognized that the practices to sustain the development of poor farmers must be linked to consumer demand and that the practices of development must be analyzed across the entire supply chain and the links or business relations within that chain. Closer links between farmers and markets have clear potential benefits.

Smallholder and agribusiness linkages are vertical integrations aimed at meeting the constraints of either party. Smallholders generally tend to be semi-subsistence farmers, and partially linked to markets usually through diversification of commodities produced. On the other hand, poor farmers are also often constrained in what they can produce, by limited

marketing opportunities, thus limiting their ability to diversify into new crops. Farmers will not cultivate unless they know they can sell their crops, and traders or processors will not invest in ventures unless they are assured that the required commodities can be consistently produced.

Small volumes of output, from scattered individual producers pre-dispose smallholders to weak bargaining positions in the market. Seasonality in production and inter-year variability in output is a source of price variability and unstable farm incomes for smallholders. Access to a guaranteed market or buyer can reduce this price uncertainty, although it also requires that producers increase volumes and take measures to stabilize production. Cooperation among smallholders and between agribusinesses can overcome these limitations of smallholders. Where price(s) to be paid are specified in advance, farmers are covered; however, in instances where prices are not fixed prices but are related to the market prices at the time of delivery, farmers are still dependent on market volatility.

In the face of state withdrawal from the distribution of inputs, smallholder access to inputs has become difficult either because of cost or because of inadequate distribution channels. The private sector has not been able to fill the void left by public sector withdrawal from the input distribution system. This has been partly due to the low demand for inputs by scattered smallholders. It is expected that successfully linking smallholders and agribusinesses will create the needed incentive for smallholders to use more inputs. Also, the conglomeration created by several smallholders supplying produce through a dedicated channel will help to reduce the cost of delivering inputs to them through bulk purchasing. Furthermore, the linkage offers an opportunity for interlocking transactions of product supply and input or more generally service delivery.

It is even more desirable to link farmers with the production of non-traditional high-value products, as the production systems are costlier, the risk of this is higher than that of conventional staples; the need for information and skills of non-traditional commodities are also demanding.

Agribusinesses are also interested in linking up small farmers as a strategy to increase bulk and access land, which has limited access to large areas of land. Small farmers' production

also increases access to work without associated labor-management problems. Closer links with small farmers also make quality assurance possible for agribusiness. In the interests of successful small farmers market connection, government and development agencies are also driven by the potential of such links for the development of smallholder agriculture. The linkages help poor farmers to make the transition from subsistence-oriented to commercially oriented production.

2.9 Recent findings on linking producers to markets

The global food distribution systems have undergone significant changes over the past decade, as supermarkets in developed and developing countries have increased, free-trade agreements have been signed, including agricultural products, and the emergence of global food-supply chains (Berdegue *et al.*, 2005). All of these developments have been characterized as a major re-governing of marketing linkages between farmers and other agroindustry stakeholders (Vorley *et al.*, 2007).

In recent years, strong research has been concerned to understand how these new supply chains work, who is involved and who emerges as the chain leaders to keep these new developments up-to-date (Poole *et al.*, 2003). Recent findings show that the right policy environment is needed to encourage private companies to move into these emerging markets, as well as to ensure the development of these markets does not hurt sustainable rural and urban livelihoods. There are clear advantages for farmers, especially poor farmers, with the right organization or market intermediary that lies in link with these new food supply chains. The importance of a sustainable and trusted relationship in marketing linkages is also highlighted in this new literature. These lessons are being used by governments and development agencies to help farmers to gain access to markets for income generation (Ferrand *et al.*, 2004).

Given the poor agricultural performances in many developing countries, especially in Bangladesh, many donors and governments hoped for better incentives, increased revenue for farmers and positive multiplier effects for imperial rural economies to be achieved through contract farming and its variants (outgoing schemes, nuclear estates, satellite farming). As a result, there was considerable growth in the number of contract farming

schemes during the 1970s and 1980s. Most of these contract farming or outgrower schemes were multipartite arrangements involving private firms (often foreign), the government of the host country, non-governmental organizations, parastatal bodies and international aid or lending agencies, such as the United States Agency for International Development, the World Bank and the Commonwealth Development Corporation (Glover, 1994; Little & Watts, 1994).

Shepherd notes that many links created by development practitioners are unsustainable when examining the various approaches to linking producers to the markets because not all poor farmers can meet their customers' demands (Shepherd & Andrew, 2007). Either the institutional environment is not conducive to a sustainable marketing chain or the marketing relationship amongst different stakeholders in the supply chain is not conducive. Whilst development practitioners may agree in principle on the need to encourage market-driven agribusiness enterprises and services, Caniels *et al.*, (2006) show how putting theory into practice is made difficult by the wariness of development projects towards private-sector suppliers and customers.

The private sector is undoubtedly recognized as being a major driver for sustainable market linkages for small producers (Vorley *et al.*, 2007; Shepherd *et al.*, 2007; Caniels *et al.*, 2006). Because it is in their business interest to develop a reliable supply base, agricultural traders can play a pivotal role in organizing farmers into groups and helping them to plan production systems to adhere to the quality requirements demanded by ever-changing agro-food markets. The positive role of private traders, which anthropologists have identified, is finally recognized by developing economists and practitioners. (Rigg & Jonathan, 1986).

Other articles have attempted to link small farmers with the market. In an article published by Torero (2011), he provided strategic inputs to strengthen the institutional and infrastructure base needed to address the heterogeneity of poor farmers and support the improvement of the competitiveness of farmers in producing and commercializing their products in rural areas. In another article Pratap, Awadhesh and Harvinder (2007) have examined opportunities and challenges for smallholders in market-oriented production of

high-value commodities, and have identified the enabling institutional and policy requirements for smallholders' participation.

2.10 Different ways of linkage between markets and poor farmers

There are many options for interventions based on market types and farmer assets. Poor farmers need diversified business plans (including non-farm options) that may be through combinations of linking to formal and informal markets. Formal markets provide the best return for small farmers with slightly larger landholdings. Millions of rural people are opting out of agriculture as the competition grows. This transition process will require strong policies and support measures to ensure a soft landing.

For small and marginal farmers, the marketing of their products is the main problem apart from credit and extension. In recent years, there has been some form of contractual arrangements in several crops such as tomatoes, potatoes, chilies, gherkin, baby corn, rose, onions, cotton, wheat, basmati rice, groundnut, flowers, and medicinal plants. There is a silent revolution in institutions regarding non-cereal foods. New production –market linkages in the food supply chain are spot or open market transactions, agricultural co-operatives and contract farming (Joshi and Gulati, 2003).

Fluctuations in the output price are one of the most important problems for small farmers. There is a big gap between producer prices and consumer prices. There are different models for collective marketing by the small and marginal farmers to realize better access to input and output market and share in the consumer rupee. These are the self-help group model, co-operative model, small producer co-operatives and contract farming (Pingali, 2007).

In a research, Andrew and Shepherd (2006) mentioned some ways by which the producers can be linked to markets. Such as,

- Farmer to the domestic trader
- Farmer to retailer
- Linkages through cooperatives
- Farmer to the agro processor
- Farmer to exporter

- Contract farming: We used this method to link farmers to markets in this thesis paper.

2.11 Contract farming

In most of the literature, the terms ‘contract farming’ and ‘outgrower scheme’ are often used interchangeably. However, Glover and Kusterer (1990) make a distinction between CF for private contractor arrangements and outgrower schemes for those involving public enterprises and parastatals. In both types of schemes farmers contract to grow crops or raise animals for a contractor who takes care of the processing and/or marketing of the agricultural product. Eaton and Shepherd (2001) suggest that outgrower schemes were typically used in Africa.

CF has been defined as an agreement between one or more farmer(s) and a contractor for the production and supply of agricultural products under forward agreements, frequently at predetermined prices (Eaton and Shepherd, 2001). The contractor can be a processing firm or a trading/marketing firm; it can be a private or a public entity. The agreement often includes the provision of production support by the contractor, such as inputs and technical assistance. The basis of a CF arrangement is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the contractor and a commitment on the part of the contractor to support the farmer’s production and to purchase the commodity.

A formal definition used in Setboonsarng *et al.*, (2008) referred to contract farming as a “contract between a farmer and a purchaser established in advance of the growing season for a specific quantity, quality, and date of delivery of agricultural output at a price or price formula fixed in advance”. This definition is quite clear and simplistic but does not provide much information about the purchaser. Yet it specifies some key elements of the agreement between the two parties. Similarly, The US Department of Agriculture defines contract farming as “the growing and marketing of farm products under such circumstances that selective terms of the market-quantity, grade, size, inspection, timing, or pricing are specified to both the grower and the processor or shipper before production is undertaken.”

A complementary definition by Eaton and Shepherd (2001) and Bijman and Wollni (2008) refers to contract farming as "...an agreement between farmers and processing or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices". This definition is vague about the components of the agreement but is more precise about the nature of the purchaser. It can be a processing firm or marketing firm.

The initiative to establish a CF scheme usually comes from the contractor, seeking to improve the supply of homogeneous (high) quality products and to increase capacity utilization of specific assets (in the case of processing). Contract farming may also be driven by state concerns to promote critical commodity chains (for example in China), or by input suppliers who wish to expand input sales (examples can be found in the feed-to-meat chains of developed countries).

All of the literature on contract farming emphasizes the diversity of contractual arrangements between farmers and contractors. This diversity is a result of the technical requirements of production and the associated production and transaction costs (Simmons *et al.*, 2005).

2.12 Functions of contract farming

Contracts in agriculture have three distinct functions (Hueth *et al.*, 1999; Sykuta and Cook, 2001; Wolf, Hueth and Ligon, 2001).

- ✓ *Firstly*, contracts serve as a coordinating instrument allowing individual actors to make decisions (e.g. allocation of resources), which are matched or must be matched with partner decisions. Coordination aims to ensure that products are produced and delivered at the right quantity and quality at the right time and place. For example, contracts also specify the amount to be supplied to the contractor so that the producer can know how much to sow or plant and how much processing capacity to install. Financial incentives can achieve coordination to a limited extent. However, more detailed communication involves information that can not be transferred exclusively by prices, but which also involves contractual provisions on

each partner's responsibilities and on distributing decision-making rights to acts not laid down in the contract.

- ✓ *Secondly*, contracts are used to provide incentives and establish penalties to motivate performance. No transaction may take place without proper incentives for every contract partner. For example, if a contractor wants a farmer to conduct specific tasks, such as delivering specific quality of the product, then the contract should clarify the compensation the farmer would incur. The contract may include a price agreement, but may also indicate which process for price determination will be used to settle on the correct compensation.
- ✓ *Thirdly*, the allocation of risk is explained by the contracts. For example, by signing an agreement with the contractor that specifies a portion of compensation independent of the performed returns, farmers may reduce the risk of income loss due to weak returns.

2.13 Recent studies based on contract farming

Producing and selling on a contractual basis are common arrangements in the agricultural sector all around the world. Contract farming (CF) has long existed, particularly for perishable agricultural products supplied for the processing industry, such as milk for the dairy industry or fruit and vegetables for preserved products (Little & Watts, 1994). In the agricultural and food industries both of the developed and developing worlds, CF became more important towards the end of the twentieth century. CF in agricultural and food industries in developed and developing countries grew at the end of the 20th century. Spurred by changes in (international) competition, consumer demands, technology, and governmental policies, agricultural systems are increasingly organized into tightly aligned chains and networks, where the coordination among production, processing and distribution activities is closely managed. Contracting between producers on the one hand and processing or marketing agribusinesses on the other hand is one of the methods to strengthen vertical coordination in the agri-food chain (Prowse, 2012).

At the beginning of the 20th century, multinational US companies in Central America and Japan used various aspects of this institutional arrangement to guarantee sugar production in Taiwan since 1885. (Runsten & Key, 1996; Rehber, 1998). Contracting was used more

and more in many food and fiber sectors between 1930 and 1950. The canning sector of fruit and vegetables grew in the USA and Europe (Little & Watts, 1994; Clapp, 1994) and merchants in Europe and North America entered into seed production contracts with growers in Australia, Britain, Canada, France, Holland, Hungary and the United States (Watts, 1994). Mexican farmers have gradually supplied fruit and vegetables to American markets on contract since the end of the 1950s. (Watts, 1994), and in the period 1960-80, there was a significant increase in contracting for vegetables, fruit, nuts and seed crops (Kilmer, 1986). Contract farming was wide stringing in West Europe, America and Japan by the late 20th century (Rehber, 1998). Contract farming in many developed countries is now a traditional organizational framework.

Contract farming has spread rapidly in Asia, Latin America and Africa owing to the higher returns earned by high-value export crops and the impact of new technologies (Clapp, 1994; Eicher & Staatz, 1998). Contract farming has been widely promoted in some import substitution programs in Latin America since 1945 and has a much longer history than in Africa (Clapp, 1994; Little & Watts, 1994; Daddieh, 1994; Runsten & Key, 1996). South Africa has a long history of farming under contract, which includes a wide range of sharecropping arrangements dating back to the early 20th century (Bundy, 1979). Vertical coordination arrangements currently exist in the tea, fruit, sugar, flower, cotton, vegetable, timber, fishing and tobacco sectors (Levin, 1988; Porter & Phillips-Howard, 1997; Van Rooyen, 1999; Karaan, 1999).

Contract farming often involves a great number of variations and multiple objectives, which include welfare, political, social and economic criteria. Usually, this institution takes the form of central processing or exporting unit purchasing harvests of independent farmers, but also includes multipartite, nucleus estate and informal models (Eaton & Shepherd, 2001). The terms of the purchase are arranged through contracts that vary from case to case but are usually signed at planting time. Often the agribusiness provides credit, inputs, farm machinery and technical advice to the farmers in exchange for the commodity they produce (Glover, 1994; Grosh, 1994; Eaton & Shepherd, 2001).

Contract farming can include several options in terms of how the contract between the producer and the integrator is structured, where some forms of contracting are dependent on specific institutions like marketing orders, bargaining cooperatives and marketing cooperatives (Sporleder, 1992). The contract could specify the price, quantity, quality, the provision of agribusiness inputs, the provision of credit facilities, the conditions of production, and the delivery and grading requirements (Sporleder, 1992; Runsten & Key, 1996). The price set in all these alternative arrangements could be a fixed price or a differential price (Sporleder, 1992).

Contract farming in developing countries has experienced a mixed fortune, yielding some successes and many failures (Little & Watts, 1994; Jaffee, 1994; Glover, 1984; Runsten & Key, 1996). Jaffee (1994), for example, talks of the 'rocky road of contract farming in Kenya'. Several studies (Minot, 1986; Glover, 1984, 1987, 1994; Glover & Kusterer, 1990; Jaffee, 1994; Little & Watts, 1994; Porter & Phillips-Howard, 1997; Runsten & Key, 1996; Eaton & Sheperd, 2001) have analyzed the nature and performance of contract farming schemes in developing countries.

Birthal *et al.*, (2005) concluded that the gross contract margins were almost double that of independent dairy farmers in India largely due to lower production and marketing costs among contract growers. It has also been found that farmers with vegetable contracts earned prices 8% higher than non-contract producers' prices.

Contract farming in peanut production in Senegal has been studied by Warning and Key (2002). The private company NOVASEN contracts 32,000 cultivators and annually produces about 40,000 tons of peanuts. They have shown that by participating in the CF program (compared to non-participating farms), farmers greatly increase their profits. They attribute this result to the program's mobilization of local information through its use of village intermediaries, permitting the substitution of social collateral for physical collateral and making the program more accessible to the poor.

Interestingly, Warning and Key (2002) found that the CF program did not favor larger or wealthier growers. They also suggest several reasons why small growers benefit as much as large growers. Unlike many CF schemes that require the cultivation of a non-traditional

crop with a limited local market, the peanut program involves the production of a traditional cash crop. This also implies that farmers do not have to make large fixed capital investments to participate in the program. Another consequence of the farmers' familiarity with peanut cultivation is that uncertainty associated with the contract is low, which means that poorer households are more willing to enter CF than they would with programs involving less familiar crops. Finally, because peanut cropping is well known, extensive training of growers is not required, which reduces the transaction costs of working with many small growers.

The effect of CF in poultry, maize and rice seeds in Indonesia was investigated by Simmons *et al.*, (2005). The contracts have been shown to have a beneficial effect. Seedcorn and broiler contracts have resulted in stronger capital returns and increased participants. The contract did not increase capital returns but conferred other advantages for seed rice contracts like safe market access. All three contracts – for poultry, maize seed and rice seed – reduced absolute poverty.

The gains of CF in poultry production in Andhra Pradesh State, India, were evaluated by Ramaswami *et al.*, (2006). They found that contractual production is more effective than non-contractual production. While the contractors appropriate the majority of the efficiency surplus in terms of lower risk and higher anticipated returns, producers still benefit significantly from contracts. “The key to this puzzle is that poultry processors choose as contract growers those whose skills, experience and access to credit make them relatively poor prospects as independent growers. With contract production, these growers achieve incomes comparable to that of independent growers”. (Ramaswami *et al.*, 2006)

The various types of contract could include a marketing contract, a contract specifying some measure of company control, or a contract specifying the provision of company inputs, as well as full company control of production (Wolz & Kirsch, 1999):

- ❖ In the *first* type of contract, the marketing contract, sometimes called a market specification contract, the producer sells the raw commodity to the processor at a specified price, quality and time. The producer has total control in respect of production decisions in this form of contract (Rehber, 1998).

- ❖ In the *second* type of contract, certain company resources could be supplied and there is a measure of company control. In this context, The producer agreed to produce and sell the raw commodity at an agreed price, quality and time, under certain degrees of company control and specification (Rehber, 1998; Wolz *et al.*, 1999).
- ❖ The *third* form of contract involves direct management of the company and the provision of inputs to the company. In this regard, the integrator, who will monitor output, provide the appropriate inputs and services, and compensate the producer for the commodities, at an agreed price. (Rehber, 1998; Wolz & Kirsch, 1999).

Furthermore, in certain cases of contracting, the structure of the contract is based on the farmer's access to key resources like water (Morvaridi, 1995), whilst in others, the producer does not even own the intermediate product, which remains the property of the integrator. In a contract like this, the integrator uses the facilities and labor of the farmer, who is paid a fee to provide such facilities and services. This type of contract can ensure that the technology incorporated in the intermediate product supplied by the farmer is retained exclusively by the agribusiness (Martin, 1999; Goodhue, 1999). Besides, many contracts incorporate some credit arrangements (Wolz & Kirsch, 1999).

A large number of studies on contract farming also came from anthropologists, political economists, sociologists and geographers (Grosh, 1994). This literature is largely dominated by questions related to the dependency and world-systems approach and criticizes contract farming as an institution leading to an increase in the marginalization of farmers and communities that do not participate in contracting (Korovkin, 1992; Watts, 1994; Little, 1994). In this respect, it is argued that technological advances are passed on to the minority, resulting in uneven benefits that do not necessarily suit the needs of the developing country concerned (Meliczek, 2000). Furthermore, there is evidence of an increase in landlessness as a result of contract farming expanding land requirements (Little, 1994).

2.14 Why should poor farmers engage in contract farming?

For small and large farmers, the reasons why farmers join CF are not radically different. This enables smallholders to take advantage of contracting by (a) reducing output and marketing risks and (b) enhancing access to input, technical assistance and credit. These reasons can be more pressing compared to large farmers for poor farmers, as the former can not afford too much risk. Since the CF is not an objective in itself, it can lead to higher incomes and/or stabilizing incomes and thereby contribute to poverty reduction.

The reasons behind the small producers' decisions to grow non-traditional vegetables under contracts for export were investigated by Masakure and Henson (2005). Based on a survey among smallholders in Zimbabwe (in 2001-2002), they found four factors motivating contracting, namely market uncertainty, indirect benefits (e.g. knowledge acquisitions), income benefits, and intangible benefits (e.g. status). Guo *et al.*, (2005), in their study of contract farming in many eastern provinces in China, found that farmers enter CF arrangements to obtain the following advantages: price stability, market access, and technical assistance to improve product quality.

The interlinking of inputs and output markets is historically a key component of CF in developing countries (Dorward *et al.*, 1998). Interlinkage contracts coordinate farmers and companies, such as the right inputs and/or technical support given to the contractor. Smallholders often do not have access to credit, technical assistance and/or inputs, as the markets for these products, are not well developed and the government does not (or no longer) provide these services. Credits for inputs can only be received by entering into (or interlocking) contracts with traders or processors. However, Dorward *et al.*, (1998) found that traders can make savings on the transaction costs by interlinkage/interlocking, thus making the transaction more successful but also as a tool to collect surpluses from farmers.

For good reasons, CF is sometimes related to export crops and high-value crops (Simmons, 2002). These non-commodity crops are riskier than traditional crops. They have higher production costs hence more income is at risk in the event of crop failure. Moreover, non-traditional crop prices are unpredictable because of thinly traded markets, the yield is uncertain than traditional crops and such crops are also more perishable. Therefore, some

form of protection must be provided to farmers to cultivate this higher risk crop. This protection can be offered by contracts. Saenz Segura (2006) offers empirical support for this argument in his research on contracts in Costa Rica's pepper and chayote supply chains. He found that contracts have one or more of the following functions for farmers that consider the production of high-value crops: (1) a security device to enable farmers to take up new production activities and to gain access to specialized markets; (2) a provision of incentives to make the investments needed for specialty products; and (3) a provision of information on specialty markets.

2.15 How contract farming links poor farmers and markets?

Each linkage is designed to meet the partners' unique needs. Poor farmers need markets, but they also need seasonal capital and inputs to enhance productivity. Agribusinesses need a certain volume, quality and time frame of production. Consequently, any relations that satisfy the needs of the parties can be considered successful. However, the long-term effect of the agreements would include improvements in livelihoods and an increase in the output of commodities. Enhanced capacity of poor farmers to meet international standards is often the beginning of a fruitful engagement in profitable value chain systems.

Zambia, and tomato in India (Spice, 2003). In these cases, farmers have shown considerable persistence in the relations an indication of the schemes being beneficial to them. Contract farming in cash crops often brings significant changes concerning both size and frequency of payments to the recipients. Average rises in income have been observed in comparative African contract-agricultural studies with between 30%–40% (moderate) and 50–60% (high) percent (Little and Watts, 1994).

However, due to high transaction costs and information costs in the market environment in which production takes, one of the strategies for successful relations is selective participation usually based on resource levels and experience. These criteria can deprive poorer farmers. The framework would also improve stratification of income, in so far as the advantages of contract farming are greater for bigger producers than for smaller farmers. To the extent the opposite is true, the CF scheme will have an equalizing effect.

Technology and skills transfer to non-target crops are some spin-offs from agribusiness farmer relations. Glover (1987) argues, besides simple technology transfer, outgrowers can learn, how the market works, how to account and how to run their farm more like a business. Farmers often apply techniques introduced by management (ridging, fertilizing, transplanting, pest control, etc.) to other cash and subsistence crops.

However, Carr (1993) has criticized the medium and long-term consequences of a variety of new technologies because sometimes transferred technologies are for monocropping systems and thus information about how to operate the system as an integrated system can not be transferred. Also, because contractors sometimes find it difficult to coordinate production amongst smallholders, they focus on standardized inputs and production procedures. This approach does not build on the established microenvironmental understanding of outgrowers and consequently does not lead inherently to the creation of a smallholder technology as an integrated system.

The food and nutrition impact of the farmer-agribusiness relations has been assessed for contract farming with the conclusion that contract farmers have not been affected negatively and that the food consumption and nutrition of poorest households may have improved (Eaton and Shepherd, 2001).

There are significant concerns that in these changing circumstances small farms and small farmers will thrive in the medium term. However, smaller businesses and farms also have resources to utilize. This position could relate to product differentiation linked to regional products and other niche markets, or organic products. However, other variables will be the key way to continue survival. One such factor is a reliance on external rather than internal economies of scale through networking or clustering and other forms of alliances. This could be among small firms or through establishing links between small firms or growers and larger enterprises that have already overcome the major barriers to market entry. These links are typically formalized by contracts like the schemes of contract farming in the developing world.

The companies involved in contracts with the small farmers since it helps them to overcome land constraints that would be present if they attempted to produce everything

themselves. They can get the necessary quantity and quality through the contracts. However, the development process is complicated by developing a replicable model that helps to provide inputs in the proper way to small farmers and to collect the quality product in the required quantity.

There is a big gap between producer prices and consumer prices. There are different models for collective marketing by the small and marginal farmers to realize better access to the input and output market. Contracting is also important to achieve marketing advantages. The emerging supermarkets and value chains can also help small-scale farmers when connected effectively.

A relation such as contract farming, which links smallholders and agribusinesses offers a potential solution to all the constraints faced, by providing market guarantees to the farmers and assuring supply to the purchasers. The first objective of this study is to analyze how contract farming creates linkages between farmers and businessmen.

2.16 Socioeconomic factors and small farmer's participation in contract farming

According to studies from Lajili *et al.*, (1997), Rehber (2000), Sartwelle *et al.*, (2000) and Key and Runsten (1999), a farmer's discrete choice to join contract farming scheme or not is influenced by the household's characteristics, operational features, socio-economic characteristics, market attributes of the product and underlying agreement condition. Zhu

contract with their sponsors were influenced by Economic influence, distance from the target market, specialization and commercialization of the production. In a study of contract farming in transitional economies of Eastern Europe, Swinnen (2005), found that the most important factors which are more influenced farmers to enter into contracts or not, in order of importance were; guaranteed product sales, avoidance of price uncertainty, higher price offers, profitability, pre-payment offer input supply and technical assistance and some form of credit.

In a detailed study of contract farming in poultry, chilly, Potato, banana, Wheat, Rice, maize, fruits and vegetables in Bali, South Africa, India, America and Lombok province of Indonesia, it was revealed that factors that the important considerations and motivating

factors for farmers were the increasing the productivity of crops, and getting better Income & Price and less uncertainty; experience in working with Contracting firm and agribusiness; education levels credit constraints and strong borrowing histories. The contracts were more appealing to less well-capitalization smallholders who were well educated, were credit constrained but who had strong borrowing histories (Patrick, 2004).

Another important objective of this paper is to analyze the main socio-economic factors that motivate smallholder farmers to engage in contract farming mechanism.

CHAPTER III

PROBLEMS ASSOCIATED WITH SUPPLY CHAIN

This chapter will discuss the existing supply chain of vegetables, function of intermediaries and the problems of the current supply chain in Bangladesh.

3.1 Introduction

World agriculture will have to undergo significant changes in the next few decades to satisfy a growing, ever wealthier and more urban population's future food demands. Small farmers in developing countries play a key role worldwide in this food security equation. They provide a significant portion of the world's agricultural production and are among the world's poorest and most food-insecure people. However, smallholders are not a homogeneous group but rather a diverse set of households with varying farm and household characteristics. While some farmers have the potential to move from subsistence farming to commercial and profitable farming, others may develop their subsistence strategies outside the agricultural sector.

Agriculture plays a dominant role in the economy in terms of food security, value addition, and employment. The major crops grown in Bangladesh are rice, wheat, jute, sugarcane, pulses & oilseeds, potato, vegetables and fruits. But the production for pulse, oilseed, vegetables and fruits is in deficit to the requirement. The production of those crops has stagnated or declined during the last few years due to the overemphasis on rice. The high-value crops like vegetables and fruits are also termed as risky due to its perishable nature and the producers devote less area to those crops compared to rice and wheat.

Small farmers of Bangladesh, lack access to markets and struggle to make a livelihood from agriculture due to the salinity of land and unsustainable agricultural practices. This is leading to large-scale poverty and food insecurity. But these small farms continue to contribute significantly to agricultural production, food security, rural poverty reduction, and biodiversity conservation despite the challenges they face in access to productive resources and service delivery. They confront new challenges on integration into high-

value chains, adaptation to climate change, and market volatility and other risks and vulnerability.

Access to guaranteed markets for produce and the acquisition of inputs is the major problem confronting smallholders. Local commodity markets are characterized by high volatility. On the other hand, international markets as well as markets offered by agro-industrial firms are relatively more stable but are inaccessible without specific channels such as those provided by predetermined producer–buyer relationships (Baumann, 2000).

When market information and markets themselves are not accessible to the smallholders, no matter if hard infrastructure exists, farmers capture little of the value that they create. The demand and supply remain highly unstable, and so are the distribution costs for goods produced in rural areas. Simply put, markets often do not work for the smallholders.

After illustrating the most conventional supply chain of vegetables in Bangladesh, this chapter identifies the problems of this supply chain.

3.2 Existing supply chain of vegetables

Intermediaries link farmer and consumer. Earlier studies on the Bangladesh food supply chain claim that there are many intermediaries involved and they are sipping off a major portion of the consumers' price as profit (Rubel & Shinya; 2009). There are five intermediaries in the major distribution channel as follows.

3.2.1 Faria

Farias are small traders who dealt in the product within three or four local markets and handled a small volume of product. They purchase products from the farmer and sold that product either to the Beparies or the consumer. They are usually landless labors or small farmers having no full-time work on the farm (Tasnoova, & Iwamoto; 2006). Their volume of business is small because they possess a little capital.

3.2.2 Bepari

Beparies are professional traders who purchase agricultural products from the farmers or Farias in the local market or the village. They handle a larger volume of product than Faria. Bepari sells its product to Arothdar.

3.2.3 Arathdar

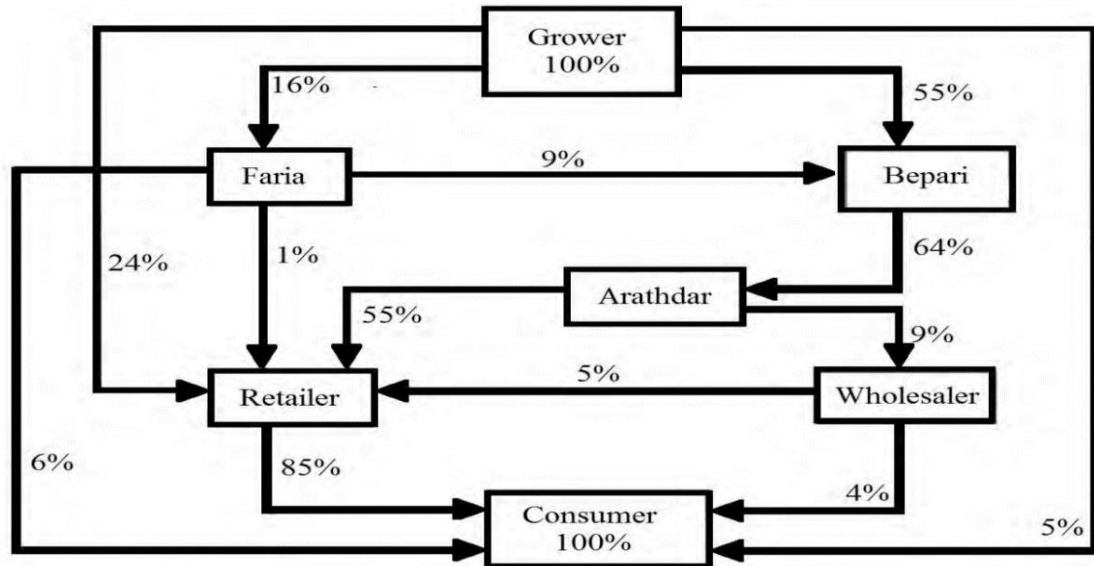
Arathedar serves as a fixed commission agent who has fixed establishment and operates between Bepari and retailer and charges a fixed commission by providing storage facilities.

3.2.4 Wholesaler

Wholesalers serve as the intermediary between Arathdar and Retailers. They sell in bulk quantity.

3.2.5 Retailers

Retailers are the last link in the marketing channel. They buy products from Beparis through Arathdar and sell them to the consumer.



Source: Sabur, 1990

Figure 3.1: Supply chain of produce from grower to consumer

The figure shows the interrelationship between the intermediaries of the existing vegetable supply chain in Bangladesh (Sabur; 1990). It is observable that a bulk amount of products are transferring from grower through Bepari. Bepari distributes his product to the next player through Arathdar.

3.3 Function of intermediaries

The important components of marketing functions at the intermediary level are transportation, storage, grading, financing, market information, pricing etc. detailed functions of intermediaries are described as follows.

3.3.1 Transport

Intermediaries make a connection between consumer and producer. They provide transport to carry locally produced agro-product to the distant market. They do all activities involved in preparation for consignment such as crating and loading. Transportation cost is high in Bangladesh. Intermediaries use different types of modes depend on availability.

3.3.2 Storage

The storage function is primarily concerned with making goods available at the desired time. It creates time utility. The storage requirement depends on specific crops. Potato can be stored for many days. But other vegetables need immediate transport to the market. As vegetables and fruits are perishable, they need proper post-harvesting treatment before reaching the market. If a seller cannot sell their product on the same day, they need to store these products for the following day.

3.3.3 Grading

Grading is one of the basic functions of intermediaries and it is defined as the classification of product according to some standard on measure. Grading is a determining factor of buying and selling price. Quality is determined by eye estimation.

3.3.4 Packaging

Packaging is an important job of intermediaries. Wastage largely depends on packaging. Packaging materials depend on the type of crops. Fresh fruits and vegetables are generally packed in bamboo baskets, plastic crates, plastic bags, or nylon sacks for transportation, in Bangladesh. Sometimes, they are transported in an unpackaged form.

3.3.5 Financing

Financing is of crucial importance for agro-product marketing like any type of product. The intermediaries face lackings of sufficient finance. Sometimes intermediaries buy products from the farmer on credit. 60% of intermediaries do operate their business by their self-finance (Tasnoova, & Iwamoto; 2006).

3.3.6 Risk bearing

Risk bearing facilities are essential in any marketing activities. An insurance policy system has not been developed yet in Bangladesh. Intermediaries bear the risk of price variation.

3.4 Why need intermediaries?

Intermediaries are an essential part of the food supply chain in Bangladesh. They share profit with the producer. But farmers in Bangladesh cannot avoid intermediaries for shifting their product to market. The reasons for dependency on Intermediaries are as follows.

3.4.1 Small scale farm

Small-scale farming is better stewards of natural resources and contributes more to the local community and economic development (Rosset; 1999). The cultivation practice in Bangladesh is more or less small scale farming. The average size of land ownership is 0.6 ha and produces a small amount of production (Weinberger & Genova; 2005). Intermediaries' involvement can be attributed to the fact that the average farmer's marketable quantity is often small. It is not always economic to employ some shipping mode to transport for such a small quantity to the marketplace.

3.4.2 Lack of education

It is observed that education has a negative impact on agriculture income, however, education effect on nonfarm income (wage, trade etc) is significant (Dixon *et al.*, 2003). Education is required to raise the total income of farmers. Most of the villagers in Bangladesh are illiterate and they are not getting updated information. Again also farmers have fear of marketing risk. They rely on intermediaries to send their products to the market.

3.4.3 Lack of information flow

For an efficient marketing system, information on the current situation of the market is a vital ingredient. Agribusiness is not out of this group. Marketing information helps producers to make a rational decision. The producer can make decisions based on information on the forecast of market demand and information on sales timing. Again understanding consumers need help to improve the harvesting method or produce desire types of crops. The most important information is price information which enables the fair

price of produced crops. Because of the recent development of telecommunication, the information barrier is reduced.

3.4.4 Limited super market

The development of supermarkets is a recent addition in the domestic retail section of Bangladesh. The coverage of supermarket chains is still very low, not even 2% of the retail sector. Since supermarkets continue to play a minor role in Bangladesh, most vegetable producers sold either in the local markets or to wholesalers who then transport the produce to the city markets, i.e., Dhaka. Consequently, production is little organized, and none of the farmers in our sample admitted participating in contract growing arrangements. Wholesalers and small traders are the major players in the vegetable trade, capturing 96% of the market.

3.5 Problems of the current supply chain

3.5.1 High losses and shrinkage

Poor prepackaging and poor handling methods and marketing systems cause high post-harvest loss of the commodity. Postharvest losses vary greatly across commodity types, with the location of production and with the season of production. Postharvest losses in food grains in Bangladesh are reported at an estimated 15%, while in fruits and vegetables they are estimated at 20–25%. For highly perishable fruits and vegetables, these losses may go as high as 40% (Badrud-doza; 2006). The absence of a well-developed marketing network and rapid transportation in the country also contributes significantly to high postharvest losses in fruits and vegetables. It is estimated that the loss of nearly 25-40% of the vegetable occurs due to rough prepackaging and improper postharvest handling, transportation, and storage practice (Singh & Chadha; 1990). Postharvest losses which average between 24 and 40% in developing countries, and between 2 and 20% in developed countries are a major source of waste (Sirivatanapa; 2004). Sharma reported that post-harvest losses of vegetables in Bangladesh could be as high as 43% (Sharma; 1987).

3.5.2 Intermediaries' dominance

A field survey in different regions of Bangladesh on different agro-product and found that intermediaries in the market were in small numbers but they were organized [45]. So they dominate farmer and compel them to sell the product at a lower price as the farmer has no way to bring back the product from the market as it involved extra cost. Rahman found in their survey that one of the main reasons for not getting a good price is the involvement of local brokers (Dalal) (Rahman *et al.*, 2006).

3.5.3 High transport cost

Transport cost varies depending on road quality, utilization of the loading capacity and trip length. According to Tasnoova, about 10%, 40% and 50% of Farias used head loads, cart, and vans to carry their crops (Tasnoova, & Iwamoto; 2006). Carts and Vans are used by 40% and 60% of baparies for the transportation of corps. Farmer use head load and rickshaw van to carry the produce to market.

3.5.5 Price difference

Price increases with the increase in the number of intermediaries. Price is less if there is less number of intermediaries. Matin *et al.*, (2008) shows that the price at the outlet in distant markets (Dhaka) becomes almost double higher than that at the farm gate. Several studies on the food supply chain in Bangladesh observed that the marketing margin as a percentage of consumer prices was high. Sabur(1990) showed the marketing margin for eggplant and tomato was as high as 74%. Perishable product marketing depends on many intermediaries due to the absence of requisite infrastructure and causes huge delivery cost and physical wastage.

CHAPTER IV

METHODOLOGY

4.1 Introduction

This chapter will describe the research design, experimental site, selection of vegetables, sample selection, data collection methods, data processing, statistical analysis, model specification, variables selection and research hypothesis used to address research questions and objectives.

4.2 Research design

The main objective of the study was to determine the effect of socioeconomic factors to engage in contract farming to the farmers of the selected area. The selected 15 socioeconomic factors were used to determine the impact of those characteristics on farmers' participation in contract farming. Besides, the study will analyze the supply chain of bean at Narsingdi to provide information on market linkage through contract farming. The other objectives were set to support the main objective. Farming practices were categorized into 2 groups (Contract farm type & non contract farm type) to identify the effect of the socioeconomic factors.

4.3 Experimental site

The study was conducted upon contract and non-contract farmers of Shibpur upazila under Narsingdi district of Bangladesh.



Source: Dhaka Tribune

Figure 4.1: Map of Narsingdi district

Narsingdi District is about 1140.76 sq km, located in between 23'46' and 24'15' north latitudes and in between 90'34' and 90'59' East longitudes. It is bounded by Kishoreganj district on the north, Narayanganj and Brahmanbaria districts on the south, Brahmanbaria and Kishoreganj districts on the east, Gazipur district on the west. Agriculture is the main source of income for 42.73% of the people of this district.



Source: Wikipedia

Figure 4.2: Map of Narsingdi district

Selected upazilla Shibpur is about 206.89 sq km. It has a population of 237246 where Males constitute 50.77% of the population, and females 49.23%. It has an average literacy rate of 32.3% (7+ years), and the national average of 32.4% literate.

The main considerations behind the selection of the above Upazila as study are as follows:

- A large number of vegetable growers are available and vegetables grow well and farmers use a good portion of their land for producing vegetables in these study areas.
- These villages had some identical characteristics like topography, soil, and climatic conditions for producing vegetables.
- Easy accessibility and good communication facilities in these villages.

4.4 Selection of vegetable

Bean is a widely grown important vegetable in Bangladesh. Among all vegetables, the bean was purposively selected. The research required data from both contract and non-contract farmers and a large number of farmers of Shibpur Upazila of Narsingdi district were engaged in contract farming for bean production. That's why the bean producers of the focal areas were selected as targeted respondents to collect data.

4.5 Sample size

The population for this research is defined as those persons involved in bean production (both contract and non-contract) in the Narsingdi district. A convenience sampling technique was selected to meet the objectives.

Farm type	No. of respondents
Contract	75
Non-contract	125
Total	200

4.6 Data collection

4.6.1 Data collection instrument

Data collection instrument indicates through which tools data were collected. For conducting the study data were collected through an interview schedule prepared by the researcher. The semi-structured questionnaires contained a limited number of the set, closed questions, designed to elicit basic quantitative data, and a range of open-ended questions guided by a checklist of discussion topics. To get the desired information direct questions and different scales were kept in the questionnaire. Some information of supply

chain was collected from internet, contract organizations, export organizations, different agro company and BADC.

4.6.1 Data collection procedure

To conduct the study, data were collected by the researcher himself through face-to face interview of the randomly selected farmers. The data were collected from July, 2019 to December, 2019.

4.7 Selection of dependent and independent variables

In this study, the dependent variable was 'Farm type' which was categorized by contract and non-contract farm type and the independent variables were 'Household head's education', 'Household head's occupation', 'Female head's occupation', 'Other family member's occupation', 'Family size', 'Major income source', 'Land type', 'Size of land holdings', 'No. of years engaged in farming', 'Labor use', 'Type of fertilizers being used', 'Having storage place for crops', 'Training or technical knowledge', 'Average annual savings', and 'Average monthly income'.

4.8 Data processing

After the field survey, collected data were coded, compiled and tabulated according to the objectives of the study. Local variables were converted into standard units. All individual responses against the questions in the interview schedule were tabulated, categorized and organized and encoded into SPSS datasheet. The dummy method of scoring was followed for converting the qualitative data into a quantitative form.

4.9 Statistical analysis

- A. Descriptive statistics (frequencies and percentage) were used to describe socio-demographic characteristics, farming information, problems of contract farming, consequences of contract farming upon farmers, and rank of suggestions. It requires a simple calculation and is widely used, and easy to understand.
- B. Bar diagram was used to describe the marital status and farm type.

C. Binary logistic regression analysis was used as an analytical procedure to examine how the selected characteristics of the respondents influence the participation of contract farm type.

4.10 Model specification

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + e \quad (i=1, 2, 3, 4, \dots)$$

Where,

Y_i is the dependent variable and

$Y_{i=1}$ = Contract Farm

$Y_{i=2}$ = Non-contract Farm

Of the independent variable, $X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}$, and X_{15} represented as the 'Household head's education', 'Household head's occupation', 'Female head's occupation', 'Other family member's occupation', 'Family size', 'Major income source', 'Land type', 'Size of land holdings', 'No. of years engaged in farming', 'Labor use', 'Type of fertilizers being used', 'Having storage place for crops', 'Training or technical knowledge', 'Average annual savings', 'Average monthly income' respectively. In this model $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}$ and β_{15} are the regression coefficient of the independent variables and e is the random error, normally and independently distributed with zero mean and constant variance. To examine the relationship between some specific indicators of the dependent variable, the co-efficient of regression was computed. One, five and ten percent level of significance was used for rejecting null hypothesis.

4.11 Research hypothesis

There are significant effects of 'Household head's education', 'Household head's occupation', 'Female head's occupation', 'Other family member's occupation', 'Family size', 'Major income source', 'Land type', 'Size of land holdings', 'No. of years engaged in farming', 'Labor use', 'Type of fertilizers being used', 'Having storage place for crops',

‘Training or technical knowledge’, ‘Average annual savings’, and ‘Average monthly income’ on choosing the type of farm by the farmer.

4.12 Null hypothesis

There is no significant effect of ‘Household head's education’, ‘Household head's occupation’, ‘Female head's occupation’, ‘Other family member's occupation’, ‘Family size’, ‘Major income source’, ‘Land type’, ‘Size of land holdings’, ‘No. of years engaged in farming’, ‘Labor use’, ‘Type of fertilizers being used’, ‘Having storage place for crops’, ‘Training or technical knowledge’, ‘Average annual savings’, and ‘Average monthly income’ on choosing the type of farm by the farmer.

4.13 The conceptual framework of the study

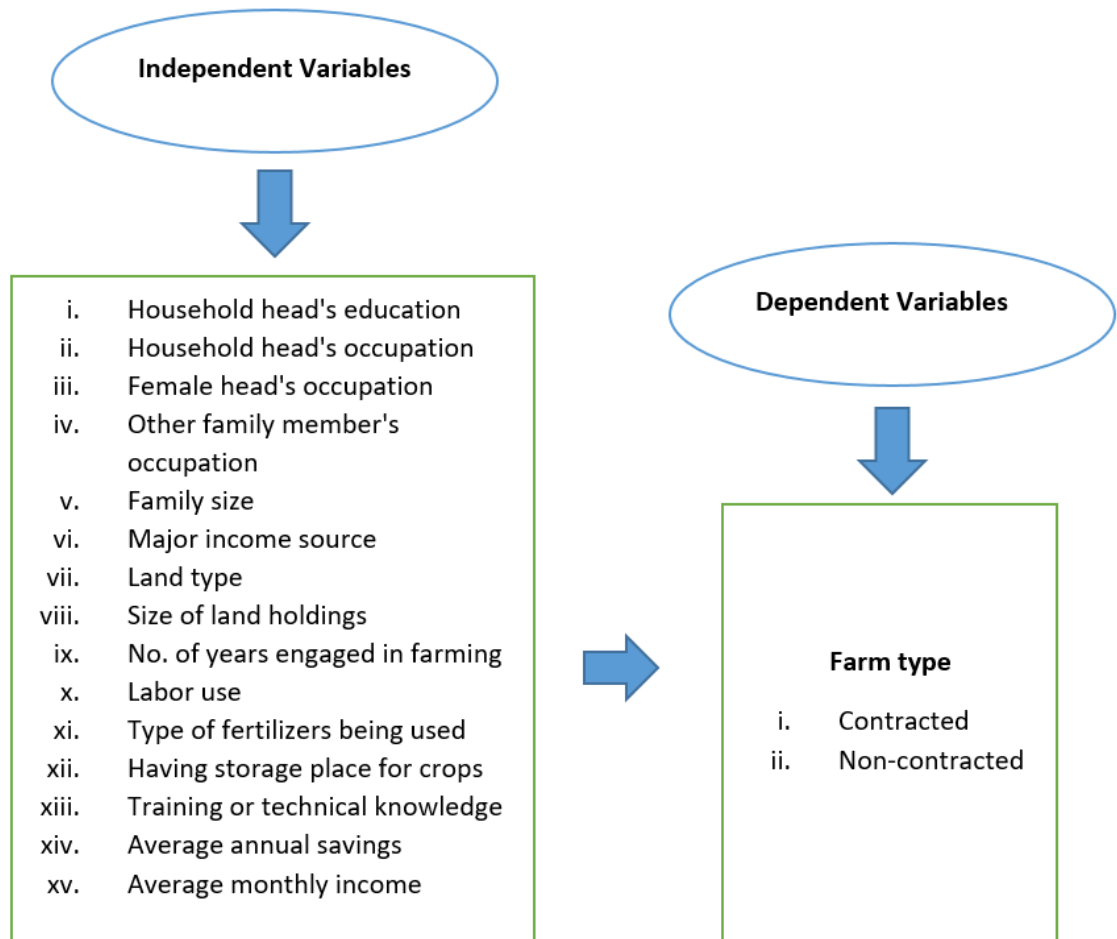


Figure 4.3: The conceptual framework of the study

CHAPTER V

RESULTS AND DISCUSSION

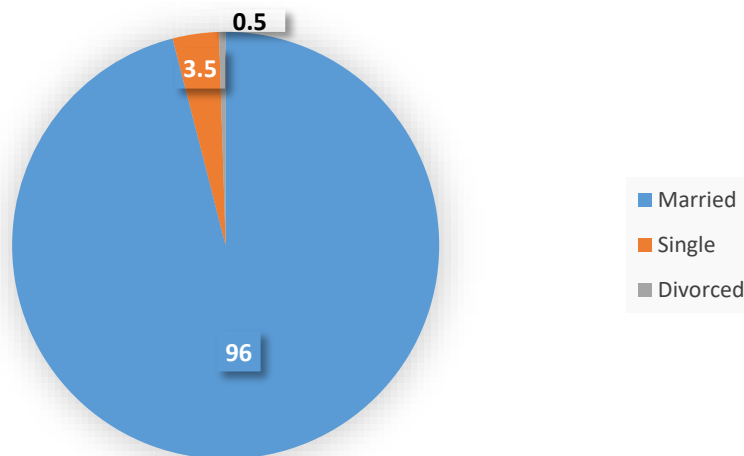
5.1 Introduction

The chapter contains two sections. In the 1st section Percentage distribution of different characteristics, the effect of socioeconomic factors on choosing contract farm types was shown. In the 2nd section, a framework of contract farming, analysis of supply chain of bean and price transmission over the chain was shown to analyze the market linkage procedure through contract farming. 2nd section ends with discussing problems faced by contract farmers and their suggestions to improve this farming practice.

5.2 1st section

The socio-economic background and characteristics of the farmer's influences the type of farming to a great extent. So, a description of the characteristics of a farmer is necessary for analyzing the main objective of the present study. Socio-economic characteristics of the farmers included their family size, educational status, farm size, farming experience of the respondents, occupation, income, savings, etc. These are described below:

5.2.1 Farmers marital status



Source: Field Survey

Figure 5.1: Farmers marital status

Among the respondents 96% of farmers were married where 3.5% were single and only 0.5% of farmers were divorced.

Table 5.1: Percentage distribution of family characteristics

Variables	Frequency	Percent
Household head's occupation		
Only Farming	111	55.5
Others with farming	89	44.5
Total	200	100
Household head's education		
No institutional education	76	38.0
Primary	83	41.5
Secondary+	41	20.5
Total	200	100
Female head's occupation		
Housewife	151	75.5
Others	49	24.5
Total	200	100
Other family member's occupation		
Unemployed	98	49.0
Farmer	45	22.5
Others	57	28.5
Total	200	100
Family size		
1 to 4	86	43.0
5 to 7	68	34.0
More than 7	46	23.0
Total	200	100

Source: Field Survey

From table 5.1, it is seen that 55.5% of respondents were involved with only farming practice, whereas, 44.5% of respondents had other occupations with farming. There was no institutional education for 38.0% of respondents, 41.5% of respondents had primary level education and only 20.5% had secondary and above level education. In the case of female head's occupation, 75.5% of females were housewives and only 24.5% of females were involved with earning activities. At the same time, 28.5% of other family members were engaged with farming and other professions, and 49.0% of members were

unemployed. The family size of the bean farmers of the study ranged from 1 to above 7 persons. Bean farmers were classified into three categories based on their family size. Bean farmers having a family size of 1 to 4 members was 43.0%, family size of 5 to 7 members was 34.3% and family size above 7 members was 23.0%.

Table 5.2: Percentage distribution of income and savings information

Variables	Frequency	Percent
Major income source		
Agriculture	36	18.0
Agriculture and allied activities	100	50
Others	64	32.0
Total	200	100
Average annual savings		
less than 1000	54	27.0
1000 to 5000	114	57.0
More than 5000	32	16
Total	200	100
Average monthly income		
less than 20000	32	16.0
20000 to 30000	76	38.0
30000 to 40000	57	28.5
more than 40000	35	17.5
Total	200	100

Source: Field Survey

Table 5.2 shows the respondent's major sources of income, average monthly income, and annual savings. It is seen that 50% of farmers are dependent on agriculture and allied activities for their income whereas, 18.0% of farmers rely on only agriculture as their earning source. A significant number of respondents (e.g. 32%) were dependent on other activities as their revenue source.

A substantial number of respondents (57%) average annual savings was between 1000 to 5000 taka, while only 16% of respondents save more than 5000 taka in a year. 27% of respondents saved less than 1000 taka in a year.

In the case of average monthly income, 38% of respondents earned 20000 to 30000 taka per month and the percentage is 28.5 for a monthly income of 30000 to 40000 taka/month. 11.4% of respondents earned less than 20000 taka per month whereas, 17.5% of respondents earned more than 40000 taka in a month.

Table 5.3: Percentage distribution of farming information

Variables	Frequency	Percent
Land type		
Owned	57	28.5
Rented \ leased	16	8.0
Both	127	63.5
Total	200	100
Size of land holdings		
Below 1 acre	74	37.0
1-3 acres	117	58.5
Above 3 acres	9	4.5
Total	200	100
No of years engaged in farming		
Less than 7 years	17	8.5
7-8 years	66	33.0
9-10 years	76	38.0
Above 10 years	41	20.5
Total	200	100
Labor use		
Hired	29	14.5
Owned	21	10.5
Both hired and owned	150	75.0
Total	200	100
Type of fertilizers being used		
Chemical fertilizers	20	10.0
Organic fertilizers	92	46.0
Both	88	44.0
Total	200	100

Source: Field Survey

Table 5.3 represents the farming information of respondents like land type, land size, years of farming experiences, labor use, the pattern of fertilizer usage. It is observed that 63.5%

of respondents used both own and rented land for farming, where 28.5% of respondents used their own land and only 8% of respondents use leased land. Bean farmers were classified into three categories based on their farm size. The numbers of respondents having land size ‘below 1 acre’, ‘1 to 3 acres’, and ‘more than 3 acres’ were 37%, 58.5%, and 4.5% respectively.

The farming experience of a respondent was determined based on involvement in the farming activities related to agriculture. Bean farmers were classified into three categories based on their farming experience. The highest portion of the bean farmers (38%) had farming experience of 9 - 10 years, and 33% of farmers had 7-8 years of experience. At least 8.5% of farmers had less than 7 years’ experience whereas 20.5% of farmers had more than 10 years’ experience.

In the case of labor usage, 75% of respondents used both own and hired labor in their farming activities. Both chemical and organic fertilizers were used by farmers in the study area and 44% of farmers used both fertilizers on their land. 46% of farmers have used only organic fertilizers and the percentage of farmers used only chemical fertilizers was 10%.

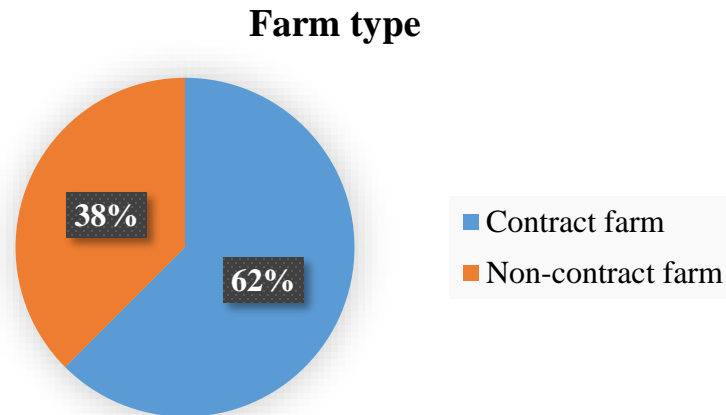
Table 5.4: Percentage distribution of storage facilities and training

Variables	Frequency	Percent
Having storage place for crops		
Yes	20	10.0
No	180	90.0
Total	200	100
Training or technical knowledge		
Yes	85	42.5
No	115	57.5
Total	200	100

Source: Field Survey

From table 5.4 it is found that a large number of farmers (90%) had not any storage place for their crops and only 10% of farmers had those facilities. Besides, 42.5% of farmers had access to training or technical knowledge where 57.5% of farmers had not any kind of training.

5.2.2 Bar diagram of farmers engaged in contract or non-contract farming practice:



Source: Field Survey

Figure 5.2: Farmers engaged farm type

Above figure 5.2 illustrates that 62.5% of farmers were not engaged with contract farming and the remaining 37.5% were engaged with contract farming practice.

5.2.3 Impact of socioeconomic factors on type of farm

Table 5.5: Binary logistic regression model fitting with predictors:

Model Fitting Information				
Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	p-value
Intercept Only	264.625			
Final	82.124	182.501	28	.000
Goodness-of-Fit				
	Chi-Square	df	p-value	
Pearson	91.349	169	1.000	
Deviance	82.124	169	1.000	

The Model fitness was assessed with chi-square statistics. Socioeconomic factors were selected as independent variables and the type of farm was selected as the dependent variable to check the model fitting information. Above table 5.5 showed the chi-square value was 182.501 and the p-value was less than 0.001. This proves that there is a significant relationship between the dependent variable and the independent variable in the

final model. The table contains a likelihood Ratio chi-square test, comparing the full model (i.e., contains all the predictors) against a null (or intercept only model i.e., no predictors). Statistical Significance indicates that the full model represents a significant improvement in fit over the null model. We see that the final model is a significant improvement in fit over the null model [$\chi^2(28) = 182.501, P < .001$].

Pearson's chi-square test indicates that the model fit the data well [$\chi^2(169) = 91.349, p = 1.000$], similarly the Deviance chi-square also indicates good fit [$\chi^2(169) = 82.124, p = 1.000$]. This proves that the model is fit.

Table 5.6: Significance test of socioeconomic factors on the type of farm

Likelihood Ratio Tests				
Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	p-value
Intercept	82.124 ^a	.000	0	
Household head's education	98.238	16.114	2	.000 ^{***}
Household head's occupation	83.834	1.710	1	.191
Female head's occupation	86.200	4.075	1	.044 ^{**}
Other family member's occupation	85.585	3.461	2	.177
Family size	86.849	4.725	2	.094 [*]
Major income source	82.645	.521	2	.771
Land type	87.096	4.972	2	.083 [*]
Size of land holdings	91.867	9.743	2	.008 ^{***}
No. of years engaged in farming	83.630	1.506	3	.681
Labor use	92.936	10.812	2	.004 ^{***}
Type of fertilizers being used	122.158	40.033	2	.000 ^{***}
Having storage place for crops	82.774	.650	1	.420
Training or technical knowledge	85.212	3.088	1	.079 [*]
Average annual savings	85.460	3.336	2	.189
Average monthly income	101.085	18.961	3	.000 ^{***}

***, ** & * indicates significant at 1%, 5% and 10% level of significance

These result from above table 5.6 contains likelihood ratio tests of the overall contribution of each independent variable to the model (Note: if a variable is added in as a factor, the result for that variable is treated as an omnibus test of that factor). Using $\alpha=0.01, 0.05, 0.10$

threshold, it was found that 'Household head's education', 'Female head's occupation', 'Family size', 'Land type', 'Size of land holdings', 'Labor use', 'Type of fertilizers being used', 'Training or technical knowledge', and 'Average monthly income' were the significant predictors in the model. Besides, predictor 'Household head's occupation' ($\chi^2=1.71$, $df=1$), 'Other family member's occupation' ($\chi^2=3.461$, $df=2$), 'Major income source' ($\chi^2=0.521$, $df=2$), 'No. of years engaged in farming' ($\chi^2=1.506$, $df=3$), 'Having storage place for crops' ($\chi^2=0.650$, $df=1$), 'Training or technical knowledge' ($\chi^2=3.088$, $df=1$), and 'Average annual savings' ($\chi^2=3.336$, $df=2$) were non-significant.

The P-value for 'Household head's education' was 0.000 (<0.01) at the Chi-Square Value of 16.114 with 2 df. As the P-value was less than 0.001, 'Household head's education' is significant at 1% level of significance. Similarly, 'Size of land holdings' ($p=0.008$, $\chi^2=9.743$, $df=2$), 'Labor use' ($p=0.004$, $\chi^2=10.812$, $df=2$) 'Type of fertilizers being used' ($p=0.000$, $\chi^2=40.033$, $df=2$), and 'Average monthly income' ($p=0.000$, $\chi^2=18.961$, $df=3$) is also significant at 1% level of significance. So, there had a significant influence of 'Household head's education', 'Size of land holdings', 'Labor use', 'Type of fertilizers being used' and 'Average monthly income' on choosing specific type of farm.

The P value for 'Female head's occupation' was 0.044 (<0.05) at the Chi-Square Value of 4.075 with 1 df. As the P value was less than 0.001, 'Female head's occupation' is significant at 5% level of significance. So, there had a significant influence of 'Female head's occupation' on choosing a specific type of farm.

Besides, 'Family size' ($p=0.094$), 'Land type' ($p=0.083$), 'Training or technical knowledge' ($p=0.079$) is significant at 10% level of significance and had significant effect on choosing specific type of farm.

Table 5.7: Impact of contract farmers socioeconomic factors relative to non-contract farm type category

Type of Farm ^a (Contract)		β	Std. Error	df	p-value	Exp(β)
	Intercept	-20.239	1.607	1	.000	
Household head's education	No institutional education	-3.852	1.171	1	.001	.021
	Primary	-1.455	.926	1	.116	.234
	Secondary+	0 ^b	.	0	.	.
Household head's occupation	Only Farming	.989	.764	1	.195	2.689
	Others with farming	0 ^b	.	0	.	.
Female head's occupation	Housewife	-1.510	.776	1	.052	.221
	Others	0 ^b	.	0	.	.
Other family member's occupation	Unemployed	1.513	.899	1	.092*	4.542
	farmer	1.297	1.002	1	.195	3.659
	Others	0 ^b	.	0	.	.
Family size	1 to 4	2.355	1.336	1	.078*	10.541
	4 to 7	2.490	1.282	1	.052*	12.065
	More than 7	0 ^b	.	0	.	.
Major income source	Agriculture	-.795	1.157	1	.492	.451
	Agriculture and allied activities	-.538	.915	1	.557	.584
	Others	0 ^b	.	0	.	.
Land type	Owned	1.708	.845	1	.043**	5.519
	Rented \ leased	2.471	2.548	1	.332	11.831
	Both	0 ^b	.	0	.	.
Size of land holdings	Below 1 acre	2.706	.725	1	.000***	20.789
	1-3 acres	2.200	.000	1	.	11.987
	Above 3 acres	0 ^b	.	0	.	.
No of years engaged in farming	Less than 7 years	1.312	1.340	1	.328	3.713
	7-8 years	.138	1.004	1	.891	1.147
	9-10 years	-.254	.901	1	.778	.776

	Above 10 years	0 ^b	.	0	.	.
Labor use	Hired	3.423	1.174	1	.004***	30.667
	Owned	-.275	1.267	1	.828	.760
	Both hired and owned	0 ^b	.	0	.	.
Type of fertilizers being used	Chemical fertilizers	-17.605	2774.660	1	.995	2.260E-008
	Organic fertilizers	3.140	.722	1	.000***	23.096
	Both	0 ^b	.	0	.	.
Having storage place for crops	Yes	-.861	1.079	1	.425	.423
	No	0 ^b	.	0	.	.
Training or technical knowledge	Yes	1.150	.672	1	.087*	3.157
	No	0 ^b	.	0	.	.
Average annual savings	less than 1000	-2.048	1.192	1	.086	.129
	1000 to 5000	-.707	.868	1	.415	.493
	More than 5000	0 ^b	.	0	.	.
Average monthly income	less than 20000	-7.117	2.094	1	.001	.001
	20000 to 30000	-4.275	1.551	1	.006	.014
	30000 to 40000	-2.817	1.348	1	.037	.060
	more than 40000	0 ^b	.	0	.	.
a. The reference category is: Not contract.						

***, ** & * indicates significant at 1%, 5% and 10% level of significance

Table 5.7 provided information of each predictor's category of contract farms against the reference category (non-contract farms). Specifically, the regression coefficients indicate which predictors significantly discriminated between contract farms and non-contract farms.

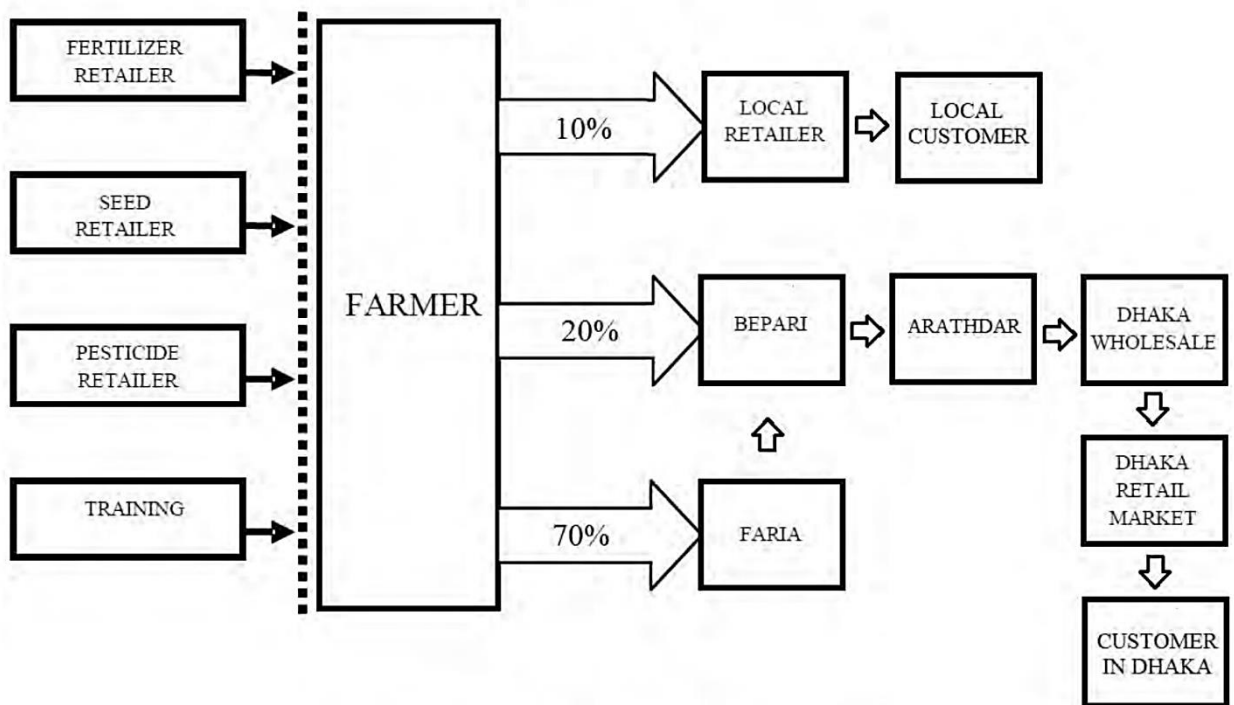
Considering non-contract Farms as a base category, 'Size of landholdings (Below 1 acre)', 'Labor use (Hired)', and 'Type of fertilizers being used (Organic Fertilizers)' is significant at 1% level of significance. 'Land type (Owned)' is significant at 5% level of significance. Besides, 'Other family member's occupation (Unemployed)', 'Family size(1 to 4)',

‘Family size (4 to 7)’ and ‘Training or technical knowledge(yes)’ is significant at 10% level of significance.

The odd ratio of ‘Other family member's occupation(Unemployed)’ [$\beta=1.513$], ‘Family size(1 to 4)’ [$\beta=2.355$], ‘Family size(4 to 7)’ [$\beta=2.49$], ‘Land type(Owned)’ [$\beta=1.708$], ‘size of land holdings (Below 1 acre)’ [$\beta=2.706$], ‘Labor use(Hired)’ [$\beta=3.423$], ‘Type of fertilizers being used(Organic Fertilizers)’ [$\beta=3.140$], and ‘Training or technical knowledge(yes)’ [$\beta=1.15$] represents that if the category is increased by 1 unit, then the participation of the farmer in contract farming will be increased by 4.542, 10.541, 12.065, 5.519, 20.789,30.667, 23.096, and 3.157 units respectively relative to non-contract farm type category.

5.3 2nd Section

5.3.1 Supply chain analysis

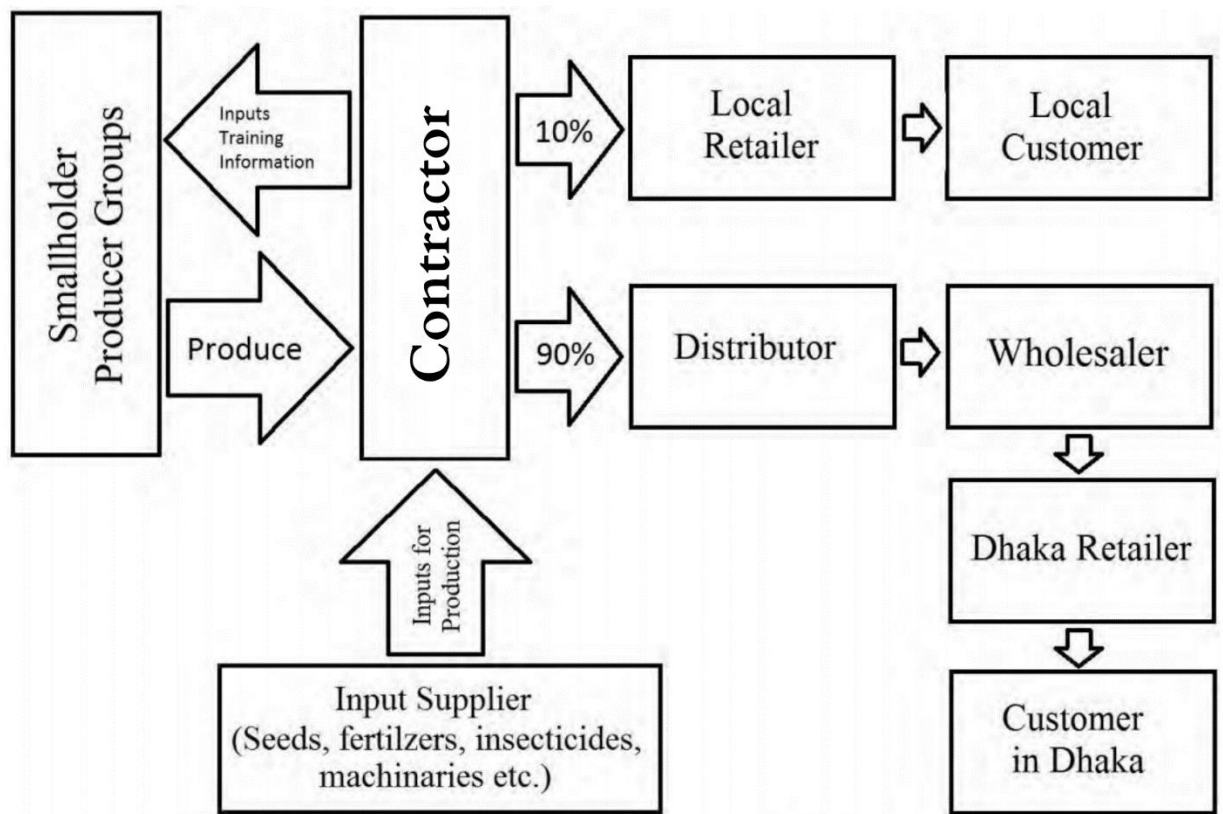


Source: Field Survey

Figure 5.4: Supply chain of non-contract farmer

In figure 5.4, it is seen that, in the traditional vegetable marketing channel, farmers produced commodities and sold directly to consumers in the local market or through the

interference of middlemen. The scientific and systematic packaging, storing, and grading practices were not implemented. Lack of these practices, a huge post-harvest loss incurred at the time of marketing which was bore by farmers and intermediaries. Most of the time products cannot ensure superior quality. The final price of the product became higher but the farmer do not get their expected price.



Source: Field Survey

Figure 5.5: Supply chain of contract farmer

In the figure 5.5 it is seen that the contractors provide inputs, trainings, information and collect their produce directly. As the contractor purchase bulk amount of inputs at a time, they got best inputs in lower prices. Thus the production cost become lower and the farmer gets higher price of output as they directly connected to customer or wholesaler through contractors.

So, it ensures that contract farming make easy access and linkages to market between smallholders and businessmen.

5.3.2 Price mark up with the traditional and contract supply chain

The table illustrates the price mark up along the chain, from the farmer to the retail market in Dhaka. The retailer adds maximum value to the price (about 35% to 45%) when selling the bean to the customer. Two important aspects need to be considered before drawing any conclusion about retailers' margin. Firstly, beans are highly perishable items and retailers add a premium to the price to offset the attendant risks. Secondly, consumers tend to pick and choose better quality beans first, resulting in low quality residual items which need to be sold at lower prices; some part of the beans could also remain unsold at the end of the day. Retailers tend to add a premium to compensate for these losses. Besides, Wholesaler, Retailer, Arathdar, Bepari etc add 10-15% profit when they sell the product.

Table 5.8: Price mark up with non contract supply chain

Stage in the supply chain	Amount (BDT/Kg)	Mark Up (%)
Farmers to Faria	16.24	
Faria to Bepari	18.67	15.00%
Bepari to Arathdar	21.47	15.00%
Arathdar to Wholesaler	24.69	15.00%
Wholesaler to Retailer	28.39	15.00%
Retailer to Customer (Dhaka)	41.17	45.00%

Source: Field Survey

From table 5.8, it is seen that when the non-contract farmers selling the product at 16.24 bdt/kg the customer of Dhaka city purchasing that at 41.17 bdt/kg.

Table 5.9: Price mark up with contract supply chain

Stage in the supply chain	Amount (BDT/Kg)	Mark Up (%)
Farmer to contractor	17.25	
Contractor to Distributor	19.83	15%
Distributor to Wholesaler	22.80	15%
Wholesaler to Retailer	26.22	15%
Retailer to Customer (Dhaka)	38.019	45%

Source: Field Survey

From the above table 5.9, it is seen that the farmer getting higher prices for the quality products than the non-contract farmer which increases the income of smallholder farmers. The customer of Dhaka also getting products at lower prices than previous.

5.3.2.1 Reduced production cost

Experts in Contract organizations able to choose better quality inputs such as seeds, fertilizers, insecticides etc. Better quality inputs result in higher yield and reduced production wastage. Which in turn reduces the production cost of smallholder farmers. Contractor purchases production inputs from direct suppliers in much larger quantities than the smallholder farmers' purchase from local retails. It results in a lower unit price for inputs than the usual. The lower price of inputs further reduces the production cost. Contractors also provide training to smallholder farmers for enhancing productivity. Improved productivity also reduces production costs. Increased productivity, lower price and better quality of production inputs reduce the production cost.

5.3.2.2 Greater income of smallholder farmers

Due to a reduction in production cost, the income of the smallholder farmer increases. Also increased productivity results in higher yield. This higher yield and greater price increase the income of the smallholder farmers significantly. From table 5.9 it is seen that the farmers are getting 17.25 tk for per kg of bean. Which is 1.01 tk more than the non-contract farmers selling price.

5.3.2.3 Increase in quality

Lower number of intermediaries results in less postharvest handling. Due to less post-harvest handling, the quality of bean remains good. The improved production process also increases the quality of bean.

5.3.2.4 Reduced retail price

Efficient marketing channel and lower number of intermediaries results in reduced retail price. After giving maximum profits to all the associates in the supply chain final price became 38.019 Tk/kg. The customer in Dhaka getting the quality bean at about 2 Tk less when the farmer of the produces engaged in contract farming.

The price transmission along with contract farming supply chain compared to traditional farming supply chain ensures better inputs, quality outputs, market information, lower production cost, higher profits, and reduces middlemen.

5.3.3 Problems faced by the contract farmer

Table 5.10: Problems of contract farming for farmers

Problems		Worst problem	Problem	No problem at all
Poor infrastructural facilities	N	17	55	3
	%	22.7	73.3	4.0
Lack of monitoring	N	21	46	8
	%	28.0	61.3	10.7
Lack of incentives	N	65	10	0
	%	86.7	13.3	0
Lack of commitment	N	59	15	1
	%	78.7	20.0	1.3
Less bargaining power of farmers	N	38	35	2
	%	50.7	46.7	2.7
Weak law enforcement	N	45	27	3
	%	60.0	36.0	4.0
Price risk	N	14	47	14
	%	18.7	62.7	18.7
Limited govt. support	N	50	24	1
	%	66.7	32.0	1

Source: Field Survey

Table 5.10 shows the problems of contract farming which were perceived as ‘worst problem’, ‘problem’, and ‘no problem at all’ by contract farmers. All respondents thought ‘Lack of incentives’ is a problem of contract farming and 65 out of 75 farmers mentioned it as the worst problem. 74 out of 75 farmers thought both ‘lack of commitment’ and ‘limited govt. support’ as problems, among those 59 respondents mentioned ‘lack of commitment’ as the worst problem and 50 respondents mentioned ‘limited govt. support’ as the worst problem. More than 72 respondents mentioned ‘poor infrastructural facilities’, ‘less bargaining power of farmers’, and ‘weak law enforcement’ as problems. 67 out of 75 respondents considered ‘lack of monitoring’ as a problem and 61 out of 75 respondents identified ‘price risk’ as a problem. On the other hand, 14 respondents said price risk is not a problem at all.

5.3.4 Suggestions provided by the contract farmers

Table 5.11: Farmers suggestions to solve the problems of contract farming

Ranking of suggestions	Ranks	1	2	3	4	5	6	7	8	9
Adequate infrastructural facilities	N	58	10	3	2	2	0	0	0	0
	%	77.3	13.3	4.0	2.7	2.7	0	0	0	0
Strong law enforcement	N	6	18	21	15	8	2	3	1	1
	%	8.0	24.0	28.0	20.0	10.7	2.7	4.0	1.3	1.3
Reduction of price risk	N	3	6	11	7	22	9	9	5	3
	%	4.0	8.0	14.7	9.3	29.3	12.0	12.0	6.7	4.0
Familiarize contract farming among businessmen and farmers	N	3	6	12	17	9	11	11	4	2
	%	4.0	8.0	16.0	22.7	12.0	14.7	14.7	5.3	2.7
Adequate govt. support	N	4	29	16	12	6	2	1	5	0
	%	5.3	38.7	21.3	16.0	8.0	2.5	1.3	6.7	0
Establishment of standard cold storage	N	0	2	1	2	7	16	19	12	16
	%	0	2.7	1.3	2.7	9.3	21.3	25.3	16.0	21.3
Establishment of standard vegetable packaging industries	N	0	0	3	8	8	15	14	16	11
	%	0	0	4.0	10.7	10.7	20.0	18.7	21.3	14.7
Solve the problem of transportation	N	1	3	5	10	7	9	12	17	11
	%	1.3	4.0	6.7	13.3	9.3	12.0	16.0	22.7	14.7
Proper scaling facilities	N	0	1	3	2	6	11	6	15	31
	%	0	1.3	4.0	2.7	8.0	14.7	8.0	20.0	41.3

Source: Field Survey

Table 5.11 shows some suggestions which were suggested and ranked by the respondents to solve the problems of contract farming.

In the 1st ranking, it is seen that most of the respondents i.e. 58 out of 75 thought that adequate infrastructure is required badly. Here the percentage of the respondents is 77.3%.

Next, which was needed by farmers was adequate government support. Here the percentage of respondents is 38.7%; 29 out of 75 respondents responded in this. In the 3rd ranking, strong law enforcement was required which is 28.0%. Reduction of price risk which was in the 5th ranking but the percentage is 29.3% which is higher than the suggestion in the 4th ranking i.e. familiarize contract farming among businessmen and farmers (22.7%). It was because firstly it is important to familiarize the contract farming among farmers before the reduction of price risk. Otherwise, the price risk could not be controlled effectively. In the 6th and 7th, respondents recommended the establishment of standard cold storage (25.3%) and standard vegetable packaging industries (21.3%) respectively. The percentage of respondents is higher in the 6th ranking than the 7th one because the vegetable is too much perishable and it requires urgent cold storage facilities. In the 8th ranking, there was a requirement to solve the problem of transportation and the percentage is 22.7%. And the last of all, proper scaling was required. It was the last step and the percentage is 41.3%.

CHAPTER VI

KEY FINDINGS AND CONCLUSION

6.1 Key research findings

6.1.1 Findings from the 1st Section

- a. 55.5% of respondents were involved with only farming practice, whereas, 44.5% of respondents had other occupations with farming. There was no institutional education for 38.0% of respondents, 41.5% of respondents had primary level education and only 20.5% had secondary and above level education. In the case of the female head's occupation, 75.5% of females were housewives and only 24.5% of females were involved with earning activities. 28.5% of other family members were engaged with farming and other professions, and 49.0% of members were unemployed. Bean farmers having a family size of 1 to 4 members was 43.0%, family size of 5 to 7 members was 34.3% and family size above 7 members was 23.0%.
- b. 50% of farmers are dependent on agriculture and allied activities for their income whereas, 18.0% of farmers rely on only agriculture as their earning source. A significant number of respondents (e.g. 32%) were dependent on other activities as their revenue source. 57% of respondents' average annual savings were between 1000 to 5000 taka, while only 16% of respondents save more than 5000 taka in a year. 27% of respondents saved less than 1000 taka in a year. In the case of average monthly income, 38% of respondents earned 20000 to 30000 taka per month and the percentage is 28.5 for a monthly income of 30000 to 40000 taka/month. 11.4% of respondents earned less than 20000 taka per month whereas, 17.5% of respondents earned more than 40000 taka in a month.
- c. 63.5% of respondents used both own and rented land for farming, where 28.5% of respondents used their own land and only 8% of respondents use leased land. The numbers of respondents having land size 'below 1 acre', '1 to 3 acres', and 'more than 3 acres' were 37%, 58.5%, and 4.5% respectively. The highest portion of the bean farmers (38%) had a farming experience of 9 - 10 years, and 33% of farmers

had 7-8 years of experience. At least 8.5% of farmers had less than 7 years' experience whereas 20.5% of farmers had more than 10 years' experience. 75% of respondents used both own and hired labor in their farming activities. Both chemical and organic fertilizers were used by farmers in the study area and 44% of farmers used both fertilizers on their land. 46% of farmers have used only organic fertilizers and the percentage of farmers used only chemical fertilizers was 10%.

- d. 90% of respondents had not any storage place for their crops and only 10% of farmers had those facilities. 42.5% of farmers had access to training or technical knowledge where 57.5% of farmers had not any kind of training. 62.5% of farmers were not engaged with contract farming and the remaining 37.5% were engaged with contract farming practice.
- e. Socioeconomic factors were selected as the independent variable and the type of farm was selected as the dependent variable to check the model fitting information. The chi-square value was 182.501 and the p-value was less than 0.001, which proves that there is a significant relationship between the dependent variable and the independent variable in the final model. Pearson's chi-square test indicates that the model fits the data well, similarly, the Deviance chi-square also indicates a good fit. This proves that the model is fit.
- f. Household head's education, Female head's occupation, Family size, Land type, Size of land holdings, Labor use, Type of fertilizers being used, Training or technical knowledge, Average monthly income were the significant predictors in the model. Besides, predictor Household head's occupation, Other family member's occupation, Major income source, No. of years engaged in farming, Having storage place for crops, Training or technical knowledge, Average annual savings were non-significant.
- g. The P-value for 'Household head's education', 'Size of land holdings', 'Labor use', 'Type of fertilizers being used' Average monthly were significant at 1% level of significance. So, there had a significant influence of 'Household head's education', 'Size of land holdings', 'Labor use', 'Type of fertilizers being used' and 'Average monthly income' on choosing the specific type of farm. 'Female head's occupation' is significant at 5% level of significance. So, there had a significant influence on

the 'Female head's occupation' on choosing a specific type of farm. Besides, 'Family size', 'Land type', 'Training or technical knowledge' is significant at 10% level of significance and had a significant effect on choosing a specific type of farm.

- h. Considering non-contract Farms as a base category, size of land holdings (Below 1 acre), labor use (Hired), Type of fertilizers being used (Organic Fertilizers) is significant at 1% level of significance. Land type (Owned) is significant at 5% level of significance. Besides, Other family member's occupation (Unemployed), Family size (1 to 4), Family size (4 to 7), and training or technical knowledge (yes) is significant at 10% level of significance. The odd ratio of Other family member's occupation(Unemployed), Family size(1 to 4), 'Family size(4 to 7)', 'Land type(Owned)', 'size of land holdings (Below 1 acre)', Labor use(Hired), Type of fertilizers being used(Organic Fertilizers), training or technical knowledge(yes) represents that if the category is increased by 1 unit, then the participation of the farmer in contract farming will be increased by 4.542, 10.541, 12.065, 5.519, 20.789,30.667, 23.096, 3.157 units respectively relative to non-contract farm type.

6.1.2 Findings from the 2nd section

- a. The smallholders are directly connected with the contractor. The contract farmers get various technical and logistic supports from exporters, Agribusiness companies, and BADC but non-contract farmers did not get it. Input suppliers, financial organization, the insurance company provides inputs and credits and collect market information from the contractor. Therefore, contract farming connected everything in a hub and smallholders got benefits of that linkage.
- b. In the traditional vegetable marketing channel, most of the time products cannot ensure superior quality, the final price of the product became higher but the farmer does not get their expected price.
- c. The contractors provide inputs, training, information, and collect their produce directly. As the contractor purchases a bulk amount of inputs at a time, they got the best inputs at lower prices. Thus the production cost becomes lower and the farmer gets a higher price of output as they directly connected to customer or wholesaler through contractors.

- d. The non-contract farmers selling the product at 16.24 taka/kg but the customer of Dhaka city purchasing that for 41.17 taka/kg.
- e. The farmer getting higher prices for the quality products than the non-contract farmer which increases the income of smallholder farmers. The customer of Dhaka also getting products at lower prices than previously.
- f. Contract Farmer got 1.01 tk/kg more than the non-contract farmer when sold beans. The customer also got 2 tk less in per kg of bean when the producer of bean engaged in contract farming.
- g. Contract farming reduced production cost, transaction cost, retail price and middlemen in the supply chain. Contract farming had improved the quality, grading, and packaging of produce. It made high yields, organic produce and higher the farmer's profit.
- h. According to the farmer, if they got adequate infrastructure, proper scaling facilities, cold storage, govt. support, price security and good transportation system contract farming would become more successful in future.

6.2 Conclusion

This study was aimed at analyzing vegetable contract farming in Shibpur upazila under Narsingdi district. The specific objectives of the study to identify socioeconomic factors affecting smallholder farmers' participation in vegetable contract farming in the study area. Binary Logistic regression model was applied to analyze factors affecting smallholder farmers' participation in vegetable contract farming in the study area. Among 15 explanatory variables, which were hypothesized to affect households' participation in contract farming, the significant variables included in the model such as Household head's education, Female head's occupation, Family size, Land type, Size of land holdings, Labor use, Type of fertilizers being used, Training or technical knowledge and Average monthly income participation in contract farming. Besides, the analysis of the contract supply chain showed that farmers got positive results in production and marketing costs when they participated in CF. Farmers also got inputs, credits, market information while engaged in contract farming.

CHAPTER VII

RECOMMENDATIONS AND LIMITATIONS

7.1 Recommendations

In the case of smallholding agriculture, the Government has to play an important role in improving the productivity and incomes of small farmers. The agricultural strategy must focus on 96% of farmers who are small and marginal, increasingly female, and who find it difficult to access inputs, credit and extension or to market their output.

As the marginal and small farmers suffer from market failures in agriculture in terms of credit, input supplies and marketing of output, access to new technologies etc. the following measures are recommended:

- a. The income from small and marginal farms is not enough to take care of daily consumption and they have to borrow to survive. Therefore, small farmers have to get part of the income from rural non-farm activities. Therefore, the promotion of rural non-farm sector is essential for generating incomes for the rural population.
- b. The government should emphasize rural infrastructure development like roads, irrigation, communications, the establishment of standard vegetable packaging industries, the establishment of standard cold storage etc.
- c. Investments in agricultural R&D, rural roads and other infrastructure and knowledge generation will enable small and marginal farmers to compete with other farmers in India as well as in other countries.
- d. Investment in the supermarket sector should be encouraged. Small farmers can be benefitted from the emerging supermarkets and value chains. The presence of supermarkets as retail trade is rapidly expanding in the emerging economies.
- e. The study recommends that the agricultural policy should base on the existing strengths of the farmers and strengthen the current strategies of extension education, providing relevant knowledge that can be used to collect information and make production and marketing decisions, direct contact of extension workers with farmers increased as this can increase benefits of contract farming to

beneficiaries hence participation in contract farming this can ensure the optimal realization of their livelihoods' potentials.

7.2 Limitations of the study

To conduct the research in a meaningful and manageable way here it becomes necessary to allow certain limitations regarding certain aspects of the study. With the consideration of time, resources and financial constraints the study was conducted under the following limitations:

- a. The study was confined to Shibpur Upazila under Narsingdi district of Bangladesh. So, the findings may not be generalized for the Narsingdi district as a whole.
- b. The farmers had various characteristics that varied to a great extent. Only a few important characteristics of the farmer were chosen for this study.
- c. Most of the respondents were not well educated and habituated with this type of research. So a huge amount of time had to spend to explain them about the purpose of the research.
- d. The respondents did not keep records of their farming business; they had difficulty in recalling information. It was an added problem to the researcher to collect reliable data because most of the farmers provided information from their memory.
- e. Farmers provided data in local units of measures in response to questions which created complexity in analyzing the data.

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APPENDICES

APPENDIX A: Interview schedule

Interview Schedule

Sample No.-----

Group of farmers : (a)Contract (b)Non-contract

Crop:

General Information:

1. Name:_____
2. Father's/Husband's Name:_____
3. Age:
 - a) Below 20years b)Between 20-35years c)Between 36-50years d)Above 50years
4. Marital status: a)Single b) Married c) Divorcee
5. Education:
 - a) Illiterate b) Illiterate but can sign c) Primary d) Secondary e) Diploma/Technical f) Graduation g) Post graduation h)Others
6. Type of family: a)Nuclear b)Joint
7. No. of family members:_____
8. Land type: a) Owned b) Rented/leased
9. Size of land holdings:
 - a) Below 1 acres b) 1-3acres c) 3.01-5acres d) Above 5 acres
10. Annual income:
 - a)Below 1 lakh b)Between 1-3 lakh c)Between 3-5 lakh d)Above 5 lakh
11. Annual savings:
 - a) Below 20000taka b) Between 20000-35000taka c) Between 35001-50000taka d) Above 50000
12. Do you have a bank account? a)Yes b)No
13. How many years have you been engaged in farming?
 - a) 1-2 years b) 3-4 years c) 5-6 Years d) 7-8 years e) 9-10 f) Above 10 years
14. Off-farm employment: a) Yes b) No
15. Labor use: a) Hired b) Owned c) Both hired and owned
16. Which kind of fertilizers do you use?
 - a)Chemical fertilizers b)Organic fertilizers
17. If organic fertilizers are used, can you specify the type:
 - a)Livestock manure b)Green manure c)Poultry manure d)Others
18. How do you control pests and diseases?
 - a)Biological and organic control method b)Chemical pesticides c)Integrated Pest Management(IPM) d)Other methods
19. How would you define your growing practices?
 - a)Organically-certified b)Organic practices but not certified c)Conventional method
20. Do you have storage place for your crops? a)Yes b)No.
If yes, where _____

21. Cost of production:

Items	BDT
Land preparation	
Seed	
Fertilizer	
Irrigation	
Pesticides and Insecticides	
Labor cost	
Harvesting cost	
Other cost	

22. Marketing cost:

Items	BDT
Transportation cost	
Storage cost	
Labor cost	
Packaging cost	
Standardization and grading cost	
Cleaning and washing cost	
others	

23. Others

Items	acre	Kg	Tk
Area of land used to cultivate bean			
Total production of bean			
Total post-harvest loss			
Total volume of sales			
Sales price /kg			

24. To whom do you sell your products:

a) Directly to consumers b) Retailers c)Wholesalers d) Processors e) Government corporation f) Exporters g) Farmers market h) Contract group/organization i) Others(specify)_____

25. How do you imagine the future of your farm in the next 5 years? a) Continue farming business as usual b) Continue and expand farming business c) Allow family members to manage the farm d) Discontinue farming business

26. Are you interested to engage with contract farming? a) Yes b) No

If yes, why didn't you yet engaged in contract farming?

a) Lack of knowledge about contract farming b) Didn't get opportunity to engage in contract farming c) Felt risk d) Preferred traditional farming method

If contract farmer,

27. Forms of contract: a) Written agreements b) Verbal agreements

28. Type of contract:

a) Production contract b)Marketing contract c)Management contract d)Partial contract e)Total contract f)Tenant farming g)Share cropping h)Others(specify)

29. Contract duration:
 a) Less than 1year b) Between 1-5years c) Between 6-10years d) Above 10years
30. Contract purpose:
 a) Commercial/Industrial application b) Research/Educational application
31. Description of the contract party:
 a) Government b) Private firms c) Research institution d) Other parties
32. Name of the contractor /Organization: _____
33. Payment method: a) Cash b) Cheque
34. Time of transaction:
 a) Payment before delivery b) Payment at the time of delivery c) Payment after delivery
35. Pricing methods: a) Spot price b) Forward price c) Others
36. Incentives provided by contract:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Facilitate planning of activities					
Provide raw materials					
Facilitate coordination with supplier					
Facilitate coordination with buyer					
Reduce sales risk					
Facilitate investment or access to credit					
Provide managerial support or technical assistance					
Provide access to new technologies					
Reduce risk of hold up					
Reduce price risk					
Provide training and instructions					
Others					

37. Consequences of contract farming use:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Increase income					
Increase productivity					
Improve product quality					
Increase adoption of new technologies					
Improve living standards					
Smooth production flow					
Improve timeliness in delivery					

Increase producer prices					
Techniques and products					
Others					

38. Attitudes of the farmers about contract farming: a) Positive b) Neutral c) Negative

39. Problems of contract farming:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Poor infrastructural facilities					
Lack of monitoring					
Lack of incentives					
Lack of commitment					
Less bargaining power of farmers					
Weak law enforcement					
Price risk					
Limited govt. support					

40. Suggestions of farmers to improve contract farming:

Please rank the following suggestions of the table:

	1	2	3	4	5	6	7	8	9	10
Adequate infrastructural facilities										
Strong law enforcement										
Reduction of price risk										
Familiarize contract farming among businessmen and farmers										
Adequate govt. support										
Establishment of standard cold storage										
Establishment of standard vegetable packaging industries										
Solve the problem of transportation										
Proper scaling facilities										
Others(specify)										

APPENDIX B.2 Output of Binary logistic regression through SPSS

Table B.2.(b)

Model Fitting Information					
Model	Model Fitting Criteria		Likelihood Ratio Tests		
	-2 Log Likelihood		Chi-Square	df	Sig.
Intercept Only	264.625				
Final	82.124		182.501	28	.000

Table B.2.(c)

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	91.349	169	1.000
Deviance	82.124	169	1.000

Table B.2.(d)

Likelihood Ratio Tests					
Effect	Model Fitting Criteria		Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model		Chi-Square	df	Sig.
Intercept	82.124a		.000	0	.
Household head's education	98.238		16.114	2	.000
Household head's occupation	83.834		1.710	1	.191
Female head's occupation	86.200		4.075	1	.044
Other family member's occupation	85.585		3.461	2	.177
Family size	86.849		4.725	2	.094
Major income source	82.645		.521	2	.771
Land type	87.096		4.972	2	.083
Size of land holdings	91.867		9.743	2	.008
No. of years engaged in farming	83.630		1.506	3	.681
Labor use	92.936		10.812	2	.004
Type of fertilizers being used	122.158		40.033	2	.000
Having storage place for crops	82.774		.650	1	.420
Training or technical knowledge	85.212		3.088	1	.079
Average annual savings	85.460		3.336	2	.189
Average monthly income	101.085		18.961	3	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Table B.2.(e)

Type of Farma (Contract)		B	Std. Error	df	Sig.	Exp(B)
	Intercept	-20.239	1.607	1	.000	
Household head's education	No institutional education	-3.852	1.171	1	.001	.021
	Primary	-1.455	.926	1	.116	.234
	Secondary+	0 ^b	.	0	.	.
Household head's occupation	Only Farming	.989	.764	1	.195	2.689
	Others with farming	0 ^b	.	0	.	.
Female head's occupation	Housewife	-1.510	.776	1	.052	.221
	Others	0 ^b	.	0	.	.
Other family member's occupation	Unemployed	1.513	.899	1	.092*	4.542
	farmer	1.297	1.002	1	.195	3.659
	Others	0 ^b	.	0	.	.
Family size	1 to 4	2.355	1.336	1	.078*	10.541
	4 to 7	2.490	1.282	1	.052*	12.065
	More than 7	0 ^b	.	0	.	.
Major income source	Agriculture	-.795	1.157	1	.492	.451
	Agriculture and allied activities	-.538	.915	1	.557	.584
	Others	0 ^b	.	0	.	.
Land type	Owned	1.708	.845	1	.043**	5.519
	Rented \ leased	2.471	2.548	1	.332	11.831
	Both	0 ^b	.	0	.	.
Size of land holdings	Below 1 acre	2.706	.725	1	.000***	20.789
	1-3 acres	2.200	.000	1	.	11.987
	Above 3 acres	0 ^b	.	0	.	.
No of years engaged in farming	Less than 7 years	1.312	1.340	1	.328	3.713
	7-8 years	.138	1.004	1	.891	1.147
	9-10 years	-.254	.901	1	.778	.776
	Above 10 years	0 ^b	.	0	.	.
Labor use	Hired	3.423	1.174	1	.004***	30.667
	Owned	-.275	1.267	1	.828	.760
	Both hired and owned	0 ^b	.	0	.	.

Type of fertilizers being used	Chemical fertilizers	-17.605	2774.660	1	.995	2.260E-008
	Organic fertilizers	3.140	.722	1	.000***	23.096
	Both	0 ^b	.	0	.	.
Having storage place for crops	Yes	-.861	1.079	1	.425	.423
	No	0 ^b	.	0	.	.
Training or technical knowledge	Yes	1.150	.672	1	.087*	3.157
	No	0 ^b	.	0	.	.
Average annual savings	less than 1000	-2.048	1.192	1	.086	.129
	1000 to 5000	-.707	.868	1	.415	.493
	More than 5000	0 ^b	.	0	.	.
Average monthly income	less than 20000	-7.117	2.094	1	.001	.001
	20000 to 30000	-4.275	1.551	1	.006	.014
	30000 to 40000	-2.817	1.348	1	.037	.060
	more than 40000	0 ^b	.	0	.	.

a. The reference category is: Not contract.

b. This parameter is set to zero because it is redundant.

c. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.