AN INTERNSHIP REPORT
ON

"Hybrid Maize Seed Marketing System in Bangladesh: A Study on Dinajpur District"

HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY UNIVERSITY, DINAJPUR

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MASTER OF BUSINESS ADMINISTRATION (MBA)

This paper has been prepared for submission to the Faculty of Business Studies, Hajee Mohammad Danesh Science and Technology University, Dinajpur, as a partial requirement for fulfillment of the MBA (Evening) Program

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October 24, 2016.

Letter of Transmittal

October 24, 2016

Md.**Jamal Uddin**
Chairmen
Department of Marketing
HSTU,
Dinajpur

Subject: Submission of Internship Report.

Dear Sir,

With due respect, I would like to inform you that, I have completed my internship. Hence, I choose **"Hybrid Maize Seed Marketing System in Bangladesh: A Study on Dinajpur District"** as the topic of my internship report. In order to prepare the report, I have collected required information through qualitative research and finally completed the report which is now ready to submit. It was really enjoyable to work on the report as it has provided me with an opportunity to know about realistic fact of the hybrid maize seed marketing. I have learned a lot about the hybrid maize seed industry after preparing this term paper and got the chance to apply my theoretical knowledge learnt from the university courses. It was a great pleasure for me to work on such a challenging and practical topic.

I shall be highly glad if you kindly receive this report and provide your valuable judgment. It would really be my immense pleasure if you find this report useful and informative.

Thank you

Sincerely yours,

A M Nuruzzaman
ID: 140504013
MBA (Evening), 4th Batch
HSTU, Dinajpur

SUPERVISOR'S DECLARATION

I hereby declare that, the concerned internship report entitled **"Hybrid Maize Seed Marketing System in Bangladesh: A Study on Dinajpur District"** is submitted by A M Nuruzzaman, ID: E140504013 (4th Batch), Masters of Business Administration (Evening) (Major Marketing), Faculty of Business Studies HSTU, Dinajpur-5200 is completed his internship under my supervision and submitted for the partial fulfillment of the requirement of the degree of Masters of Business Administration MBA (Evening).

Therefore, he is directed to submit his report for evaluation.

I wish his every success in life.

_____

MD. JAMAL UDDIN
Chairmen
Department of Marketing
Faculty of Business Studies
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Technology University (HSTU), Dinajpur.

CO-SUPERVISOR'S DECLARATION

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I wish his every success in life.

SHAHANAZ PARVIN
Assistant Professor,
Dept.of Finance and Banking
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Acknowledgements

The authors wish to express their appreciation to the many people in Birol and Biegonj Upozilla of Dinajpur District, Bangladesh who provided the information and insights that form the basis of this report. Meetings were held with scientists, managers, policy-makers and other knowledgeable individuals from a broad range of public and private agencies, including agricultural research institutes, universities, ministries, nongovernmental organizations and commercial companies. We have tried to capture the wealth and diversity of views on plant breeding and seed systems in the country at this critical juncture in their evolution, recognizing that we were likely to fall short given the limits of time and space. We would like to thank especially those who reviewed and commented on our draft report, including **Mr. Md. Jamal Uddin Chairmen Department of Marketing** and **Shahanaz Parvin Assistant Professor, Dept.of Finance and Banking.**Their insights, which draw on their distinguished careers in agricultural research, were very helpful in refining both our discussion and findings. The assistance of the AEO of Birol and Biegonj Upozilla greatly facilitated the fieldwork for the study. I particularly wish to thank them in this regard.

ABSTRACT

Hybrid maize seed utilization enhances high maize production and productivity thereby improving farmers` food security and economic livelihood. Its availability, quantity, quality and affordability are at the kernel of the contributions that seed makes to agricultural production and productivity. To address these demands, efficient and responsive seed marketing and supply chain mechanisms are required.

There are two different types of seed marketing, known as formal and informal (farmer's) seed supply. The formal seed supply sector is not well developed in Bangladesh, it was able to provide only -20-30% of the actual seed demand and the remaining demand has been supplied by the farmers' seed system. The informal seed system has been contributing a lot for the existence of the majority farmers' economic performance for many centuries and still offers many opportunities for the seed security of farmers. However, the formal an informal seed system has been performing in Bangladesh in general and Dinajpur in particular at individual level and not as a business; with almost no attention was given to improve the system through appropriate research and investment. The study therefore was aimed at analyzing the seed marketing challenges and investigates the Opportunities for Local Seed Business Development in Birol and Biegonj Upozilla of Dinajpur District, Bangladesh.

The study was conducted by collecting data from primary and secondary sources of seed marketing in the region, in two sample Birol and Biegonj Upozilla which was selected purposively because of the existence of Local Seed Business development pilot project supportive programme. Using random sampling procedure and probability proportionate to size of the population data has been collected from 147 total farmer respondents, of which 76 from Birol and 81 from Birgonj Upozilla. The

data was analyzed using different qualitative and quantitative statistical procedures and methods. Both descriptive statistics like mean, standard deviation, percentage,

Chi-square tests and t-test etc and econometric models were employed to study the relationship between the dependent and independent variables.

A binary logit model was employed to analyze determinants of farmers' participation in seed marketing. To understanding on importance of seed business, and existence of contract seed farming practice in the area were found significant and positively influencing farmers' participation in seed marketing.

Based on the descriptive statistics, econometric models and focused group discussions results of this study, awareness creation program, managerial and technical capacity building of the seed producer society, seed business oriented extension system designing, community based financial institution establishment, startup capital support and long-term credit access, autonomous cooperative system promotion, link seed producer societies with contract farming and market information systems, support the seed producer societies to establish marketing infrastructure facilities are suggested as potential recommendations to promote sustainable local seed business development in the study areas.

Keywords: Hybrid maize seed, seed marketing and LSB Development, value-chain and seed accessibility, Dinajpur District, Bangladesh.

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CHAPTER- I

1. INTRODUCTION

1.1. Prelude

This part of the research paper offers background information about seed marketing and supply chain management; states the problem in hybrid maize seed marketing and supply chain management, and suggests the potential contributions of the proposed study to research knowledge and practice in the seed sector. It also lists the research questions, and objectives that the study was designed to address. Finally, it provides the scope and limitation of the study, definition of operational terms, and the organization of the study.

1.2. Background of the Study

Maize is the third most important grain crop in the world. It is introduced as relatively new crop in the cropping patterns of Bangladesh especially in the northern region. Every year approximately 1.2 million ton maize is utilized of which only 42% is produced by the country and remaining is imported from other countries (BBS, 2005). More than 90% of maize is used as poultry feed and the remaining in fish sector and as human food products. The country has a great potentiality to improve and expand the maize production. Maize is a relatively new crop in Bangladesh and it has an enormous market potential. The country's poultry industry continues to grow and so there is also a growing demand for maize. Farmers cultivating maize are not completely aware of the benefits of maize cultivation. They are not interested to invest for maize cultivation as they do not have proper information on maize farming and marketing techniques.

Bangladesh is facing a problem of malnutrition due to her high population growth and low productivity of crops. The traditional crop including rice and wheat seems quite unable to meet up the nutritional requirements to the increasing population. So, it is a time demand to introduce a new crop like maize to the existing cropping pattern of the country. Maize can be a potential grain crop for nutritional support to the country population. Moreover, the country environment is more suitable for cultivation of this crop. The economics related to maize cultivation need to be exposed among the farmers for its proper diffusion. A number of studies have

conducted concerning the economics of maize production including costs and returns (Hossain, 1990; BARI, 1988 and BARI, 1980). To such an end, boosting the supply and quality of agricultural inputs is of paramount importance and priority. A case in point is the supply of improved certified seeds to farmers through laconic market structure mechanisms.

The supply of adequate and quality seeds to a large number of farmers has a crucial contribution to agriculture for food security and economic development in the country. This in turn resides in the involvement of many parties in the seed sector as well as collaborative partnerships and innovations, hotbed policies and institutions based on a shared knowledge and experience to that the seed business is fostered to attain sound supply chain management attributing to active seed marketing.

Thus, the supply of improved certified and high quality seeds is critical to scale up agricultural production and productivity and thereby attain food security and economic development. A number of operations are embedded in this endeavor. One of such key operations in availing improved certified and high quality seeds to farmers is seed marketing. This operation is underpinned by integrated supply chain management system. The integrated seed marketing and supply chain management approach states that vibrant, commercial, and pluralistic sectors need to be developed, and coherent programs and policies created so that farmer's seed demands can be meet in light of their practical realities.

Currently, however, seed is availed/channeled to small-scale farmers via a regional delivery mode. Regional, state-run extension and input supply systems deliver improved certified seed to Bangladeshi smallholder farmers. These systems function with a degree of guidance from the Department of Agriculture Extension (DAE), Ministry of Agriculture and Bangladesh Agricultural Development Corporation (BADC). The supremacy of this linear and public oriented seed supply chain hampered sustainable availability of good quality seed and well functioning marketing systems that meet farmer's demands. In Dinajpur District, the formal seed marketing and supply chain management system has not been very successful in supplying quality seed of diverse varieties. To alleviate this problem, many local seed businesses (LSBs), Seed Producer Cooperatives (SPCs) or seed importer have been established. These have significant contributions in producing and distributing seeds and crops to the consumers. Smallholder farmers also play pivotal roles in accessing certified improved seeds to each farmer. However, this marketing and supply chain management system has not been researched and documented. So, it is vital to explore how such system is operating and identify the

challenges, and ultimately to suggest opportunities for improvement in the certified hybrid maize marketing and supply chain management.

The supremacy of this linear and public oriented seed supply chain hampered sustainable availability of good quality seed and well functioning marketing systems that meet farmer's demands. In Dinajpur District, the formal seed marketing and supply chain management system has not been very successful in supplying quality seed of diverse varieties. To alleviate this problem, many local seed businesses (LSBs), seed producer cooperatives (SPCs) or seed importer have been established. These have significant contributions in producing and distributing seeds and crops to the consumers. Smallholder farmers also play pivotal roles in accessing certified improved seeds to each farmer.

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1.3 Statement of the problem

The formal seed supply sector both from the public and the private companies provide only 20-30% of the actual demand of the country and less than 5% of the cultivated area is covered by improved seed (Hussein, 2009). The remaining demand has been supplied by the informal seed supply system for the past thousands of years from farmers to farmers, which is considered illegal by the country seed laws (Louwaars, 2009). This condition creates unproductive limitations and hinders the informal system not to flourish in the seed market. As a result, the farmers, farmer owned cooperatives, and entrepreneurs are not stimulated to enter into the seed business.

According to Kiros *et al.* (2009), even though the informal seed system offers many opportunities for improving the seed security of small-scale farmers, because of the best agronomic characteristics, built on farmer's knowledge, and fulfill the diverse needs of the households in terms of taste, drought resistance and other qualities. Kiros farther explained that the informal seed system has gone largely unrecognized, unappreciated and undocumented while the formal seed sector has been unsuccessful in meeting farmers' needs.

Various factors may hinder the efficiency of seed marketing in general and local seed marketing in Bangladesh. These factors were not studied in-depth; as a result no appropriate strategy is designed to promote the local seed marketing development in a commercial way, which in turn suppresses the economy in general. For this reason it has been remained to be difficult to utilize local seed resources.

Therefore, this research was designed:

1) To identify how the seed system is functioning?
2) To characterize that farmers are less likely to determine the type of seeds they receive, when they receive them, and who supplies them.
3) To assess the seed allocation and seed price setting by the government.
4) To measure the technical and economic efficiency of hybrid maize production.
5) To assess the profitability of maize and maize-based cropping patterns.
6) To examine the growth rate of maize in terms of area, production and yield.
7) To find out the main constraints to improve production of maize and
8) To suggest policy guidelines for sustainable maize production.

Thus, research is important to explore how the hybrid maize seed marketing and supply chain management system is operating in these areas and figure out the serious supply problems. It is also important to single out factors influencing the stakeholder's participation in the system, to consider challenges and opportunities for local hybrid maize seed business, and to posit the formulation of better strategies addressing these challenges to develop a well-organized farmer- based hybrid maize seed system in Dinajpur district as well as in Bangladesh.

1.4. Research Questions

In the light of the research objectives, the following basic questions were posed;

a) How is hybrid maize seed marketing and supply chain management system functioning in a large number of farmers?

b) To what extent does the system meet the hybrid maize seed demand of farmers in terms of availability, quantity, quality, affordability, and variety?

c) To what extent are farmers satisfied with hybrid maize seed supply and what is the impact on them?

d) What are the challenges and opportunities drawn from the hybrid maize seed marketing and supply chain management system in this study?

1.5. Objectives of the study

1.5.1. General Objective

The principal aim of this study is to explore the certified hybrid maize seed marketing and supply chain management system in Dinajpur district and determine its responsiveness and efficiency (or lack thereof) to meet farmer's demand via integrated approaches.

1.5.2. Specific Objectives

a) To evaluate how the prevailing hybrid maize seed marketing and supply chain management system operate to address the farmer's demands

b) To look in to the roles, and synergy of the frontline actors to facilitate the system`s functions.

c) To examine the coherence and synergy between stakeholders, practices, programs, policies, and systems

d) To ferret out the structural and practical bottlenecks in the system

e) To posit possible solutions and opportunities that may help to develop a better marketing and supply chain management for the maize seed sector.

1.6 Conceptual framework of the study

Conceptual framework is a set of ideas that shows the relationship between the dependent and independent variables; used as a basis for making analytical discussion and conclusion on the relationship of the variables of study.

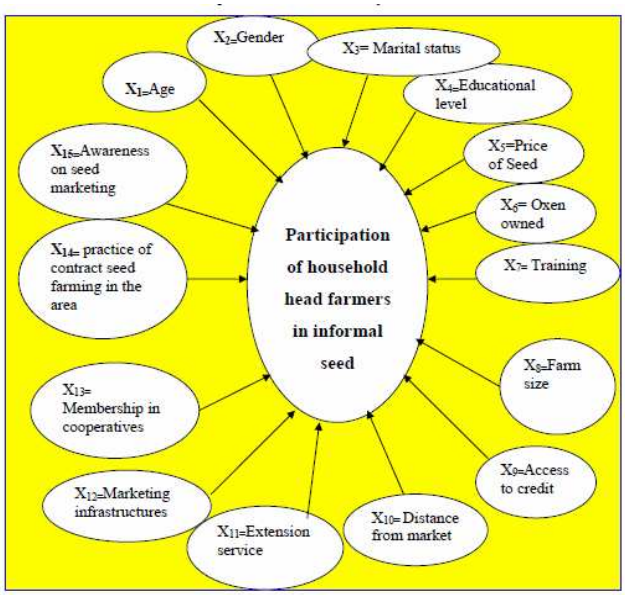

Figure 1: Conceptual Framework of variables

1.7 Operational Definition of Basic Terms

1.7.1 Local Seed: is a seed produced, disseminated under the local farmers' system, in which farmers themselves produce by selecting, choosing and testing the variety, introducing the seed, multiplying the seed, disseminating, storing and make accessible the seed based on the experience had got directly from their ancestors and own knowledge, as integral parts of farmers' production systems.

1.7.2 Improved Seed: is the seed developed in research institution through selection, variety choice, variety testing, introduction, seed multiplication, dissemination and monitored or controlled by government policies and regulations.

1.7.3 Marketing: is the process of anticipating the needs of targeted seed customers and finding ways to meet their needs profitably.

1.7.4 System: the organization's part/sector of an activity and way of doing the seed marketing either in the formal or farmers' marketing activities.

1.7.5 Local Seed supply sector: is the farmer saved seed supply. Activities tend to be integrated and locally organized at individual level, in which farmers themselves produce, disseminate, and access seed: directly from their own harvest based on their ancestors and own knowledge.

1.7.6 Seed Business: is a chain of activity that starts from directly planning of what seed variety to produce, how to finance, producing and marketing through integrated operated effectively and is well managed to ensure that quality seed of improved, adapted and appropriate varieties is available for sale to farmers.

1.7.7 Seed Business: in this study is defined as the chain of activities that start from locally preferred seed selection, conservation, multiplication under farmers full participation under seed producer cooperative, farmers group or community seed bank and selling to farmers based on their demand, as well as purchase seed from other companies and sell this directly to farmers, by acting like an agent for seed company.

1.7.8 Farmers group: a number of seed producer farmers that are together in the same place and connected in some way to perform common goals for common benefit.

1.7.9 Participation: - According to UNDP (1993), cited in Berhane (2008) participation refers to the close involvement of people in the economic, social cultural and political process that affect their living condition, in some cases, have complete and direct control over these process in other cases; the control may be partial or indirect. The important thing is that people have constant access to decision making and power.

In this study participation is defined as the act of taking part and involvement of farmers in an activity of seed producing and marketing in an organized manner may be under cooperatives, community seed bank and seed producer farmers group.

Participation includes the involvement of farmers in seed production and marketing

1. Decision making;
2. Implementation of decisions;
3. Monitoring and evaluation; and
4. Sharing the benefits of the activities, etc.

Seed Marketing is the final step in a seed program, it takes the seed to the producer farmers, and gets them to buy it and plant it. All seed programs operations exist only to provide high quality seed for marketing. Seed Marketing is critically time sensitive and sensitive to so many factors affecting rural marketing. Seed must reach the farmer at the right time, place, and price, in the right amount and of the highest economic quality. Since seed Marketing is sensitive to so many factors, it has been considered as a high risk-business. An additional problem is that during production, conditioning and handling, highly technical tasks must be performed properly on the seed crop and seed, done in the proper sequence, and in specific critical time periods. There is further an inflexible time lag of 2-4 years from initiating stock seed production to production of the seed. Initial decisions are critical; little can be done without significant financial loss to change or reduce production after the seed multiplication program has started. Too often, good seed is produced and then stays in the storage (Gregg *et al.*, 1997).

Therefore, to minimize the high risk-business nature of the seed sector, it is very crucial to implement and follow all the marketing functions and marketing principles. For this reason it is very important to understand what are the challenges of seed marketing? Why only few farmers are participating in the seed marketing, etc?

1.8 Significance of the Study

This study is intended to explore the conventional seed marketing and supply chain management in the context of hybrid maize. It diagnoses the pros and cons of the mechanism from different perspectives. It is hoped to ferret out whether the system works in integrated ways to serve what it is meant for. In so doing it is likely to distil the functions of the actors in the marketing and supply chain structure and thus the impediments constraining them. This will be vital to understand the supply chain for the marketing channels which becomes invaluable in designing policy instruments to enhance the development of integrated seed sector via concerted avenues.

Apart from the above expected payoffs, the research is hoped to have other ramifications. Studies analyzing the impact of seed marketing and supply chain arrangements on farmers are lacking in the context of this study. Besides, there appears to be a meager literature of case studies demonstrating the prevailing impediments blanketed with the seed marketing and supply chain system. Thus, this study is intended to contribute to such analyses and syntheses by compiling a

coherent categorization of barriers and discussing possible solutions and recommendations.

Therefore, this research study is conceived with multiple outcomes and ramifications in understanding and improving the seed sector via orchestrated knowledge and practice, after a thorough scrutiny of pitfalls and bottlenecks.

1.9 Research Methodology

1.9.1 Nature of the study

The research is the form of descriptive design. Both qualitative and quantitative approach was used in this study.

1.9.2 Sample Size and Sampling Method

Population of the convenience study were Producers 3(Three), Importers 3(Three), Wholesalers 5 (Five), dealers 5 (Five), Retailers5 (Five), farmers 147(One hundred forty-seven) and purposively selected for the study from two Upozilla **Birol and Birgonj** in **Dinajpur District**.

1.9.3 Sources of Data

Primary data were collected from producer, importer, wholesalers, dealers, retailers, farmers. The secondary data had been collected from various newspapers, magazines, internet and Bangladesh Govt. websites etc. Furthermore, different working papers, journals and articles have been studied to enrich the literature of the study.

1.9.4 Tools of Data collection

The primary data for this study were collected through self-administrated questionnaire prepared by researcher. The questionnaire includes both open ended and close ended question.5 point likert scale (where, 1= Strongly Disagree; 2= Disagree; 3=Neutral; 4=Agree; 5= Strongly Agree were used in this study. Besides this secondary data were also used.

1.9.5. Data analysis Techniques

Microsoft office package like Microsoft word, Microsoft Excel, Graphical technique (such as pie chart, bar chart, percentage, etc. have been used for summarizing and illustrating the collected data systematically.

1.10 Scope and Limitation of the study

At the outset, the study was conceived to be conducted in the context of hybrid maize seeds. However, a thorough literature survey of the two varieties convinced the research that the inbreed rice seed marketing is less profitable as the seed can be saved and replants across seasons by farmers and even it can be saved and reuse for 4-5 years time. Since, farmers are not supposed to buy the seed seasonally; commercial seed traders and marketers do not invest in this unprofitable crop. Thus, inbreed rice seed marketing is not a lucrative potential for all the actors across the supply chain. This would imply that research in this sector is of longitudinal nature. Due to such reasons, the inbreed rice seed has been excluded from this research paper and only hybrid maize seed is taken as a focal point. This is because hybrid maize seed is the most profitable seed business available to private innovators and investors for its biological nature of hybridization could not allow smallholder farmers to save the seed from season to season. The artificial production of hybrid maize seeds via crossing selected parent lines would imply farmers must buy these seeds each year to reap their yield benefits, while saving hybrid maize seed can result in much yield losses. Thus, its biological nature not to be saved by smallholder farmers seasonally led to low rate of seed recycling and high rate of seed replacement. And this feature makes the market economically viable and a lucrative potential.

This research paper is focused only on hybrid maize seed due to the fact that the prevailing research system in Bangladesh produces hybrid seeds only for maize. Despite there are two already released sorghum varieties, they are also under production and marketing. Hence, the only hybrid seed under commercial production and marketing in Bangladesh is maize.

The study was also undertaken in Dinajpur District of extreme North zone of Bangladesh. The researcher purposely taken these based on his acquaintance with these areas regarding their maize growing potential and the hybrid maize marketing and supply chain management there. Despite the potentiality, the researcher was unaware of any study in these areas in the sector.

Furthermore, despite diverse varieties of seed crops and seed businesses thereof in several areas of Bangladesh, the study is confined to one seed variety and two

Upozilla. All Upozilla and even individual smallholder farmers operate in a very distinct and unique manner. It may be difficult for some district, Upozilla and individual farmers to find connections to this survey study given the differences in agro-ecology, adoption of hybrid maize seed varieties along with other best practices such as irrigation, fertilizer and other on-farm management practices.

The survey is also confined to hybrid maize seed variety. The results of the survey study may not represent the actual constraints of other certified maize seed varieties. Moreover, non- representative sample from non-users where hybrid maize could be relevant may limit the use of the research output. To address these limitations, eclectic methodological approaches are used to glean valid and reliable data. Even so, the generalizability of the research findings was considered with caution.

1.11 Layout of Thesis

The findings of the study are presented here in the form of a dissertation. The chapter outlines of the thesis are as follows:

Chapter- 1 **Introduction:** Introduction chapter includes: prelude, background of the study, statement of the problem, research question, research objectives, and definition of key terms, scope and limitations of the study, significance of the study, research methodology of the study and Layout of Internship.

Chapter- 2 **Literature review:** This part of the research paper offers a synopsis of historical, notional, and practical issues about the seed business by glimpsing the major literature made so far.

Chapter- 3 **Overview of the Hybrid Maize Seed Marketing System in Bangladesh:**

A study on Dinajpur district: This chapter starts by brief description of Worldwide background of seed industry, International and national seed policies, Status and background of seed industry in Bangladesh, The Local Seed Business Constraints in Dinajpur. Success Stories, Challenges in Marketing Seed Challenges, Opportunities of Seed Marketing.

Chapter- 4 **Data analysis and interpretation:** This chapter includes analysis of primary data which were collected from the respondents through questionnaire.

Chapter- 5 **Findings, Recommendations and Conclusion:** This chapter includes findings, recommendations, conclusions and scope for further research.

Chapter- 6 **Reference, Appendix**

CHAPTER TWO

2. Review of related literature

2.1. Overview

This part of the research paper offers a synopsis of historical, notional, and practical issues about the seed business by glimpsing the major literature made so far. First, it describes briefly the history of the subject in a limited context with the respective assumptions and problems thereof. It then presents, the conceptual perspectives embedded in the area. This is followed by the identification of land mark empirical studies indicating central arguments. Major issues or central practical problems are demonstrated to see the gap and visualize the nature of research deemed necessary. Besides, in this part, key terms and their usage are delineated. Ultimately, key contributions of the intended research are identified followed by a summary of the review.

2.2. The Need for Seed

The importance of seed for enhanced production has a long-standing backdrop even in biblical parables and philosophical proverbs. In the New Testament Jesus said that the sower went out to sow seed; each seed gives forth thirty and sixty fruits. The proverbial saying" to get the fruit, water the root, "goes with the above parable to verify the critical importance of seed for agricultural production and productivity, given the other inputs.

Seed is a crucial input for crop production. Its availability, quantity, quality and affordability are at the kernel of the contributions that seed makes to agricultural production and productivity (louwaars and de Boef.2012). To address these demands, efficient and responsive seed marketing and supply chain mechanisms are required. This in turn call for an integrated assumptions and approaches among all the stakeholders (partners) in the seed sectors and systems.

2.3. Historical Perspectives

The historical background of seed marketing and supply chain management is blanketed with the historical development of seed sectors and systems to address seed demands through time. Below is the case in the context of South Asian countries in general and Bangladesh. Most plant breeding in Bangladesh continues to be in the public domain. However, NGOs and private companies are becoming increasingly involved in plant breeding, in response to the growing demand from farmers for good-quality and better-performing varieties. Private Sector Seed firms include Bangladesh Rural Advancement Committee (BRAC), PROSHIKA, Lal Teer Seeds, Grameen Krishi Foundation, Rangpur Dinajpur Rural Service (RDRS), Aftab Seeds, Supreme Seeds Com. Ltd., ACI seeds, Getco, Northern Agriculture & cultivation Co. Ltd. (NAICOL) etc. produce mainly improved varieties of vegetables and grain crops. Of the total quantity of seed used in the country, only about 25% is said to be of good quality, the balance is deemed inferior.

2.4. Seed Sector Development in Bangladesh

Bangladesh is primarily an agriculture based country with agriculture accounting for 23% of the country's Gross domestic product (GDP). Agricultural production can be increased by 15-20% through use of quality seed keeping other things constant. The legal and regulatory framework for seed is currently provided by

(i) The *National Seed Policy* (NSP), *1993*;

(ii) The *Seed Ordinance,1977* (Amendments in 1997 and 2005); and

(iii) The *Seed Rules, 1998*. The *Plant Quarantine Regulation* is considered part of the regulatory framework as it also affects the seed sector. The *Plant Variety and Farmers' Rights Protection Act, 2009*, and the proposed National Plant Genetic Resources Institute (NPGRI) are also critical components of plant breeding and the seed system in Bangladesh.

In Bangladesh, government institutions have until recently been responsible for seed production and seed supply. Restrictions on the use of new genetic material, levies on seed imports and subsidies on domestic produced seed prevented the emergence of the private seed sector. In the late 1980's, the private sector therefore only supplied about 5% of the total requirement for seed.

The National Seed Policy (NSP) of 1993 and Seed Rules of 1998 paved the way for active participation of the private sector and Non-Governmental Organizations (NGOs) in seed production. The intension of the NSP was gradually to rationalize and decentralize the national seed sector and attract private investment in the seed sector. Given the new policy framework, the Government of Bangladesh (GOB) provided a conducive environment (policy, institutions and infrastructure) for investments and initiatives in the private seed sector.

The increased participation of private-sector actors in seed production is also a result of several donor-driven Government projects. The Food and Agriculture Organization of the United Nations (FAO) supported the Strengthening of the National Vegetable Seed Program (1986–93), working with Bangladesh Agricultural Development Corporation (BADC), Bangladesh Agricultural Research Institute (BARI) and Department of Agricultural Extension (DAE). The Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) supported the Bangladesh German Seed Development Project with BADC (1989–2000). Danida supported seed industry development through their sector-wide support activities in agriculture and worked with all the players in the seed industry (2002–2006). All these projects contributed to stimulating the private sector to produce and market good-quality seed as well as strengthening the capacity of the public-sector actors, thereby improving the interface between the sectors.

BADC is the only public sector mandated to produce large quantity seed of various kinds. It receives Breeder Seed from Agricultural Research Institutes (ARIs) and produces Foundation Seed in its own farms; Truthfully Labeled Seeds (TLS) are produced through contract growers. It produces seed of cereals (rice, wheat and maize), potato, jute, pulses and oilseeds, vegetables and spices. It supplies about 20 percent of the country's cereal seed requirements and about 2–5 percent of seed of other crops. It has about 1300 licensed dealers for marketing certified seed, including registered private seed dealers and NGOs. BADC and private companies sell truthfully labeled seed (TLS) produced by contract growers. TLS are exempted from quality certification by Seed Certification Agency (SCA).

Recently, GOB funded projects "Production, Storage and Distribution of Quality Rice, Wheat and Jute Seeds at Farmers' Level", which started in 2007 and "Improvement and Quality Seed Production of Rice, Wheat and Maize"(2009-2013) the Government is trying to ensure production and supply of quality seed among the farmers.

2.5. Phases of Seed Sector Development in Bangladesh

Institutional weaknesses of public sector organizations and absence of consistent policies and their implementation to promote growth of private seed enterprises are affecting production and supply of quality seeds in adequate quantities at a reasonable price. Manpower, funds, and facilities are inadequate in BADC, hampering production of increased quantities of quality seed. Seed processing and storage facilities of BADC are inadequate to cater for both public and private sector needs. Seed production, processing and storage require elaborate infrastructure and sizeable capital, beyond the capacity of most NGOs and private sector enterprises.

There is genuine dearth of quality seeds. Farmers themselves supply most seeds but since they have inadequate knowledge of producing and preserving good seeds, quality of seeds at farmer's level deteriorates very fast. Agricultural Research Institutes (ARIs), i.e. Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute (BRRI), Bangladesh Institute of Nuclear Institute (BINA), Bangladesh Jute Research Institute (BJRI), Bangladesh Sugarcane Research Institute (BSRI) and Ag-Universities are mandated to produce and supply breeder seed to BADC. Breeder seed supply by ARIs to BADC is inadequate due to lack of physical facilities and manpower and funding constraints.

It is almost impossible for anyone agency to solve the full range of seed-related problems unassisted. Activities of the Government, private sector, NGOs and farmers need co-ordination which is yet to be established successfully. It is not surprising that most of the private sector seed companies prefer importation rather than production of seed and Research and Development (R&D). There is a lack of regulation to this effect. Difficult import procedures and restricted access to credit are constraints to private seed industry development.

Human Resource Development in the seed sector is limited in NARS (National Agricultural Research System), BADC, SCA and NGOs. The entire situation is aggravated by weakness of the Seed Wing of the Ministry of Agriculture (MoA) and its inability to monitor and foster the growth of the seed industry and to provide adequate support to the National Seed Board (NSB). Linkages between SCA, Plant Quarantine and National Seed Pathology Laboratory are almost absent. Similarly, co-operation among NARS, BADC and SCA is not optimal.

Although public sector research organizations form the most important component of agricultural R&D system but the changing environment in which the institutes operate demands adjustments in their structure and roles. There is a need to

develop effective partnerships and linkages with universities, private sector and NGOs. Commercial enterprises, NGOs, universities and public sector research organizations are real and definable entities of innovation systems. A focus on only one or group of public or private sector institutions will not necessarily guarantee impacts on production and sustainable resource use. Combining collective wisdom and knowledge of potential actors, with hands-on-experience, is becoming a new way of generating innovation. These developments have changed the context of agricultural research which hopefully will help towards self sufficiency and ultimately future food security in Bangladesh. Food security is highlighted as one of the main priorities for Bangladesh in the country's Investment Plan, and a sustainable seed supply constitutes a pivotal component of food security. Side by side with domestic food production, greater importance is given to ensure access to adequate and safe food by all people at all times for maintaining an active and healthy life.

CHAPTER THREE

3. Overview of the Hybrid Maize Seed Marketing System:

3.1 Worldwide background of seed industry

Seed is Basis of civilizations for Babylonian and ancient Egyptians according to Hussein (2009). In Europe documented history of Seed industry began back to the 17th century in England, and then expanded to France, Netherlands, Germany and the US (Dillon, 2005).

Before 1854, seeds were sourced in the U.S. by way of a small number of horticultural seed catalogs, farmer (or gardener) exchange, on-farm seed saving, that was through the informal seed supply sector. One hundred fifty years ago the United States did not have a commercial seed industry; today it has the world's largest. A nation once a 'debtor' in plant genetics now supplies the world (ibid, 2005). The US government funded a massive movement of seed industry development from the recognition and objective of feeding an expanding continent which require a diversification of foods to attain food security.

The local seed system is dominating the world seed supply. However, for most countries there is no official statistics, how much of the world's crop area is sown to farm-saved seed (FSS), but according to GRAIN rough estimates can often be made by comparing the sales of certified seed of a crop with the total area under cultivation with that crop. That is: -

% of FSS CL= TACC – ACISC TACC

Where

FSS CL is Farm save-seed covered land

TACC is Total area under cultivation with crop

ACISC is Area covered by improved seed of a crop (Le Buanec, 2005)

Figures compiled by GRAIN indicate that most developing countries still mainly depend on FSS, in particular regions with a large peasant farming sector, such as South Asia and sub-Saharan Africa, where typically 80–90% of planting materials are produced on farm from FSS. What is less well-known is that many rich and middle-income countries also still use considerable amounts of FSS. The International Seed Federation (ISF) in 2005 circulated a questionnaire to its seed company members, which yielded estimates from 18 mostly developed countries.

Typical figures were in the 20–40% range, but for some crops and countries they were much higher. Several of the major cereal producing countries Argentina, Australia and Canada reported FSS figures from 65% all the way up to 95%. Another notable country was Poland a recent EU member and the largest agricultural power in Europe after France where FSS was reported at around 90% for all major crops except oilseed (ibid, 2005).

3.2 International and national seed policies

Germany was one of the first countries to regulate seed sales in 1905, followed by Switzerland (1913; Schneider, 2002), and the Netherlands (Federal regulations in 1924; Maat, 2001) as it was cited by McGuire (2005).

The importance of seed in agriculture, food security and rural development has made seed an issue in national and international policies. Its multiple roles, moreover, makes it vulnerable to policies that may not be directed at seed itself or even at agriculture (Louwaars, 2007).

Louwaars (2007), farther indicate that, seed issues are debated at the international level in today's globalize world. Often this leads to jointly agreed objectives, such as the Millennium Development Goals or rules laid down in conventions and treaties.

Recent agreement made globally that specifically deals with seed is the International Treaty on Plant Genetic Resources for Food and Agriculture. Most international policies and institutions do not focus exclusively on agriculture, but they do have a marked effect on crop production and more particularly on seed (ibid, 2007). From the international experience we can learn that even if the formal seed system has been promoted in an organized way for more than 100 years with the objective of supplying quality seed, remains inadequate to satisfy the demand from farmers in all countries and how much the local seed system is very important equally for both developed and developing countries in fulfilling the gap of seed demand.

3.3 Status and background of seed industry in Bangladesh

Bangladesh Agriculture is characterized by subsistence farming and small landholdings. Per capita landholdings are smaller in high land areas inhabited by the majority of farmers than in areas of low land. The national average for annual crops (Table 1). Most farmers in the northern and central highlands own even smaller areas and grow diverse crops and varieties.

Table 3.1 Population Engaged in Agricultural Work Classified by Area Size of Holdings, 2008

Holdings	Total Population			Population Engaged in Agriculture Work			Percent		
	Total	Male	Female	Total	Male	Female	Col.'5/2	Col.'6/3	Col.'7/4
All	15366399	7780070	7586329	217607	157865	59742	1.42	2.03	0.7
Non Farm	13781701	6964587	6817114	72032	48873	23159	0.52	0.70	0.34
Farm	1584698	815483	769215	145575	108992	36583	9.19	13.37	4.76
Area Size Classes									
Small Farm	1400916	720475	680441	118989	88602	30387	8.49	12.30	4.47
00.05 - 00.49 Acre	698686	357440	341246	37545	27474	10071	5.37	7.69	2,95
00.50 - 00.99 Acre	338653	174536	164117	33582	25092	8490	9.92	14.38	5.17
01.00 - 01.49 Acre	198369	102556	95813	24044	18074	5970	12.12	17.62	6.23
01.50 - 02.49 Acres	165208	85943	79265	23818	17962	5856	14.42	20.90	7.39
Medium Farm	153664	79769	73895	22912	17605	5307	14.91	22.07	7.18
02.50 - 04.99	115177	59918	55259	17569	13460	4109	15.25	22.46	7.44
05.00 - 07.49	38487	19851	18636	5343	4145	1198	13.88	20.88	6.43
Large Farm									
07.50 - Acres & Above	30118	15239	14879	3674	2785	889	12.20	18.28	5.97

Source: Agriculture Census, 2008, BBS.

Table 3.2 Acreage, Production and Yield Rate of Major Agricultural Crops, 2005 - 06 to 2012 - 13

Year	Rice			wheat			Maize		
	Acre In '000'	Prod. '000' (m.Ton)	Yield Per acre(kg)	Acre In '000'	Prod. '000' (m.Ton)	Yield Per acre(kg)	Acre In '000'	Prod. '000' (m.Ton)	Yield Per acre(kg)
2009 -10	28056	31975	1140	923	901	970	376	887	2360
2010-11	28489	33542	1177	923	972	1053	409	1018	2489
2011-12	28488	33890	1190	885	995	1125	487	1298	2665
2012-13	282288	33834	1198	1029	1255	1219	554	1485	2880

Source: Agriculture Wing, BBS.

The formal seed supply sector aims to supply adequate amounts of seed of high quality, at the right time, place, and with reasonable prices. However, currently the share of the formal seed supply sector is estimated to be about 10-20% while the rest (80-90%) is covered by the informal supply sectors.

3.4 The Local Seed Business Constraints in Dinajpur.

According to the field assessment report 2008 of Dinajpur BADC, the seed supply sector of the region and the study area limited from flourishing in the area by the following main constraints and opportunities: -

Constraints

- Lack of awareness and absence of orientation of the farmers towards seed business, but farmers do seed selection before harvesting based on their experience for their own consumption.
- Inadequate and poor seed marketing infrastructure and facilities,
- Inadequate basic seed supply,
- Land fragmentation and small landholding: difficult to have required isolation distance and cluster plots.
- Fragile and high risk environment: Presence of erratic rain and recurrent drought.
- Inefficient extension service and organization, loose coordination among stakeholders on local seed sector development and promotion.

Opportunities

- Presence of high seed demands as well as existence of huge gap between the seed demand and supply for cereal crops such as Maize, wheat, Rice, etc, and vegetables seed such as potato, onion, and pulses, etc:
- Presences of strong national and regional initiatives in seed production,
- Willingness among stakeholders and their commitment towards promoting local seed business,
- Presence of irrigation facilities for seed production.

3.5. Success Stories

July 19, 2011 *by BRAC*

Newspaper headlines have become something we do not look forward to anymore. It reads mostly on the lines of corruption, crime, tragedies and conflicts. Some of us are frustrated and have stopped reading the papers. Good news is somewhat hard to find it seems. Or maybe we just miss out on it because we don't really read through. So when there is a series of positive news being reported it is bound to catch the eye. It speaks of all the good work that is being done all around us. In recent times, one such continuous stream of positive news I have read is about farmers with photographs of them smiling with their healthy crops. This is indeed good news for Bangladesh. In an industry as labor intensive as the agriculture sector of our country, it means that the conditions are improving for a large number of people. The news is about the lives of Jamir, Rafiq, Hossain, Rashida and many more. These are the stories of BRAC's agriculture and food security programme which has gained coverage in The Daily Star, The Daily Sun, The Janakantha, Naya Diganta after its success in the fields of maize and sunflower.

Bangladesh has traditionally followed single cropping strategy growing rice. But with the increased demand for food security, the Ministry of Agriculture has focused in multiple cropping as we have idle land when rice is not being grown. In line, BRAC has promoted maize and sunflower among farmers in the middle of the rice season, which has a dual positive impact – attaining food security and improving farmer's economic condition. Planting sunflower has also helped to utilize the coastal regions of the country.

3.6. Challenges

The challenge of food security in Bangladesh is huge. In spite of making considerable socioeconomic progresses over the years, Bangladesh still has the third largest number of poor after China and India. Food security is a complex sustainable development issue, linked to health through malnutrition, but also to sustainable economic development, environment, and trade. Agriculture remains the largest employment sector in Bangladesh and international agriculture agreements are crucial to the country's food security. Food security in Bangladesh is characterized by considerable regional variations. Factors such as tendency to natural disasters, distribution and quality of agricultural land, access to education and health facilities, and level of infrastructure development, employment opportunities, and dietary practices provide possible explanations for this. Food security of the country has been significantly and adversely affected by recent rising of food prices, and the amount of food insecure populations increased.

Bangladesh is a very densely populated country that has moved from chronic dependence on imports to meet basic food needs at the time of independence in 1971 towards becoming almost self-sufficient in rice production as a result of high-yielding varieties, irrigation, and efficient use of fertilizers, flood protection measures and expansion of rural credit networks. Rice is the staple food, contributing to over 63 percent of the caloric intake for urban consumers and over

71 percent for the rural population. The percentages are much higher for the poor. Food security situation in Bangladesh has improved, especially on the availability side, and further improvements on access and utilization, to be sustainable and large-scale, needs renewed efforts from the government, civil society (including media) and the development partners.

On national scale, Bangladesh has obtained food through domestic production, imports and food aid. The first two sources have increased while food aid decreases. The role of food production in food security cannot be over emphasized given the country's low income, recurrent natural calamities and increasing international prices of food commodities. The National Food Policy and the National Agricultural Policy promote attaining food-grain self sufficiency as well a reasonable non-grain sufficiency.

Food security is a multi-sectoral, multi-ministerial issue. There is a need to develop an integrated policy and action plan, bringing together all the diverse players and stakeholders as well as making them accountable to contributing their bit to the overall challenge of improving Food Security. However, although rice productions are largely sufficient, self sufficiency in other food items is still to be achieved. For example among non-cereal food, 70% of the pulse requirements get imported and Bangladesh produces only 34% of its edible oil. Estimation of requirement, demand and supply (availability) of other food items- vegetables, pulses, fruit etc should be systematically carried out and the National Food Policy, the Import Policy and the Agricultural and the Nutrition Policy should address these requirements in a planned, integrated fashion.

Table3.3: Priority problems and potential projects in Dinajpur district seed sector development

Priority Problems	**Potential Projects**
Increasing the availability of basic seed for seed production	Institutionalizing breeder and pre basic seed production in Dinajpur.
Establish an efficient and independent quality assurance system, including quarantine	Quarantining ; impact assessment and policy implication studies
Improving seed delivery, marketing and pricing	Marketing innovation in Upozilla
Locating finance for seed production	Mechanisms and modalities for quality declared seed
The provision of crop insurance	Financial service for commercial seed production

3.6.1 Challenges in Seed Marketing:

The marketing experts or the sales man faces many problems in seeds marketing. Marketing a product to farmers is not much easy as sometimes they take some other decisions and also reaching rural areas is not also much easy due to poor infra structure.

3.6.1.1 Storage Facilities

Storage is that protecting seeds from sunlight, pests and rodents (R.V.Badi & N.V.Badi 2008 Book (Rural Marketing.), should consider future needs without deterioration of quality of seed. In marketing function storage is defined as one of the essential needs. Moreover Agri-inputs (i.e.) seeds are seasonal goods which has to be retained for consumption till the end of season.

Agro-dealers often have poor storage facilities (http://ageconsearch.umn.edu/bitstream/51713/2/Seeds-paper-2009-uploaded.pdf.).

In fact most of them store seed, fertilizer and other consumer goods side by side in the sun or humid conditions for extended periods which reduce the quality of the seeds.

3.6.1.2 Fake Seeds in Market

The challenge which the marketer has to face is the fake brands or fake seeds present in the market. Due to non availability or limited supply of seeds by government and private institutions the fake seeds were emerging in market, usage of this fake seeds will result in reduce in yield or sometimes crop failure.

3.6.1.3 Seasonal Market

The seed business is highly seasonal and the demand is unpredictable, the farmers purchase the seeds only in particular season of the crop. The changes in the weather, price of crop, price of competing crop may change the prospects of demand for seed of particular variety at the commencement of sowing seasons (Singh, 2004).

3.6.1.4 Distribution

Seeds have short shelf life and should be made available to farmers when required and has to ensure that right crop seed is available with village level dealers during the sowing season. The government of Bangladesh formed an organization to deal a task of developing and distributing of various types of seeds. But due to involvement of large number of intermediaries the distribution has became complex increasing the distribution cost.

3.6.1.5 Quality Seeds

Efficiency of other agricultural inputs such as fertilizers, pesticides and irrigation is largely determined by the quality of seeds. Seeds quality is estimated to account for 20-25percent of productivity and is, therefore, important that quality seeds are made available to the farmers. The use of good quality seed of adopted and improved varieties is widely recognized a fundamental to ensure increased crop production and productivity. This is even more important in SSA(FAO, 1999) in the view of declining soil fertility, increasingly available land, and ever growing population; those facts increase the importance of promotion and use of good quality seed as a means to intensify food production(FAO, 1999). Diluting the seed quality leads to a loss of farmers' confidence in the given brands and subsequently, loss of revenue for both the farmers and the seed companies.

3.6.1.6 Media Problems

In rural areas Media has to face lots of problems. Television is known as a good medium to communicate message to the people in rural areas. But due to non-availability of power, as well as television sets, majority of the rural population were unable to get the benefits of various media. (MR. K. PhanindraKumar; MR. S. Swamy2013).

3.6.1.7 Poor Road Condition

In Bangladesh only 70% of the markets are connected by roads. The major problems that seed marketers find in rural areas were poor road conditions. Due to these poor roads the transportation facilities and communication facilities were limited which made rural areas poor exposure to urban areas, increases the transportation cost and also the sales people feel de-motivated to go to rural areas. The interior village roads were also flooded by monsoons.

3.7 Opportunities of Seed Marketing

Under proper guidance and advice Indian farmers were willing to adopt new technology and are trying to produce more output per acre. This is creating an opportunity for seed companies to enter into seed production and marketing.

3.7.1 Market Size and Potential

The Bangladeshi seed industry is not a largest seed market in the world.

3.7.2 Increase in Income

The income in rural areas is increasing due to the government involvement by introducing various schemes. So the farmers were in a position to buy quality seeds (i.e.) the branded products, avoiding the fake which were available at low cost.

3.7.3 Population Growth

In order to meet the consumption level of this population, the production of agricultural products has to be increased but due to urbanization, land under cultivation has been decreasing day by day. So with the limited resources available we have to produce more output by using nonconventional inputs like HYV seeds.

3.7.4 Increase in Literacy Rate

In olden days due to illiteracy people were unaware of the quality, type and brands available in market, seek others opinion in selecting the seeds. Because of this increase in literacy rate people came to know the type of brands, quality available in the market and this made marketer easy to communicate directly with farmers.

3.7.5 Accessibility to Market

Though the poor roads does not facilitate, but a fire amount of development made in some areas made them accessible to the urban market, made easy for supplying the seeds to those areas. So this made people in rural areas expose to urban market and can get seeds in their areas without going to urban areas.

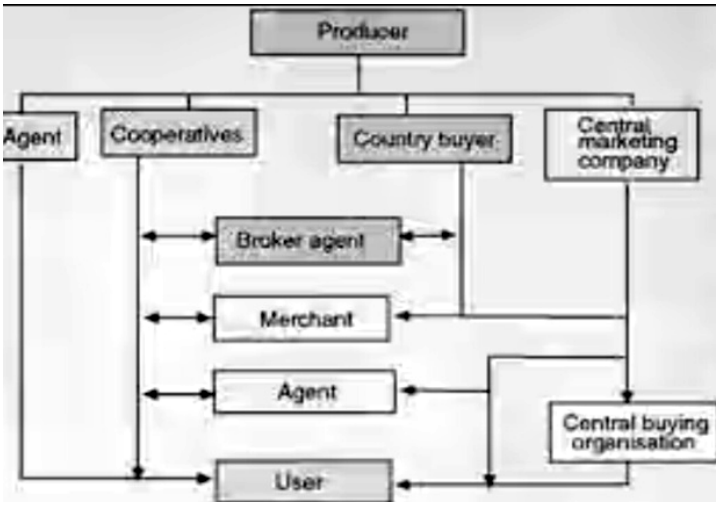

Table-3.3: Number of Establishments and Persons Engaged by Activity

Activity	Establishments			Persons Engaged		
	Total	Urban	Rural	Total	Male	Female
Mining and quarrying	3	-	-	451	444	7
Manufacturing	8090	2194	5896	41716	33848	7868
Electricity, gas and water supply	51	24	27	603	524	79
Construction	56	47	9	225	215	10
Wholesale & retail trade	47796	14717	33079	93649	87794	5855
Hotels and restaurants	5243	1601	3642	16605	15506	1099
Transport, storage and communication	1120	536	584	3422	3345	77
Bank, insurance and financial institution	770	293	477	6886	5401	1485
Real estate and renting	637	426	211	1406	1350	56
Public administration and defense	728	464	264	8156	7704	452
Education	4996	558	4438	27748	22373	5375
Health and social work	2015	612	1403	7394	5418	1976
Community, social and personal services	15328	2317	13011	28448	24581	3867
Dinajpur District	**86833**	**23789**	**63044**	**236709**	**208503**	**28206**

Source: Census of Non-farm Economic Activities 2001-2003

According to the above table, there are 86833 establishments in the district in which 236709 persons are engaged in different types of non-farm activities. Female participation in non-farm activities is very poor. They constitute about 18.1% as against 81.9% of the males. Wholesale & retail trade emerges as the single largest activity (55.04%) with 86833 establishments and 236709 persons engaged (39.56%) in Dinajpur district.

Table 3.4. Sample size of the study Population Sample of Birol and Birgonj Upozila.

SL. NO	Upozila	Union	Population					Sample Size
			Total HHs	NP HHs	PSPS HHs	NP HHs	PSPS HHs	Total Sample
1	**Birol**	**Mangalpur Union**	789	709	80	14	16	30
2	**Birgonj**	**Nijpara union**	14781	444	34	29	7	36
3	**Birgonj**	**Polashbari union**	1,249	548	701	11	70	81
Total			**35162**	**701**	**815**	**54**	**93**	**147**

Remark: HHs is households, NP is none-participation, and PSPS is participation in seed production and supply.

CHAPTER FOUR

4. Results and Discussion

In this chapter the results of the study are presented and discussed in detail based on the results of descriptive statistics and econometrics model analysis to address the objectives of the study.

Descriptive statistics, frequency, percentage, mean standard deviation, chi-square, etc. and econometrics model analysis were examined to study the relationship between the dependent variable (participation of household head farmers in seed production and marketing) and explanatory variables, the differences in their characteristic explanatory variables, identify the existence of significant relationship between variables and measure their significance levels. Logit model was the main econometric analysis tool employed to see the factors influencing farmer's participation in seed production and marketing using Econometric software called "SPSS" version 15.

4.1 Result of descriptive statistics

4.1.1 Respondents' demographic characteristics in frequency

Various measures were made to understand respondents' socio-economic characteristics such as age, gender, marital status, level of education, family size, etc. The distribution of sample respondents based on their demographic characteristics is presented as follows as it summarized on table 4.1 below.

4.1.1.1 Gender of the Sample Respondents

The summarized Table 4.1 reveals that, 87.8 percent of the respondents were male headed, where as female headed were only 12.2 percent. From this and the marital status data revealed that females participate in rural area socio-economic activity, if only if they are responsible for the entire family as a result of divorce, the husband is dead or she is single.

4.1.1.2 Age Distribution of the Respondents

The age of the respondents who participated in the study ranged from 25 to 69. The mean age of the respondents was 45.40 years with the standard deviation of 10.396 the respondents were placed under four age categories as it is indicated in table 4.1. Majority (46%) of the respondents ranged in the age category of 31-45; followed by age group 46-55 (29%) and age group 56-70 (19%).

Table 4.1. Respondents' Demographic **characteristics (N=147)**

Characteristic	**Status**	**Frequency**	**Percentage**
Gender of respondents	Male	129	87.8
	Female	18	12.2
Total		147	100.00
Age of respondents	Age group 18-30	10	7
Mean = 45.40 Std. Deviation = 10.396 Maximum = 69 Minimum = 25	Age group 31-45	67	46
	Age group 46-55	42	29
	Age group 56-70	28	19
Total		147	100.00
Level of Education	Illiterate	60	40.8
	Primary school	76	51.7
	Junior school	11	7.5
Total		147	100.00
Marital status	Married	128	87.1
	Single	5	3.4
	Divorced	6	4.1
	Widowed	8	5.4
Total		147	100.00
Family size Mean = 5.80 Std. Deviation = 1.868 Maximum = 10 Minimum = 1	1-4	37	25
	5-7	82	56
	8-10	26	19
Total		147	100.00

Source: results of descriptive statistic26s from own survey data

4.1.1.3 Education level of respondents

Education level of farmers is hypothesized positively to influence increase their ability of participating in adopting new technologies and benefit by utilizing local resources in a better way. The Table 4.1 indicated that 51.7% of respondents were attained Primary school, followed by 40.8% of the sample respondents were under category of illiterate, and 7.5% respondents reach Junior school.

4.1.1.4 Marital status of the respondents

The respondents were categorized into four categories namely, married, single, divorced, and widowed. The result in Table 4.1 shows that 128 (87.1%) the respondents are married and living with their wives/husbands, followed by widowed which is 5.4 percent. The result shows that the widowed are females. And the remaining 6 (4.1%) and 5 (3.4%) are divorced and single, respectively.

4.1.1.5 Family size of the respondents

In this study, the respondents were placed into five categories, as the Table 4.1 reveals respondents with family size of 5-7, 1-4, and 8-10 categories are 56%, 25%, and 19%, respectively.

Table 4.2. Respondents' socio-economic characteristics (N=147)

Characteristic	**Status**	**Frequency**	**Percentage**
Farm oxen holding	None	24	16.3
	1	61	41.5
	2-3	62	42.2
Total		**147**	**100.00**
Respondents' land holding in hectare	0.25	55	37
	0.38-0.50	81	55
	0.51-1.00	11	8
Total		**147**	**100.00**
income sources	Crop	8	5.4
	Mixed farming	103	70.1
	Mixed farming &off – farm	36	24.5
Total		**147**	**100.00**

Source: results of descriptive statistics from own survey data**.**

4.1.1.6 Respondents' farm oxen holding

The sample survey on the Table 4.2 indicated that about 42.2% of respondents' had 2-3 farm oxen, followed by 41.5% of respondents' had one oxen, which indicates that in general about 42.2% respondents did not face critical shortage of oxen for their farming practices.

4.1.1.7 Respondents' land holding in hectare

The results of descriptive statistics on the Table 4.2 revealed that the large proportion of respondents (54%) failed under category of 0.38-0.50 hectare and 39 percent of respondents hold 0.25 hectares of land and only 7% owned greater than 0.5 hectare of land.

4.1.1.8 Respondents' income sources

The sample survey on the Table 4.2 indicated that 70.1% of respondents' major source of their income is from mixed farming activities, followed by 24.5% generate their income from Mixed farming & off-farm activities and only 5.4% from crop production.

4.1.2 Descriptive statistics of variables

The descriptive statistics of variables was run to examine the relationship between the variables and to test the hypothesis, such as: participation, age, gender, marital status, level of education, family size, Price of Seed, Oxen owned, Training, Farm size holding, Distance from the market, Extension service, Practice of contract seed farming and Awareness on seed marketing, annual income and other related variables.

4.1.2.1 Age of respondents

The survey descriptive statistics result in Table 4.3; indicates that large proportion 54% of participant respondents are in the range of 31-45 age group, followed by 24% of participants under age category of 46-55 and 14% of participants found in the age range of 56-70. Pearson chi-square value (10.483) indicated that there is significant relationship between participation and age, which implies that the middle age group participates more than the young and older once.

Table 4.3. Age distribution of sample household heads (N=147)

Characteristic	Non-participant		Participant		X2-value	Total	
	count	%	count	%	10.483	count	%
Age group 18-30	2	4	8	9		10	7
Age group 31-45	17	31	50	54		67	46
Age group 46-55	20	37	22	24		42	29
Age group 56-70	15	28	13	14		28	19
Total	54	100.00	93	100.00	P-value0.015	147	100

Source: results of descriptive statistics from own survey data
** Significant at less than 5% level of significance

4.1.2.2 Gender distributions

The survey data in Table 4.4; indicates that large proportion (90%) of participants respondents are male, only 10% participants found female. The Pearson chi-square value (1.553) indicated that there is no significant relationship between participation and gender. The data in Table 4.4 and the marital status data in Table 4.1 reveals that female participate in rural area socio-economic activity, if and only if they are responsible for the entire family as a result of divorce, or the husband is dead or she is single, which proved the conclusion that status of low economic position (lack of ox and skill to plough) affect women's economic participation, (*Fetien et al*., 2009).

Table 4.4. Gender distribution of sample household heads (N=147)

Characteristic	Non-participant		participant		X2-value	Total	
	count	%	count	%	1.5533	count	%
Male	45	83	84	90		129	88
Female	9	17	9	10		18	12
Total	54	100.00	93	100.00	P-value o.213	147	100.00

Source: results of descriptive statistics from own survey data
Not Significant,

4.1.2.3 Respondents' level of education

Education is a crucial factor for skill development and enhancing effective production and marketing decisions. It was hypothesized that education influences participation of farmers in seed marketing.

The survey data in Table 4.5; indicates that large proportion (69%) of participants respondents are primary(60%) and junior school(9%) educated, followed by 31% of illiterate, where as 57% of non-participants respondents are illiterate, followed by 43% of (37% primary and 6% junior school) educated. The Pearson chi-square value (9.730) indicated that there is significant relationship between participation

and level of education. Therefore, it's safe to say that the differences among participant and non-participant are due to level of education variation.

Table 4.5. Respondents' level of Education (N=147)

Education	Non-participant		Participant		X2-value	Total	
	count	%	count	%		count	%
Illiterate	31	57	29	31	9.730	60	41
Primary school	20	37	56	60		76	52
Junior school	3	6	8	9		11	7
Total	54	100	93	100	P-value0.008	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

4.1.2.4 Respondents' perception on seed price

Market price of seed expected to affect both marketable seed supply and utilization of seed positively by farmers. Hence, attractive price of seed and farmers good perception on the paid price was hypothesized to motivate farmers to produce more. Based on the data of this survey indicated on Table 4.6; majority (64.52%) of participant respondents disagree (25.81% Strongly disagree and 38.71% disagree) and 81.48% of non-participant respondents disagree (66.67% disagree and 14.81% Strongly disagree with the sentence on Table 4.6 about attractiveness of seed price in the area) and they believe that the seed price paid by the seed production promoting organizations (both DAE and BADC) in their area do not motivate farmers to participate in seed production as compared with the effort needed to produce the seed and food grain, as well the FGD key informants have the same opinion (Box 1). The Pearson chi-square value (11.802) indicates that there is significant relationship between participation and farmers' seed price perception. Perception of farmers on technologies selection and use has been found positively and significantly affect farmer's decision in the studies of (Guerin and Guerin, 1994) cited by Zelalem (2007).

Table 4.6. Respondents' category in seed price perception (N=147)

Buying price of seed in your area by the seed production promoting Organizations was highly motivating farmers to engage in seed production.	Non-participant		Participant		X2-value	Total	
	count	%	count	%		count	%
Strongly agree	4	7.4	7	7.53	11.802***	11	7
Agree	6	11.11	26	27.96		32	22
Agree Disagree	8	14.81	24	25.81		32	22
Disagree	36	66.67	36	38.71		72	49
Total	54	100	93	100		147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

Box 1. Result of focus group discussion (FGD) on seed price perception

Box 1. The focus group discussion at each sample villages (LSB site) revealed, the seed price paid by the seed production promoting organizations (both DAE and BADC) in all the sample sites believed by FGD key informant not fair price, as compared with the effort needed to produce the seed and food grain, besides the key informant of the FGD believe that in an area where there is no seed market it is unfair to pay farmers 15% premium price based on the local food grain price, because both seed & food grain price are incomparable in all measurements of effort to produce, required input etc, which discourage other farmers to participate in seed business.

4.1.2.5 Oxen owned by sample members

In a country like Bangladesh, where small-scale and fragmented agricultural practice operate oxen are the most important assets of farm activities to produce marketable surplus and having farm oxen was hypothesized to influence positively participation of farmers in seed production and marketing.

The sample survey on Table 4.7 indicated that about 51% of participant respondents had two and above farm oxen, followed by 39% and 11% who had one and no farm oxen respectively, which implies that about 89.25% of participant respondents did not face shortage of oxen for their farming practices. Whereas this study further indicated that the majority about 46% and 27.78% of non-participant respondents hold one and above two farm oxen respectively and more than 25% non-participant respondents had no farm oxen. More oxen unit means more asset and more asset possession leads to investment decision. The Pearson chi-square

value (9.487) indicates that existence of significant relationship between participation and farm oxen holding. Therefore, it's safe to say that the differences among participant and non-participant are due to variation in oxen holding.

Table 4.7. Respondents' category in oxen holding (N=147)

Farm oxen holding	Non-participant		Participant		X2-value	Total	
	count	%	count	%		count	%
None	14	25.93	10	10.75	9.487***	24	16
1	25	46.30	36	38.71		61	41
2-3	15	27.78	47	50.54		62	42
Total	54	100	93	100	P-value 0.009	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

4.1.2.6 Land holding category of respondents

Land is an indication for wealth status in rural economy, the quantity of agricultural production is limited to the availability of land. Land size owned was hypothesized to have positive influence on participation in seed production and marketing.

The sample survey data on Table 4.8 indicated that about 62% of participant respondents had land range of 0.38-0.50 hectare, followed by 26% and 12% who had 0.25 and a land range of 0.51-1.00 hectare respectively, whereas from the nonparticipant respondents 61% and 39% who had 0.25 and a land range of 0.38-0.50 hectare respectively. The Pearson chi-square value (20.872) indicates that there is significant relationship between participation and land ownership.

Table 4.8. Respondents' category in Land holding (N=147)

Respondents' land holding in hectare.	Non-participant		Participant		X2-value	Total	
	count	%	count	%		count	%
0.25	33	61	24	26	20.872***	57	39
0.38-0.50	21	39	58	62		79	54
0.51-1.00	0	0	11	12		11	7
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance,

4.1.2.7 Training undergo in seed marketing

Training expected to increase farmers' knowledge and skill on seed production and marketing. Training was hypothesized to be positively and significantly correlated with the level of farmers' participation. The descriptive statistic data on Table 4.9 indicates that 82% of participant respondents have received seed related training, where as 100% of the non-participant respondents have never received any type of seed related training. The Pearson chi-square value (91.366) indicates that the existence of highly significant relationship between participation of farmers and training. Therefore, it is safe to say that the differences are due to the received training variation among the participant and nonparticipant.

Table 4.9. Respondents' category in seed based training received (N=147)

Have you obtained seed production training?	Non-participant		Participant		X2-value	Total	
	count	%	count	%		count	%
Yes	0	0	76	82	91.366***	76	52
No	54	100	16	18		71	48
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

4.1.2.8 Credit accessibility

Credit is the most important development tool that could enable resource poor farmers to get access to modern agricultural technologies like agricultural input. This variable was hypothesized to influence the supply and utilization of seed positively on the assumption that access to credit improves the financial capacity of farmers to buy modern inputs, and practice introduced new agricultural practices.

The survey result of descriptive statistic on Table 4.10 revealed that majority of the participant respondents (93.55%) have access to credit, where as 72.22% of the nonparticipant respondents have no access to credit. The Pearson chi-square value (69.574) indicates that the existence of highly significant relationship between participation of farmers and credit access.

Table 4.10. Respondents' category in terms of access to credit (N=147)

Do you have access to credit?	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
Yes	15	27.78	87	93.55	69.574***	102	69
No	39	72.22	6	6.45		45	31
Total	54	100	93	100	P-value0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

4.1.2.9 Distance from the market

The shorter time the residence of the household to arrive the rural market center, the more chance to have accessibility to seed on time. Distance from market is a key factor in linking farmers with a market to sell or buy and it was hypothesized to have positive influence for expansion of agricultural production and marketing. The survey data on Table 4.11 clearly indicates that 79.79% of the participant respondents have the shortest distance to the central market from their home, where as only 24.07% of the non-participant respondents travel for maximum of one hour, and the remaining 75.93% non-participant respondents have to travel more than one hour up to two hours to reach the central market of their district. The Pearson chi-square value (45.137) indicates that there is highly significant relationship between participation of farmers and market distance in hours. Lack of close access to seed retail points has been cited as a major limitation to farmers adopting improved varieties (MacRobert, 2009).

Table 4.11. Respondents' category in distance from market centre (N=147)

Market center distance from respondent's home in hours	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
0.30-1.00 hours	13	24.07	75	79.79	45.137***	87	59
1.01-1.30 hours	18	33.33	5	5.32		23	16
1.31-2.00 hours	23	42.59	14	14.89		37	25
Total	54	100	93	100		147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

4.1.2.10 Access to extension service

Farmers that have frequently contact with DAs will have better access to information and could adopt better technology that would increase their marketable supply of seed and utilization. Extension was hypothesized to have positive effect for market participation through its stimulation of production and productivity. The survey result indicated on Table 4.12 clearly show that 100% of the participant respondents had regular extension service, where as 96% of the non-participant respondents did not have any extension service related to seed production and marketing, the FGD key informants idea also support this result (Box 2). The Pearson chi-square value (138.575) indicates that there is highly significant relationship between participation of farmers and access to extension service. Extension services that promote farmer development and facilitate improvements in crop productivity will therefore probably contribute to increasing farmers' demand for seed (MacRobert, 2009).

Table 4.12. Respondents' category in terms of access to extension (N=147)

Do you have regular agricultural extension service?	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
Yes	2	4	93	100	138.575***	95	65
No	52	96	0	0		52	35
Total	54	100	93	100		147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance,

Box 2. Result of focus group discussion (FGD) on extension service

Box 2. The focus group discussion at each sample villages (LSB site) revealed that there are three development agents; assigned as agricultural extension worker for the dissemination of new agricultural technology to farmers. However, none of them have responsibility and knowledge to promote agricultural marketing services at all.

4.1.2.11 Marketing infrastructures

Farmers' access to efficient and cost effective storage facilities, transportation, marketing information services is critical to their effort to integrate their economy to the market. It was hypothesized to affect positively seed production, supply and utilization of farm households.

However, the data on the two Tables (4.13 and 4.14) and the results of Pearson chi-square values (1.979) and (.052) for both tables respectively indicate that there is no significant relationship between participation of farmers and marketing infrastructure.

Therefore, it's safe to say that the differences are due to chance variation, which implies that, each participant and non-participant face the same problem of lacking marketing infrastructure. The FGD key informants share the same idea (Box 3).

Table 4.13. Respondents' access to marketing infrastructures (Car transport) (N=147)

car transport Total availability	Non-participant		Participant		X2-value	Total	
	NO	**%**	**NO**	**%**		**NO**	**%**
Good	18	33.33	42	45.16	1.979	60	41
somewhat available	36	66.67	51	54.84		87	59
Total	54	100	93	100	P-value0.160	147	100

Source: results of descriptive statistics from own survey data
Not Significant.

Table 4.14. Respondents' access to marketing infrastructures (Transport cost) (N=147)

car transport cost	**Non-participant**		**Participant**		**X2-value**	**Total**	
	NO	**%**	**NO**	**%**		**NO**	**%**
Fair	19	35.19	31	33.33	0.052	50	34
Not Fair	35	64.81	62	66.67		97	66
Total	54	100	93	100	P-value 0.819	147	100

Source: results of descriptive statistics from own survey data
Not Significant,

Box 3. Result of focus group discussion (FGD) on marketing infrastructure

4.1.2.12 Membership in cooperatives

Membership in cooperatives is one that helps farmers to achieve advantage of economic scale and to initiate collective action. Membership in cooperative was hypothesized to promote participation of farmers in Agricultural marketing. However, the survey result on Table 4.15 indicates that majority of both the participant respondents (86.02%) and non-participant respondents (74.07%) are members of different kind of cooperatives. The results of Pearson chi-square values (3.252) indicate that there is no significant relationship between participation of farmers and membership in cooperatives. The FGD key informants idea also support this result (Box 4)

Table 4.15. Respondents' category in terms of membership to cooperatives (N=147)

Are you a member in any Cooperative? if no, skip to question 97)	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
Yes	40	74.07	80	86.02	3.252	120	82
No	14	25.93	13	13.98		27	18
Total	54	100	93	100	P-value 0.071	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance,

Box 4. Result of focus group discussion (FGD) on membership in cooperatives

4.1.2.13 Practice of contract seed farming

Knowing about existence of contract seed farming practice in the area was hypothesized to affect farmers positively to participate or not in seed marketing. The result of this study on Table 4.16 also confirms majority of non-participant respondents (64.81%) had no knowledge about the existence of contract seed farming practice in their area. The results of Pearson chi-square values (30.623) indicate that there is significant relationship between participation of farmers and knowing the existence of contract seed farming practice in the area. Therefore, it is safe to say that the differences are due to knowledge variation about the existence of contract seed farming practice in the area, among participant and non-participant farmers. The FGD key informants idea also support this result (Box 5)

Table 4.16. Respondents' category in terms of knowing existing practice (N=147)

Is there practice of contract seed farming system in your area?	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
Yes	19	35.19	75	80.65	30.623***	94	64
No	35	64.18	18	19.35		53	36
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

Box 5. Result of focus group discussion (FGD) on practice of contract seed farming system

Box 5. The result of focus group discussion at each sample villages (LSB site) revealed that, the extension workers only introduce contract seed farming for few farmers at individual level based on their previous agricultural practices and early adoption for new agricultural technology, as a result most farmers in all sites had no knowledge about practice of contract seed farming system, as a result did not

able to participate in seed marketing, exactly confirms the chi-square result indicated on the above table.

4.1.2.14 Awareness on seed marketing

Having good knowledge on the importance of seed marketing improves farmers' participation and productivity. Awareness was hypothesized to influence the farmers' participation on quality seed production and marketing. The survey data on the Table 4.17 clearly indicates that majority of the nonparticipant respondents (72%) found had no knowledge about the existence of seed producer society in their area. The results of Pearson chi-square values (72.787) also indicate that there is significant relationship between participation of farmers and awareness.

Table 4.17. Respondents' category in level of awareness (N=147)

Do you know the existence of seed producer society?	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
Yes	15	28	88	95	72.787	103	70
No	39	72	5	5		44	30
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance,

In-addition to the above justification, the data on Table 4.18 also support the hypothesis that awareness has direct positive relationship with participation, according to this table 61% of the non-participant respondents replied that they had no information about the seed producer society's objective and advantage. The result of Pearson chi-square values (113.978) also confirms that there is significant relationship between participation of farmers and awareness.

Therefore, from the above explanations of the survey it is safe to say that the differences in participation of farmers in seed marketing are due to awareness variation among the participant and non-participant respondents.

Table 4.18. Respondents' category in terms of constraints (N=147)

Constraints which prevent you from becoming member of seed producer society.	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
I do not have any information about the seed producer society	33	61	10	11	113.978***	43	29
I don't have spar land for seed Production	12	22	0	0		12	8
the seed producer society doesn't allow to join new members	9	17	0	0		9	6
Not Applicable/NA/	0	0	83	89		83	56
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

4.1.2.15 Access to on time seed supply

The inefficient capacity of improved seed suppliers was hypothesized to affect farmers' participation in seed marketing. The descriptive statistic result of this study on Table 4.19 confirms that majority of non-participant respondent farmers (64.81%) had no on time seed supply access, where as about 71% of participant respondent farmers confirm that they had on time access for seed. The result of Pearson chi-square values (17.936) also confirms that there is significant relationship between participation of farmers and on time access to seed.

Therefore, from the above explanations results of the survey it is safe to say that the differences in participation of farmers in seed marketing are due to variation in on time access for seed among the participant and non-participant respondents. The FGD key informants idea also support this result (Box 6)

Table 4.19. Respondents' category in terms of access to on time seed supply (N=147)

Do you get on time seed supply, if you need from formal suppliers?	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
Yes	19	35.19	66	70.97	17.936***	85	58
No	35	64.81	27	29.03		62	42
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

Box 6. Result of focus group discussion (FGD) on access to on time seed supply

Box 6. The result of focus group discussion at each sample villages (LSB site) supports the result of the above descriptive statistics, the key informants agree that, every year seed supply in their area was delayed and farmers did not able to get demanded seed from the formal seed supplier on time with unknown reason, in addition the supplied seed were fake, had problem of quality, specially been seeds, as a result farmers made big losses.

4.1.2.16 Major problems in seed marketing

Based on the result of the descriptive statistics on Table 4.20 indicates that majority of non-participant respondents (85%) believed that fluctuating market price and absence of secured market are the major problems that discourage farmers from participating in seed business. The result of Pearson chi-square values (14.924) also confirms that there is significant relationship between participation of farmers and secured market and price.

Therefore, from the above explanations results of the survey it is safe to say that the differences in participation of farmers in seed marketing are due to having secured market variation among the participant and non-participant respondents. The FGD key informants idea also proved this result (Box 7)

Table 4.20. Good reasons of respondents' on major problems in seed marketing (N=147)

Major problems in seed marketing in the study area.	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
Unfair seed price paid by DAE & BADC	0	0.00	20	21.51	14.924	20	14
Fluctuating market price & no secured Market	46	85.19	56	60.22		64	69
no organized local seed marketing practice	8	14.81	17	18.28		25	17
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

Box 7. Result of focus group discussion (FGD) on major problems in seed marketing.

Box 7. The result of focus group discussion at each sample villages (LSB site) supports the result of the above descriptive statistics, the key informants agree that, absence of secured market and fluctuating price, absence of organized storage and distribution system, challenges of climate change such as drought, are the major problems that discourage farmers from participating in seed business.

4.1.2.17 Major seed suppliers of the study are

Based on the result of the descriptive statistics on Table 4.21 indicates that majority of participant respondents (61%) know that the major supplier of improved seed in the study area where BADC and DAE, where as majority non-participant respondents (63%) have no idea who supply improved seed to their area. The result of Pearson chi-square values (16.248) also confirms that there is significant relationship between participation of farmers and knowing source of seed.

Table 4.21. Respondents' on major seed suppliers of the study area (N=147)

Who are the major improved seed suppliers in your area?	Non-participant		Participant		X2-value	Total	
	NO	%	NO	%		NO	%
DAE & BADC	20	37	57	61	16.248	77	52
BARI	0	0	16	17		16	11
University	0	0	20	22		20	14
I have no idea	34	36	0	0		34	23
Total	54	100	93	100	P-value 0.000	147	100

Source: results of descriptive statistics from own survey data
*** Significant at less than 1% level of significance.

Box 8. Major seed suppliers of the study area as per focus group discussion (FGD).

Box 8. The result of focus group discussion at each sample villages (LSB site) supports the result of the above descriptive statistics, the key informants identified that, BADC, and DAE through cooperatives are the main seed suppliers, in all the study areas, and BRAC,World vision, BARI, Mymensing university and TDA were the main supporter of seed supply through both technical and financial support in Birol and Birgonj upozila, on the other hand BADC and BARI only were involved in both technical and financial support in Dinajpur District.

4.2 Identifying factors influencing farmers' participation in seed marketing

On Table 4.22. Variables such as age of the household respondents (**Age**), land holding of household respondents (**Land holding**), literacy level of household head respondents (**Literacy**), farm oxen holding of household respondents (**Oxen holding**), respondents knowledge about existence of seed producer society in the area (**Knowledge**), existence of contract seed farming practice in the area (**contract seed farming**), access of household respondents to market information (M**arket information**), access of household respondents to credit service (**Credit access**), cooperative membership of the household respondents (**Cooperative membership**), and household respondents understanding on importance of seed business for income improvement (**Seed business importance**) were included in

logit analysis as important factors influencing farmer's participation in seed marketing in the study area. Of which six independent variables: - respondents knowledge about existence of seed producer society in the area (**Knowledge**), access of household respondents to credit service (**Credit access**) found significant at less than 1%, age of the household respondents (age), cooperative membership of the household respondents (**Cooperative membership**), and household respondents understanding on importance of seed business for income improvement (**Seed business importance**) found significant at less than 5%, and existence of contract seed farming practice in the area (contract seed farming) were found significant at less than 10% in influencing farmers participation in seed marketing, as it is shown on Table 4.22. Whereas land holding of household respondents (Land holding), literacy level of household head respondents (Literacy), farm oxen holding of household respondents (Oxen holding), and access of household respondents to market information (market information) were found not significant.

Table 4.22. Logistic regression estimation of farmers' participation on seed marketing

SL.NO	Explanatory variables	B	SE	Wald	Sig	Exp(B)
1	Age	-0.204	0.089	5.231	0.222	0.816
2	Land holding	5.234	3.395	2.376	0.123	187.588
3	Literacy	-0.256	1.023	0.063	0.802	0.774
4	Oxen holding	1.196	1.375	0.756	0.385	3.306
5	Knowledge	3.439	1.209	8.092	0.004	31.170
6	Contract Seed farming	1.727	0.943	3.351	0.067	5.632
7	Market information	20.173	5084.35	0.000	0.997	577019971.71
8	Credit access	5.357	1.672	10.263	0.001	212.122
9	Cooperative Membership	3.013	1.280	5.537	0.019	20.339
10	Seed business importance	2.807	1.418	3.917	0.048	16.558
	Constant	-5.456	3.372	2.618	0.106	0.004
Overall percentage correctly predicted93.9						93.9
Chi-square value						157.705
-2 Log Likelihood						35.608
Sample size						147

CHAPTER FIVE

FINDINGS, RECOMMENDATIONS, CONCLUSIONS AND SCOPE FOR FURTHER RESEARCH

5.1 Findings:

The top two areas that are viewed major suppliers of seed corn are: lower prices (78%), friendly service (45%), convenience/location (43%), and product performance (30%) .Of the total amount of seed corn purchased by farmers. An effective marketing strategy should begin with:

Respondents knowledge: - majority of the farmers found that did not knew about existence of seed producer society in the area, as a result very few farmers who have information about seed business were motivated to participate in seed production and marketing in the study area, indicating that the probability of being involved in seed production and marketing increases as the know how of the farmer on business increases. The justification for this could be a farmer with good knowledge of existing business is more likely to be motivated to participate in that business.

Contract seed farming practice: - this practice of contract seed farming found in the study area as new farming activity and practiced by very few model farmers, indicating that the probability of the farmer being involved in seed production and marketing increases as the practice of contract seed farming expands in outreach. The justification for this could be as the outreach of contract seed farming practice expands to farmers, the farmers' knowledge about the importance of seed business is more likely to be improved and motivate him/her to participate in that business.

Access of household to credit service: - credit service access was found that motivates farmers to be involved in productive business activities such as seed production and marketing. The possible reason for this positive relationship could be farmers often face cash constraints to invest in land and purchase new technological inputs, in this context credit is one of the financial services help farmers to pay all their financial obligations related with agricultural production. Therefore, it is safe to conclude that having access to credit motivate farmers to improve their income by investing and participating in new technology adoption.

Cooperative membership of the household: - farmers who involved in cooperative activities as member found to have active participation in seed marketing. The possible justification for this positive relationship could be cooperative members might have better exposure to group business and

cooperative membership helps the farmer to get important services of agricultural input easily and at the needed time.

Household understanding: - good understanding on the importance of seed business in improving income level of the household found as the main motivating factor for farmers to participate in seed marketing. Therefore, it is safe to say that as the level of farmers' understanding on the importance of seed business in improving their income improves, the rate of participation of farmers in seed marketing could be increase.

Fluctuating market price and absence of secured market: - the result of the descriptive statistics shows that fluctuating market price and absence of secured market are the major problems that discourage farmers from participating in seed business. Therefore, from this explanation result of the survey it is safe to say that the differences in participation of farmers in seed marketing are due to having secured market variation among the participant and non-participant respondents.

Extension service: - The descriptive statistics survey result also clearly indicates that farmers who have frequent contact with development agents secured better access to information and could adopt better technology that would increase their marketable supply of seed and utilization. Therefore, it is safe to conclude that farmers who have regular extension service, more likely to be motivated to participate in productive activities such as seed production and marketing.

Seed related training: - the descriptive statistical result of this study indicates that farmers, who received seed related training, were highly motivated in seed production and marketing in the study areas. Therefore, it is safe to conclude that, training improves motivation of farmers to participate in seed production and marketing.

Education: - In addition the descriptive statistics result of survey data shows majority of the participant farmers were attended formal primary education than the nonparticipant farmers in the study area. Therefore, it's safe to say that education improves motivation of farmers in adopting new agricultural technologies such as adopting and practicing seed production and marketing as a business.

Distance to the central market from their home: - the descriptive statistics result of survey data in this study shows majority of the participant farmers were need to travel for short hour to reach the central market from their home; a maximum of one hour single trip, than the non-participant farmers. Therefore, it's safe to say that the shorter the distance of the marketing center from the farmers' home, the more likely to be motivated to involve in business activities such as seed

production and marketing as a business. Lack of close access to seed retail points has been cited as a major limitation to farmers adopting improved varieties (MacRobert, 2009).

5.2 RECOMMENDATION

In a country like Bangladesh which is following agriculture development led industrialization strategy as the main development policy to ensure rapid and sustainable agricultural based development, efficient seed marketing has the potential significance to contribute for the improvement of agricultural productivity and improve the well-being of farmers in the country.

Although so many measures has been taken to improve the service efficiency of the formal seed sector (public institution) for the last five decades, farmers' access to seed was hindered by technical problems, poorly developed seed sector and rural marketing infrastructures. The formal seed sector, despite all the efforts made to improve the sector for the last five decades, it was able to supply only 10-20% of the potential demand of the country. In this respect development and promotion of small and medium sized local seed businesses at both community and private levels are a potential solution to this problem. To stimulate the community and private seed sector that could improve seed marketing efficiency at local level, designing local seed marketing strategies based on grass-root challenges is appropriate to make the local seed business sustainable.

Therefore, based on the summarized statistical findings of the survey result on the conditions of the sector in the study areas, the following suggestions could be used as recommendation for improving the seed producer capacity to run the local seed business and for policy measures to take forward local seed business and ensure the sustainable development of local seed business activities.

1. Awareness creation program

Farmers' knowledge about existence of seed producer society in the area, importance seed business in improving household income were found significant in explaining farmers' participation in seed marketing. The study reveals that majority of the nonparticipant farmers were found to have no knowledge and not aware about the existence of the seed producer society, objectives and the advantages of the seed producer society for them.

Therefore, to solve this problem, awareness creation program is suggested to be designed and seed business need to be promoted using different promotional campaign activities at local level by the seed producer cooperative themselves as

self-help society to promote farmers' participation. New members and Community Promotion program should be designed through continuous farmer to farmer and radio sensitization programs. Moreover, concerned bodies, be it Governmental or NGOs, should support the promotional campaign of the seed producer cooperative through technical and material capacity building to improve farmers' knowledge about seed business.

In addition, it is also necessary to encourage farmers to participate in local seed conservation activities through establishing community seed conservation system in order to motivate farmers to participate in saving locally preferred seed and make easily accessible by them which could avoid seed contamination, and stimulate farmers' awareness and participation. Governmental, NGOs and Research institutions should support the establishment of community seed conservation system through technical and physical capacity building programs.

2. Build managerial and technical capacity of the seed producer society

Build the seed producer human resources efficiency through experts, leaders and hired staffs long-term and short-term trainings on topics: - seed producer promotion and management training, seed marketing business plan and entrepreneurial skill development and management training, seed producer enterprise governance and monitoring, auditing and financial management training. In addition, arranging exposure visit for experience sharing with other similar seed producer societies, will help the leaders and members of seed producer societies to get experience on how to run their seed business.

3. Establish Community based financial institutions

Access of household respondents to credit service was found significant in explaining farmers' participation in seed marketing. Therefore, increasing access of credit through establishment of community based financial institutions such as saving and credit cooperatives promotion is an important dual impact strategy for providing households with sustainable financial resources through promoting saving, that could enable farmers to invest in new technologies that improve their productivity and motivate them to participate in seed marketing is suggested as potential recommendation to promote sustainable local seed business in the study area.

4. Support with startup capital and long-term credit

Farmers should be encouraged to mobilize their own startup capital as share capital by organizing themselves may be under cooperatives. In addition community seed system often need financial support at the outset, including startup capital or long-term loan to cover costs for storage, processing and packaging constructions, seed

purchase and marketing. Hence, supporting the community based seed producer society through startup capital or long-term loan suggested as recommendation to promote sustainable local seed business.

5. Promote Autonomous Seed Producer Cooperative system

Cooperative membership of the household respondents was found significant in explaining farmers' participation in seed marketing. Cooperatives are organizations designed to enable people to cooperate by participating in all the activities of the society to achieve common goals. The current government has created favorable political climate for cooperative movement to enhance their performance. This favorable climate should continue at all administrative levels by creating suitable work environment for the cooperatives through designing problem based technical and financial support till they become self sustainable. Since the cooperatives have a power to mobilize the majority of the country's population who live under poverty line in rural and urban areas, the government should encourage autonomous cooperative promotion geared towards motivating agribusiness activities such as local seed business development through both technical and financial support.

However, the role of governmental and non-governmental organizations should be limited on decision making power transfer and technical capacity building in helping the seed producer farmers to organize themselves to form locally operated independent small-scale cooperative seed enterprises.

6. Designed Seed Business oriented extension system

Household understanding on importance of seed business for income improvement was found significant in explaining farmers' participation in seed marketing. Studies indicate that lack of information is the major problem for poor understanding of farmers on proper utilization of new agricultural technology. Therefore, local seed business oriented extension system should be designed to improve farmers' understanding. In addition the key informants indicate that the main cause of the farmers' poor understanding about the seed business in all the areas are lack of exposure, hence designing for farmers exposure trip as experience sharing program and providing seed business training opportunities could be potential solution to promote the local seed business in a sustainable way.

7. Link Seed Producer Societies with contract farming and market information

Systems

Existence of contract seed farming practice in the area was found significant in explaining farmers' participation in seed marketing. Existence of functioning agricultural product markets and development of value-adding industries act as a stimulant to the improvement of agricultural productivity. However, agricultural product markets are poorly developed and price fluctuations are high in Dinajpur region in particular and Bangladesh in general, which may discourage farmers to participate in adopting new technologies. In this respect linking seed producer societies with contract seed farming and regular market information systems, finding ways of stimulating output markets suggested as appropriate development strategies for local seed business in the areas.

8. Support the Seed Producer Societies to establish marketing infrastructure facilities

Absence of marketing infrastructure facilities (Lack of storage, collection material, and processing machine) were the major problems that discourage farmers' and leaders of the society from promoting the seed business within their locality according the FGD. As we have observed, in reality none of the seed producer societies have marketing infrastructure facilities, due to poor financial capacity. Therefore, physical capacity building in terms of marketing infrastructure facilities through cost sharing method suggested as potential solution to stimulate the seed business at local level in the study area.

In addition the local administrative body and government should support the seed producer societies by providing land for constructing store, installing seed processing machine and office.

5.3 CONCLUSION

In this study, both descriptive statistics and econometric analysis (binary logistic regression) were employed for analytical purpose using SPSS (version 15 software). The first objective of this study, identifying seed marketing partners and their role in the study area was addressed by examining secondary data of annual report of BADC, BARI and DAE from both the study area Upozilas and the District, as well as holding focus group discussion with key informants. Accordingly, BADC and DAE through multipurpose cooperatives were found the main seed suppliers and World vision, BRAC, Lal Teer, BARI, BINA as well as Bangladesh Agricultural University were found the main institutions that support the seed system in study areas through capacity building in both technical and financial aspects.

The second and third objectives of the study examine the challenges of seed marketing (the seed supply sector) and study factors influencing the seed marketing and Local Seed Business Development opportunities was addressed using descriptive and logistic regression analysis. Accordingly, the lesson of this research on challenges and factors influencing the seed marketing are discussed as follows. The findings of descriptive statistics, econometric analysis and FGD in this study clearly shows that lack of farmers awareness about seed business, low contract seed farming practice due to poor extension system were found as the main factors influencing farmers' participation of farmers in seed production and marketing, this is in line with the empirical literature (BARI-2007). Of course, farmers produce seed every year as part of their food grain production for their own consumption, but they do not produce seed purposefully for selling except the model farmers involved in contract seed farming with DAE and BADC. The outreach of contract seed farming was found small and introduced for very few model farmers.

The other important finding of this study was inconvenient access to credit, both statistical analysis and FGD discussion shows majority farmers highly influenced by poor access to credit, similar with the finding of (BBS, 2012), according to the FGD most of the time the credit access was attached with other development obligations, such as a farmer if he/she does not participate in one of the food security packages it is difficult to access credit, that makes access to credit inconvenience for most farmers. The FGD shows that Agricultural product markets are poorly developed and farmers have no linkage with direct consumers, no cooperatives found involved in improving members product linkage with market due to poor capacity. For instance, the potato seed producers of Birol Upozila face critical problem of market for their potato seed every year, which discourages the majority farmers in seed production and marketing participation; similar with the

finding of (Wolday, 2002). The FGD shows that none of the seed producer societies have marketing infrastructure facilities (Lack of storage, collection material, and processing machine), due to poor financial capacity, and lake of long-term credit service for farmers' group investment, similar with the finding of (Khobir, 2008; Islam, 2008).

5.4 SCOPE FOR FURTHER RESEARCH

This study has provided some basic information regarding the importance of the marketing attributes exhibited by smaller, independent, seed corn companies and their relation to the corn grower's purchasing decision. Further research would be useful to evaluate empirically some of the concepts suggested in this study. The following are suggestions for additional research in the area:

1. Examine the relationship between price and product performance. Many seed corn companies and corn growers focus on price in the Spring and product performance in the Fall. More work should be completed indicating the net income advantage of using a particular seed corn number (implementing price and final yields). This could be a useful tool for BADC when emphasizing lower prices. If it can be shown the lower priced corn is also increasing the com grower's net income per bushel, more customers may be won over.

2. Devote an entire study towards product promotion. Seed corn companies continue to spend valuable marketing Taka on free hats, jackets, calendars, pens, etc. What is the level of importance? Does it vary depending upon a corn grower's size or geographic location? It would be interesting to receive input from BADC who (a) rely quite heavily upon promotional items, and (b) who rely very little upon promotional items. This could include the use of company publications and newsletters as well.

3. Examine the importance of fanner meetings/field days? In this study, corn growers place more reliance upon them in their purchasing decision than BADC believe. Some areas to further analyze are: location, time of year, time of day, topics to be discussed, guest speakers, follow-up procedures, composite of typical corn grower attendee, and others.

4. Breakdown and examine the area of "service after the sale." Are seed corn companies waiting for the corn growers to call with feedback, good or bad, or are they continually soliciting feedback? The latter approach would seem to be the correct approach if a seed corn company is interested in increased sales in the future. How many times does the company representatives follow-up (with a phone call, hand-written note, or personal visit) after the corn is sold? The answer could be quite revealing.

CHAPTER SIX

6. Reference, Appendix.

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6.2 Appendix –A

Questionnaire-A

Hybrid Maize Seed Marketing System in Bangladesh : A study on Dinajpur district.

Dear respondent,
I am a student of EMBA, Dept. of Marketing, Faculty of Post Graduate Studies, Hajee Mohammad Danesh Science and Technology University (HSTU), Dinajpur. I would like to invite you to participate in a research study which aims at collecting data about **Hybrid Maize Seed Marketing System in Bangladesh : A study on Dinajpur district**. You are requested to fill it out this questionnaire with as much accuracy as possible. For your kind information, I shall use 5 point likert scale.
Range: 1= Highly dissatisfied; 2= Dissatisfied; 3=Neutral; 4=Satisfied; 5= Highly Satisfied.
1. Do you use Hybrid Maize seed?

Yes No

Demographic profile of the respondents:

2. Name…….....

3. Address:……..

4. Sex: ☐ Male ☐ Female

5. Age: ☐18-30 ☐ 31-45 ☐ 46-55 ☐56-70

6. Profession:

☐Farmer ☐ Retailers ☐ Dealers ☐ Importer

☐ Producer

7. Education:

☐ Below P.S.C ☐ Below S.S.C ☐ Below H.S.C ☐No Education

8. Income:

☐Below-10000 ☐10000-20000 ☐ 20000-30000 ☐ 30000-Above

8. Role:

Here, **1=** Strongly Disagree**, 2=** Disagree**, 3=** Neutral**, 4=** Agree**, 5=** Strongly Agree

Sl. No	**Content**	1	2	3	4	5
1	Do you know how you can collect information about Hybrid Maize Seed?	1	2	3	4	5
2	Do you mean that Hybrid Maize Seed to get fair market price?	1	2	3	4	5
3	Do you trust your local Retailer?	1	2	3	4	5
4	Do you belief Hybrid Maize Seed get better yield?	1	2	3	4	5

9. Satisfaction / Dissatisfaction

Here, **1=** Highly dissatisfied**, 2=** Dissatisfied**, 3=** Neutral**, 4=** Satisfied**, 5=** Highly Satisfied

Sl. No	**Content**	1	2	3	4	5
1	Do you think membership growth in the above seed producer societies?	1	2	3	4	5
2	Do you mean that Hybrid Maize Seed helps to reduce Poverty?	1	2	3	4	5
3	Do you think that Hybrid Maize Seed increase your life style?	1	2	3	4	5
4	Do you mean that Hybrid Maize Seed is potential for our country?	1	2	3	4	5

10. Problem related.

1	Transportation problem
2	Information problem
3	Cost increase
4	Purchase problem
5	Illiteracy problem
6	Unwillingness to use
7	Misinformation of buying
8	Difficulty in Cultivation
9	Uncertainty about Demand
10	Decrease of Grain value

Questionnaire for officials B

Name of the official _____
Position _____
Experience_____

1. What are the potentials of seed marketing?

SL.No	Potentials	Rank	Suggestions
1.			
2.			
3.			
4.			

1. Please identify the major problems in seed marketing in your Area?

SL.No	Potentials	Rank	Suggestions
1.			
2.			
3.			
4.			

3. What are the technical problems?
   1. _____
   2. _____
   3. _____
4. What are the managerial problems?
   1. _____
   2. _____
   3. _____

5. What are the infrastructural problems?
   1. _____
   2. _____
   3. _____

6. Any other problems
   1. _____
   2. _____
   3. _____

7. What is your suggestion to overcome the above problems?

S/N	Problems	Suggestions
1.	Technical	1) 2)
2.	Managerial	1) 2)
3.	Infrastructural	1) 2)
4.	Others specify	1) 2)

6.3 Appendix –B Field observation photos: