FARMERS' KNOWLEDGE ON MAIZE CULTIVATION IN FIVE SELECTED VILLAGES OF SHIBALAYA UPAZILA UNDER MANIKGONG DISTRICT

BY

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CERTIFICATE

This is to certify that the thesis entitled, **FARMERS' KNOWLEDGE ON MAIZE CULTIVATION IN FIVE SELECTED VILLAGES OF SHIBALAYA UPAZILA UNDER MANIKGONG DISTRICT** submitted to the faculty of Agriculture, Sher-e- Bangla Agricultural University, Dhaka in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in AGRICULTURAL EXTENSION AND INFORMATION SYSTEM embodies out by **SHAYLA SULTANA CHOWDHURY,** Registration No. 00595 under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that such help or information, as has been availed of during the course of this investigation has duly been acknowledged by her.

Dated.....
Place : Dhaka, Bangladesh

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Dedication
To
My Beloved Children

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Place : Dhaka
Dated :

The Author

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ABBREVIATION AND ACRONYMS

AAO	=	Additional Agriculture Officer
AEO	=	Agriculture Extension Officer
BAU	=	Bangladesh Agricultural University
BADC	=	Bangladesh Agricultural Development Corporation
BBS	=	Bangladesh Bureau of Statistics
CDP	=	Crop Diversification Program
CIMMYT	=	International Maize and Wheat Improvement Centre
DAE	=	Department of Agricultural Extension
ERB	=	Economic Review of Bangladesh
et al	=	and other
FAO	=	Food and Agriculture Organization
GDP	=	Gross Domestic Product
GO	=	Government Organization
HYV	=	High Yielding Variety
IPM	=	Integrated Pest Management
NGOS	=	Non Government Organization
RDRS	=	Rangpur Dinajpur Rural Service
SAAO	=	Sub Assistant Agriculture Officer
UAO	=	Upazila Agriculture Officer

ABSTRACT

The major purpose of this research study was to determine farmers' knowledge on maize cultivation and explore the relationship between selected characteristics of the farmers and their knowledge on maize cultivation. To identify the problems confronted by the maize farmers was another purpose of this study. The study was conducted in five villages of Shibalaya upazila under Manikgonj district. The population of maize farmers in these villages were 550, from where sample of 110 farmers was selected drawn following random sampling techniques. An interview schedule was used for data collection. Knowledge on maize was determined by a rating scale. The data were collected during 17 February to 17 March 2009. Majority (68 percent) of the farmers had high level of knowledge, while 32 percent of them had possessed very high level of knowledge. Only education, annual income and communication exposure of the farmers were positively related while farmers' age, family size, farm size, land cropping intensity, organizational participation and innovativeness were negatively related with their knowledge on maize cultivation practices. High input cost was their major problem.

CHAPTER–I

INTRODUCTION

সোহরাওয়ার্দী কৃষি বিশ্ববিদ্যালয় গ্রন্থাগার
সংযোজন নং 125
তারিখ ... তাং 41.7.12

1.1 General Background

Bangladesh is predominantly an agricultural country. About 80 percent of the total population and about 52 percent of the total labour force is employed in agriculture (ERB, 2007). Agriculture creates self employment and wage employment for most of the people of Bangladesh. Agriculture is the backbone of the economy. In terms of GDP the direct contribution of agriculture comes to 23.87 percent in which 11.70 percent comes from crops, 4.07 percent from fisheries, from live stock 2.79 percent and others 5.31 percent (BBS, 2008)

Bangladesh is one of the densely populated developing country in the world. It has an area of 1,47,570 square kilometers with population of about 15 core with an annul growth rate of about 1.42% (BBS, 2008). It is deficit in food supply which is about 5.61 percent of total requirement. It has been facing burning problem of high unemployment, poverty & severe malnutrition.

The most staple food for Bangladesh is rice. But she can not produce enough rice to feed her population. To feed her huge population, alternative source for food should be searched. In this case, maize might be one of the sources.

Maize is an amazing crop, which can supply human food, feed and fodder for animal, fuel for domestic use and also raw material for use in industry. In poultry industry maize is used as feeds. It is used as major source of carbohydrate for animal feed and as an industrial raw material for wet and dry milling (Swaminathan et al, 1982). In addition corn oil, starch & many

other products can be produced from maize. Now a days, bio-fuel being prepared from maize which is used for various purposes.

Though the importance of maize can not be ignored yet, the production of maize in Bangladesh is not good. But considering the importance of maize, the Government of Bangladesh has given priority for its cultivation and production.

Area, production and yield of maize in Bangladesh have been shown in fig–1.

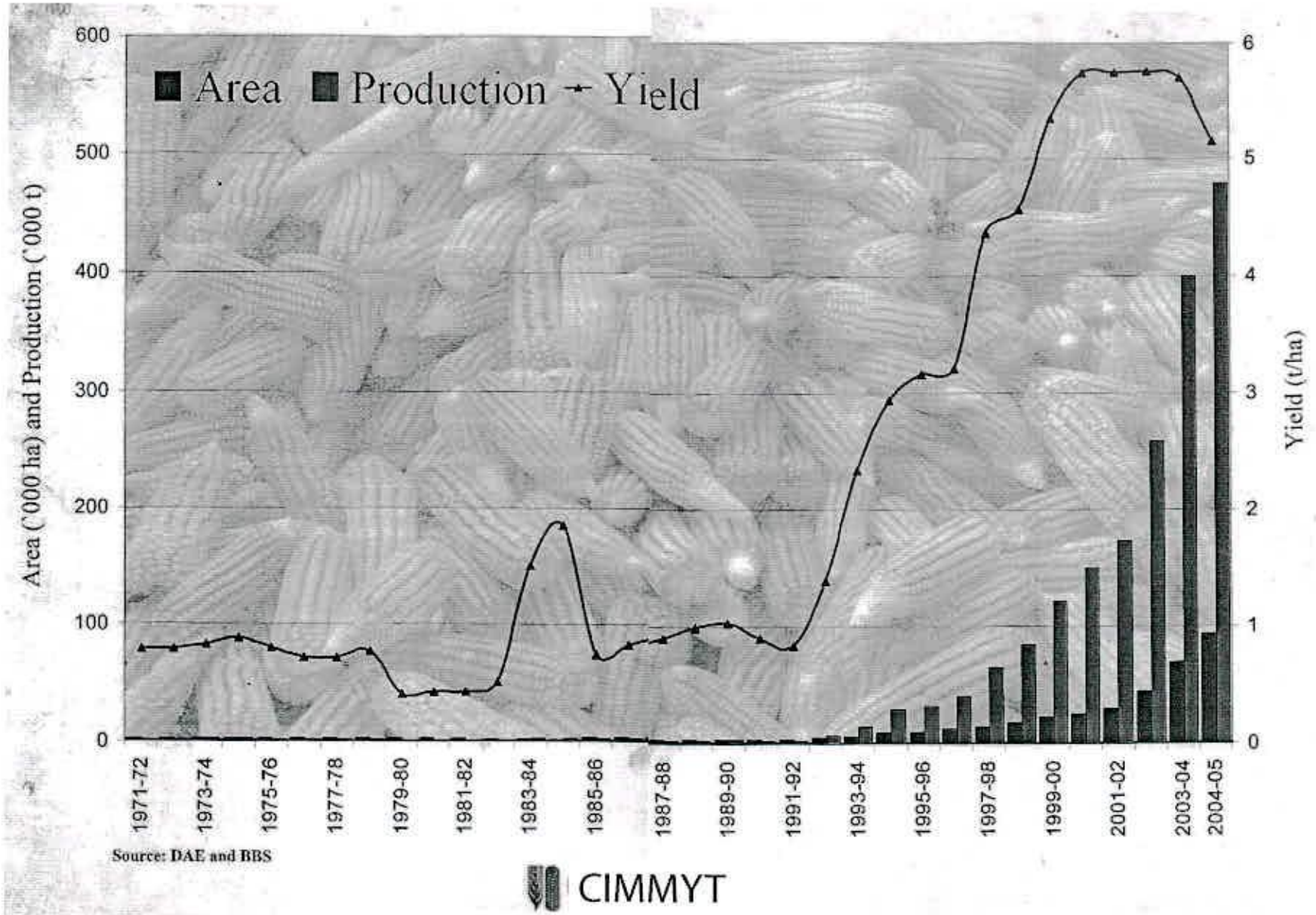

Fig. 1: Maize Area, Production and Yield in Bangladesh

The planning commission in 1990 recommended maize to be included in crop diversification program (CDP). As a result, Ministry of Agriculture (MOA) developed a project entitled "Integrated Maize Promotion Project (IMPP)." It was undertaken in August, 1991 with assistance of United Nations Development Programmes (UNDP) and United States Agency for International Development (USAID). Implementation of the project started in 124 upazilas of 21 districts in September 1992, and completed in June, 1995. Based on priority and importance, Government of Bangladesh (GOB) had undertaken the 2nd phase of IMPP in July 1995 for implementation in 150 upazilas of 33 districts. IMPP had been operating in 200 upazilas of 47 districts and the project period had been extended up to June. 2005. DAE, BRAC, BADC, Grameen Krishi Foundation and other government as well as private organizations are trying to increase maize production. But with these about efforts the cultivation & production of maize is not satisfactory. The researcher thought that one of the reason of this unsatisfactory production may be due to the in adequate knowledge of the farmers regarding the cultivation procedure of maize. Assuming this idea the researcher became interested to searched out the knowledge of the farmers about the maize cultivation.

1.2 Statement of the Problem

In view of the foregoing discussion, the investigator undertook a piece of study entitled, "Farmers' Knowledge on Maize Cultivation in Shibalaya upazila under Manikgong district. It attempts to seek answer to the following major research questions:

1. What is the farmers' existing knowledge level in maize cultivation?
2. What are the characteristics of maize growers?

3. Are there any relationships between selected characteristics of maize growers and their knowledge, and
4. What are the problems they confront with maize cultivation ?

1.3 Specific Objectives

The research questions were further broken down into the following specific objectives to give proper direction to the study:

1. To determine and describe some selected characteristics of the maize farmers. These include their:
   i) Age
   ii) Education
   iii) Family size
   iv) Farm size
   v) Annual income
   vi) Cropping intensity of their land
   vii) Organizational participation
   viii) Innovativeness and
   ix) Communication exposure
2. To ascertain farmers' knowledge on maize cultivation.

3. To explore the relationship between each of the selected characteristics of the farmers and their knowledge on maize cultivation.

4. To identify the problems confronted by the farmers in maize cultivation.

1.4 Significance of the Study

The importance of maize in the farming systems having been recognized in the previous narration, the academicians, planners and administrator in Extension Education need to know the existing cognitive and affective

levels of the client systems including the problems the latter groups have been facing. Although some studies have been made, these were limited in scope and coverage. Thus, it is imperative to have full understanding of the answers to the research questions for a programmatic planning in future. On a broader perspective, the investigator believes that the findings of the study will reveal the phenomenon related to diffusion of innovations. This will be of special interest to the policy makers and planners in formicating and redesigning the extension services specially for maize cultivation. The findings, in general, are expected to be helpful to the field workers of different nation building departments and organizations to improve strategies of extension for effectively working with the rural people.

1.5 Assumptions of the Study

An assumptions is the supposition that an apparent fact or principle is true in the light of the available evidence (Goode and Hatt, 1952). However, the researcher had the following assumption in mind while undertaking this study:

1. The respondents included in the sample in this study were competent to furnish data to the questions included in the interview schedule.
2. The researcher who only acted as the interviewer was well adjusted to the socio-economic environment of the study area. Hence, the data collected were free from extraneous variables.
3. The responses furnished by the respondents were valid and reliable, and they truly reflected data on knowledge and other concerned variables of maize cultivation process.
4. The views and opinions furnished by the maize growers included in the sample were representative of the whole population of the study area.

1.6 Scope and Limitations of the Study

In order to keep the study under management limit due to resource constraints, the following limitations were recognized.

1. The study was confined to Shibalaya upazila under Manikganj district.
2. The variables of the study could be more than the present ones. But it was limited to 10 only.
3. The investigators depended on the data furnished by the farmers during their interview.
4. The findings of the study will have general application to other parts of the country with similar socio-economic and cultural characteristics of the study area.

1.7 Definition of Terms

Certain key terms used in the study are defined in this section for clarity of understanding.

Age

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

Education

Education refered to the development of desirable knowledge, skill and attitude in an individual through reading, writing, observing and other related activities. However, it was operationalized by the number of years successfully spent in formal educational institutions.

Family size

It referred to the total number of members that including the respondent himself, his wife, children and other permanent dependents who lived and ate together as a family unit during data collection.

Farm size

It referred to the hectarage of land owned by a farmer on which he carried out his farming. The area was estimated in terms of full benefit enjoyed by the farmer. A farmer was considered to have full benefit from cultivated area either owned by himself or obtained on lease from others and half benefit from area which he either cultivated by himself on borga system or given to other the same system.

Annual income

Annual income referred to the total amount of earnings of all the family members of a respondent from agriculture, livestock, fisheries and other accessible sources (business, service, daily wage etc.) during a year. It was expressed in taka.

Organizational participation

Organizational participation of an individual referred to his association in various organizational activities either as an office bearer, executive committee member or as an ordinary member within a specific period of time.

Communication media

Communication exposure referred to the use of communication media through which the farmers received maize related message. The media included in this study were Block Supervisor, Extension Personnel, NGO worker, farm input dealer, result demonstration, ideal fanner, local leader, neighbour, poster, radio, television. magazine, daily newspaper.

Maize growers

Maize growers referred to those fanners who produced maize in the study area during the Rabi season, 2007–2008 The term was synonymously used as maize growers, farmers, respondents and subjects. They, however, cultivated other crops also.

Extension media contact

Extension media contact referred to an individual's levels of exposure with the aforesaid 16 media for maize farming practices during a period of one year prior to data collection.

Adoption

Adoption is the implementation of decision to continue the full use of an innovation. According to Rogers (1995), "Adoption is a decision to make full use of an innovation as the best course of action available." When an individual takes up a new idea as the best course of action and practices, the phenomenon is known as adoption (Ray, 1991). In this study, adoption was defined as the phenomenon of taking up a new idea of maize and put these into practices.

Innovation

An innovation is an idea, practice or object that is perceived as new by the members in a social system. According to Barnett (1953), innovation may be defined as any thought, behavior or thing that is new because it is qualitatively different from existing fevers. The perceived newness of the idea for the individual determines his/her reaction to it. If the idea seems new to the individual, it is an innovation (Rogers, 1995). In this study farming practices related to maize cultivation as a whole and other scientific recommendations are termed as innovations.

Knowledge

Knowledge in broader sense is considered as the vision of an explanation for the world in which we live. Knowledge is relative in the sense that the vision can differ among people because of differences in their experiences. A distinction is made between every day and scientific knowledge or between technical and social knowledge.

Knowledge on maize cultivation

Knowledge on maize cultivation refers to one's content in the cognitive domain on maize cultivation or holding facts or information on the same which may induce his behavioral change in actual life situation.

Problem confrontation of the farmers :

It refers to the different problems as perceived by the farmers in their rural life. It also referred to the different situation that a farmer faced at the time of producing the crop, operating livestock and fisheries cultivation in the season concerned.

CHAPTER 2

REVIEW OF LITERATURE

The researcher made an elaborate search of available literature the study. Available literature was extensively reviewed to find out work in Bangladesh as well as abroad. The reviews are conveniently presented passed on the major objective of the study. This chapter is divided into three major sections. The 1st section deals with the Concept of Knowledge. The 2nd section deals with farmers knowledge of innovation. The 3rd section deals with the relationship between farmers characteristics and knowledge of innovation.

2.1 Concept of Knowledge

Knowledge can be defined as the 'understanding obtained through the process of experience or appropriate study'. Knowledge can also be an accumulation of facts, procedural rules, or heuristics. Here–

- A fact is generally a statement representing truth about a subject matter or domain.
- A procedural rule is a rule that describes a sequence of actions.
- A heuristic is a rule of thumb based on years of experience.

Knowledge is the result of some activity such as generation, storage, dissemination and utilization of something that entails either information or data. It usually based on learning, thinking, and proper understanding of the problem area. It is not information and information is not data. Knowledge is derived from information in the same way information is derived from data when processed or patterned in human mind. It can be considered as the integration of human perceptive processes that helps them to draw meaningful conclusions.

So when a pattern relation exists among the data and information, the pattern has the potential to represent knowledge. It only becomes knowledge, however, when one is able to realize and understand the patterns and their implications.

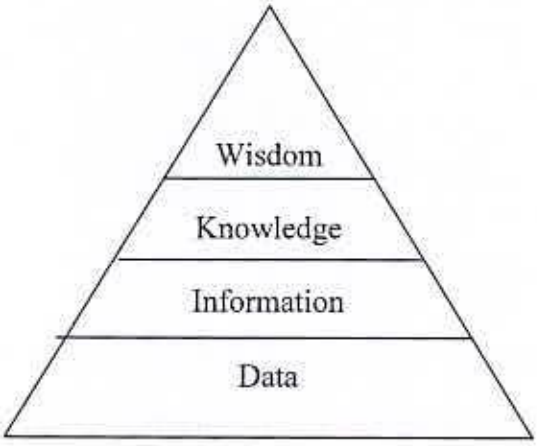

Figure 2.1. Data, information, knowledge and wisdom process.

2.2 Farmers Knowledge on Innovations

Sana (2003) conducted a study on farmers' knowledge of shrimp cultivation in Assasuni upazila under Satkhira district and found that majority (61 percent) of the farmers had medium level of knowledge while 30 percent had low and the rest 9 percent had possessed high knowledge.

Saha (2003) studied on a comparative analysis of farmers' communication exposure and knowledge in rice and poultry farming and showed that 48 percent of the farmers had medium knowledge while 48 percent of them had low knowledge and only 4 percent had high knowledge in rice farming.

Hossain (2003) conducted a study on farmers' knowledge and adoption of modern Boro rice cultivation practices and found that 66 percent of the Boro rice farmers had medium knowledge compared to 17 percent having low knowledge and 17 percent having high knowledge.

Sarker (2002) studied on farmers' knowledge of and attitude towards BRR1 Dhan-29 variety of rice and found that 60 percent of the farmers held medium knowledge, 33 percent high knowledge and 7 percent possessed low knowledge.

Hussen (2001) in his study found that 84 percent of the fanners had medium knowledge, 13 percent had high knowledge and the lowest proportion (3 percent) possessed low knowledge on modern sugarcane cultivation practices.

Mannan (2001) conducted a study on knowledge about food and nutrition of the farmers under Proshika Mung and found that the highest proportion (75 percent) of the respondents fell in the medium knowledge level, while 9 percent of the respondents fell in the low knowledge level and 16 percent in the high knowledge category.

Saha (2006) made an attempt on farmers knowledge in improved practices of pineapple cultivation and found that the majority (62 percent) of the farmers possessed good knowledge, 33 percent poor knowledge and only 5 percent possessed excellent knowledge.

Nurzaman (2000) found that 60 percent of the FFS (Fanners Field School) farmers had medium, 25 percent low and 15 percent high agricultural knowledge. The majority (55 percent) of the non-FFS farmers had low agricultural knowledge and the rest 45 percent had medium agricultural knowledge.

Nurzaman (2000) also in his study assessed knowledge, attitude and practices FFS and non-FFS farmers in respect of IPM. He found that 47 percent of the FFS farmers have medium, 32 percent had high and 21

percent had low IPM knowledge, while 98 percent non-FFS farmers had low and only 2 percent had medium IPM knowledge.

Hossain (2000), while determining farmers' knowledge and perception of Binadhan-6 in the Boro season, found that the highest proportion (65 percent) of the farmers possessed medium knowledge, 21 percent low knowledge and lowest proportion (14 percent) possessed high knowledge.

Khan (1996) conducted a research on the effectiveness of "A Farmers Primer on Growing Rice" in knowledge change of the farmers in Shakhipur thana and found that 67 percent farmers had good knowledge at initial stage (before the treatment) where 21 percent had excellent knowledge and 12 percent had poor knowledge's.

Parveen (1995), in her study, found that 58 percent of the farm women had moderate knowledge while 35 percent had high and 7 percent had poor knowledge on the use of fertilizers, pesticides and irrigation water.

Ratnakar et al. (1991) conducted a study on knowledge of Tribal Farmers about Recommended Farm Practices. They found that 53 percent of the tribal farmers had low level of knowledge about recommended practices, while 31 percent and 16 percent of them had medium and high level of knowledge, respectively.

Singh and Prashad (1990) conducted a study on farmers choice of information sources and knowledge of afforestation technology of salt affected soil. They also found that 19 percent of the farmers had high level of knowledge, 73 percent of the farmers had medium level of knowledge and 8 percent of the farmers had low level of knowledge.

Rahman et al. (1988) conducted a study on health cover practices of poultry and found that 26 percent of the farm women possessed low level knowledge while four percent possessed medium level and none possessed high level of knowledge.

Huque (1985), following a study on a quasi-experimental design, tested rice farming knowledge of field extension agents employed in two provinces-Leyte and Southern Leyte of the Philippines. The number of agents were 44 selected randomly from each province.

Their rice farming knowledge was measured before the intervention (treatment). Results showed that 75 percent possessed low knowledge and 25 percent possessed high knowledge by the Leyte agents. The percentages of the knowledge in that level orders were 70 and 30, respectively for southern leyte. The t-statistics show, that there was no differences in rice farming knowledge between the agents in two locations.

Ahmed (1974) ascertained farmers knowledge of five aspects of farming. The comprehensive knowledge scores show that 44 percent of the farmers possessed low knowledge, 41 percent medium knowledge and 15 percent high knowledge.

2.3 Relationship Between Farmers' Characteristics and Knowledge of Innovations

2.3.1 Age and knowledge of innovation

Saha (2006) found no relationship between poultry fanners[1] age and their knowledge on poultry production.

Sana (2007) in his study found that age of the farmers had no significant relationship with their knowledge of shrimp culture.

Saha (2006) in his study found that age of the System of Rice Intensification (SRI) farmers had a negative and significant relationship with their knowledge about SRI. Similar findings were also observed by Hussen (2001) and Hossain (2001).

Sarker (2002) conducted a study on farmers' knowledge and attitude towards BRRI Dhan29 variety office and found that the age of the farmers was not related to farmer's knowledge on BRRI Dhan29.

Saha (2006) made on attempt on fanners' knowledge on improved practices of pineapple cultivation and found that the age of the farmers had no significant relationship with their knowledge on improved practices of pineapple cultivation.

Rahman (2001) conducted a study to determine the knowledge, attitude and adoption of the farmers regarding Alok 6201 hybrid rice. He found that age of the fanners was not related to farmers' knowledge on Alok 6201 hybrid rice.

Hossain (2000) in his study found that age of the farmers' had no significant relationship with their knowledge on Bina dhan-6 technology.

Nandiwal et al (1999), in their study, on knowledge and adoption level of the fanners about rice production technology. The research was conducted at Kheda district of Gujarat State. They found that age of the farmers had non-significant correlation with their knowledge about rice production.

Mostafa (1999) in his study found that the age of the mango growers had a negative significant relationship with their knowledge on mango cultivation.

Khan (1996) conducted a research on the effectiveness of "A Farmers Primer on Growing Rice" in knowledge change of the fanners in Shakhipur thana. He found that age of the respondent had no role with the three dependent variables namely, initial rice knowledge, final rice knowledge and knowledge gain.

Islam (1993), in his study, concluded that age of the BSs had no significant relationship with their knowledge on modem agricultural technology.

Narwal et al. (1991) found that age of the fanners had significant association with their knowledge about improved buffalo management practices.

Rathore and Shakhawat (1990) conducted a study on knowledge of farm women towards agricultural innovations of hybrid Bajra cultivation. They found age of the women was not associated with their knowledge of Bajra cultivation.

Rayspreddy and Jayaramaiah (1989) revealed that age of the VEOs showed negative relationship with their knowledge level on rice production technologies.

Kashem (1987) in his study on the small farmers' constraints to the adoption of modern rice technology found that age of the farmers had significant negative correlation with their agricultural knowledge.

Hansra and Chopra (1986) found that there was a significant negative con-elation between gain in knowledge about cattle diseases and age of the respondents i.e., the more was the age of the respondents, less was their gain in knowledge.

Chandargi (1980) found that there was significant association between age and knowledge gain as a result of training.

Bhaskaram and Mahajan (1968) reported that young farmers had gained more information on agricultural technology.

2.3.2 Education and knowledge of innovation

Saha (2006) found among the six independent variables only education was positively and significantly related at 0.01 level of probability with poultry farming knowledge.

Sana (2007) conducted a research on a farmers' knowledge of shrimp culture and found that the education of the respondents showed positive relationship with their knowledge in shrimp cultivation.

Saha (2006) found that the education of the SRI farmers had a positive and significant relationship with their knowledge about SRI. Similar findings were also observed by Kumari (1988), Khan (1996), Hussen (2001) and Hossain (2001).

Hossain (2003) conducted a study on farmers' knowledge and adoption of modern Boro rice cultivation practices and found that the education of the respondents had significant and positive relationship with their knowledge on modern Boro rice at 0.001 level of probability.

Sarker (2002) conducted a research on farmers' knowledge and attitude towards BRRI Dhan29 variety of rice and found that education of the respondents had positive relationship with their knowledge of BRRI Dhah29.

Saha (2006) found that the education of the farmers had a positive significant relationship with their knowledge on improved practices of pineapple cultivation.

Hossain (2000) found that the education of the respondents had significant positive relationship with their knowledge on Binadhan-6.

Hazarika et al. (1999) conducted a study on relative influence of socio-personal, psychological and communicational traits of the farmers on gain in knowledge in plain and hilly areas of Kamrup district of Assam. He found that both in hilly and plain areas, education of the respondents was positively and significantly related to their knowledge gain.

Khan (1996) in his study found that formal education was related to both their initial rice knowledge (r=0.42) and their final rice knowledge (r=0.33). But he also found that concerned variable was not related to their knowledge gain (r=0.02).

Islam (1993) found that the general education of the BSs had no significant relationship with their knowledge on modern agricultural technologies. However, the trend of relationship between general education and knowledge on modem agricultural technologies was negative.

Kumari (1988) from a study on communication effectiveness of selected mass media concluded that there was a significant association between education of the respondents (women) and attitude towards the message and knowledge level.

Kashem (1987) in his study revealed that there was no significant relationship between education of the farmers and their agricultural knowledge.

Hansra and Chopra (1986) found that education and knowledge gain in cattle diseases through telecasts have highly significantly positive relationship.

Baodgaonkar (1983) and Rathore and Shakhawat (1990) reported in their study that fanners' education was significantly related with their knowledge. Banerjee (1976) and Chandargi (1980) reported that farmers' education was significantly related with their knowledge.

2.3.3 Family size and knowledge of innovation

Sana (2003) found that family size of the members was not related to their knowledge of shrimp culture.

Hossain (2003) in his study found that family size of the fanners was not significantly related to farmers' knowledge on modern Boro rice cultivation practices.

Rahman (2001) conducted a research on knowledge, attitude and adoption of the farmers regarding Aloke 6201 hybrid rice and reported that family size of the farmers was not significantly related to farmers' knowledge on Aloke.

Saha (2001) found that family size of the farmers had no significant relationship with their knowledge on improved practices of pineapple cultivation.

Hossain (2000) found that family size of the farmers had significant positive relationship with their knowledge on Binadhan-6.

Rathore and Shakhawat (1990) found that the knowledge about improved agricultural practices of Bajra cultivation by farm women was found to be significantly associated with their size of family.

Kashem (1987) also did not find any significant relationship between family size and agricultural knowledge of the farmers.

Yasmin (1987) showed that family size of the poultry farmers had significant positive relationship with their knowledge on poultry production.

Shidhu (1980) found that family size was not associated with the level of knowledge toward dairying.

2.3.4 Farm size and knowledge of innovation

Hossain (2003) in his study found that the farm size of the respondents had positive and significant relationship with their knowledge on modern Boro rice at 0.05 level of probability.

Sarker (2002) also found that there was a positive relationship between farm size of the farmers and their knowledge of BRRI Dhan29.

Hossain (2000) found that farm size of the farmers had no relationship with their knowledge of Binadhan-6. Hossain (2001) in his study similar findings.

Khan (1996) in his study indicated that farm size of the respondent was not significantly related to their initial rice knowledge, final knowledge and knowledge gain.

Ali (1984) found that farm size of the contact and non-contact farmers had significant positive contribution to their agricultural knowledge.

Sharma and Sonoria (1983) found that both the contact and non-contact farmers were different in their size of operational holdings. However, they found no significant differences in knowledge of both the contact and non-contact farmers with the size of their operational holdings.

Ahmed (1974) found that there is a significant relationship between farm size of the farmers and their agricultural knowledge.

2.3.5 Annual income and knowledge of innovation

Boadgaonkar (1983) reported an association ship between family income and knowledge. On the other hand, vishnoi and Bose (1961), Chandgargi (1980) and Sadagath (1986) have revealed the absence of association between family income and gain in knowledge if new technology among persons.

Singh (1991)found in the study that income of the farmers was associated with the level of knowledge of plant protection measures. He also found the low income farmers had grater tendency to apply less than the recommended dose and lack of knowledge was found major reasons for non adoption.

Hamid (1995) found a positive relation between family income of the farmers and their awareness on environmental pollution.

Perveen (1995) in her study observed that there was a relationship between income and awareness on environmental degradation.

Farhad (2003) found that annual income for rural income women income had significant positive relationship with their knowledge of IPM in vegetable cultivation.

Hossain (2003) found that income of the rural women farmers had negative relationship with their knowledge of modern boro cultivation.

2.3.6 Cropping intensity and knowledge of innovation

Cropping intensity and knowledge of innovation no direct study on this relationship was available in Bangladesh or India. However, only three studies relating to cropping intensity and adoption could be located from Indian Literature and Bangladesh. These are reviewed.

Rahman (2003) conducted a study on adoption of intercropping in pineapple cultivation in three selected villages. He found a significant and positive relationship between cropping intensity and adoption of intercropping pineapple cultivation.

Pathak and Sasmal (1992) undertook a study on adoption of jute technologies in West Bengal. They found no relationship between jute crop intensity and adoption of jute technology.

Katarya (1989) conducted a study on association of farmers' characteristics with adoption of wheat technology in two district of Haryana. He did not find significant relationship between cropping intensity and adoption of wheat technology.

2.3.7 Organizational participation and knowledge of innovation

Sana (2007) found that organizational participation of the farmers had a significant relationship with their knowledge in shrimp cultivation.

Hossain (2003) in his study found that organizational participation of the farmers had positive and significant relationship with their knowledge on modern Boro rice cultivation practices at 0.01 level of probability.

Sarker (2002) revealed that organizational participation of the fanners was significantly related with their knowledge and attitude towards BRRI Dhan29 variety of rice.

Saha (2006) conducted a study and found that organizational participation of the farmers had a significant relationship with their knowledge on improved practices of pineapple cultivation.

Hossain (2000) found no significant relationship between organizational participation of the fanners and their knowledge on Binadhan-6.

Hazarika (1999) in his study found that social participation of the respondents was significantly associated with their knowledge gain both in plain area and hilly areas of Assam.

Khan (1996) revealed that farmers' organizational participation had insignificant relationships with their initial rice knowledge, final rice knowledge and knowledge gain.

Rahman (1995) in his study found that organizational participation of potato growers had no relationship with their knowledge regarding improved practices of potato cultivation.

Sharma and Sonoria (1983) in their study found that contact fanners' knowledge varied significantly with social participation; while adoption of both contact and non-contact farmers differed significantly with their social participation.

Ahmed (1974) concluded that there was a relationship between organizational participation of farmers and their agricultural knowledge.

2.3.8 Innovativeness and knowledge of innovation

Saha (2006) in his study found that innovativeness of the fanners had a positive and significant relationship with their knowledge about SRI.

Mamun (2002) found that there was no significant difference between the knowledge and innovativeness categories of the farmers.

Amin (2001) observed higher average innovativeness among Poverty Elimination Though Rice Research Assistance (PETRRA) and non-PETRRA beneficiaries with their knowledge on organic cocoon and skills on production, processing and storing of rice seeds.

Sharma and Sanoria (1983) observed a higher average innovativeness among contact fanners than the non-contact farmers. They also found that knowledge of both the contact and non-contact farmers differed significantly with their innovativeness.

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2.9.9 Communication exposure and knowledge of innovation

Sana (2007) found that media exposure of the farmers had a significant positive relationship with their knowledge of shrimp culture.

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Hossain (2003) in his study found that communication exposure of the respondents had significant and positive relationship with their knowledge on modern Boro rice cultivation practices at 0.001 level of probability.

Sarker (2002) in his study found the media exposure of the fanners was significantly related with their knowledge on BRRI Dhan 29 variety of rice.

Hossain (2000) concluded that media exposure of the fanners had a positive significant relationship with their knowledge of Aloke 6201 hybrid rice.

Nandiwal el al. (1999) conducted a research on knowledge and adoption level of the fanners about rice production technologies and concluded that extension contact of the farmers had significantly influenced farmers' knowledge.

Khan (1996) found an insignificant relationship between extension contact of the farmers and their initial knowledge, final knowledge and also knowledge gain.

Rahman (1995) studied farmers' knowledge on improved practices on potato cultivation by the farmers of Kajipur upazila under Sirajgonj district. The study-indicated a significant relationship between extension contact and knowledge of improved practices on potato cultivation.

Islam (1991) in his study found that extension contact was significantly related with their agricultural knowledge. Haque (1993) also found a positive relationship between extension contact and adoption of improved practices.

Kaur (1988) found that extension contact and mass media exposure had significant influence upon opinion and level of knowledge on selected program among the rural women.

Ali (1984) found that contact and non-contact farmers differed significantly in respect of their media exposure. He observed that media exposure of the contact and non-contact fanners had significant contribution towards their agricultural knowledge.

Ahmed (1974) found that there is a significant positive relation between extension contact of the farmers and their agricultural knowledge.

2.4 Problems and knowledge of Innovation

The study of Ali (1999) revealed that knowledge of the rural youth had significant positive relationship with their anticipated problem confrontation in self-employment by undertaking selected agricultural income-generating activities.

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

Mansur (1989) found in his study that there was a substantial significant negative relationship between knowledge in feeds and feeding cattle of the farmers and their problem confrontation in feeds and feeding. Similar findings were obtained by Sarker (1983), Ragman (1995), Hossain (2002) and Ahmed (2002) in their respective studies.

2.5 Conceptual Model of the Study

The present study would be tried to focus two concepts; first the farmers' selected characteristics and the second, their knowledge on maize cultivation. Knowledge on maize cultivation of an individual may be influenced and affected through interacting forces in his surrounding. Knowledge on maize cultivation and individual farmer may also be influenced by these personal, economic, social and physiological characteristics. In this study, farmers characteristics and their problems have been taken into consideration. Moreover, it is quite impossible to deal with

all the characteristics which including age, education family size, farm size, annual income, cropping intensity, organizational participation, innovativeness and communication exposure. These nine (9) characteristics are the independent variables of this study, while Knowledge on cultivation being the main focus of the study constituted the only dependent variable. On the basis of above discussion and review of literature, the theoretical framework of this study has been structured as shown in figure 2.2

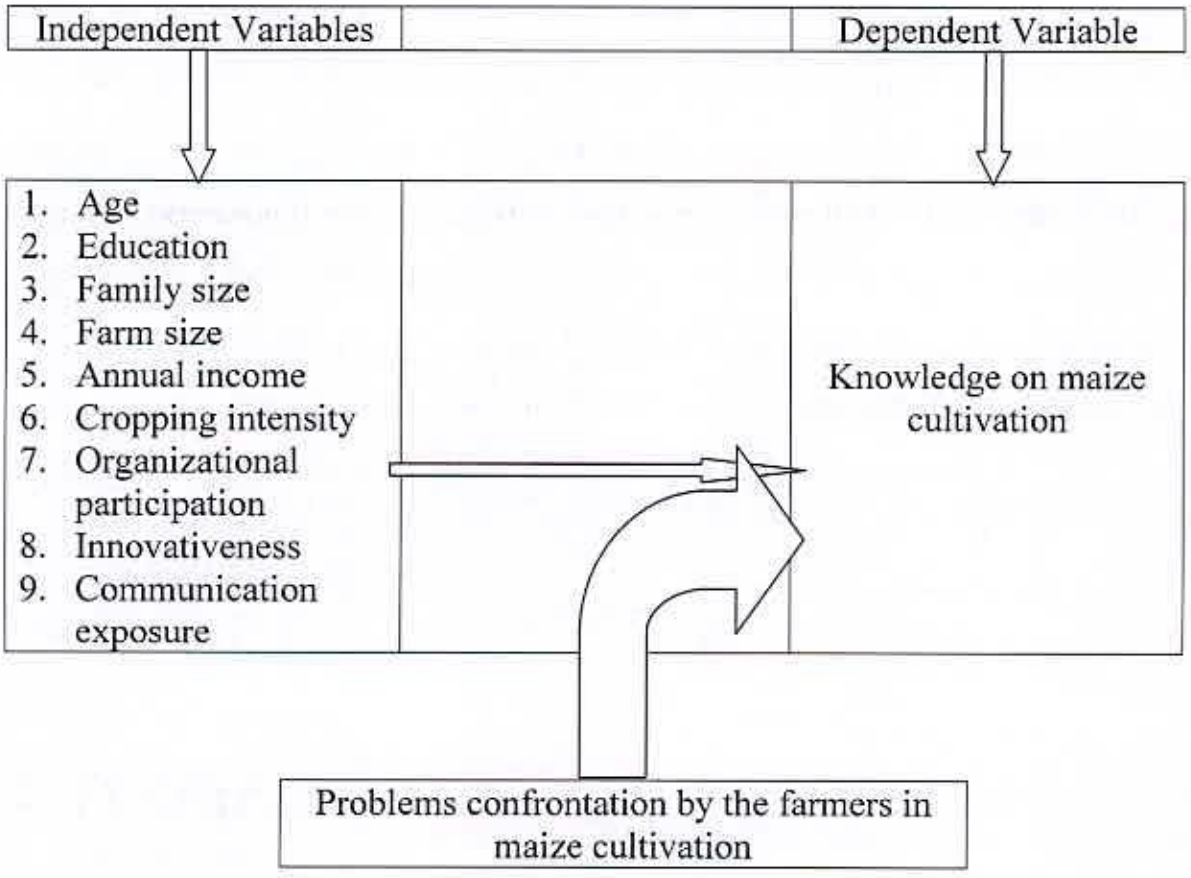

Figure : 2.2 The conceptual model of the study

CHAPTER -3
METHODOLOGY

Methods and procedures that were used for collection and analysis of data which are very important in any scientific investigation. Appropriate use of method and procedures in research helps to collect valid and reliable data and analyze the information to arrive at correct and meaningful conclusion. From this point of view, the researcher took great care in using suitable methods. Methods and procedures that were followed in this study are discussed in this chapter.

3.1 The locale of the study

Five villages of Shibalaya upazila, under Manikgong district was purposely selected as the locale of the study. The area of the upazila is 201.00 square kilometer. In the year of 2007-08, maize cultivated area of this Upazila was 415 ha, and the yield was 21 lac metric ton. In the year of 2008-09, maize cultivated area was 220 ha & the yield is 22 lac metric ton as reported by Upazila Agriculture office, Shibalaya, Manikgong.

The study was conducted in five villages in shibalaya upazila of manikgong district. The villages are very near from the shibalaya upazila headquarters. The map of manikgong district and shibalaya upazila showing the study area have been presented in fig. 3.1 and fig. 3.2.

3.2 Population and sample of the study :

The maize farmers of purposely selected five villages of Shibalaya Upzila were taken into consideration for this study. An up to date list of all maize farmers were prepared with the help of SAAO, upazila Agriculture office, shibalaya, Manikgong. Thus, 550 maize farmers of the five selected villages constituted the population of the study. Respondents were then selected at

the rate of 20 percent following simple random sampling method (Kerlinger, 1973). The number of samples drawn was 110. Moreover, a reserve list of 20 farmers was prepared for use when the farmers under samples where not available during data collection. Thus, 110 maize farmers were the sample of the study. The distribution of the selected farmers along with reserve list in the selected villages are shown in Table 3.1.

Table 3.1 Distribution of population and sample of the study

Name of villages	Total number of maize farmers	Number of sample drawn	Number of reserve farmers
Mahadebpur	180	32	5
Rupsha	165	30	4
Utholy	70	14	4
Tapra	60	13	2
Taota	75	21	5
total	550	110	20

3.3 The research instrument and its preparation :

An interview schedule was used as the data gathering instrument. The interview schedule was prepared considering the objectives of the study. The questions and statements contained in the schedule were simple, direct and easily understandable by the maize farmers. The schedule contained questions to reflect farmers characteristics of age, education, farm size, family size, annual income, cropping intensity of their land, innovativeness, communication exposure and organizational participation. On the basis of pretest experience, necessary correction, modification and adjustment were made before finalizing the interview schedule. The interview schedule was then printed in its final form and was multiplied for collecting data from the respondents. The English version of the interview schedule has been attached to appendix – A.

Selection of Study Area

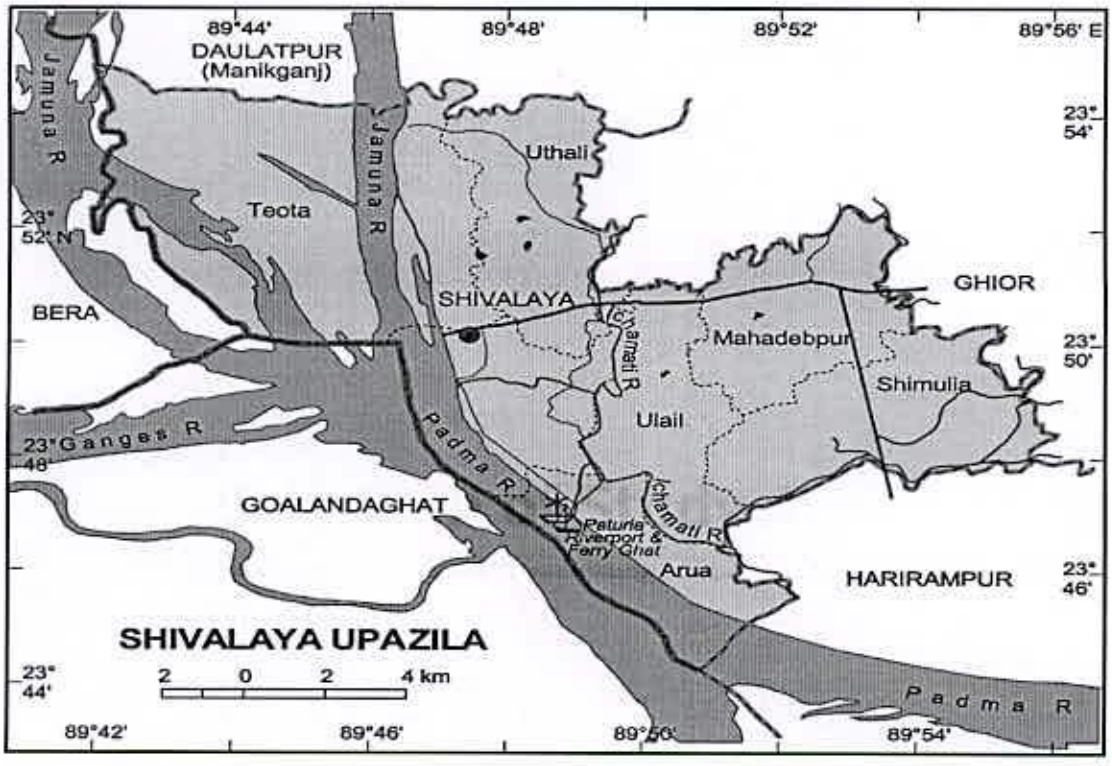

Fig. Map of Shivalaya Upazila Showing the locale of the study area

Selection of Study Area

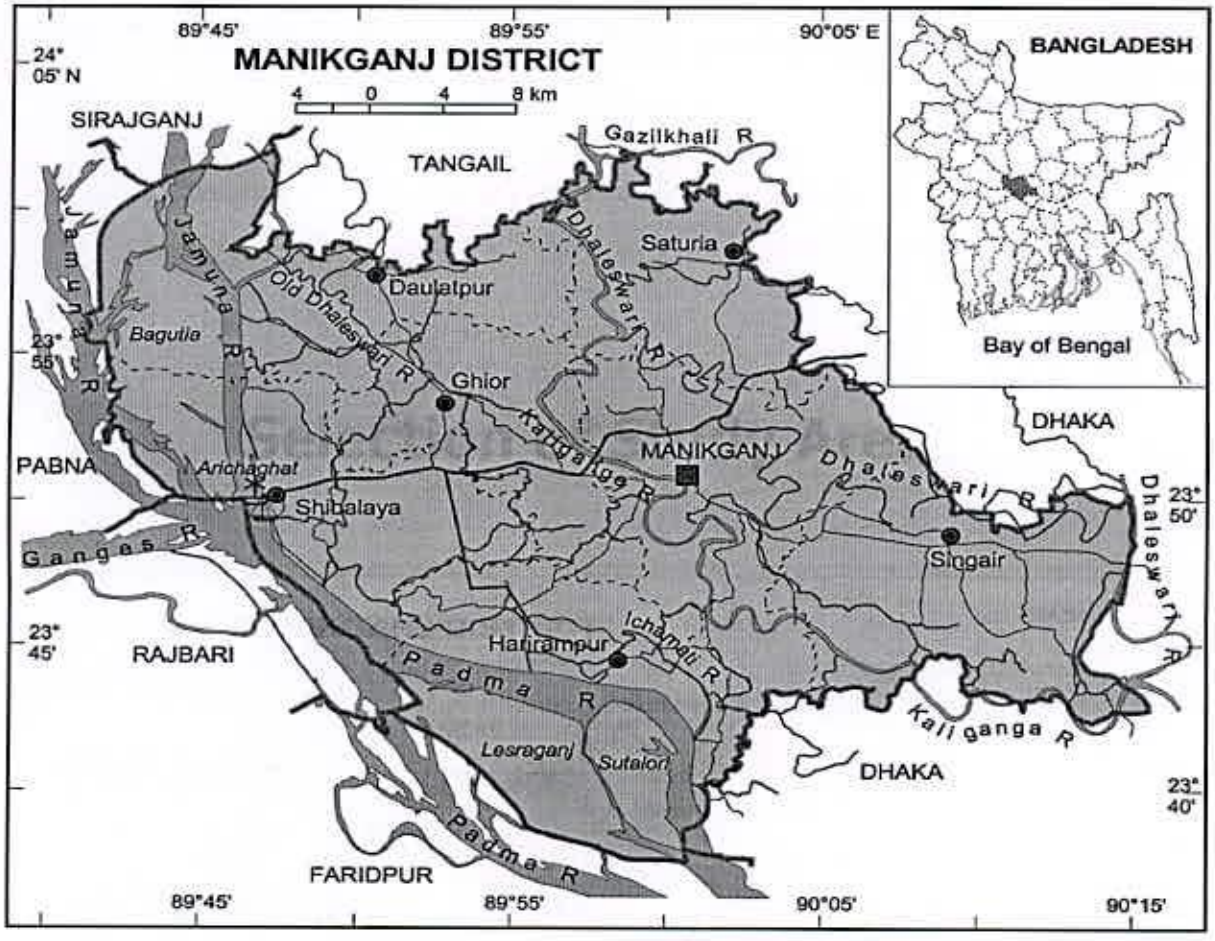

Fig. A map of Manikganj district showing locale of he study

3.4 Measurement of variables

Measurement of variables constitutes an important task of social research. Ezekiel Karl and fox (1959) defined a variable as any measurable characteristics, which can assume different values in successive individual cases. Tow types of major variables of major variables were used in the study e.g. independent and dependent variable. Townsand (1953) defined an independent variable as that factors manipulated by the experimenter in his attempt to ascertain its relationship to an observed phenomenon. He further defined a dependent variable as that factor which appears, disappear or varies as the experimenter introduces, removes or varies the independent variable.

Nine selected individual characteristics of maize farmers constitute independent variables. These were age, education family size, farm size, annual income, cropping intensity of their land, organizational participation innovativeness and communication exposure. Farmers' knowledge on maize cultivation was the dependent variable of the study. Measurement procedures of the variables are described below.

3.4.1 Measurement of Independent variables :

3.4.1.1 Age

The age of the respondent was measured in actual years from his birthday to the time of interview. A score of one was assigned to each year of age.

3.4.1.2 Education

Education was measured as the ability of the respondent to read and write or the formal education received up to a certain standard. A score of one (1) was assigned for each year of schooling in a formal institution.

A score of 0.5 was given to the respondent who could sign only. A score of zero (0) was given to the respondent who could not read and write.

3.4.1.4 Family Size :

Family size of a respondent was measured in terms of actual number (dependents) of members in his family (including himself) during the time of interview. A score of one (1) was assigned for each member of the family without discrimination between a new born baby and an old member.

3.4.1.4 Farm Size :

Farm size of a farmer was measured as the area of land on which he was farming during one year period upto data collection. It was measured in hectares on the basis of the land area used by a farmer using the following formula:

$$FS=A_1+ A_2+ \frac{1}{2} (A_3+A_4) + A_5$$

Where,

FS = Farm Size

A_1 = Home stead area

A_2 = Area of own land under own cultivation.

A_3 = Area of land taken on borga from others.

A_4 = Area of land given to others on borga.

A_5 = Area of land taken from others on lease.

Data were collected primarily on local unit of measurement or easy communication with the farmer. However, these were later converted into hectare.

3.4.1.5 Annual income :

Annual income of a respondent was measured in taka on the basis of his total yearly earning from different sources (e.g. service, farming, business and others) in last year. A score of one (1) was assigned for each thousand taka. This variable appears in item no 5 in the interview schedule as presented in Appendix – A.

3.4.1.6 Cropping intensity :

In order to measure cropping intensity, each respondent was asked to mention the number of crops (one, two or three) cultivated in his farm during the last one year i.e. the respondents were asked to mention the area of single cropped land, double cropped land and triple cropped land. Then the cropping intensity of a respondents farm was measured by using the following formula:

$$\text{Cropping intensity} = \frac{\text{Gross cropped area}}{\text{Net cropped area}} \times 100$$

Where,

Gross cropped area = single cropped land. X 1 + double

Cropped land X 2+ triple cropped land X 3.

Net cropped area = Single cropped land + double cropped land + triple cropped land.

3.4.1.7 Organizational Participation :

The respondent's participation in different organization during the last five years computed organizational participation on the basis of nature of participation. The participation score multiplied by its duration (i.e. number of year) to obtain organizational participation score. Scores were assigned for participation of a respondent on an organization in the following manner.

Nature of participation	Score
No participation	0
Participation as ordinary member	1
participation as executive committee member	2
Participation as executive committee officer	3

Organizational participation (OP) score of a respondent for one organization was computed by using following formula:

$OP = Y\ P_{OM} \times 1 + Y\ P_{EM} \times 2 + Y\ P_{EO} \times 3$

OP = Organizational participation

P_{OM} = Participation as ordinary member.

P_{EM} = Participation as executive committee member.

P_{EO} = Participation as executive committee officer.

N = Number of organization.

Y = Duration of participation in year.

Organization participation score of a respondent was determined by summing the participation score in all the organizations.

3.4.1.8 Innovativeness :

Innovativeness is the degree to which an individual adopts an innovation relatively earlier than other members in a social system. (Rogers, 1995). Operationalization of innovativeness in some past researches seems to have partially done.

Innovativeness of maize grower was measured by computing an innovativeness score on the basis of his adoption of 11 selected agricultural technologies. Score was assigned on the basis of time dimension. Since the exact data of introduction of the selected technologies in the study area was

specifically known, the relative earliness of the adoption of a particular technology by a respondent was ascertained by considering how long before he first adopted that technology prior to the data of interview. The higher the length of time of his first adoption, the more earlier he was adopting the technology than other members of his social system. A score of one (1) was given for 7^{th} year of adoption, two (2) was given for 6^{th} year of adoption, three (3) was given for 5^{th} year of adoption, four (4) was given for 4^{th} year of adoption, five (5) was given for 3^{rd} year of adoption, six (6) was given for 2^{nd} year of adoption and seven was given for 1^{st} year of adoption of a particular technology prior to the date of interview. However, when a farmer discontinued it for a year, he was given zero. The scores for all the 11 technologies were added together to constitute the innovativeness score of a respondent. This score, thus, could range from 0 to 77, Zero (o) indicating no innovativeness at all and 77, highest degree of innovativeness. The variable appears in item no 7 in the interview schedule as presented in Appendix–A.

3.4.1.9 Communication exposure :

Extension media contact score of a respondent was measured on the basis of his extent of his contact with 14 selected media. For a particular media, a respondent was asked to mention his nature of contact namely frequently, occasionally, rarely and not at all where and the corresponding score given as 3, 2, 1 and 0 respectively. The scoring system for extension media contact was done in the following manner detailed scale could be seen in item no. 8 in interview schedule as presented in Appendix–A.

	Sl. No.	Extant of communication	Extant of use	Score assigned
Personal	1	Upazila agriculture officer (UAO) Additional Agriculture officer (AAO)/ Agriculture extension officer (AEO)	Not at all Rarely Occasionally Frequently	0 1 2 3
	2	Sub-assistant agriculture officer (SAAO)	Not at all Rarely Occasionally Frequently	0 1 2 3
	3	NGO worker	Not at all Rarely Occasionally Frequently	0 1 2 3
	4	Farm input dealer	Not at all Rarely Occasionally Frequently	0 1 2 3
	5	Ideal maize farmer	Not at all Rarely Occasionally Frequently	0 1 2 3
	6	Negihbour/ friend/ relative	Not at all Rarely Occasionally Frequently	0 1 2 3
Group	7	Group meeting/ Gr. Discussion	Not at all Rarely Occasionally Frequently	0 1 2 3
	8	Agricultural training programme	Not at all Rarely Occasionally Frequently	0 1 2 3
	9	Result demonstration plots	Not at all Rarely Occasionally Frequently	0 1 2 3
	10	Local Leader	Not at all Rarely Occasionally Frequently	0 1 2 3
Mass	11	Daily newspaper	Not at all Rarely Occasionally Frequently	\0 1 2 3
	12	Agricultural magazine (e.g. Krishi katha)	Not at all Rarely Occasionally Frequently	0 1 2 3
	13	Watching agricultural programme in TV (e.g. Manto-Manush, Ridoyee Mati-O-Manush)	Not at all Rarely Occasionally Frequently	0 1 2 3
	14	Listening to radio programme relating to agriculture (e.g. Desh Amar Mati Amar)	Not at all Rarely Occasionally Frequently	0 1 2 3

The range of extension media contact score could vary from 0 to 42. When '0' indicate no contact and 42 for highest level of contact.

3.5 Problem Confrontation :

Ten statements were enlisted in the interview schedule as the major problems being faced by the farmers with maize cultivation. The statements of the problems were identified following the consultation with different stakeholders, e.g. upazila Agriculture officer (UAO), Additional concerned sub-assistant Agriculture officer (SAAO), community leaders and farmers. Problems were measured by using a four point rating scale. A score of 3, 2, 1 and 0 were assigned to indicate extent of problems as high, moderate, little and not at all, respectively. The problem confrontation score was computed for each respondent by adding his scores for all 10 problems. The theoretical problem score were 0 to 30. Where zero (o) indicates no problem at all and 30 indicates highest level of problem confronted by the farmers in maize cultivation.

For clear understanding of problem confrontation on maize cultivation of the maize farmers, index for each item, along with rank order was computed by using the following formula :

Problem Index (PI) = $P_{npc} \times 0 + P_{lpc} \times 1 + P_{mpc} \times 2 + P_{hpc} \times 3$

Where,

P_{npc} = Number of the farmers with not at all problem conformation.

P_{lpc} = Number of the farmers with low problem conformation.

P_{mpc} = Number of the farmers with medium problem conformation.

P_{hpc} = Number of the farmers with high problem conformation.

Problems index (PI) is respect of maize cultivation could range 0 to 330. Where 0 indicate no problem confrontation and 330 indicate high problem confrontation.

3.6 Measurement of Dependent Variable :

There was a single dependent variable as farmers knowledge on maize cultivation. Farmers knowledge was computed by using a test that consisted of twenty (20) multiple choice questions and five (5) true-false statement. In the multiple choice format, three answers were provided for a single question, one of which was the correct answer most perfectly. A score of one(1) was given for identifying the correct answer. For true-false statement a score of one (1) was given for a true answer. But a score of zero (o) was given when he was unable to answer or gave a wrong answer. Knowledge score was computed by the scores obtained in both the multiple choice scores & true – false scores. Knowledge score of a respondent could range 0 to 25, where zero (0) indicating no knowledge and 25 indicating vary high knowledge about maize cultivation of respondent.

3.7 Hypothesis of the study :

In order to study relationship between the variables, the null hypothesis was developed. "There is no relationship between farmers knowledge on maize cultivation and their selected characteristics."

3.8 Data Collection :

Data were collected by means of interviewing the selected sampled of maize farmers. The researcher himself collected data for this study from 17 February to 17 March, 2009. But to get to know the selected farmers and establishing rapport during data collection, the researcher had to seek help from local leaders of the study area. Before going to the respondents home for interviewing, they were informed verbally to ensure their availability at

home as per schedule date and time. If any respondent failed to understand any questions, care was taken to explain the issue. Ten respondents from the reserve list were interviewed because the respondents were repeatedly unavailable for data collection. In some cases the respondents felt shy to give answer at some aspect of questioning.

3.9 Data coding and tabulation

Based on the available data, a coding plan was prepared following the level of measurement. The coded data were entered into a master code sheet for all variables.

3.10 Data processing and statistical analysis :

The coded data were put into the computer for statistical analysis. For analysis, statistical measures like frequency, percentage distribution, range, mean and standard deviation were used to describe the variables. Correlation co-efficient (r) was used, depending upon the level of measurement, for testing hypothesis. Five percent (0.05) level of probability was used for rejecting a null hypothesis.

CHAPTER - 4

FINDINGS AND DISCUSSION

In this Chapter, the findings of the study and their logical interpretation have been presented according to the objectives of the study. The chapter has been divided into four sections. The first section deals with the selected characteristics of maize growers. The second section deals with farmers problem on maize cultivation. The third section deals with farmers knowledge on maize, cultivation; while the fourth section deals with the relationships of the farmers characteristics on the one hand and their knowledge on maize cultivation, on the other.

4.1 Selected characteristics of the Maize Growers

The nine (9) selected characteristics of maize farmers included are their age, education, family size, farm size, Annual income, cropping intensity, organizational participation, innovativeness and communication exposure. The salient feature of these characteristics are shown in table 4.1

Table 4.1 salient features of the individual characteristics of maize farmers

Characteristics	Scoring system	Range	
		Possible	Observed
Age	Years	—	23—70
Education	Year of schooling	—	0—14
Family size	Numbers	—	3—15
Farm size	Hectare	—	
Annual income	'000' taka	—	0.26—2.99
Cropping intensity	Percent	0-100	172—266
Organizational participation	Score	0-150	10—42
Innovativeness	Score	0-77	18—58
Communication exposure	Score	0-42	8—23

4.1.1 Age of the farmers

The range of farmers' age was found to be 23 to 70 years, the mean being 44.19 years and standard deviation was 10.89. Based on their age distribution, the farmers were classified into three categories namely, "young" (up to 35), "middle aged" (36-55) and old (above 55). The distribution of farmers according to their age is shown in Table 4.2.

Table 4.2 Distribution of the farmers according to their age

Age category (Years)	Farmers		Mean	Standard deviation
	Number	Percent		
Young (up to 35)	27	25	44.19	10.89
Middle aged (36-55)	66	60		
Old (above 55)	17	15		
Total	110	100		

The highest proportion (60 percent) of the farmers fell in the "middle aged" category, while 25 percent of them fell in the "young" category and 15 percent fell in the "old" category (Table 4.2). It shows that 85 percent of the farmers belonged to the young and middle aged groups. It can be assumed that majority of them were generally more energetic and presumably in active habits. Also by proportion, majority (60 percent) belonged to the middle-age group. Development psychologists observed that highest achievement of human beings take place in the middle-aged category. Thus, the study area has the propensity of being innovative in general.

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4.1.2 Education of the farmers

Education of the farmers' ranged from 0 to 14, the mean and standard deviation being 4.21 and 4.06, respectively. On the basis of their educational scores, the farmers were classified in to the following five categories as shown in Table 4.3.

Table 4.3 Distribution of the farmers according to their educational level

Education category (Score)	Farmers		Mean	Standard deviation
	Number	Percent		
Illiterate (0)	22	20	4.21	4.06
Can sign only (0.5)	20	18		
Primary level (1-5)	29	26		
Secondary level (6-10)	34	31		
Above secondary level (above 10)	5	5		
Total	110	100		

It is evident from Table 4.3 that the largest proportion of 31 percent of the farmers fell under the category of "secondary level" compared to 20 percent with no education or illiterate, 18 percent can sign only, 26 percent having primary level and 5 percent having above secondary education. It also indicates that 62 percent of he maize farmers were educated which varied from primary level to above secondary level

Hossain (2003) in his study found similar findings. He observed that 39 percent farmers had secondary level, 19 percent farmers had primary level, 11 percent farmers had above secondary level, 21 percent farmers could sign only and 10 percent farmers had no education. Bashar (1993) and Ali (1993) also found similar findings. They found that the highest number of cane growers had secondary level education.

Education makes the development of human mind and it increases the power of one's observation, analysis, understanding, decision making and adjusting to new situations, favorable or unfavorable. Educated person can take risks to a greater extent. Also education develops mental and psychological ability of a person to understand, decide and adopt new ideas and practices.

4.1.3 Family size of the farmers

The family size of the respondents ranged from 3 to 15 members, the mean being 6.75 with a standard deviation, 2.74. On the basis of their family size scores, the farmers were classified into three categories namely "small family" (3-4), "medium family" (5-7) and "large family" (above 7). The distribution of the farmers according to their family size is shown in Table 4.4.

Table 4.4. Distribution of the farmers according to their family size

Family size category (number)	Farmers		Mean	Standard deviation
	Number	Percent		
Small family (3-4)	25	23	6.75	2.74
Medium family (5-7)	46	42		
Large family (above 7)	39	35		
Total	110	100		

Data in Table 4.4 indicate that 23 percent of the farmers had small family size compared to 42 percent who belonged to "medium category" and 35 percent to "large category". The average family size of 6.75 in the study area is higher than that of the national average of 5.6. The family planning activities presumably been continuing since many years ago, but its performance does not seem to be satisfying.

Hussen (2001) in his study found similar findings. He observed that 19 percent fanners had small family, 40 percent had medium family and 41 percent had large family.

Family size is a fundamental social unit, or social grouping, the members of winch are is a by bonds of kinship. The characteristics of the family including its size determines largely the character and structure of the society. Family background also influences a person's bebaviour, social position and out look of life. It could be good source of acquiring knowledge also.

4.1.4 Farm size of the farmers

Farm size of the farmers varied from 0.26 to 2.99 hectare. However, the mean of farm size was 0.94 hectare and standard deviation of 0.47. The fanners were classified into categories according to their farm size based on DAE's methodology (DAE, 1995). However, two categories e.g., marginal farmers and large farmers were not observed in the data. Thus, they were classified as "small farm" (up to 0.99 ha) and "medium farm" (1- 2.99 ha). The distribution of the farmers according to their farm size is shown in Table 4.5

Table 4.5 Distribution of the farmers according to their farm size

Farm size category (hectare)	Farmers		Mean	Standard deviation
	Number	Percent		
Small farm (up to 1 ha)	70	64	0.94	0.47
Medium farm (1.0 1-3 ha)	40	36		
Total	110	100		

Data presented in Table 4.5 shows that a majority of 64 percent fanners possessed small farm compared to 36 percent who possessed medium farm and none had marginal or large farms. The average farm size of the farmers was 0.94 ha which is slightly higher than national average (0.81 ha). It may indicate that the socio-economic levels of the farmers in the study seems to be slightly better than in comparison to general context of Bangladesh.

4.1.5 Annual income

The annual income scores of the maize growers ranged from 59 to 425 thousand taka. The mean was 112.27 taka and standard deviation was 46.84. On the basis of annual income the respondents were categorized into three groups as shown in table 4.6

Table 4.6 classification of maize farmers according to their annual income

Categories	Annual income (000' taka)	farmers		mean	standard deviation
		number	percent		
Low income	up to 60	1	1	112.27	46.84
Medium income	61—120	73	66		
High income	Above 120	36	33		
Total		110	100		

Data presented in a table 4.6 that the highest proportion (66 percent of the respondents had medium had medium income that was followed by low (1 percent) and high (33 percent) income earners Generally higher income gives an individual better status in the society. Therefore, the higher income increases the risk taking capacity of the farmers in maize cultivation.

4.1.6 Cropping intensity of the maize farmers

Cropping intensity of farmers' land varied from 172 to 266 with an average 212.98 and standard deviation 21.22. On the basis of cropping intensity, the farmers were classified into three categories as shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their/cropping intensity

Cropping intensity category (percent)	Farmer		Mean	Standard deviation
	Number	Percent		
Low cropping intensity (172-203)	11	10	212.98	21.22
Medium cropping intensity(204- 235)	59	54		
High cropping intensity (236-266)	40	36		
Total	110	100		

Table 4.7 reveals that the largest proportion of the fanners (54 percent) had medium cropping intensity, while 36 percent had high cropping intensity, and 10 percent farmers had low cropping intensity. The average cropping intensity was 212.98 percent which was higher than the national average of 179 percent and that of Manikgonj region of 190 percent, respectively (BBS/DAE–2009)

It is encouraging that the cropping intensity of the study area is quite satisfactory. It indicates that farmers are using their land productively to grow more crops. This indicates that crop diversification programme of the Government might have increased the cropping intensity of the area.

4.1.7 Organizational participation of farmers

The range of organizational participation scores was 10 to 42 with a mean of 21.87 and standard deviation of 7.61. On the basis of organizational participation scores, the farmers were classified into three categories: "low participation" (10–20), "medium participation" (21–31) and "high participation" (32–42). The distribution of the farmers according to their organizational participation is shown in Table 4.8.

Table 4.8. Distribution of the farmers according to their organizational participation

Organizational participation category (score)	Farmers		Mean	Standard deviation
	Number	Percent		
Low participation (10–20)	58	53	21.87	7.61
Medium participation (2 1-31)	40	36		
High participation (32-42)	12	11		
Total	110	100		

Table 4.8 reveals that the majority (53 percent) of the fanners had low participation organizations, 36 percent had medium participation and only 11 percent had high participation. So, organizational participation of the maize farmers were not satisfactory. Participation in different organizations brings an individual to come in contact with persons of various occupational and social status. This may broaden his out look and vision. Organizational participation helps to identify the problems and find out their solutions. Informal exchange of ideas in organizational participation helps in decision making in various issues including fanning innovations.

4.1.8 Innovativeness of the farmers

The observed innovativeness score ranged from 18 to 54 against the possible range of 0 to 77. The mean of the innovativeness scores of the farmers was 37.97 and standard deviation was 9.71. Based on the innovativeness scores, the respondents were classified into three categories as shown in the Table 4.9.

Table 4.9 Distribution of farmers according to their innovativeness

Innovativeness categories (scores)	Fanners		Mean	Standard deviation
	Number	Percent		
Low innovativeness (18-30)	32	29	37.97	9.71
Medium innovativeness (31-42)	63	57		
High innovativeness (43-54)	15	14		
Total	110	100		

Data presented in the Table 4.9 reveals that the highest portion (57 percent) of the fanners had medium innovativeness, while 29 percent of the farmers had low innovativeness and 14 percent of the farmers had high innovativeness. The study area thus could be considered as a progressive rural community where innovation diffusion has the propensity to succeed.

4.1.9 Communication exposure of farmers

The range of media exposure of the farmers varied from 8 to 23 with an average 13.92 and standard deviation of 2.76 against the theoretical range of 0 to 42. Based on media exposure, farmers were classified into two categories, "relatively low exposure" (8–16), and "relatively high exposure" (17–23). Table 4.10 shows the distribution of the farmers according to their media exposure.

Table 4.10 Distribution of maize farmers according to their media exposure

Media exposure categories (scores)	Farmers		Mean	Standard deviation
	Number	Percent		
Relatively low (8- 16)	90	82	13.92	2.76
Relatively high (17-23)	20	18		
Total	110	100		

Table 4.11 indicates that 82 percent of the fanners had relatively low media exposure and 18 percent had relatively high media exposure. Media exposure is important for receiving farm information through various teaching methods. But in the study area, fanners are generally poor in their media exposure.

4.2 Problems faced by the farmers in maize cultivation

The theoretical range of problem scores could be 0 to 30 where 0 indicated no problem and 30 highest level of problem faced by the farmers. The observed problems scores ranged from 12 to 30 with a mean 24.99 and standard deviation of 4.05. On the basis of these data, maize farmers were classified into three categories as shown in Table 4.10.

Table 4.11 Distribution of maize farmers according to their problem

Categories of farmers on problem faced (scores)	**Farmers**		**Mean**	**Standard Deviation**
	Number	**Percent**		
Low problem (12–18)	12	11	24.99	4.05
Medium problem (19–24)	18	16		
High problem (25–30)	80	73		
Total	110	100		

Data indicated that majority (73 percent) of the farmers faced problems at the high level compared to 16 percent who faced problems at a medium level. This means that 89 percent farmers faced problems at a medium to high levels. Generally, the extent of problems faced by the farmers was quite high.

The farmers who grew maize were asked to express their problems in order of importance based on a three point rating scale. The data observed are presented in table 4.12.

Table : 4.12 Frequency distribution and rank order of different problems faced by the farmers

Sl. No.	Statement of problems	Extent of problem				Problem index (P1)	Rank order
		High (3)	Moderate (2)	Low (1)	Not at all (0)		
1	High input cost (seed, fertilizer, pesticide etc.)	98	05	04	03	308	1
2	Low scope of marketing	99	01	08	02	307	2
3	Lack of hybrid seed	90	14	02	04	300	3
4	Lack of technical information	95	03	08	04	299	4
5	Low market price	87	12	04	07	289	5
6	Low scope for consuning as food	73	25	10	02	279	6
7	Non availability of credit	73	14	15	08	262	7
8	Threshing problem	68	20	17	05	261	8
9	Non availability of land	55	37	11	07	250	9
10	Less irrigation facilities	47	14	26	23	195	10

Table 4.12 indicates the relative importance of the problem faced by the farmers based on the problem index (PI). It reveals that 'High input cost' with a P1 of 308 was the greatest problem. The nature of other problems can be seen from the table low score of marketing on the basis of PI (307). "Lack of hybrid seed" was ranked third on the basis of PI (330).

4.3 Farmers Knowledge on Maize Cultivation

Farmers' knowledge scores could theoretically range from 0 to 25. But the observed knowledge score of the farmers ranged from 17 to 23. The mean of this was 19.92 and a standard deviation of 1.31. Since the knowledge did not appreciably vary, these categories were made which are "high" (17-20), "very high" (21-23). The distribution of the farmers according to their level is shown in Table 4.13.

Table 4.13 Distribution of the farmers according to their knowledge level

Farmers' knowledge level	Farmers		Mean	Standard deviation
	Number	Percent		
High knowledge (17-20)	75	68	19.92	1.31
Very high knowledge (21-23)	35	32		
Total	110	100		

Table 4.13 indicates that highest proportion (68 percent) of the farmers possessed high knowledge, while 32 percent of the farmers possessed very high knowledge. It was interesting that media exposure of the farmers was not satisfactory but their knowledge of maize cultivation is very good.

General performance of the farmers in their knowledge test could be well compared with the studies of Sana (2007), Sarker (2002), Hossain (2000), Khan (1996) and Huque (1985). Sana's study have dealt with farmers knowledge of shrimp culture Sarker's study have dealt with farmers knowledge of and attitude towards BRRI dhan-29 variety. Hossain dealt with farmer's knowledge of and perception of BINA dhan-6, while khan and Huque went to assess their subjects' performance on rice farming knowledge. The number of test item in Sana, Sarker and Hossain study were 20, 25 and 25, but Khan and Huque had 80 items in each case. Also in the present study, the number of test items was 25, which is equal to that of Hossain and Sarker.

The knowledge of the farmers at different cognitive level followed different methodological approach and as such a comparison of these findings in precise term is difficult. However, the means of knowledge score of the authors Sana (2007); Sarker (2002), Hossain (2000), Khan (1996), Huque (1985) and the present study were 11.96, 17.16, 11.69, 36.53, 40.50 and 19.92 respectively.

The test items of Sana (2007), Sarker (2002), Hossain (2000), Khan (1996), Huque (1985) and this study were 20, 25, 25, 80, 80 and 25 respectively. The study of Sana was done in Bangladesh with the shrimp farmers. The studies of Sarker, Hossain, Khan and the present ones were done is Bangladesh (the former three in rice and the last on in maize). However, Huque assessed rice production of change agents in the Philippines. The proportions of mean knowledge score against the concerned test item number were 0.48 for Sana, 0.42 for Sarker, 0.46 for Hossain, 0.46 for Khan, 0.50 for Huque and 0.79 for this study. Thus'it could be observed that fanners in the present study had the highest level of performance in their knowledge level.

4.4 Relationship Between the Selected Characteristics of the Farmers and Their Knowledge on Maize Cultivation

As mentioned earlier, the nine selected characteristics of the maize farmers were the independent variables of the study. These were age, education, family size, farm size, annual income, cropping intensity organizational participation. Innovativeness and communication exposure. Knowledge was the dependent variable of this study.

The purpose of this section is to explore the relationship of the selected characteristics of the farmers with their knowledge on maize cultivation. Pearson's Product Moment co-efficient of correlation (r) was used to reject a null hypothesis relating to the relationship between the variables concerned. Results by the tests of co-efficient of correlation between the dependent and independent variables are shown in Table 4.16. The test of hypotheses by 'r' is presented in Table 4.14.

Table 4.14 Co-efficient and correlation (r) showing relationships between independent and dependent variable farmers' knowledge on maize cultivation (N= 110)

Characteristics of the farmers (Independent variables)	Co-efficient correlation (r) with 108 DF	Table value significant at	
		0.05 level	0.01 level
Age	-0.105^{NS}	0.186	0.243
Education	0.297**		
Family size	-0.133^{NS}		
Farm size	-0.49^{NS}		
Annual income	0.201*		
Cropping intensity	-0.184^{NS}		
Organizational participation	-0.137^{NS}		
Innovativeness	0.031^{NS}		
Communication exposure	0.251**		

* = Significant at 0.05 level, ** = Significant at 0.01 level
NS = Non-significant

4.4.1 Age and knowledge on maize cultivation

The relationship between age of the farmers and their knowledge of maize cultivation, as reflected by the 'r' value (-0.105), revealed a negative insignificant relationship. Thus the null hypothesis could not be rejected. The researcher concluded that age of the farmers was not related to their knowledge of maize cultivation practices. Sana (2007) found that age was insignificantly related to knowledge on shrimp culture with a negative trend (r= 0.107). Khan (1996) found that age was not related to farmers' knowledge on rice (r = 0.01). Hossain (2000), Mannan (2001) also found similar findings. Thus, it can be concluded that age of the client systems is not a factor to contribute in their knowledge acquisition process.

4.4.2 Education and knowledge on maize cultivation

The education of the farmers and their knowledge of maize cultivation was tested by the null hypothesis; "There is no relationship between education and their knowledge in maize cultivation." The relationship reflected by the observed 'r' value (0.297) in Table 4.14 leads to the following observations:

* The relationship showed a positive trend.
* The null hypothesis was rejected and observed value of 'r' was significant at 0.01 level of probability.

Based on the findings, education of the respondents had positive relationship with their knowledge in maize cultivation. Khan (1996), in a Bangladeshi study, found that both formal education and functional literacy had positive and significant relationship with rice farming knowledge even at 0.001 level of probability. A similar also found by Sarker (2002), having conducted a study on BRRI dhan 29 farmers (r = 0.668**). Sana (2007), also found that education of the farmers and their knowledge level held a positive significant association at 0.01 level of probability.

Education helps individuals gain knowledge and skills in different cognitive contents and develop positive attitudes. It helps to learn the general behvaiour in the family and community. When an individual attains education, he is likely be exposed to different communication media. Such communication exposure, especially to mass media (print), would broaden his outlook and help develop rationality and knowledge in the concerned field. This would ultimately increase their power of observation and decision making.

4.4.3 Family size and knowledge on maize cultivation

The computed 'r' value -0.133 (Table 4.14) shows an insignificant relationship between the concerned variables. Thus, the null hypothesis could not be rejected. Thus, the researcher concluded that family size of the farmers had no relationship with their knowledge on maize.

Khan (1996) found an insignificant relationship between family size and rice farming knowledge of the farmers. Sana (2007), Sarker (2002), Saha (2006). Nandiwal *et al.* (1999) also found similar findings. Thus, it could fairly be concluded that family age plays no role in knowledge acquisition process.

4.4.4 Farm size and knowledge on maize cultivation

The observed 'r' value (0.049) being insignificant it was concluded that farm size of the respondents had no relationship with their knowledge of maize cultivation. Khan's (1996) findings also corroborated the present findings. Besides Sana (2006), Hossain (2001), Saha (2007) and Hazarika (1999) found insignificant relationship between farm size and their knowledge gain but Sarker (2002) found a significant relationship. This shows that client systems acquire and retain knowledge irrespective of whether they possess big farms or small farms.

4.4.5 Annual income and knowledge on maize cultivation

The relationship between annual income of the respondents and their knowledge on maize cultivation was examined by testing the null hypothesis. "There is no relationship between annual income of the maize farmers and their knowledge on maize cultivation." The calculated value of 'r' 0.201 as present in Table 4.14 which was greater than that of the tabulated value of r (0.186) with 108 degrees of freedom at 0.05 level of probability. Hence, the concern null hypothesis was rejected and therefore, it could be concluded that annual income of the maize farmers had a significant positive relationship with their knowledge on maize cultivation. The findings are quite logical, because the farmers who earn more and cultivate such kind of crops.

4.4.6 Cropping intensity and knowledge on maize cultivation

The relationship between cropping intensity of the farmers land and their knowledge on maize cultivation was examined by testing the concerned null hypothesis; "There is no relationship between cropping intensity and their knowledge." Correlation co-efficient observed as r= -0.184 leads to the following observations:

* The relationship showed a negative trend.
* The relationship is non significant.

From the above findings, the null hypothesis is could not be rejected and hence the researcher concluded that cropping intensity of the farmers land had a negative insignificant relationship with their knowledge on maize cultivation.

4.4.7 Organizational participation and knowledge on maize cultivation

The observed 'r' value (r =–0.137) between the organizational participation of the farmers and their knowledge of maize led to insignificant relationship between the variables (Table 4.16). Thus, the null hypothesis could not be

rejected and hence the researcher concluded that the organizational participation of the farmers had an insignificant and negative relationship with their knowledge on maize cultivation. Khan (1996) also found an insignificant relationship between the same variables. But Sana (2007) found a significant relationship between organizational participation and farmers' knowledge in shrimp cultivation.

4.4.8 Innovativeness and knowledge on maize cultivation

The observed 'r' value (0.031) in Table 4.14 led the researcher fail to reject the null hypothesis. Hence, the researcher concluded that innovativeness of the farmers had "no relationship with their knowledge of maize cultivation. The operationalization of innovativeness was accomplished exhaustively which differs conceptually from most past studies. It was done on two essential dimensions e.g., (i) how earliest a farmer had used an innovation after it had reached to the community; and secondly, (ii) what was his behaviour in its continuity over the period till the time of data collection. Thus, all possible measures were taken conceptually for validity of the variable's operationalization. Also utmost care was taken by the researcher during field work for valid data and incidentally the researcher hails from that area and knew some of them personally.

It seems that farmers' knowledge acquisition and retention proceed in a way without regard to their being innovativeness- a trait that every extensionist would most appreciate of that his client system. The behavioural characteristics of the innovative farmers could be that they accept the innovations in their earliest opportunity than other community farmers, but they don't go well through these innovations of their cultural practices. There may have a reflection of the old proverb, "Jack of all trade, but master of none." The innovative farmers are mostly apt in adopting earlier, but they hardly try to know thoroughly cognitive aspects of those adopted innovation

such that their innovativeness show no relationship with knowledge, This finding bears similarity of that found in the relationship of intensity and knowledge.

4.4.9 Communication exposure and knowledge on maize cultivation

The relationship between communication exposure of the farmers and their knowledge on maize cultivation, as reflected by the 'r' (0.251) led the researcher to observe that a positive significant relationship exists at 0.01 level of probability. Thus, the null hypothesis was rejected. So, the researcher concluded that media exposure of the farmers had a significant and positive relationship with their knowledge of maize cultivation practices.

Sana (2007), Sarker (2002), Rahman (2001), Nurzaman (2000) and Nandiwal et al. (1999) also found the similar findings. The findings have trends to show a cause-effect relationship in that if farmers are exposed to media, the effect is know ".edge gam and vis-a-vis adoption although statistically 'r' does not reflect a cause- effect relationship. However the relationship observed depicts mostly a universal phenomenon.

In developing countries such as Bangladesh, a significant proportion (although not necessarily the majority) of the client systems do not posses functional literacy This group especially comes in contact with the farming innovations through the use of various communication media. It was revealed earlier that communication level of the maize farmers was generally low, but this low level communication had played a significant role in farmers' knowledge acquisition process. It could be assumed that knowledge has been related to adoption of maize innovations which remained beyond the scope of this innovation.

CHAPTER - 5

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

The economy of Bangladesh is predominantly based on agriculture that contributes to 23.87 percent of the GDP and utilizes 62 percent of the available labour force. Around 77 percent of her people live in rural areas and depend mostly on agriculture for their livelihood. Of all agricultural crops, maize is the third cereal crop in Bangladesh. Per unit yield of various crops in Bangladesh are miserably low due to improper management of production technologies. Bangladesh Agricultural Research institute (BARI) has been working since 1970 in agricultural research. It released some an improved maize variety, BARI hybrid Bhutta–1 in 2000 which possesses favorable characteristics that suits to the maize farming system of the country. In the locale of the study, some maize farmers are growing BARI hybrid Bhutta–1. Besides this are BARI Bhutta-5, BARI Bhutta-6 and Barnali are also growing here . Among the characteristics these three verities have some differences in their size of cob, life cycle and yield. However, one common characteristics of these varieties is that these can be grown in both Rabi and Kharief season.

The introduction of maize in the farming system has been increasing over time. Therefore, farmers' knowledge in maize cultivation along with related phenomena need to be empirically observed. Thus a study entitled, "Farmers' knowledge of maize cultivation in Shibalaya upazila was undertaken with the following specific objectives:

1. To determine and describe the selected characteristics of the maize farmers.

The selected characteristics were :

i) Age

ii) Education

iii) Family size

iv) Farm size

v) Annual income

vi) Cropping intensity of their land

vii) Organizational participation

viii) Innovativeness

ix) Communication exposure

2. To ascertain farmers knowledge on maize cultivation.
3. To explore the problems faced by the farmers in maize cultivation.
4. To explore the relationship between each of the selected characteristics and their knowledge on maize cultivation.

The study was conducted in five selected villages of Shibalaya upazila under Manikgonj district where maize is grown quite extensively. An up to date list of all maize farmers of the selected villages was prepared with the help of Sub-Assistant Agriculture Officer (SAAO). A total of 550 constituted the population of the study where 110 farmers were selected following simple random sampling method.

An interview schedule was used to collect socioeconomic data of the farmers. However, as an innovative operationalization of superstition and knowledge a scale and a test were developed respectively. All possible measures were taken to make the scale and test reliable and valid. Data were collected by the research himself over, 17 February to 17 March 2009.

5.1.1 Characteristics of the farmers

Age of the farmers ranged from 23 to 70 years, the average being 44.19 years. Fifty one percent of the farmers were middle aged, 25 percent were young and 24 old. About 76 percent of the farmers belonged the young-middle.

The education scores of the farmers ranged from 0 to 14, the mean being 4.21. Thirty one percent (31) of the farmers were secondary level of education, 5 percent farmers were above secondary level and the 20 percent were illiterate, 18 percent of the fanners were can sign only and 26 percent of the fanners were primary level.

The family size of the respondent ranged from 3 to 15 with a mean of 6.75 where 42 percent farmers had medium family, 35 percent had large family and 23 percent had small family.

The farm size of the farmers ranged from 0.26 to 2.99 hectares. Majority of the fanners (64 percent) had small farm size, 36 percent had medium farm size and none had large farm and marginal farm.

Annual income score of the respondents ranged from 59 to 425 with an average of 112.27. Majority of the respondents (66 percent) had medium income followed by 1 percent and 33 percent low and high income respectively.

Cropping intensity scores ranged from 172 to 266 percent with an average 212.98 percent. Fifty four (54 percent) of the farmers had medium cropping intensity while 36 percent fanners had high cropping intensity 10 percent fanners had low cropping intensity. Thus the cropping intensity of the area was quite satisfactory since 212.98 percent farmers stand above the national figure of 179 percent.

Organizational participation score range from 10 to 42 where the mean was 21.87. Greater proportion, 53 percent had low participation while 36 percent had medium participation and only 1 1 percent had high participation.

The innovativeness score of the farmers ranged from 18 to 54 with an average of 34.97. Majority of the farmers 57 percent had medium innovativeness and 14 percent had high innovativeness and 29 percent fanners had low innovativeness.

Media exposure of the fanners ranged from 8 to 23 with an average of 13.92. An overwhelmingly of 82, percent of the farmers had relatively low exposure and 18 percent had relatively high exposure. Thus fanners' exposure to communication media was miserably low in this age of information technology.

Knowledge scores of the fanners ranged from 17 to 23 with a mean 19.92. Sixty eight percent of the fanners had relatively low knowledge and 32 percent of the fanners had relatively high knowledge.

Problem scores of the farmers ranged from 12 to 3 1 with a mean of 24.99. Majority of the fanners (73 percent) faced high problem, while 16 percent of the fanners had medium problems and 11 percent farmers had low problems.

5.1.2 Results of hypothesis testing

Based on the level on measurement test of hypotheses were accomplished by Coefficient Correlation (r). The findings are as follows :

Farmers knowledge on maize cultivation was positive and significantly related to each of their education annual income and exposure to communication media.

Farmers age, family size, farm size, cropping intensity of their land, organizational participation, innovativeness and problem confrontation were not related to their knowledge on maize cultivation.

5.2 Conclusions

Based on the findings of this study and their logical interpretation, the following conclusions were drawn :

1. A majority (76 percent) of the farmers belonged to the young and middle aged categories. These age groups are the most productive stage in all developments of one's life. Further age was not related to knowledge possessed. It is thus concluded that age is not a factor in acquisition of knowledge and farmers with all age levels except under aged could be equally responsive to develop their cognitive component.

2. The findings showed that 62 percent of the farmers were literate. There exusted a positive significant relationship between education and knowledge on maize cultivation. Thus, it may be concluded that educational foundation of the study area provides a unique opportunity to work with different innovations including maize.

3. The average family size of the study area is 6.75 and it is higher than the national figure of 5.6. Forty two (42) percent of the farmers had medium family size compared to 35 percent having large family and 23 percent having small family size. Also their family size was not related to their knowledge. It may be concluded that families with big-or small size had the equal propensity of gaining knowledge on maize.

4. The average farm size of study area is 0.94 ha which is not much higher than the national figure of 0.81 ha, However, farm size was not related to knowledge. The conclusion follows that farmers with different farm size does not discriminate their acquisition of knowledge.

5. About 100 percent of maize growers had medium to high income indicating that of comparatively suitable economic standing. The farmers who earn more, he has more chance to cultivate such crops. So maize farmers income had a significant positive relationship with their knowledge on maize cultivation.

6. The average cropping intensity of the study area is 212.38 percent, which is higher than the national figure of 179 percent. A majority of 54 percent maize growers had a medium cropping intensity, 36 percent high and 10 percent had low cropping intensity. Further, cropping intensity was negatively and insignificantly related. The conclusion may follow that the Crop Diversification Project of the DAE is beset with challenges of non-adoption of recommended practices.

7. It was observed that 53 percent fanners had low organizational participation, while 47 percent had medium to high participation. Again organizational participation was not related to the knowledge. Thus, it may be concluded that organizational participation could not be an intervening variable unless fanners are organized with specific goal of technology diffusion.

8. Majority of the (57 percent) farmers had medium innovativeness, while 29 percent had low and 14 percent had high innovativeness. The findings of the study showed that innovativeness had no significant relationship with their knowledge of maize cultivation. Thus, it may be concluded that innovativeness of the client systems seems to have no role in technology diffusion. Further, farmers are earlier in their adoption, but only shows their mental readiness for adopt innovativeness earlier, but they don't show the other desired behaviors e.g., to know more or presumably to adopt. Also innovativeness was significantly related to farm size at 0.01 level of probability.

9. Most of maize growers (73 percent) faced high problems, while 16 percent medium and 11 percent low problems. The problem confrontation was related significantly not positively but negatively to the knowledge. Therefore, it is concluded that with the solution of problems, it is likely to increase maize production knowledge and consequently lead to adoption of maize.

10. Majority (68 percent) of the farmers had high level of knowledge, while 32 percent of them very high level of knowledge.

5.3. Recommendations

Based on the findings and conclusions derived from this study, the following recommendations could be made:

5.3.1 Recommendations for policy implication

1. Majority of the maize farmers belong to young to middle-aged groups and age is not related to the knowledge. It is recommended that extension services be extended to all farmers irrespective of their age levels.

2. One plausible explanation for inadequate use of communication media in Bangladesh lies on farmers large illiteracy. But in the study area, literacy rate was quite high and it was related to their knowledge gain. Also it was observed that media exposure of the clients was generally unsatisfactory. It is thus, recommended that adequate number of leaflet, poster, booklet, manual agricultural magazine be published or developed following some principles. Also the use of Upazila Agriculture Officer. NGO field worker and result demonstration plot, training programme by the fanners among the individual and group contact methods was also unsatisfactory. These also need to be used for developing a communication strategy.

3. There was relationship between family size and knowledge. This mean-interaction of the farmers, who in most cases is the head of family, with other members do not take place. Also it could be assumed that other members do not have anything new that the farmers could know in farming. Thus, it is recommended that other potential adult male members of the family be also recipient of development messages of the GOs and NGOs. This would make a communication network in the familial system.

4. Organizational participation of the farmers in the study area is very low. But it is very important for the farmers in changing their attitudes, and cognitive behaviours including adoption of innovation. Also organizational participation provides group approach in extension which is one of the principles of NAEP. Group serves a very good catalytic force in extension work. But group organization for the farmers is yet to develop. Thus, it is recommended that the farmers be organized into groups by the Department of Agricultural Extension. This is one of lacking elements in the DAE compared to their counterparts at the NGOs.

5. Interestingly innovativeness was not related to knowledge. This means the innovative farmers only take opportunity to adopt innovation. But they don't seem to be different in knowledge level than less innovative farmers. Adopting relatively early is a very good characteristics of the 'Innovators' and 'Early Adopters'. And most leadership role is demonstrated by the 'Early Adopters'. Thus, it is recommended that both these two groups be identified and special training programmes be arranged to serve then as source of information and leaders.

6. It was observed that 68 percent of the farmers had relatively low and 32 percent farmers had relatively high knowledge. So, it is strongly recommended that adequate support and training facilities be extended to ensure application of scientific cultivation practices of maize.

7. Extension services should provide improved farm management practices to all categories of farmers in order to raise this production our enhance farm income.

5.3.2 Recommendations for further study

1. The study was conducted in selected villages of Shibalaya upazila under Manikgonj district. Similar studies be undertaken in other parts of the country- where extension programmes on maize is being conducted.

2. This study investigated the relationship of nine characteristics of the farmers with their knowledge on maize cultivation the latter being the single dependent variable. Therefore, it is recommended that further studies be conducted with other independent and dependent variables.

3. Knowledge of the fanners in maize cultivation has been investigated in this study. It is also necessary to study and compare fanners' knowledge on other agricultural crops including vegetables and fruits.

4. The study revealed that farmers exposure to maize cultivation messages remains confined to interpersonal (e.g. contact with farm input dealer, relatives and SAAOs) and mass contact methods (e.g. radio and television). It is recommended that effectiveness of major media be studied preferably following experimental design.

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Appendix–A

Interview Schedule

Department of Agricultural Extension & Information system

Sher-e-Bangla Agricultural University.

Sher-e-Bangla Nagar

Dhaka-1207.

* Interview schedule on the research study entitled "Farmers Knowledge on Maize cultivation in five selected villages of Shibalaya Upazila under Manikgang District."

Sample No: .....

Name of the respondents.

Village:-.....

Union.....

Upazila-.....

District-.....

Please provide information on the Following aspects:

1. Age:

   What is your age? ☐ years

2. Education:

   What is your level of education?

   i. I passed.....examination

   ii. I studied up to class.....

   iii. I can read and write only (Yes/No)

   iv. I can sign only (Yes / No)

3. Family size :

   Please mention the number of your family members . ☐

4. Farm size :

Mention the area of your land according to use.

Type of land	land area	
	Local unit	Hectare
Homestead		
Own land under own cultivation		
Land taken from others on borga		
Land given to others on borga		
Land taken form others on lease		
Others		
Total		

5. Annual income:

Give particulars about your income from different source from the last one year.

i. Service and other profession .....taka

ii. From crops (vegetable, fruits, field crops) .....taka

iii. From animal, poultry and fish .....taka

iv. From business .....taka

v. From other source .....taka

.....

Total income =

6. Cropping intensity :

Please mention about your land use for farming during the last one year

Sl. No.	extent of land intensity	Land area	
		Local unit	hectare
1.	Singled cropped land		
2.	Double cropped land		
3.	Tripled cropped land		
4.	Net cropped land		
5.	Gross cropped land		

7. Organizational participation

Please state your nature and extent of participation in the following organizations during the last 5 years

Sl. No	Name of the organization	Not involved	Name and extent of participation		
			Ordinary member (year)	Executive committee member (year)	Officer of the executive committee president/ secretary/ Treasurer etc. (year)
1	Krishi Shamabya Shamittee				
2	Youth Shamittee				
3	School Committee				
4	Union Parished Committee				
5	Madrasha committee				
6	Mass Education Committee				
7	Mosque Committee				
8	NGO Shamittee				
9	Bazar Committee				
10	Others (please specify)				

8. Innovativeness :

Please mention the nature of adoption of the following innovations during the last seven years

Sl. No.	Innovation	In which year the innovation was first introduced in your locality?	Year in which you adopted the innovation first?	Put a tick mark (√) reflecting of continuity of your adoption in the following years							Do not use
				1st	2nd year	3rd year	4th year	5th year	6th year	7th year	
1	Cultivation of BARI Hybrid Bhutta-1 variety										
2	Use of mechanical maize sheller										
3	Use of Integrated pest management (IPM) technology										
4	Use of Bio-fertilizer										
5	Use of drum seeder										
6	Use of preventive medicines/ injection for poultry rearing										
7	Maize cob (baby corn) consumed as a vegetable										
8	Use of LCC (leaf color chart)										
9	Rice cum fish culture										
10	Use of seed treatment agent										
11	Use of gutti urea										

9. Communication exposure :

Please state your extent of contact with the following agricultural extension media :

Information source			Extent of contact			
			Not at all	Rarely	Occasionally	Frequently
Personal	1	Upazila agriculture officer (UAO) Additional agricultural officer (AAO)/ Agriculture Extensions officer (AED)		1-3 times/ year	3-4 times/ year	≥5 times/ year
	2	Sub Assistant agricultural officer		1 time/ month	2-3 time/ month	≥ 4 times/ month
	3	NGO worker		1-2 times/ month	3-4 time/ month	≥ 4 times/ month
	4	Farm input dealer		1-2 times/ month	3-4 time/ month	≥5 times/ month
	5	Ideal maize farmer		1-2 times/ month	3-4 time/ month	≥ 5 times/ month
	6	Negihbour/ friend/ relative		3-4 times/ month	5-6 time/ month	≥7 times/ month
Group	7	Group meeting/ group discussion		3-4 times/ year	5-6 times/ year	≥7 times/ month
	8	Agricultural training programme		1 time/year	2-3 times/year	≥ 4 times/ month
	9	Result demonstration plots		1-2 times/ year	3-4 times/ year	≥ 5 times/ month
	10	Local leader		1 time/ month	2-3 times/ month	≥ 4 times/ month
Mass	11	Daily news paper		1-2 times/ week	3-4 times/ week	≥5 times/ week
	12	Agricultural (magazine eg. krishi katha)		1-2 times/ week	3-4 times/ week	≥5 times/ week
	13	Television (e.g. mati-o- manush, ridoyee mati-o-manush)		1-2 times/ week	3-4 times/ week	≥5 times/ week
	14	Listening to radio programme relating to agriculture (e.g. desh amar, mati amar)		1-2 times/week	3-4 times/week	≥5 times/ week

10. Problem confrontation :

Sl. No	Problems	Extent of problem			
		High	Moderate	Low	Not at all
1	Non- availability of hybrid seed				
2	Lack of technical information				
3	Non-availability of credit				
4	Less irrigation facilities				
5	Low market price of maize				
6	Low scope of marketing				
7	High input cost (seed, fertilizer, pesticide etc)				
8	Low scope for consuming as food				
9	Threshing problem				
10	Non availability of land for maize cultivation				

ITEMS OF KNOWLEDGE TEST

A. multiple choice questions

Each of the following question is followed by a set of answers as a, b and c of which one reflects the most correct answers. For each correct answer, the respondents could get 2 (two) marks.

1. Which of the following is a variety of maize?
   (a) Akbar... (b) Mohor .... (c) Kanchan...
2. What kind of maize is used to prepare parched corn?
   (a) Barnali... (b) Khoibhutta.... (c) Suvra...
3. Which crop may be grown as inter crop with maize?
   (a) Bhutta+Groundnut... (b) Bhutt+Wheat... (c) Bhuta+Jute...
4. Which of the following chemical is used for seed treatment of maize?
   (a) Vitavax-200.... (b) Agro son... (c) Malathion..
5. Which one is a hybrid variety of maize?
   (a) Barnali.. (b) BARI hybried-1... (c) Mohar...
6. Which crop is use for fodder crop?
   (a) Maize (b) Jute (c) sugarcane
7. Whcih disease is common in maize?
   (a) Bakani (b) Seed rot (c) Black band
8. Which type of land is suitable for maize cultivation?
   (a) Sandy loam & loamy soil (b) Sandy soil (c) Clay soil
9. Which institute does research on maize?
   (a) Bangladesh Rice Research institute
   (b) Bangladesh Sugarcane Research Institute
   (c) Bangladesh agricultural Research Institute
10. For maize cultivation which season gives more production?
    (a) Rabi season (b) Kharif season (c) Both seasons

11. How much cowdung needs to apply for maize cultivation?

    (a) 1-2 ton/ha (b) 4-6 ton/ha (c) 7-8 ton/ha.

12. Which variety is leaf blight registant?

    (a) Barnali (b) Shuvra (c) Mohar

13. Which of the following bird reduce the yield by eating immature cob?

    (a) Pigion (b) parrot (c) crow

14. When maize cob is use as fodder crops?

    (a) When cob husk is dry

    (b) When cob husk is green

    (c) When cob husk is dry and become golden color.

15. How much time maize cultivation is possible in field in a year?

    (a) 3 times (b) 2 times (c) 1 time

16. How many times weed control is required in maize cultivation?

    (a) 1-2 times (b) 3-4 times (c) above 4 times

17. How many irrigation are required for cultivating maize in rabi season?

    (a) 1-2 times (b) 3-4 times (c) 7-8 times

18. In case of baby corn which part is discarded?

    (a) Mail part (b) Female part (c) None of them

19. What is the seed rate of baby corn?

    (a) 25-30 kg/ ha (b) 50-60 kg/ha (c) 5-10 kg/ha

20. When we preserve maize seed, how much moisture contain–

    (a) 10-12% (b) 20-25% (c) 35-40%

B. TRUE – FALSE statements

Against each of the following statements put a tick mark (√) when you think it is true. For each correct answer, the respondents could get one mark.

1. The nutritive value of maize is higher than that of rice and wheat.
2. There is no need to irrigate maize crop in the rabi season.
3. For fodder cultivation, 7-9 kg seed is required per bigha.
4. The quality of seed could not retained if seeds are stored in gunny bag with polythne cover.
5. The future of multiple uses of maize is bright to meet the continued demand of food in Bangladesh.

Thank you for your kind co-operation.

Date Signature of the interviewer

Appendix – B
Correlation Matrix of Dependent and Independent Variables

	Age	Education	Family size	Farm size	Annual income	Cropping intensity	Organizational participation	Innovativeness	Communication exposure	Knowledge
Age	1.000									
Education	-0.418	1.000								
Family size	-0.153	-0.345	1.000							
Farm size	0.336**	0.427**	-0.162	1.000						
Annual income	0.082	0.120	0.148	0.528**	1.000					
Cropping intensity	-0.194	-0.016	0.005	0.071	-0.032	1.000				
Organizational participation	0.080	0.526**	-0.246	0.258**	0.065	0.215*	1.000			
Innovativeness	0.082	0.092	-0.073	0.253**	0.364**	0.124	0.284**	1.000		
Communication exposure	0.251**	-0.110	0.273**	0.043	0.241**	o.072	-0.176	0.200*	1.000	
Knowledge	-0.105	0.297**	-0.133	-0.49	0.201*	-0.194	-0.137	0.031	0.251**	1.000

** Correlation is significant at 0.01 level of probability (Table value = 0.243)

*Correlation is significant at 0.05 level of probability (Table value = 0.186)