

**IMPACT OF INFORMATION AND COMMUNICATION  
TECHNOLOGIES (ICTs) USE AS PERCEIVED BY THE  
FARMERS OF BANGLADESH**

**ALI AHMED REZA**



**MASTER OF SCIENCE (M.S.)  
IN  
AGRICULTURAL EXTENSION**

**SEMESTER: JULY – DECEMBER, 2007**

**DEPARTMENT OF  
AGRICULTURAL EXTENSION AND INFORMATION SYSTEM  
SHER-E-BANGLA AGRICULTURAL UNIVERSITY  
DHAKA-1207**

**DECEMBER, 2007**

**IMPACT OF INFORMATION AND COMMUNICATION  
TECHNOLOGIES (ICTs) USE AS PERCEIVED BY THE  
FARMERS OF BANGLADESH**

**BY**

**ALI AHMED REZA**

**REGISTRATION NO. 00981**

A Thesis

Submitted to the faculty of Agriculture  
Sher-e-Bangla Agricultural University, Dhaka,  
in partial fulfillment of the requirements  
for the degree of

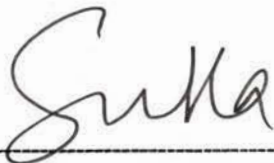
**MASTER OF SCIENCE (M.S.)**

**IN**

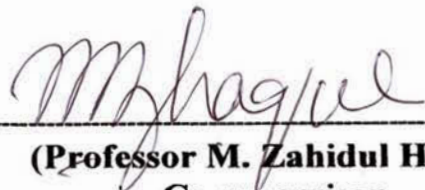
**AGRICULTURAL EXTENSION**

**SEMESTER: JULY – DECEMBER, 2007**

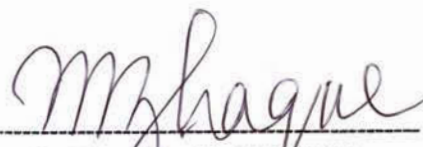
**Approved by:**



**(Prof. Md. Shadat Ulla)**  
Supervisor



**(Professor M. Zahidul Haque)**  
Co-supervisor



**(Professor M. Zahidul Haque)**  
Chairman  
Examination Committee



## *CERTIFICATE*

This is to certify that the thesis entitled, **“IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICTs) USE BY THE FARMERS OF BANGLADESH”** 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**, embodies the result of a piece of bona fide research work carried out by **ALI AHMED REZA**, **Registration No. 00981** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

**Dated:**

**Dhaka, Bangladesh**

**(Prof. Md. Shadat Ulla)**  
**Supervisor**

*Dedicated to  
My  
Beloved Parents who laid the  
foundation of my success*

## ACKNOWLEDGEMENT

*With a great pleasure, I express my deepest sense of respect, and heartiest gratitude to my honorable teacher and supervisor, Professor Md. Shadat Ulla,, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for his efficient and scholastic guidance, constructive criticism, valuable suggestions and immense help to carry out the research work toward successful completion and preparation of the thesis by necessary correction through reviewing the text.*

*I am pleased to avail myself of the opportunity to express my profound appreciation and thanks to my honorable Co-supervisor, Professor M. Zahidul Haque, Chairman, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for his generous guidance, broad view of discussion and stimulating assistance during the period of research work.*

*I would like to take the opportunity to express my deepest indebtedness for all the facilities placed at my disposal and kind cooperation provided my respected teachers, Prof. Mohammad Hossain Bhuiyan,. Prof. Md. Rafiqul Islam, Assoc. Prof. Md. Sekender Ali, Lecture, Humayan kabir & Thanima begum, Lecturer, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka.*

*I would like to extend cordial thanks to my friends specially Sultan Mahmood, Rafiqul Islam, Mrs. Ayesha and Rupa for their kind co-operation, valuable advise during my study. Diction is not enough to express my profound gratitude and deepest appreciation to my father and mother who sacrificed their happiness during the entire period of study and brothers, sister for their never ending prayer, encouragement, sacrifice and dedicated efforts to educate me to this level.*

*Last but not the least, farmers of the study area of Patuakhali Shadar union under Patuakhali district, deserves special appreciation for their patience and co-operation during the collection of data.*

**The Author**

# CONTENTS

	ITEMS	PAGE
	<b>ACKNOWLEDGEMENT</b>	<b>i</b>
	<b>LIST OF CONTENTS</b>	<b>ii</b>
	<b>LIST OF TABLES</b>	<b>vi</b>
	<b>LIST OF FIGURES</b>	<b>vii</b>
	<b>LIST OF APPENDICES</b>	<b>vii</b>
	<b>ABBREVIATIONS AND ACRONYMS</b>	<b>viii</b>
	<b>ABSTRACT</b>	<b>ix</b>
<b>CHAPTER I</b>	<b>INTRODUCTION</b>	<b>1-7</b>
	1.1 General Background of the study	1
	1.2 Statement of the problem	2
	1.3 Specific Objective of the study	3
	1.4 Scope and Limitations of the study	4
	1.5 Assumptions	5
	1.6 Definition of the terms	6
<b>CHAPTER II</b>	<b>REVIEW OF LITERATURE</b>	<b>8-21</b>
	2.1 Concept on impact of information and communication technologies use	8
	2.2 Review of Studies on the Selected Characteristics of Farmers and impact of information and Communication technologies use	13
	2.2.1 Age and impact of ICTs use	13
	2.2.2 Education and impact of ICTs use	15
	2.2.3 Farm size and impact of ICTs use	16
	2.2.4 Annual income and impact of ICTs use	17
	2.2.5 Social participation and impact of ICTs use	18
	2.2.6 Use of ICT materials and impact of ICTs use	18

## **CONTENTS (Contd.)**

2.2.7	Farming experience and impact of ICTs use	18
2.2.8	Cosmopolitanness and impact of ICTs use	18
2.2.9	Agricultural knowledge and impact of ICTs use	19
2.2.10	Innovativeness and impact of ICTs use	20
2.3	Conceptual framework of the study	21

### **CHAPTER III      METHODOLOGY      22-34**

3.1	Locale of this study	22
3.2	Population and Sampling design	22
3.3	Variables of the study	25
3.4	Measurement of Variables	27
3.4.1	Measurement of independent variables	26
3.4.1.1	Age	26
3.4.1.2	Farm size	27
3.4.1.3	Education	27
3.4.1.4	Annual income	27
3.4.1.5	Social participation	28
3.4.1.6	Use of ICT materials	28
3.4.1.7	Agricultural experience	29
3.4.1.8	Cosmopolitanness	29
3.4.1.9	Agricultural knowledge	29
3.4.1.10	Innovativeness	30
3.4.2	Measurement of dependent variable	30
3.5	Statement of Hypothesis	31

## **CONTENTS (Contd.)**

3.6	Collection of data	32
-----	--------------------	----

3.7	Processing of data	33
3.8	Statistical analysis	33

**CHAPTER IV FINDINGS AND DISCUSSION 35-54**

4.1	Selected characteristics of the farmers	35
4.1.1	Age	35
4.1.2	Education	36
4.1.3	Farm size	37
4.1.4	Annual income	38
4.1.5	Social participation	39
4.1.6	Use of ICT materials	40
4.1.7	Farming experience	41
4.1.8	Cosmopoliteness	41
4.1.9	Agricultural knowledge	42
4.1.10	Innovativeness	43
4.2	Extent of impact of ICTs use by the farmers	44
4.3	Relationships between the selected characteristics of the farmers and their impact of information and communication technologies use	45
4.3.1	Relationship between age of the farmers and their impact of ICTs use	47
4.3.2	Relationship between education of the farmers and their impact of ICTs use	47
4.3.3	Relationship between farm size of the farmers and their impact of ICTs use	48
4.3.4	Relationship between annual income of the farmers and their impact of ICTs use	49

**CONTENTS (Contd.)**

4.3.5	Relationship between social participation of the farmers and their impact of ICTs use	50
-------	---	----



4.3.6	Relationship between use of ICT materials of the farmers and their impact of ICTs use	54
4.3.7	Relationship between farming experience of the farmers and their impact of ICTs use	51
4.3.8	Relationship between cosmopolitaness of the farmers and their impact of ICTs use	52
4.3.9	Relationship between agricultural knowledge of the farmers and their impact of ICTs use	52
4.3.10	Relationship between innovativeness of the farmers and their impact of ICTs use	53
<b>CHAPTER V SUMMARY , CONCLUSION AND RECOMMENDATIONS</b>		<b>60-68</b>
5.1	Summary	60
5.1.1	Introduction	60
5.1.2	Methodology	61
5.1.3	Summary of findings	62
5.1.3.1	Characteristics profile of the farmers	62
5.1.3.2	Impact of information and communication technologies use by the farmers	64
5.2	Conclusion	65
5.3	Recommendations	67
5.3.1	Recommendations of policy implication	67
5.3.2	Recommendations of future study	68
<b>BIBLIOGRAPHY</b>		<b>69-62</b>
<b>APPENDICES</b>		<b>63-78</b>

## LIST OF TABLES

<b>TABLE</b>		<b>PAGE</b>
3.1	Distribution of population and sample of respondents in two selected villages of Itbaria upazila	25
4.1.1	Distribution of the respondents according to their age	36
4.1.2	Distribution of the farmers according to the their level of education	37
4.1.3	Distribution of the farmers according to their farm size	38
4.1.4	Distribution of the respondents according to their annual income	38
4.1.5	Distributions of the respondents according to their social participation	39
4.1.6	Distributions of the respondents according to their use of ICT materials	40
4.1.7	Distributions of the respondents according to their agricultural experience	41
4.1.8	Distribution of the respondents according to their cosmopolitaness	42
4.1.9	Distribution of the farmers according to their agricultural knowledge	42
4.1.10	Distribution of the respondents according to their innovativeness	43
4.2.1	Distribution of the respondents according to their impact of ICTs use	45
4.3	Co-efficient of correlation of the selected characteristics of the respondents/farmers and their impact of ICTs use	46

## LIST OF FIGURES

FIGURE		PAGE
2.1	Conceptual framework of the study	21
3.1	A map of Patuakhali District which showing the local area	23
3.2	A map of Patuakhali Shadar Upazilla of Patuakhali District showing the study area	24
4.2.1	Distribution of the respondents according to their impact of ICTs use	45

## LIST OF APPENDICES

APPENDIX		PAGE
A	An English version of the interview schedule	68
B	A Bengali version of the interview schedule	73
C	Correlation matrix showing interrelationship among all the variables	78

## **ABBREVIATIONS AND ACRONYMS**

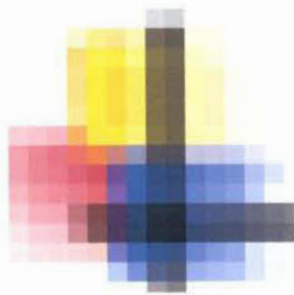
SAU	:	Sher-e-Bangla Agricultural University
BBS	:	Bangladesh Bureau of Statistics
DAE	:	Department of Agricultural Extension
GO	:	Government Organization
NGO	:	Non Government Organization
ICT	:	Information and Communication Technology
TV	:	Television
<i>et al</i>	:	Associates
i.e.	:	That is
NS	:	Not-significant
*	:	Significant at 0.05 level of probability
**	:	Significant at 0.01 level of probability
df	:	Degrees of Freedom
SPSS	:	Statistical Package for Social Science
Fig.	:	Figure
Tk.	:	Taka
r	:	Co-efficient of Correlation

# Abstract

The prime objective of the study was to find out the impact of ICTs use as perceived by the farmers of Bangladesh. Appropriate scale was developed to measure the impact effectively. Seven items of ICTs was taken as TV agricultural program, Radio agricultural program, Telecommunication, Poster, Newspaper, Multimedia, and Internet. Attempt was also made to explore the relationship between the impact of ICTs use by the farmers with their selected characteristics. The characteristics were age, education, farm size, annual income, social participation, use of ICTs materials, farming experience, cosmopolitaness, agricultural knowledge and innovativeness. Data were collected from 102 farmers which were randomly selected from Itbaria union of Patuakhali Shadar Upazila under Patuakhali district. About four percent had no impact where 16.6 percent had very low impact, 34.4 percent had low impact and 44.1 percent had medium impact of ICTs use. Significant relationship was found with farmers' education, farm size, annual income, use of ICTs materials, cosmopolitaness, contact with mass media, agricultural knowledge and innovativeness. No relationship was found with farmers' age, social participation and farming experience.

# CHAPTER I

## INTRODUCTION



# CHAPTER I

## INTRODUCTION

# CHAPTER I

## Introduction

### 1.1 General Background

Bangladesh is predominantly an agricultural country with an area of 1,47,570 square kilometer. The economy of the country mostly depending on agriculture represents directly and indirectly, almost 23 percent of the country's gross domestic product (GDP) and gives employment to 62 percent (BBS, 2004). In fact agriculture plays a vital role in capital formation at home and for foreign exchange also. It also supplies most of the raw materials for the industrial development of the country. The country is supplying to meet the basic need of her population from its cultivatable land which is estimated around 8.29 million hectares. But still agricultural productivity of Bangladesh is one of the lowest in the world.

Through predominately an agrarian country. Bangladesh cannot produce enough food to her population. Although "Agriculture is the principal engine of growth in many low-income developing countries, where it accounts for 60 to 80 percent of all employment" (CGIAR, 1995). Food security should also be linked to environmental, social, cultural, political and institutional aspects of society (Forno, 1999). At present food situation is alarming and the food reserve is very poor. Besides this, there is no scope to increase the cultivable land rather it is decreasing rapidly to provide new generation. On the other hand, the soils of Bangladesh are very fertile and climate is favorable for crop growth throughout the year. Thus there is tremendous scope for increasing agricultural production in Bangladesh.

However, agricultural production can only be increased if appropriate technologies are used by the farmers, who are the primary unit of adoption of improved practices. Therefore, proper utilization of modern agricultural inputs, knowledge of the usefulness of inputs and the know-how of their use should reach to the farmers within a shortest possible time and that should be done very effectively. Further, diffusion of knowledge on modern agriculture among the rural people demands effective communication system. "More than natural resources, more than cheap labor, more than financial capital, knowledge is said to be the key factor of production" (World Bank, 1992). So, communication is essential for improving the productivity. That is the way farmers, more specially the commercial farmers can help them change their way of cultivation from traditional to modern one. Farther more different communication behavior more effective for different person. Rogers (1962) after reviewing many studies on sources of information by

stages, made a generalization that communication sources were most important at the stages in the adoption process.

Development of agricultural sector is of prime importance for our country. Therefore, to accelerate the place of economic growth and development application of ICT could be a better proposition. Globally, the development of ICT has proven its potentials not for enhancing development efforts, but also virtually reduced the distance and turned the world into a global village (O'Farrell, 2003). Besides that the number of devices or equipments of communication is increasing in a very rapid speed. Now a larger proportion of farmers have their own TV set and cable TV is available almost everywhere in Bangladesh. Extension communicators are more intensive than previous years. The newspaper and poster is available almost every village. But computer is not available due to its high cost. So, farmers can easily receive information through various information communication media.

The government has declared ICT as thrust sector and put much emphasis on the computerized and establishing e-governance in all aspect of development. Several ICT initiatives or programs were undertaken and the outputs of these are used for agricultural research, development and extension.

Research conducted in foreign countries, particularly of the west, revealed that farmers are contacted, trained and organized generally through the sources like friend, relative contact, result demonstration, general meeting, office call, agricultural magazine, radio, television and but the very few researchers conducted research on ICT in Bangladesh and perhaps no one conducted research to find out the impact of ICT in Bangladesh.

## **1.2 Statement of the problem:**

In view of the foregoing discussion, the framework of the study stems from "Communication System" which is very important and a matter of very much consciousness to the policy makers. Agricultural information has been considered as an important input for increased farm productivity. Farmers use various sources for obtaining farm information. Moreover, by using Information and communication technologies, any message can be diffused effectively within a very short time. ICTs involve Television, Radio, Telephone, Internet, Multimedia, Magazine, Newspaper, Leaflet, Booklet, Publication, Posters etc. But this research took Television agricultural programs, Radio agricultural programs, Telecommunication, Internet, Multimedia, Magazine, Newspaper for conducting his study and try to discover the behavioral changes with their perceived impact of use these technologies. For identifying the impact of use of ICTs as perceived by



the farmers in receiving agricultural information, it is necessary to know the answers of the following questions an appropriate direction.

1. What are the characteristics of farmers towards the use of ICT?
2. What are the impacts of ICTs use as perceived by the farmers in Bangladesh?
3. What are the relationships between the characteristics of farmers with their impact of ICTs use as perceived by them?

The various characteristics and situational factors of the farmers might have some kind of relationships with impact of use of Information and Communication Technologies which also taken in to consideration during the study. On the basis of the above discussion, the researcher undertook a piece of study, entitled "Impact of use of Information and Communication Technologies as perceived by the farmers of Bangladesh."

### **1.3 Objectives:**

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

- i. To determine and describe some selected characteristics of the Farmers.  
The selected characteristics are:

- Age
- Education
- Farm size
- Annual income
- Social participation
- Use of ICT materials
- Farming experience
- Cosmopolitaness
- Agricultural knowledge
- Innovativeness

ii. To determine the impact of ICTs use as perceived by the farmers. The ICTs are:

- a. TV agricultural programs
- b. Radio agricultural programs
- c. Telecommunications
- d. Posters
- e. Newspapers
- f. Multimedia
- g. Internet

iii. To explore the relationship between the impact of information and communication technologies use as perceived by farmers and their selected characteristics

#### **1.4 Scope and Limitations of the study:**

The finding of the study will be particular applicable to the Itbaria union of Patuakhali Sadar Upazila of Patuakhali district. However, the findings may also be applicable in other Bangladesh where the physical, socio-economical and cultural conditions do not differ much with those of the study area. Thus, the findings of the study may be profitable utilized by the planners, policy makers, extension personnel and field workers for successful planning and extension of programs aimed at effective communication of agricultural information to the farmers in general.

The purpose of the study was to have understanding about the impact of use of Information and communication technologies. However, in order to conduct the research in a meaningful and manageable way it becomes necessary to impose certain limitations in regard to certain aspects of the study. Considering the time, money and necessary resources available to the researcher the following limitations have been observed through out the study.

1. The study was confined to two villages of Patuakhali Shader upazila of Patuakhali district.

2. Population for the present study was kept confined within the heads of the families of the farmers, because they were the major decision maker in their families.

3. Only eleven characteristics were selected for investigation in the study. But the characteristics of the farmers were many and varied.

4. The investigator depended on the data furnished by the selected farmers during their interview.

5. Information used by the farmers for various purposes such as farming, business, politics, religion etc. this study investigated the impact of use of ICTs as perceived by the farmers in receiving agricultural information related to cultivation.

6. Facts and figures collected by the investigator applied to the situation prevailing during the year 2007.

### **1.5 Assumptions:**

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

1. The respondents included in the sample were competent to give proper responses to the queries included in the interview schedule.
2. The researcher who acted as interviewer was well adjusted to the social and cultural environment of the study area. Hence, the data collected by him from the respondents were free from bias.
3. The responses furnished by the respondents were reliable and the respondents truly and freely expressed all facts concerning impact of ICTs use as perceived by them and their selected characteristics.
4. Views and opinions made by the respondents were representative of the whole population of the study area.
5. The researcher was capable to rate the responses of the farmers with adequate precision.
6. The findings of the study will have general application to other parts of the country where physical, socio-economic and cultural conditions do not differ much from the study area.

7. Impact of use of ICTs as perceived by the farmers was linearly related with their selected characteristics.

Study on the impact of information and communication technologies use as perceived by the farmers are conducted in very limited area of Bangladesh. A few studies in this regard have so far been conducted. Finding this study well, therefore, focus some light about the impact of ICTs use as perceived by the farmers is conducted in this part of the world. Thus, the study will add to the body of knowledge about the impact of information and communication technologies use as perceived by the farmers.

### **1.6 Definition of the Terms**

Certain terms used throughout the study are defined below for clarity of understanding.

#### **Information and Communication Technologies (ICTs):**

ICT stands for Information and Communications Technology In other words, it can mean almost anything that's new and relevant to communications. This includes the Internet, mobile telephone, satellite communications and digital television over cable or aerials. In this study only seven selected technologies (i.e., TV, Radio, Telephone, Poster, Newspaper, Multimedia and Internet) have been taken into consideration.

#### **Age**

Age of a respondent is defined as the period of time in actual years from his birth to the time of interviewing.

#### **Education**

Education defined as the formal education received up to a certain level from an educational institute (e.g. school, college and university) at the time of interview.

#### **Farm size**

Farm size referred to the area of land possessed by a farmer through different land tenure system such as own land under own cultivation, land given other as barga, land taken from other as barga, land given lease, land taken as lease etc. Farm size was measured in terms of hectares.

**Annual income**

Annual income referred to the total earning of a respondent himself and the members of his family from agriculture and non- agriculture (services, business, etc.) sources during a year. It was expressed in Taka.

**Social participation**

Social participation referred to the degree to which a farmer takes part in different social organization either as an ordinary member, executive committee member or executive officer with in a specified period of time.

**Use of ICT materials**

Use of ICT materials referred the rate of using various ICT materials by the respondents.

**Farming experience**

Farming experience of a respondent defined as the period of time he practices agricultural work. It is calculated in actual years at the time of interviewing.

**Cosmopolitaness**

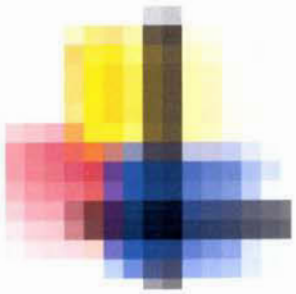
It referred to the orientation or exposure or involvement of an individual respondent external to the own social system.

**Agricultural knowledge**

It was the extent of basic understanding of the farmers in different aspects of agricultural subject matters i.e. crops, livestock, fisheries, agro-forestry, soil, seed, fertilizer, insects and diseases of crops, high yielding variety etc. Agricultural knowledge of a respondent was measured by counting agricultural knowledge score.

**Innovativeness**

The term innovativeness referred to the degree to which an individual is relatively earlier in adopting new ideas than the other members of a social system (Rogers 1983).



# CHAPTER II

## **REVIEW OF LITERATURE**

## **CHAPTER II**

### **REVIEW OF LITERATURE**

The researcher made an elaborate search of available literature for this research. Available literatures were extensively reviewed to find out work in Bangladesh as well as abroad. The reviews are conveniently presented in accordance with the major objectives of the study. This Chapter is divided into three sections. First section deals with the concept on impact of information and communication technologies use and the second section is devoted to a discussion on the findings of studies exploring relationships between the selected characteristics of the clients and impact of information and communication technologies use as perceived by them. The third section presents the conceptual framework of the study.

#### **2.1 Concept on Impact of Information and Communication Technologies use as perceived by the farmers**

Kaini (2007) in a study found that ICTs was very important for developing agricultural sector. He found ICTs were very efficient in terms of time, cost and distance, developing agricultural programs through assisting access to new technologies, production inputs and market information.

ICT had it's direct and indirect effect for poverty alleviation. The main direct effect was higher profits from agricultural productions through adopting new technologies and indirect effect was employment generation through commercialization of agriculture.

Tanvir (2007) stated that ICTs for poverty alleviation through agricultural development was increasing rapidly. Electronic media which were far more effective in view of its high speed, vast range of coverage and particularly because it offers visual contents except in case of Radio.

Pandia *et. al.* (2002) conducted a study on the Impact of Video Education on Knowledge Retention and found direct positive effect with age, education, farming experience, economic motivation, mass media exposure, extension agency contact, involvement in decision making, innovativeness and direct negative effect with respondents annual income, farm size, social participation.

kabir and Bhattachargee (1994) conducted a study on the Impact of Radio and Television on rural people and found that the responses regarding the impact of TV programs were similar to responses regarding the impact of Radio broadcasts. All of the telecasts were of average benefit to most of the male and female audience. No one of the respondent started that many of the selected programs had adequate use to him or her. That the programs were of no use was said none of the female TV audience. Among the need based telecasts "Apnar Shasthya" seemed to be the most effective program for male viewers. About 53 per cent of the male respondents watch this program. The next important one was "Mati-O-Manush", which had 35.25 per cent audience.

Diaz-knauf et al. (1993) stated in a study on consumer attitude towards food safety of product in Costa Rica that information sources on which consumers rely are television (92%), radio (73%) and newspaper (63%).



Laharia and Joshi (1992) found in a study on farm telecast viewing behavior of farmers in India that about two thirds of the respondents (total 100) reported the Krishi Darshan Program (KDP) of Delhi Doordarshan Kendra was very useful. The study implied that the perception of usefulness increased with the increase in one's periodicity of viewing the program.

Saianturi (1992) found in a study that Radio was the Highest rated source of agricultural information, followed by Television.

Papa (1991) conducted a study on intensity of extension contact and innovativeness of multiple cropping farmers in Philippines and the study showed that fifty four per cent of the farmers had high intensity of extension contact while only forty seven per cent had extent of innovativeness. The extension contact of teaching methodologies frequently preferred by the multiple cropping farmers were farm and home visit, leaflet, television, general meeting and seminar / short course.

Allin-Ton (1991) reported by the mid-term review of the Fifth Malaysia Plan (1986-90) and has stated that emphasis would be placed on accelerating transfer of technology to small holders to improve their productivity and efficiency. Technology transfer could be achieved through publications, newspaper, radio, and television networks and interpersonal methods as exemplified program launched in 1983 by the Ministry of Agriculture which has contributed to increase farmers' communication through the printed media. The advent of information technology had benefited Malaysia in the transfer of technology by reducing costs in terms of time. This seen in the rapidity with which information could be mass produced for dissemination

by using desktop publication which further allowed information transfer through the printed media to be expedited, thus bringing to the farmers new information quickly. This approach to publication was cost effective.

Singh and Sharma (1973) and Reddy (1986) conducted researches in India about dissemination of agricultural information through television and have reported significant impact of farm telecasts in increasing the technology knowledge of farmers and farm women.

Cherian and Chandra (1989) in their study had shown that rural women took interests in watching the television programs produced. The extent of watching the television programs was more frequent in case of men than women. The television helped women and men to gain significant amount of knowledge about green leafy vegetables, potato, vaccination and laparoscopy. The gain in knowledge was more among females than males.

Huque (1982) in a study with M. 99 farmers in the Philippines determined the perceived effectiveness of 10 communication media in which television was included. Farmers' perceived effectiveness was measured on a four point rating scale for each of the message trait-adequateness, understandability, applicability and persuasiveness. The comprehensive message trait-index of the television was observed as 311 which occupied ninth rank.

Reddy (1982) opined that with the help of new modes of communication like radio and television the research findings can be conveyed to the farmers quickly and in away that intelligibly eligible to them.

Chanhan and Sinha (1979) found in their study that TV alone is no doubt, capable of imparting knowledge to its audience by it became more effective then it combines with other channels like group discussion and / or printed matters and, the effectiveness, further increases with increase in the number of channels in combination employed to communicate to the farmers.

Parvez (1977) conducted a study on the radio listening habit and other related aspects of the farmers of the Bhabokhali union of Mymensing district. The finding of the study revealed a picture about the extent of use of radio by the farmers. The researcher found that 67 per cent of the farmers had high or medium exposure to Agricultural Radio Program (ARP). This indicated that information be made available to the farmers through radio. Regarding the opinion of the farmers about the usefulness of ARP for agricultural work Parvez opined that 67 per cent of the farmers considered ARP very useful for agricultural work while 20 per cent considered the ARP useful. Thirteen per cent of the farmers expressed no opinion about the usefulness of ARP.

Singh and Sharma (1973) found in a study that the farmers of TV-villages were far ahead of their counterparts of non-TV group with respect to adoption of HYV wheat. The impact of TV was found all the conducive to small farmers and those without schooling. The specialized source credibility in TV-villages indicate a 'monomorphic' pattern in the information seeking behavior of farmers, while the polymorphic trend was found still prevalent among the farmers of non- TV villages.

Sharma and Dry (1970) conducted a study on the relative effectiveness of radio and television in dissemination of agricultural information and from the study television was found to be significantly effective than radio in case of all the programs, with respect to gain and retention of knowledge, with lapse of time in case of both media and with all the programs. The average gain of knowledge was 30.95 per cent with the television viewers as against 21.92 per cent with radio listeners. Similarly the extent of average retention after 15 days exposure with TV viewers and radio listeners was 35.04 per cent and 16.12 per cent respectively.

Singh and Shankariah (1969) recommended an optimal use of all the mass media like television, radio, films, demonstration, and farmers' training camps.

Knox (1962) in a study in Barten county, Kansas found that there is seldom complete agreement among extension climate as to whether extension program can be made more effective by efficient use of available mass media, if so, which media are all respondents had radios and daily and weekly newspapers and 92 per cent of them had TV sets.

## **2.2 Relationship between the Selected Characteristics of the Farmers and impact of information and Communication technologies use as perceived by them**

### **2.2.1 Age and impact of ICTs use**

Shin and Evans (1991) found significant and positive relationship between age and impact of use of communication technologies.

Pandian *et. al.* (2002) found that the age farmers had direct positive effect between age of the farmers and Impact of use of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship between farmers' age and their perception of effectiveness of television programs.

Ahmed (1977) in his study found that age of the farmers had no significant influence on the use of various communication media in the adoption of improved farm practices.

Rahman (1974) observed no relationship between communication media and farmers age of registered jute seed growers.

Ullah (1996) observed that age of farmers showed a negative but not significant relationship with their use of different information media.

Khalil (1998) observed a negatively insignificant relationship between age of the farmers and their use of information sources in producing HYV Rice.

Rahman (1996) undertook an investigation on communication behavior of winter vegetable growers at Sherpur thana of Gazipur District. He reported that age had no relationship with communication behavior.

Sarker (1995) observed a negatively insignificant relationship between age of the small farmers and their use of communication media in receiving agricultural information.

Khan (1996) concluded that age of the farmers had a negative and insignificant effect on the use of information media.

Most of the research findings on age and impact of information communication technologies use showed that either the variables are of independent or they had negative relationships. This means that age of the farmers do not possess any significant influence upon their impact of information communication technologies use in receiving agricultural information as well as the farming practices.

### **2.2.2 Education and impact of ICTs use**

Pandian *et. al.* (2002) found that education of the farmers had direct positive effect on the Impact of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship of farmers' education with their perception of effectiveness of television programs.

Ahmed (1977) found that education had no effect on the use of communication media in the adoption of recommended variety of jute, recommended dose of fertilizer but showed an effect of education on the use of communication media and the relationship was positive.

Hossain (1981) in his study found that there was no relationship of education of the farmers with their adoption of improved practices.

Bhuiyan (1988) showed that education had positive and significant contribution to the comprehensive use of information and communication media.

Rahman (1974) found that the level of education of the respondents had significant influence on various information and communication technologies.

Halim (1982) in his study on schooling, extension and agricultural production found that increase of educational level of the farm operators resulted increased per acre production of rice, jute and net farm income of the farm, but this positive trend between level of education and increased production tended to fall in those farms where the operator received more the secondary level of education. He found significant regression between level of formal schooling of the farm operator and per hectare production of jute and rice which also resulted significant increase in net farm income.

Kashem and Jones (1988) found in their study that education of the small farmers rendered significant positive correlation with their contact with information sources.

Rahman (1996) observed that education of the winter vegetable growers had moderate association with their use of different information sources.

Ullah (1996) concluded in his study that education of the vegetable growers had positive and highly significant relationship with their use of information sources. This means that the more the education of the vegetable growers, the more was their impact of information and communication sources use for vegetable cultivation.

Anisuzzaman (2003) concluded that the education of the farmers had significant positive relationship with their use of information and communication media.

The above research findings suggested that in most of the cases level of literacy of the farmers encouraged them to maintain better contact with various information and communication media which ultimately kept good impact of ICTs in receiving agricultural information.

### **2.2.3 Farm size and impact of ICTs use**

Pandian *et. al.* (2002) found negative insignificant relationship and direct negative effect of respondent's farm size with on the Impact of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship between farmers' farm size and their perception of effectiveness of television programs.

Ahmed's (1977) study showed that farm size had significant influence on the use of information sources and communication media in the adoption of plant protection measures.

Bhuiyan (1988) found that the farm size had significant positive correlation with the use of information media in the adoption of selected improved farm practices in rice cultivation.

Hooda (1989) found that land holding of the farmers had positive and significant correlation with their communication behavior.

Sarker's (1995) study showed that farm size of the small farmers had a significant amount of influence upon their decision on using communication sources of information.

Rahman (1996) concluded in his study that farm size had moderate association with their use of information sources and communication media.

Majority of the researchers opined that the farm size had relationship with their perceived impact of various information and communication technologies use and adoption of improved farming practices.

#### **2.2.4 Annual income and impact of ICTs use**

Pandian *et. al.* (2002) found positive significant effect of respondent's annual income with the Impact of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship of farmers' annual income with their perception of effectiveness of television programs.

Latif (1974) observed a significant positive relationship between income of the farmers and their communication exposure.

Sawheny (1996) showed that income was positively related to use of different information sources and media.

Hossain and Crouch (1992) observed that farmers annual income had positive relationship with their use of mass media.

Uddin (1993) found that there was a relationship between annual income of the sugarcane growers and their reception of information in sugarcane cultivation.

Rahman (1996) found in his study that annual income of the winter vegetable growers had moderate association with their use of different information sources.

Karim (2005) found that income of the farmers had significant effect on the use of communication sources in receiving agricultural information.

Majority of the research findings indicated that the annual income of the farmers had significant relationship with their perceived impact of information and communication technologies use.



### **2.2.5 Social participation and impact of ICTs use**

Pandian *et. al.* (2002) found negative insignificant relationship and direct negative effect of respondent's social participation with the Impact of Video Education on Knowledge Retention.

Chandra and Raddy (2004) found positive insignificant relationship of respondents social participation with impact of use of television program.

On the basis of research finding mentioned above it may be concluded that the social participation may not have any effect of maintaining exposure with various information sources.

### **2.2.6 Use of ICT materials and impact of ICTs use**

Reddy (1986) conducted researches in India about dissemination of agricultural information through television and have reported significant impact of farm telecasts in increasing the technology knowledge of farmers and farm women.

### **2.2.7 Farming experience and impact of ICTs use**

Shin and Evans (1991) found significant and positive relationship between farming experience and impact of use of communication technologies.

Pandian *et. al.* (2002) found direct positive effect on the Impact of Video Education on Knowledge Retention with the Farming experience of farmers.

Chandra and Raddy (2004) found negative insignificant relationship of respondents Farming experience with their impact of television program.

Khalil (1998) mentioned in his study that farming experience of the farmers had low association with their use of different information sources.

### **2.2.8 Cosmopolitanism and impact of ICTs use**

Hossain and Crouch (1992) reported that cosmopolitanism had positive relationship with the information sources.

Ullah (1996) in a study observed that cosmopolitanism of farmers had significant and positive relationship with their extent of use of information sources.

Rahman (1996) concluded that cosmopolitanism of the winter vegetable growers had moderate association with their use of different information sources.

Anisuzzaman (2003) observed in his study that cosmopolitanism of rice growers had significant positive effect on their use of information and communication media.

Considering the above mentioned research finding it may be concluded that the cosmopolitanism of the farmer and their impact of various information and communication technologies use are dependent on each other.

#### **2.2.9 Agricultural knowledge and impact of ICTs use**

Paul (1989) found in his study that the knowledge gained by the farmers from different sources and also through their experience regarding different aspects of agriculture were related with attending of result demonstration meeting.

Kashem and Halim (1991) found in their study that agricultural knowledge had significant positive correlation with competence, belief and attitudes towards agricultural technologies, behavior intent, innovativeness, self-confidence cosmopolitanism, use of communication media in the transfer of modern rice technologies, use of communication media in livestock production, use of communication media in fish culture and use communication media in adoption of total agricultural technologies.

Sarker (1995) in his study on communication media used by the small farmers in receiving agricultural information found that the agricultural knowledge of the farmers are highly correlated with their use of communication media in adopting new technologies.

Karim (2005) in his study on farmers' use of communication sources in receiving agricultural information found a significant positive relationship between knowledge of the farmers and their communication sources used in improving cultural practices.

This means that agricultural knowledge of the farmers played an important role in receiving information on farming practices. Therefore, it may be concluded that agricultural knowledge of the farmers influence them to

maintain various information and communication technologies for receiving information on improved farm practices.

### **2.2.10 Innovativeness and impact of ICTs use**

Pandian *et. al.* (2002) found direct positive effect on the Impact of Video Education on Knowledge Retention with the innovativeness of farmers.

Rahim (1963) concluded in his study that adoption of improved farming practices/agricultural technology by the farmers was positively related to their contact with communication media.

Beal and sibley (1967) found that there was a positive relationship between communication behavior of the Indian Guatemala and their adoption of agricultural technology.

Kashem and Halim (1991) found in their study that innovativeness of the farmers had significant positive correlation with their (farmers) self confidence, use of communication media in adoption of modern rice technology, use of communication media in livestock production, use of communication media in adoption of total agricultural technology.

## **2.3 The Conceptual Framework of the Study**

In scientific research, selection and measurement of variables constitute an important task. The hypothesis of a research while constructed properly contains at least two important elements i.e. "a dependent variable" and "an independent variable". A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variables. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A simple conceptual framework for the study is shown in Fig. 2.1. It anticipates that there are functional relationships of the 10 selected characteristics of the farmers (independent variables) with their perceived impact of ICTs use (dependent variable).

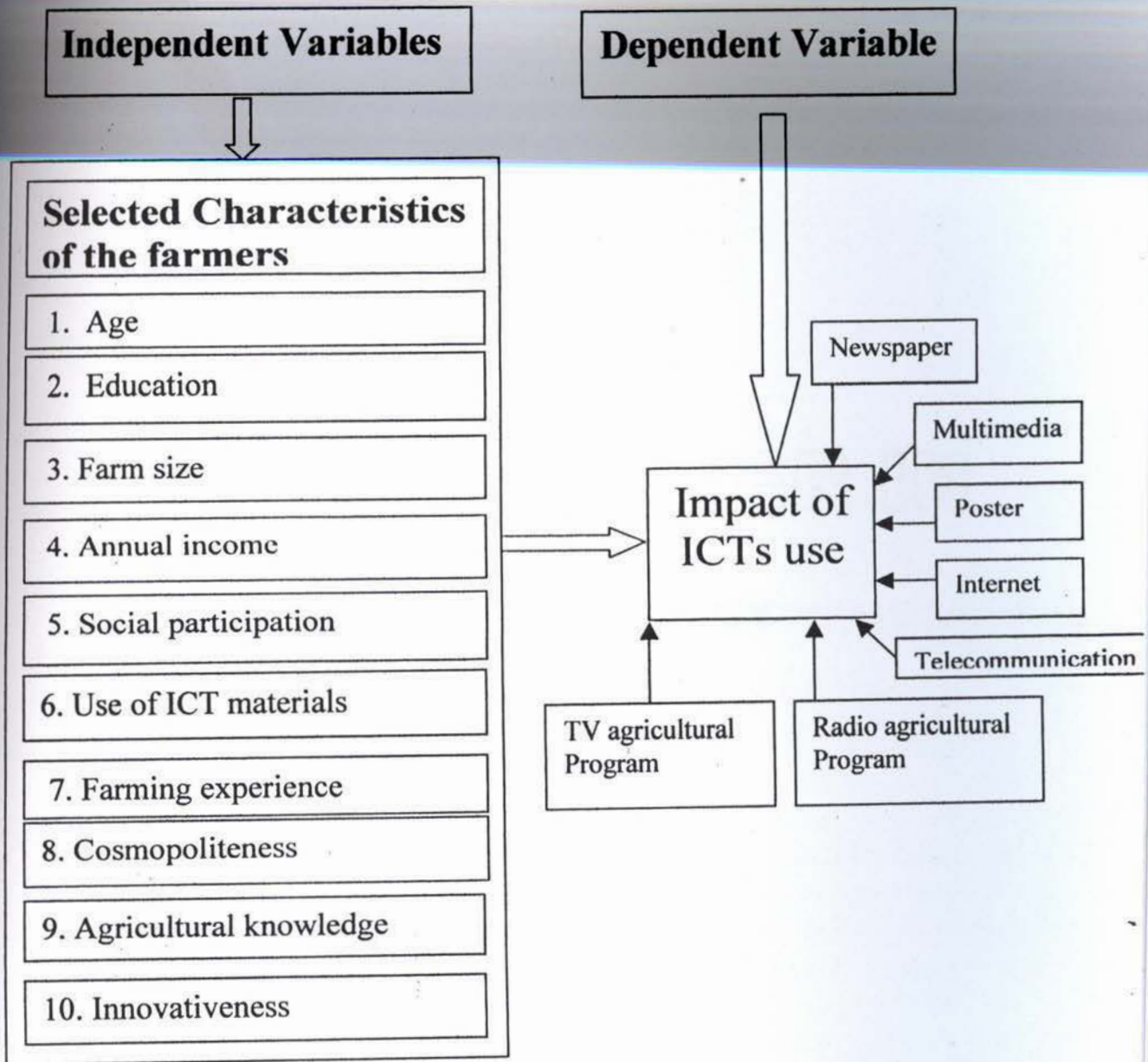
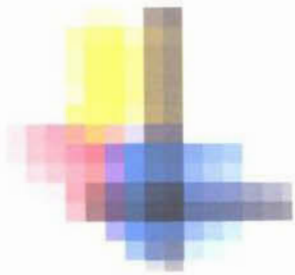


Figure 2.1 Conceptual Framework of the study



# CHAPTER III

## **METHODOLOGY**

## CHAPTER III

### Methodology

Methodology deserves a very careful consideration in conducting scientific research. Importance of methodology in conducting any research cannot be undermined. Methodology enables the researcher to collect valid and reliable information and to analyze them properly to arrive at correct decisions. Keeping this point in view, the researcher took utmost care for using proper methods in all the aspects of this piece of research work. Methods and procedures followed in conducting this study has been described in this chapter.

#### 3.1. Locale of the study

Patuakhali Sadar Upazila under Patuakhali district was purposefully selected as locale of the study. Itbaria Union was purposively selected among 12 unions of the Sadar upazila. Itbaria Union consists of twenty villages. Again, out of the twenty villages two village namely Durgapur and Dakurbunia were randomly selected.

#### 3.2. Population and Sampling Design

An up to date list of all farm family heads of the selected villages were prepared with the help of Sub-Assistant Agricultural Officer. The list comprised a total of 512 farmers in the study area. These farmers constituted the population of this study. There were 390 farmers in Durgapur and 122 farmers in Dakurbunia. Twenty percent of the population of each village was randomly selected as representative sample by using random number (kerlinger, 1973). Thus, the sample size for Durgapur was 78 and that of Dakurbunia was 24 making the total sample size of 102 farmers. In addition to that, 2 percent of the population was selected randomly and proportionately from each of selected villages. Thus, the additional sample, so drawn stood 10 farmers, which were included in the reserve list. In case, the individuals included in the original samples were not available or not found suitable at the time of data collection, the farmers of the reserve list were used for the purpose. The distribution of the farmers included in the population, sample and those in the reserve list appears in Table 3.1.

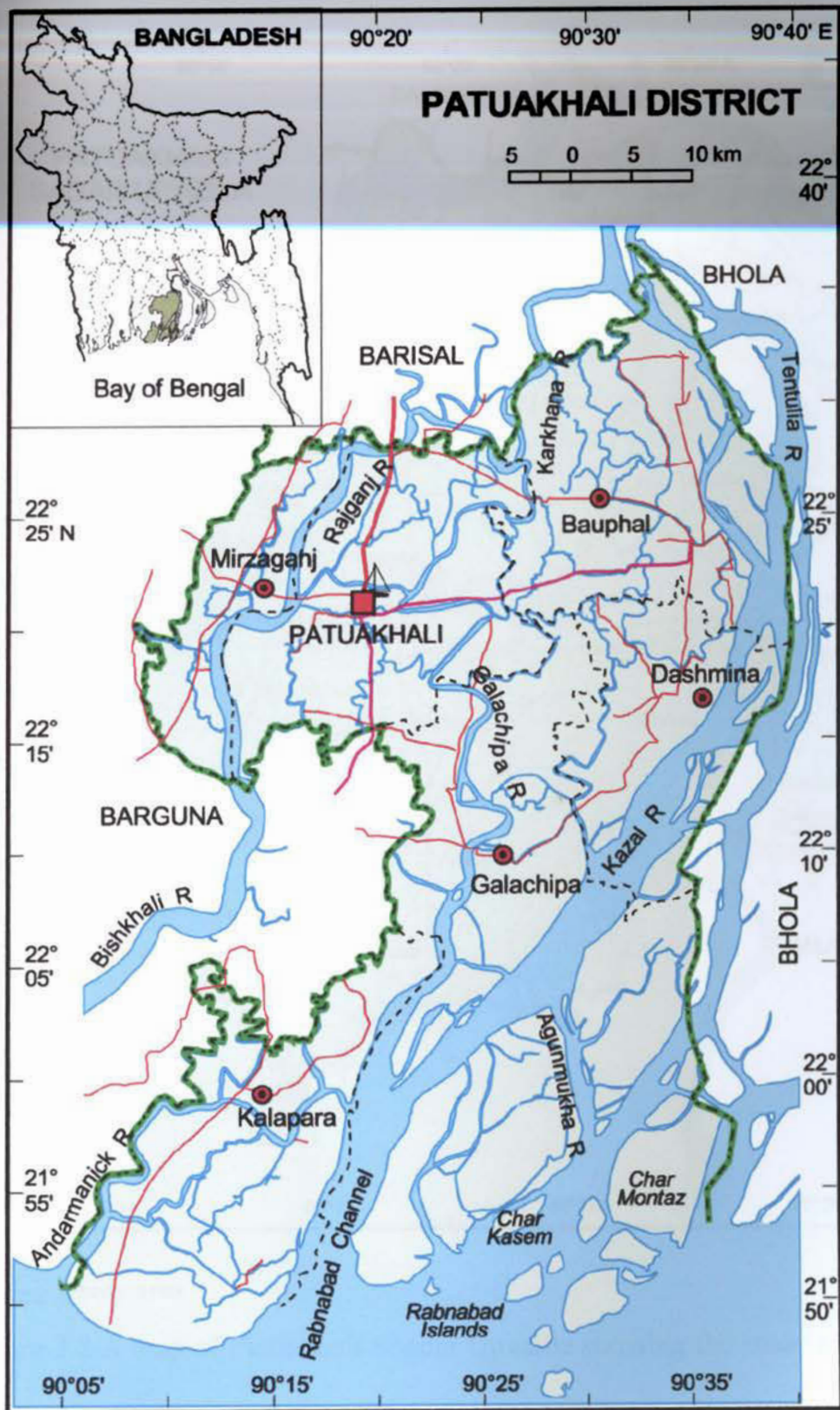


Figure 3.1 A map of Patuakhali District showing the locale of the study



★ = Study area

Figure 3.2 A map of Patuakhali Shadar Upazilla showing the study area



**Table 3.1. Distribution of population and sample of respondents in two selected villages of Itbaria union**

Sl. No.	Name of village	Total number of farmers	Sample size	Number of farmers in the reserve list
1	Durgapur	390	78	8
2	Dakurbunia	122	24	2
Total		512	102	10

### **3.3 Variables of the Study:**

In a descriptive social research, the selection of variables constitutes an important task. Success of a research to a considerable extent depends on the successful selection of the variables. In this connection, the investigator looked into the literature to widen his understanding about the nature and scope of the variables involved in the research studies. Ezekiel and Fox (1959) stated variable as any measurable characteristics, which can assume varying or different values in successive individual cases. Independent variables are that factor which is manipulated by the experimenter in his attempt to ascertain the relationship to an observed phenomenon. Townsend (1953) stated that dependent variables varies as the experimenter introduces, removes or varies the independent variables.

The researcher keeping in mind took adequate care in selecting the dependent and independent variables of the study. Before selecting variables, the researcher himself visited the study area and talked to the local farmers intimately and he was able to observe the various factors of the farmers, which might have influence on their perceived impact of Information and Communication Technologies use. Based on this experience, literature for the study, discussion with relevant experts and academicians and also with the research supervisor, the researcher selected the following variables for this study.

Two types of variables were concerned with the study such as

- i. Independent variables and
  - ii. Dependent variables
- 
- i. **Independent variables:** An independent variable is that factor which is manipulated by the experimenter in his attempt to ascertain the relationship to an observed phenomenon. The respondents' selected characteristics viz. age, farm size, education, annual income, social participation, use of ICT, farming experience, cosmopolitanism, agricultural knowledge and innovativeness are selected as independent variables.
  - ii. **Dependent variable:** A dependent variable is that factor which appears, disappears or varies as the experimenter introduces, removes or varies the independent variables. Impact of ICTs use as perceived by the farmers of Bangladesh is selected as dependent variable.

### **3.4 Measurement of Variables**

In order to conduct the study in accordance with the objectives, it was necessary to measure the selected variables. This section contains procedures for measurement of both independent as well as dependent variables of the study. The procedures followed in measuring the variables are presented below.

#### **3.4.1 Measurement of independent Variables**

The selected characteristics of the respondent farmers constituted the independent variables of the study. To keep the research manageable, eleven independent variables were selected for the study. The procedures of measurement of the selected variables were follows:

##### **3.4.1.1 Age**

The age of individual is one of the important factors pertaining to his personality make up (Smith and Zope, 1970). Age can play an important role on the use of ICTs. The age of a respondent farmer was measured by counting the actual years from his birth to the time of interview on the basis of his statement. It was measured in terms of actual years. No fractional year was considered for the study.

### 3.4.1.2 Education

Education of a respondent was measured on the basis of his ability to read and write or receiving formal education up to a certain standard. It was expressed in terms of year of schooling. One score was given for passing each level in the educational institution. For example, if the respondent passed the final examination of HSC class, his educational score was given as 12. Similarly if the respondents passed the final examination of class X, his educational score was given as 10. If the respondents did not know how to read and write, his educational score was given as zero. A score of 0.5 was given to a respondent who could sign his name only.

### 3.4.1.3 Farm size

Farm size of the respondent was measured as the size of his farm (including rice and other crops) on which he continued his farm practices during the period of study. Each respondent was asked to mention the homestead area (including ponds and gardens), the area of land under his own cultivation, own land given to others on borga (share cropping) system, land taken from others on borga system, land taken from others on lease system, and miscellaneous fallow land. The area was estimated in terms of full benefit to the farmers or his family. The following formula was used in measuring the farm size:

$$\text{Farm size} = A_1 + A_2 + 1/2(A_3 + A_4) + A_5 + A_6$$

Where,

$A_1$  = homestead area

$A_2$  = Own land under own cultivation

$A_3$  = Own land given to others on borga system

$A_4$  = Land taken from others on borga system

$A_5$  = land taken from others on lease system

$A_6$  = Miscellaneous fallow land.

The unit of measurement was hectares.

### 3.4.1.4 Annual income

Annual income of a respondent was measured on the basis of total yearly earning from agricultural and non-agricultural sources (business, service etc) earned by the respondent himself and other family members. The methods of ascertaining income from different sources were involved three phases.

1. In the first phase, the yield of all the crop in the previous year were noted, then all the yield were converted into cash income according to the prevailing market price

2. In the second phase, the cash income by selling cattle heads, milk and milk products, poultry and its products, fisheries etc according to prevailing market price.

3. In the third phase, earnings of each respondent himself and other members of his family from different sources (like service, business, labour) in the last year from farming and others sources were added together to obtain total family annual income of the respondent.

$$\text{Total annual income} = A+B+C$$

Where,

A = Annual income from agriculture

B = Annual income from livestock, poultry & fisheries

C = Annual income from service, business & labour

#### **3.4.1.5 Social participation**

Social participation of a respondent was measured by his membership in different social organization for particular period of time. This was measured by participation of a respondent in social organization. For participation, weight was assigned as 0, 1, 2 and 3 for no participation, general member, executive member and executive officer respectively for one year of participation. If a respondent is a general member of a cooperative society, executive member of social committee and executive officer of a sports club for subsequent two years, his score of the social participation would be:  $1 \times 2 + 2 \times 2 + 3 \times 2 = 12$

#### **3.4.1.6 Use of ICT materials**

Use of ICT materials refers to one's exposure to the use of various materials related information and communication technologies. The use of ICT materials of a respondent was measured on the basis of seven ICTs. The respondents mentioned the nature of his use of equipments by putting a tick mark against any one of the four responses –“don't use at all”, “use occasionally”, “use most often”, “use regularly”. The score for each

respondent was determined by adding his response to all the items on the basis of his frequency of contact with a score of 0, 1, 2 and 3 respectively. The use of ICT materials score of the respondents could range from 0 to 21, where 0 indicating no use and 21 indicating very high use.

#### **3.4.1.7 Farming experience**

Farming experience of individual is one of the important factor. Experience can play an important role on the use of ICTs. The farming experience of a respondent farmer was measured by counting the actual years of his cultivation practices at the time of interview on the basis of his statement. It was measured in terms of actual years. No fractional year was considered for the study.

#### **3.4.1.8 Cosmopolitaness**

Cosmopolitaness refers to the degrees to which a respondent's orientation is external to his own social system. Cosmopolitaness of a respondent was measured in terms of his nature of visits to the eight different types of places as shown in item number 8 in the interview schedule. The cosmopolitaness was measured by assigning score 4 for regular visit, 3 for often visit, 2 for occasional visit, 1 for rare visit and 0 for no visit. The cosmopolitaness score of the respondents could range from 0 to 32, where 0 indicating no cosmopolitaness and 32 indicating very high cosmopolitaness.

#### **3.4.1.9 Agricultural knowledge**

Agricultural knowledge of an individual referred to the extent of knowledge. Agricultural knowledge of a farmer is the foundation of his farming business and is a very important factor in one's adoption behavior either for acquiring or disseminating ideas, practices, technologies, information etc. Knowledge is power and it inspires one to take correct and prompt decision. Without proper knowledge a farmer can take wrong decision which may lead him to failure in the business.

To measure the agricultural knowledge of a respondent a set of 16 questions was constructed in the interview schedule. Each respondent was asked to answer all the 16 questions. Out of assigned scores against each question, the summation of obtained scores against 16 questions represented the agricultural knowledge of a respondent.

Agricultural knowledge was measured by the total knowledge score about agriculture. The total assigned score was 50. But, the score of each question

was not equal, it was determined according to the extent of difficulty. However, for correct responses to all questions, a respondent could get a total score of 50. While wrong responses to all question he could get 0 (zero).

#### 3.4.1.10 Innovativeness

Innovativeness is the degree to which an individual adopts an innovation relatively earlier than other members in a social system (Rogers; 1995). In this study innovativeness of a respondent was measured on the basis of the period of 9 improved agricultural practices scores were assigned on the basis of time required by an individual to adopt each of the practices in the following manner:

Period of adoption (after hearing)	Assigned score
Within Two years	3
Within Four years	2
After Four years	1
Not at all	0

Innovativeness score of a respondent farmer was obtained by adding his scores for adoption of all the 9 selected improved agricultural practices. Innovativeness score of a respondent farmer could range from 0 to 27, where, 0 indicating no innovativeness and 27 indicating very high innovativeness.

#### 3.4.2 Measurement of dependent variables

The procedure followed in measuring the dependent variable is presented below:

##### Impact of ICTs use

Impact of ICTs use refers to one's change regarding use of various materials related information and communication technologies. For selecting the ICTs of this research various journals were accessed and consulted with the experts of ICTs. Finally, for computing Impact of ICTs use, seven ICTs were selected. Those were TV agricultural programs, Radio agricultural programs, Telecommunications, Posters, Newspapers, Multimedia, and

Internet. The respondents mentioned the positive change nature of use of technologies by putting a tick mark against any one of the five responses – “No change”, “Small change”, “Change”, “High change” and “Excellent change” against the seven ICTs. The score for each respondent was determined by adding his response to all the items. The was assigned as ‘0’ for No change, ‘1’ for Small change, ‘2’ for change, ‘3’ for High change and ‘4’ for Excellent change. Impact of ICTs use score of the respondents could range from 0 to 28, where 0 indicating no impact and 28 indicating very high impact.

### **3.5 Statement of Hypothesis**

As defined by Goode and Hatt (1952), “A hypothesis is a proposition which can be put to a test to determine its validity. It may seem contrary to, or in accord with common sense. It may prove to be correct or incorrect. In any event, however, it leads to an empirical test”. A hypothesis simply means a mere assumption or some supposition to be proved or disproved. But for a researcher, hypothesis is a normal question that he intends to resolve. According to kerlinger (1973), “A hypothesis is a conjectural statement of the relation between two or more variables. Hypotheses are always in declarative statements form, and they relate either generally or specifically variables to variables”. Hypotheses may be broadly divided into two categories, namely, research hypothesis and null hypothesis. In studying relationships between variables, an investigator first formulates research hypotheses which states anticipated relationships between the variables.

Research hypothesis: There is a relationship between age, education, farm size, annual income, social participation, use of ICT materials, farming experience, cosmopolitaness, agricultural knowledge, innovativeness of farmers and their perceived impact of ICTs use.

However, for statistical test it becomes necessary to formulate null hypothesis. A null hypothesis states that there is no relationship between concerned variables.

The null hypotheses were developed in this study to explore the relationship between dependent and independent variables. For testing the hypothesis statistically, the following null hypotheses were formulated:

1. There is no relationship between age of the farmers and their perceived impact of ICTs use.

2. There is no relationship between education of the farmers and their perceived impact of ICTs use.
3. There is no relationship between farm size of the farmers and their perceived impact of ICTs use.
4. There is no relationship between annual income of the farmers and their perceived impact of ICTs use.
5. There is no relationship between social participation of the farmers and their perceived impact of ICTs use.
6. There is no relationship between use of ICT-related materials of the farmers and their perceived impact of ICTs use.
7. There is no relationship between farming experience of the farmers and their perceived impact of ICTs use.
8. There is no relationship between cosmopolitanness of the farmers and their perceived impact of ICTs use.
9. There is no relationship between agricultural knowledge of the farmers and their perceived impact of ICTs use.
10. There is no relationship between innovativeness of the farmers and their perceived impact of ICTs use.

### **3.6 Collection of Data**

For the purpose of data collection, an interview schedule was prepared. It was prepared keeping the objectives of the study in mind. The schedule contained both open and closed form questions. Direct simple questions were included in the schedule to collect data on the selected dependent and independent variables. Appropriate scales were developed to measure the selected factors of the respondents. Scales were also developed to ascertain the impact of ICTs use. The draft schedule was prepared in Bengali and pre-tested before using it for collection of data. For pre-test purpose, ten farmers taken from the selected village of the study area were interviewed by using the draft interview schedule. Based on the pre-test experience, necessary corrections, additions, alternations and rearrangements were made in the schedule. Thus, the schedule was prepared for final use. The schedule was prepared both in Bengali and English version. The Bengali version of interview schedule was multiplied as per requirements to collect data from the respondents. The English version of interview schedule was enclosed in appendix A.

Data were collected personally by the researcher himself through face to face visit to all the selected farmers of Durgapur and Dakurbunia villages of Patuakhali Shadar upazilla to obtain valid and pertinent information. The



researcher made all possible efforts to explain the purpose of the study to the farmers. Rappports were established with the farmers prior to interview and the objectives were clearly explained by using local language to the extent possible. So he did not hesitate to furnish proper responses to the questions and statements which were collected during 3<sup>th</sup> November to 10<sup>th</sup> December, 2007. At the time of data collection, the researcher was also aware of side talking and tried to avoid that problem tactfully. The researcher sought the help of the local supervisors for this purpose. Excellent co-operation and co-ordination were obtained from all the respondents.

### **3.7 Processing of Data**

The collected raw data were examined thoroughly to find out the errors and omissions. For this, the researcher made a careful scrutiny of the completed interview schedule to make sure that they were entered as complete as possible and well arranged to facilitate coding and tabulation. Very minor mistakes were detected by doing this, which were corrected promptly.

Having consulted with his research supervisor, the investigator prepared a detailed coding plan. All responses in the interview schedule were given numerical coded values. Local units were converted into standard units. All the individual responses to the questions of the interview schedule were transferred to a master sheet to facilitate tabulation.

In case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative forms. These were then tabulated according to the objectives of the study.

For describing the various independent and dependent variables, the respondents were classified into various categories and arranged in simple table for description. These categories were developed for each of the variable by considering the nature of distribution of the data and the general consideration prevailing in the social system. The procedure and the effect of categorization of a particular variable were discussed while describing the variable in the subsequent sections.

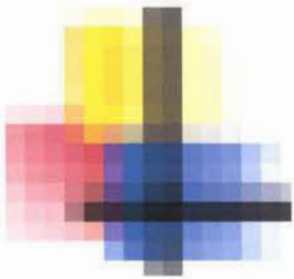
### **3.8 Statistical Analysis**

The collected data were compiled, coded tabulated and analyzed in accordance with the objectives of the study. Qualitative data were quantified by means of suitable scoring techniques. The statistical measures such as range, mean, standard deviation, percentage distribution were used to describe both the dependent and independent variables. Tables were also

used in presenting data for clarity of understanding. In order to explore the relationships of the selected characteristics of the farmers with their perceived impact of information and communication technologies use, the Pearsons Product Moment Correlation Co-efficient was computed. Correlation matrix was also computed to determine the inter relationship among the variables. Five (0.05) percent level of significance with relevant degrees of freedom considered to reject or accept the null hypothesis. If the tabulated value was found greater than the calculated value ( $r$ ) then the null hypothesis could not be rejected, i.e. there was no relationship between the concerned variables. To the contrary if the calculated value ( $r$ ) was higher than the tabulated value then the null hypothesis was rejected. Conclusion was made with the statement that "there was a significant relationship between the concerned variables".

# CHAPTER IV

## RESULTS AND DISCUSSION



# CHAPTER IV

## FINDINGS AND DISCUSSION

## CHAPTER IV

### RESULTS AND DISCUSSION

A sequential and detailed discussion on the findings of the study has been presented in this Chapter. The Chapter is divided into three sections. In the first section, independent variables i.e. characteristics of the respondents have been discussed. The second section dealt with dependent variable impact of ICTs use as perceived by the farmers in receiving information. The third sections dealt the relationship between the dependent and independent variables have been discussed.

#### 4.1 Characteristics of the Farmers

The prudent use of agricultural technologies is the key to agricultural progress (Kashem, 1990). Farmers use modern technologies when they find those useful in their own socio-economic set-up and agro-economic settings. Moreover, the impact of information and communication technologies differ from farmer to farmer, that is, farmer's individual characteristics and personal make-up play a vital role in adopting any agricultural practice in the overall technology transfer process. A particular technology might be proved beneficial or suitable for a farmer but he may not be in a position to accept it due to his varied mental make-up and situational factors. The individual characteristics of the farmers may greatly vary and the various factors might have great impact on their use of various information and communication technologies.

Eleven characteristics of the farmers were selected to find out their relationship with impact of ICTs use for various agricultural technological practices. The selected characteristics included their age, education, farm size, annual income, social participation, use of ICT materials, farming experience, cosmopolitaness, agricultural knowledge and innovativeness. These characteristics of the farmers have been described in this section.

##### 4.1.1. Age

Age of the farmers was determined by the number of years from his birth to the time of interview. It was found that the age of the respondents ranged from 28 to 92 years, the average being 51.16 years and the standard deviation was 14.152. On the basis of age, the farmers were classified into three categories: "young aged" (up to 35), "middle aged" (36-50) and "old aged (51 and above) Table 4.1.1 contains the distribution of the respondents according to their age.

Data presented in table 4.1.1 indicated that the highest proportion (48.04 percent) of the respondents fell in the old-aged category compared to 37.25 percent middle and 14.71 percent young aged category. It was also revealed that 48 percent of the respondents comprised of old-aged categories.

**Table 4.1.1 Distribution of the respondents according to their age**

Category	Numbers of respondents	Percent	Observed ranged	Mean	Standard deviation
Young aged (up to 35)	15	14.71			
Middle aged (36-50)	38	37.25	28-92	51.16	14.152
Old aged (51 and above)	49	48.04			
Total	102	100			

Conclusion can be drawn that middle and old-aged farmers were generally receptive to new ideas and things. They have a favorable attitude towards trying of new ideas. They maintain better communication with various information sources available in rural areas. The older farmers, because of their longer farm experience, might have valuable opinions in regard to modern agricultural technologies. So, old farmer also maintain better communication with various information sources and communication media available in the rural areas. They were usually influential partner in making decisions regarding farming affairs. The extension agents can make use of these views and opinions in designing their extension activities.

#### **4.1.2 Education**

Education of a respondent was measured by the level of his formal education i. e. highest grade (class) passed by him. The education score of the respondents ranged from 0 to 12, the average being 5.87 and the standard deviation was 3.21. Based on their level of education, the respondents were grouped into five categories, "no education" (0), "can sign only" (0.5), "primary education" (1-5), "secondary education" (6-10), and above secondary education" (11 and above).

Data presented in Table 4.1.2 indicate that a large proportion 87 percent of the respondents are having standard level of education (37 percent having "primary education" and 50 percent having "secondary education") compared to 5.76 percent "can sign only", and 1.96 percent having "above secondary education".

**Table 4.1.2 Distribution of the farmers according to the their level of education**

Categories	Numbers of respondents	Percent	Observed ranged	Mean	Standard deviation
Illiterate (0)	5	4.8			
Can sign only (.50)	6	5.76			
Primary education (1-5)	38	37.26	0-12	5.873	3.2148
Secondary education (6-10)	51	50			
Above secondary education (11 and above)	2	1.96			
Total	102	100			

Farmers need to have some education in order to use the various agricultural information sources properly and ultimately fall good effect. It is evident that 89 per cent of the farmers had education of various degrees from primary to above secondary level and 11 per cent have no education in the study area. Thus, it can be said that in the study area the education of the farmers was relatively higher compared to typical rural area in Bangladesh. Because the level of education of the people of Bangladesh is 62.66% ( BBS, 1994).

#### 4.1.3 Farm size

Farm size was measured on the basis of the cultivated area either owned by a farmer or cultivated on borga system, the area being estimated in terms of full benefit to the farmers. The farm size varied from 0.00 to 1.67 hectares. The average farm size was 1.03 hectares with a standard deviation of 0.455. The respondents were classified into four categories based on their farm size as: "Land less farmer" ( Having on land ) "small farmer" (up to 0.56 ha), "medium farmer" (.56-.1.48 ha), and "large farmer" (1.49 and above). The distribution of the respondents according to their farm size shown in Table 4.1.3

Data presented in the table 4.1.3 show that the highest proportion (73.5 percent) of the farmers had medium farm compared to 12.7 percent had small farm and 11.76 percent having large farm. It may also be revealed that 85 percent of the respondents comprised of either small or medium farm or large farm.

**Table 4.1.3 Distribution of the farmers according to their farm size**

Categories	Numbers of respondents	Percent	Observed ranged (ha)	Mean	Standard deviation
Land less farmers (00ha)	2	1.96			
Small farmers (up to .56 ha)	13	12.74			
Medium farmers (.57-1.48 ha)	75	73.53	0-1.67	1.0269	0.45545
Large farmers (1.49 ha and above)	12	11.76			
Total	102	100			

The average farm size of the respondent farmers was 1.02 hectares, which is higher than the national average (0.81 hectares). This type of distribution is helpful to access different sources for disseminating agricultural information according to farmers need and which kept good impact of using information and communication technologies.

#### 4.1.4 Annual income

Annual income was estimated on the basis of total receipt of money, goods and services during a year and expressed in taka. Annual income of the respondent ranged from TK.36.00 thousand to TK. 81.2 thousand. The average annual income was TK 56.55 thousand and standard deviation 11.34. On the basis of annual income, the respondents were classified into three categories: "low income" (up to TK. 45.00 thousand), "medium income" (TK. Above 45-68 thousand) and "high income" (above 68.00 thousand). The distribution of the respondents according to their annual income is shown in Table 4.1.4

Data shown in Table 4.1.4 revealed that highest proportion (65.69 percent) of the respondents had medium annual income compared to 19.6 percent having high and 14.71 percent under low annual income.

#### 4.1.4 Distribution of the respondents according to their annual income('000' Tk.)

Category	Numbers of respondents	Percent	Observed ranged	Mean	Standard Deviation
Low income (up to 45)	15	14.71			
Medium income (>45-68)	67	65.69	36-81.2	56.55	11.34
High income (above 68)	20	19.60			
Total	102	100			

The average annual income of the farmers of the study area was little bite higher than the average per capita annual income of the country i. e. 444 U. S. dollar (UNICEF, 2006). This might be due to the fact that the respondents were mainly engaged in farming and they have few other sources of income, such as, selling of labors, small trade, fishing and gardening (Betel-nut). Since, the greater proportion (85 percent) of farmers had medium income to high income, it is logical to assume that they might have access to modern information sources such as Radio, TV etc. This is so because income is obviously associated with purchasing these types of modern instruments.

#### 4.1.5 Social participation

Social participation scores of the respondents were computed on the basis of the extent of participation in different social organizations. Social participation of the respondents ranged from 0 to 9.00. The average was 1.62 with a standard deviation 2.521 against the possible range of 0 to 24. On the basis of social participation, the farmers were classified into three categories: “no participation” (0), “very low participation” (1-4), “low participation” (5 & above).

Data presented in the table 4.1.5 show that the highest proportion (64.71 percent) of the respondents had no participation in social organizations compared to 20.59 percent having very low Social participation and 14.7 percent of the respondent had low social participation.

#### 4.1.5 Distributions of the respondents according to their social participation

Category	Numbers of respondents	Percent	Observed ranged	Mean	Standard Deviation
No participation (0)	66	64.71			
Very low participation (1-4)	21	20.59	0 - 9	1.62	2.521
low participation(5 & above)	15	14.7			
Total	102	100			



The findings indicate that most of the farmers (85.3 percent) had either no participation or very low social participation. This means that the respondents of the study area are mostly engaged in their farm works and do not participate in other social activities. Social participation was very much important for self actualization as well as technological information generation. However, no one from them found to maintain high and medium social participation.

#### 4.1.6 Use of ICT materials

Use of ICT materials scores of the respondents were computed on the basis of the degree of use of different equipments like Radio, TV, Telephone Poster, Newspaper, Multimedia and Internet. Use of ICT materials of the respondents ranged from 0 to 21. The average was 5.8 with a standard deviation 3.648 against the possible range of 0 to 11. On the basis of use of ICT materials, the farmers were classified into three categories: "very low level of use" (below 2), "low level of use" (3-9), "medium level of use" (10 & above).

Data presented in the table 4.1.6 show that the highest proportion (61.76 percent) of the respondents had low level of use of ICT materials compared to 20.59 percent having very low level of use of ICT materials and 17.6 percent of the respondent had medium level of use of ICT materials.

#### 4.1.6 Distributions of the respondents according to their use of ICT materials

Category	Numbers of respondents	Percent	Observed ranged	Mean	Standard Deviation
Very low level of use (0-2)	21	20.59	0 - 11	5.8	3.648
Low level of use (3-9)	63	61.76			
Medium level of use (10 & above)	18	17.65			
Total	102	100			

The findings indicate that most of the farmers (82.35 percent) had either low or very low level of use of ICT materials. This means that the respondents could not get many of ICT materials due to their high cost and unavailability. But the available materials like Radio, TV, Mobile phone were frequently use by them and impact was quite good. GOs and NGOs should come up to take appropriate steps for spreading ICT materials to the farmers.

#### 4.1.7 Farming experience

Farming experience of the farmers ranged from 2 to 70 years, the mean being 30.43 with a standard deviation, of 13.529. Based on their farming experience, the farmers were classified into three categories as shown in Table 4.1.7

#### 4.1.7 Distributions of the respondents according to their agricultural experience

Category	Numbers of respondents	Percent	Observed ranged	Mean	Standard Deviation
Low experience (1-16)	16	15.69			
Medium experience (17-44)	73	71.57	2 - 70	30.43	13.529
High experience (45 & above)	13	12.64			
Total	102	100			

The highest proportion (71.57 percent) of farmers in the study group had medium farming experience, while 13 percent had 45 years or more farming experiences. Only 15.69 percent of the farmers had very few years of farming experience.

Agriculture is a complex business. Therefore, one needs multiple information to take correct decision. One acquires practical knowledge only after a long experience for judicial using the information sources. Moreover, the farming experience of an individual helps him to learn new technologies and may lead him to take correct decisions.

#### 4.1.8 Cosmopolitaness

Cosmopolitaness scores of the respondents ranged from 5 to 19 against the possible range of 0 to 32 with an average 13.39 and standard deviation of 3.87. On the basis of their cosmopolitaness scores, the respondents were classified into three categories: "very low cosmopolitaness" (up to 9), "low cosmopolitaness" (10-17), "medium cosmopolitaness" (above 17). The distribution of the respondents according to their cosmopolitaness is shown in Table 4.1.8.

**Table 4.1.8 Distribution of the respondents according to their cosmopolitaness**

Categories	Numbers of respondents	Percent	Observed ranged	Mean	Standard deviation
Very low cosmopolitaness (up to 9)	18	17.65			
Low cosmopolitaness (10-17)	76	74.51	5-19	13.39	3.87
Medium cosmopolitaness (above 17)	8	7.84			
Total	102	100			

Data contained in Table 4.1.8 indicate that the highest proportions (74.5 percent) of the respondents had “low cosmopolitaness”, while 17.65 percent of the being “very low cosmopolitaness”, and only 7.84 percent under “medium cosmopolitaness”. Data also revealed that majority (82.35 percent) of the respondents were moderate to low in terms of their cosmopolitaness. None of the respondents was found high cosmopolitaness.

#### 4.1.9 Agricultural knowledge

It referred to the knowledge gained by the farmers from different media and also through their own experiences regarding different aspects of agriculture. The agricultural knowledge scores of the farmers ranged from 11 to 50, against the possible range of 0 to 50 with a mean of 39.65 and standard deviation of 10.08. The farmers were classified into three categories on the basis of their agricultural knowledge scores such as (i) Low agricultural knowledge, (ii) Medium agricultural knowledge, and (iii) High agricultural knowledge (Table 4.1.10).

**Table 4.1.9 Distribution of the farmers according to their agricultural knowledge**

Categories	Numbers of respondents	Percent	Observed ranged	Mean	Standard deviation
Low agricultural knowledge (1-10)	0	0			
Medium agricultural knowledge (11-28)	16	15.67	11- 50	39.65	10.08
High agricultural knowledge (above 28)	82	80.39			
Total	102	100			

Data presented in Table 4.1.10 showed that the highest proportion (80.39 percent) of the farmers had high agricultural knowledge compared to 15.67 percent of them having medium knowledge and no one had low agricultural knowledge. It can be clearly seen from the Table 4.1.10 that majority of the respondent farmers (80.39 percent) had high agricultural knowledge. Information and communication technologies help to increase knowledge. On the other hand, knowledge influence adoption of any improved technology.

#### 4.1.10 Innovativeness

Innovativeness scores of the respondents were computed on the basis of their extent use of new ideas. The maximum innovativeness score of the respondents was 19 and the minimum was 1 against the possible range of 0 to 27. However, the average was 13.57 and the standard deviation 4.58. Based on their innovativeness scores, the respondents were classified into three categories: "low innovativeness" (up to 8), "medium innovativeness" (9-18) and "high innovativeness" (above 18). The distribution of the respondents according to their innovativeness is shown in Table 4.1.11.

Data contained in table 4.1.11 indicate that the highest proportion (83.33 percent) of the farmers had medium innovativeness as compared to (14.7 percent) low innovativeness.

**Table 4.1.10 Distribution of the respondents according to their innovativeness**

Categories	Numbers of respondents	Percent	Observed ranged	Mean	Standard deviation
Low innovativeness ( 0- 8)	15	14.7			
Medium innovativeness ( 9- 18 )	85	83.33	1 -19	13.57	4.58
High innovativeness (above 18)	2	1.96			
Total	102	100			

Data also revealed that majority (83.33 percent) of the respondents of the study area had medium level of innovativeness. It may also be concluded that all the respondents of the study area had the innovativeness. The farmers with low innovativeness opined that they received agricultural information from their peer groups, while the others used interpersonal, group and mass media sources of information for getting agricultural information. These two results would

help the extension planners to chalk out future extension program for transfer of new ideas to the potential farmers.

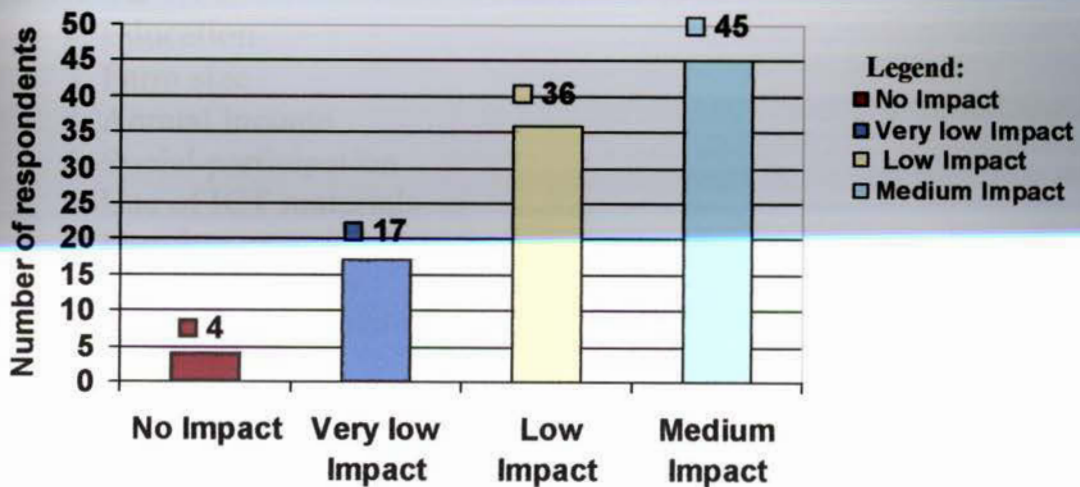
#### **4.2 Extent of impact of ICTs use by the farmers.**

Impact of ICTs use by the farmers is pertinent to increase farm output. The degrees change in respondents by receiving information through few information and communication technologies were considered indicator to measure the impact. Farmers were asked whether they had any changes by receiving information through using each of the selected ICT. Impact was measured on the basis of opinion provided by the respondents according to their extent of change in different aspects. Respondents were asked question regarding the following ICTs:

- a. TV agricultural programs
- b. Radio agricultural programs
- c. Telecommunications
- d. Posters
- e. Newspaper
- f. Multimedia
- g. Internet

The observed extent of impact of ICTs use score of the farmers ranged from 0 to 10 against the possible range of 0 to 28. The mean and the standard deviation were 5.47 and 2.97 respectively. The farmers were classified into four categories on the basis of their extent of perceived impact of ICTs use such as (i) no Impact, (ii) very low Impact, (iii) low Impact and (iv) medium Impact.

Data shows that 4 (3.9 percent) respondents had no perceived impact, 17(16.6 percent) respondents had very low perceived impact, 36 (35.4 percent) respondents had low perceived impact and 45 (44.1 percent) respondents had Medium impact on use of ICT out of 102 respondents. The relative proportion of the respondents having their perceived impact level are shown in Figure 4.2.1



**Fig 4.2.1** Distribution of the respondents according to their perceived impact of ICTs use

This means that majority (79.5%) of the farmers of the study area had perceived low to medium impact of ICTs use and 16.6 percent had perceived very low and 3.9 percent had opined no impact. Maximum farmers perceived impact (64.6 percent) of the study found below medium impact level. It was so, because ICTs (i.e. Multimedia, Internet) were not available in the study area. The materials of ICTs were also very expensive. But the farmers were not much rich or poor. So, they could not buy those ICTs. Moreover, farmers had not enough technical knowledge to handle ICTs.

GOs as well as NGOs should take proper step for overcoming the percent situation. Communication planners should be careful to include agricultural information through various media of ICTs as it enhances communication behavior of the farmers for receiving new technologies and modern cultural practices in future.

#### **4.3 Relationships between the selected characteristics of the farmers and their perceived impact of information and communication technologies use**

This section deals with the relationships with eleven selected characteristics of the farmers and their impact of ICTs use. The selected characteristics constituted independent variables and impact of ICTs use by the farmers are considered as dependent variable. The characteristics included:

1. Age
2. Education
3. Farm size
4. Annual income
5. Social participation
6. Use of ICT materials
7. Farming experience
8. Cosmopolitaness
9. Agricultural knowledge
10. Innovativeness

Pearson's product moment correlation co-efficient "r" has been used to test the hypothesis concerning the relationship between two variables 0.05 level of significance was used as the basis for acceptance or rejection of a hypothesis.

The summary of the results of the correlations co-efficient relationships between the selected characteristics of the respondent/ farmers and their perceived impact of ICTs use is shown in Table 4.3 and the correlation matrix is given in the APPENDIX-C.

**Table 4.3 Co-efficient of correlation of the selected characteristics of the respondents/farmers and their perceived impact of ICTs use**

Dependent variable	Independent variable	Computed value of "r"	Table value of "r" at 100 degree of freedom	
			5%	1%
Impact of ICTs use	Age	-0.163 <sup>NS</sup>	0.195	0.254
	Education	0.820 **		
	Farm Size	0.553 **		
	Annual Income	0.289 **		
	Social Participation	0.180 <sup>NS</sup>		
	Use of ICT	0.962 **		
	Agricultural Experience	-0.116 <sup>NS</sup>		
	Cosmopolitaness	0.612 **		
	Agricultural Knowledge	0.748 **		
	Innovativeness	0.609 **		

NS = Not Significant

\* = Significant at 0.05 level

\*\* = Significant at 0.01 level

#### **4.3.1 Relationship between age of the farmers and their perceived impact of ICTs use**

In order to determine the relationship between age of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*“There is no relationship between age of the farmers and their perceived impact of ICTs use”.*

The co-efficient of correlation between the concerned variables was computed and found to be -0.163 as shown in table 4.3 which led to the following observation regarding the relationship between the two variables under consideration:

- a) The trend of relationship between the two variables was negative direction and a very low relationship was found between the two variables.
- b) The computed value of “r” ( $r = -0.163$ ) was found to be smaller than the table value ( $r = \pm 0.195$ ) with 100 degrees of freedom at 0.05 level probability.
- c) The co-efficient of correlation between the concerned variable was insignificant at 0.05 level of probability.
- d) The null hypothesis was accepted.

Based on the above findings, the researcher concluded that age of the farmers had no significant relationship with their perceived impact of ICTs use. It was however, the tendency of relationship between age farmers and their perceived impact of ICTs use was negative. Khan (1996), Sarker (1995) and Haque (1982) observed the similar findings in their studies.

#### **4.3.2 Relationship between education of the farmers and their perceived impact of ICTs use**

The relationship between level of education of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*“There is no relationship between education of the farmers and their perceived impact of ICTs use”.*

Computed value of the co-efficient of correlation between level of education of the farmers and their perceived impact of ICTs use was found to be +0.820 as shown in Table 4.3. The following observations were recorded regarding the



relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.
- b) Highly significant relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.820$ ) was found to be larger than table value ( $r = \pm 0.254$ ) with 100 degrees of freedom at 0.01 level of probability.
- d) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
- e) The concerned null hypothesis rejected.

The researcher concluded that level of education of the farmers had a positive significant relationship with their perceived impact of ICTs use. This means that with the increase of education of the farmers, the impact of ICTs use in getting agricultural information is also increased. Similar findings were also observed by Rahman (1974) and Pandian *et. al.* (2002).

#### **4.3.3 Relationship between farm size of the farmers and their perceived impact of ICTs use**

The relationship between farm size of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*"There is no relationship between farm size of the farmers and their perceived impact of ICTs use".*

Computed value of the co-efficient of correlation between farm size of the farmers and their perceived impact of ICTs use was found to be +0.553 as shown in Table 4.3. The following observations were recorded regarding the relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.
- b) Highly significant relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.553$ ) was found to be larger than table value ( $r = \pm 0.254$ ) with 100 degrees of freedom at 0.01 level of probability.
- d) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
- e) The concerned null hypothesis rejected.

The researcher concluded that farm size of the farmers had a positive significant relationship with their perceived impact of ICTs use. This means that with the increase of farm size of the farmers, the impact of ICTs use in getting agricultural information is also increased significantly. Similar findings were also observed by Rahman (1996), Sarker's (1995) and Hooda (1989).

#### **4.3.4 Relationship between annual income of the farmers and their perceived impact of ICTs use**

The relationship between annual income of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*"There is no relationship between annual income of the farmers and their perceived impact of ICTs use".*

Computed value of the co-efficient of correlation between annual income of the farmers and their perceived impact of ICTs use was found to be +0.289 as shown in Table 4.3. The following observations were recorded regarding the relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.
- b) Highly significant relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.298$ ) was found to be larger than table value ( $r = \pm 0.254$ ) with 100 degrees of freedom at 0.01 level of probability.
- d) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
- e) The concerned null hypothesis rejected.

The researcher concluded that annual income of the farmers had a positive significant relationship with their perceived impact of ICTs use. This means that with the increase or decrease of annual income of farmers, the impact of ICTs use in getting agricultural information is increased or decreased respectively. Similar findings were also observed by Pandian *et. al.* (2002), Karim (2005), and Latif (1974).

#### **4.3.5 Relationship between social participation of the farmers and their perceived impact of ICTs use**

The relationship between social participation of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*"There is no relationship between social participation the farmers and their perceived impact of ICTs use".*

Computed value of the co-efficient of correlation between social participation of the farmers and their perceived impact of ICTs use was found to be +0.180 as shown in Table 4.3. The following observations were recorded regarding the relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.
- b) A very low relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.180$ ) was found to be smaller than table value ( $r = \pm 0.195$ ) with 100 degrees of freedom at 0.05 level of probability.
- d) The co-efficient of correlation between the concerned variables was insignificant at 0.05 level of probability.
- e) The concerned null hypothesis accepted.

The researcher concluded that social participation of the farmers had a positive, but insignificant relationship with their perceived impact of ICTs use. This means that with the increase of social participation of farmers, the impact of ICTs use in getting agricultural information was not increased significantly. Similar finding was also observed by Chandra and Raddy (2004).

#### **4.3.6 Relationship between use of ICT materials of the farmers and their perceived impact of ICTs use**

The relationship between **use of ICT materials** of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*"There is no relationship between use of ICT materials of the farmers and their perceived impact of ICTs use".*

Computed value of the co-efficient of correlation between **use of ICT materials** of the farmers and their perceived impact of ICTs use was found to be +0.962 as shown in Table 4.3. The following observations were recorded regarding the

relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.
- b) Highly significant relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.962$ ) was found to be larger than table value ( $r = \pm 0.195$ ) with 100 degrees of freedom at 0.01 level of probability.
- d) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
- e) The concerned null hypothesis rejected.

The researcher concluded that **use of ICT materials** of the farmers had a positive significant relationship with their perceived impact of ICTs use. This means that with the increase of **use of ICT materials** of the farmers, the impact of ICTs use in getting agricultural information is also increased, decrease make decreases and the changing rate is significant.

#### **4.3.7 Relationship between farming experience of the farmers and their perceived impact of ICTs use**

In order to determine the relationship between farming experience of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*"There is no relationship between farming experience of the farmers and their perceived impact of ICTs use".*

The co-efficient of correlation between the concerned variables was computed and found to be -0.116 as shown in table 4.3 which led to the following observation regarding the relationship between the two variables under consideration:

- a) The trend of relationship between the two variables was negative direction and a very low relationship was found between the two variables.
- b) The computed value of "r" ( $r = - 0.116$ ) was found to be smaller than the table value ( $r = \pm 0.195$ ) with 100 degrees of freedom at 0.05 level probability.
- c) The co-efficient of correlation between the concerned variable was insignificant at 0.05 level of probability.
- d) The null hypothesis was accepted.

Based on the above findings, the researcher concluded that farming experience of the farmers had no significant relationship with their perceived impact of ICTs use. However, the tendency of relationship between farming experience farmers and their perceived impact of ICTs use was negative. Chandra and Raddy (2004) observed the similar findings in their studies.

#### **4.3.8 Relationship between cosmopolitanism of the farmers and their perceived impact of ICTs use**

The relationship between cosmopolitanism of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*"There is no relationship between cosmopolitanism of the farmers and their perceived impact of ICTs use".*

Computed value of the co-efficient of correlation between cosmopolitanism of the farmers and their perceived impact of ICTs use was found to be +0.612 as shown in Table 4.3. The following observations were recorded regarding the relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.
- b) Highly significant relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.612$ ) was found to be larger than table value ( $r = \pm 0.254$ ) with 100 degrees of freedom at 0.01 level of probability.
- d) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
- e) The concerned null hypothesis rejected.

The researcher concluded that cosmopolitanism of the farmers had a positive significant relationship with their perceived impact of ICTs use. This means that with the increase of cosmopolitanism of farmers, the impact of ICTs use in getting agricultural information is increased. Similar findings were also observed by Anisuzzaman (2003), Ullah (1996) and Hossain and Crouch (1992).

#### **4.3.9 Relationship between agricultural knowledge of the farmers and their perceived impact of ICTs use**

The relationship between agricultural knowledge of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

*"There is no relationship between agricultural knowledge of the farmers and their perceived impact of ICTs use".*

Computed value of the co-efficient of correlation between agricultural knowledge of the farmers and their perceived impact of ICTs use was found to be +0.748 as shown in Table 4.3. The following observations were recorded regarding the relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.
- b) Highly significant relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.748$ ) was found to be larger than table value ( $r = \pm 0.254$ ) with 100 degrees of freedom at 0.01 level of probability.
- d) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
- e) The concerned null hypothesis rejected.

The researcher concluded that agricultural knowledge of the farmers had a positive significant relationship with their perceived impact of ICTs use. This means that with the increase of agricultural knowledge of farmers, the impact of ICTs use in getting agricultural information is also increased. Similar findings were also observed by Kashem and Halim (1991), Karim (2005) and Sarker (1995).

#### **4.3.10 Relationship between innovativeness of the farmers and their perceived impact of ICTs use**

The relationship between innovativeness of the farmers and their perceived impact of ICTs use, the following null hypothesis was tested:

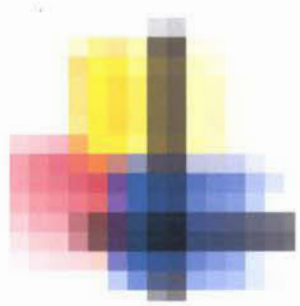
*"There is no relationship between innovativeness of the farmers and their perceived impact of ICTs use".*

Computed value of the co-efficient of correlation between innovativeness of the farmers and their perceived impact of ICTs use was found to be +0.609 as shown in Table 4.3. The following observations were recorded regarding the relationships between the two variables on the basis of the co-efficient of correlation:

- a) The relationship showed a positive trend.

- b) Highly significant relationship was found between the two variables.
- c) The computed value of "r" ( $r = +0.609$ ) was found to be larger than table value ( $r = \pm 0.254$ ) with 100 degrees of freedom at 0.01 level of probability.
- d) The co-efficient of correlation between the concerned variables was significant at 0.01 level of probability.
- e) The concerned null hypothesis rejected.

The researcher concluded that innovativeness of the farmers had a positive significant relationship with their perceived impact of ICTs use. This means that with the increase of innovativeness of farmers, the impact of ICTs use in getting agricultural information is also increased. Similar findings were also observed by Pandian *et. al.* (2002), Rahim (1963), Beal and sibley (1967) and Kashem and Halim (1991).



# CHAPTER V

## **SUMMARY, CONCLUSION AND RECOMMENDATIONS**



## CHAPTER V

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Summary

##### 5.1.1 Introduction

The main occupation of the people of Bangladesh is agriculture and the largest segment of her national economy comes from this sector. So, the need for developing agriculture is a burning question of the time to mitigate food problem. Now-a-days agricultural information is considered by the farmers as an important input of agricultural production like other inputs. From past researches it was found that the flow of agricultural information among the farmers of our country is inadequate and slow. The consequential reasons for poor communication media use in receiving agricultural information on selected agricultural technologies and agriculture production practices resulting poor yield in both the cases. Moreover, the farmers have not been properly trying the modern technologies like improved agricultural practices, although they constitute the majority of the total farming population of the country. This is a major cause of poverty, low production, and backwardness and years- long food shortage of the people of Bangladesh.

The use of modern technologies along with receiving agricultural information regarding improved cultivation practices, though proven to be remunerative, has not yet been in large scale acceptance by most of the farmers. But it will be of no use unless the ideas reach them. Therefore, in bringing about technological changes among the farmers, it is essential to improve impact of information and communication technologies regarding agricultural information. Considering the national importance and economic contribution made by the farmers, the present piece of research work was designed.

The present study was undertaken in Patuakhali Shadar upazila of Patuakhali district, keeping the following specific objectives in view:

i. To determine and describe some selected characteristics of Farmers towards the use of information and communication technologies. The selected characteristics are:

- Age
- Education
- Farm size
- Annual income
- Social participation
- Use of ICT materials
- Farming experience
- Cosmopolitaness
- Agricultural knowledge
- Innovativeness

ii. To determine the impact of farmer towards the use of following information and communication technologies.

- a. TV agricultural programs
- b. Radio agricultural programs
- c. Telecommunications
- d. Posters
- e. Newspapers
- f. Multimedia
- g. Internet

iii. To explore the relationship between the impact use of information and communication technologies by farmers and the selected characteristics

### **5.1.2 Methodology**

The population of this study was 512 farmers, who cultivated winter vegetable in 2 villages of Patuakhali Shadar Upazilla under Patuakhali District. However, data for this study were collected from a sample of 102 farmers selected by random sampling technique. The researcher personally collected data for this study by using an interview schedule in Bengali. Simple, easy and direct questions were included in the interview schedule. The data were collected from November 3, 2007 to December 10, 2007.

Impact of information and communication technologies use by the farmers was the dependent variable of this study. Eleven characteristics of farmers were selected as independent variables. These characteristics were age, education, farm size, annual income, social participation, use of ICT materials, farming experience, cosmopolitaness, agricultural knowledge and innovativeness.

The farmers were classified into suitable categories in respect of ICTs use by them in receiving agricultural information. In developing the categories the investigator was guided by the nature of the data and standard criteria were taken into consideration of the existing social system. The statistical measures such as number, percentage distribution and mean were used in describing the findings related to information and communication technologies used by the farmers in receiving agricultural information.

Correlation analysis was used as the principal statistical method for analyzing the data. All these analyses were done by a computer using the SPSS (Statistical Package for Social Science). The level of probability fixed for the rejection of a null hypothesis was 0.05.

### 5.1.3 Summary of findings

#### 5.1.3.1 Characteristics profile of the farmers

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

**Age:** Age of the farmers ranged from 28 to 92 years with a mean value of 51.16 years. Seventy three percent of the farmers were middle aged, 11 percent were old and 16 percent were young farmers. This indicates that the nature and extent for receiving agricultural information in the study area took place to a considerable level among the young aged group. Young farmers usually used TV, radio, telephone etc. The old aged farmers relatively used interpersonal communication media for receiving agricultural information to a greater extent.

**Education:** Education attainment of the respondents ranged from no schooling to 16 years of schooling. Five percent of the farmers had no schooling, 51 percent had secondary, 38 percent had primary education and only 2 percent had above secondary level of education. It revealed from the study that majority of the farmers were literate.

**Farm size:** The farm size of the respondents ranged from 0 hectares to 1.67 hectares with a mean value of 1.027 hectares. Among the respondents, 1.96 percent had no land, 12.74 percent had small farm size, 73.53 percent had medium and 11.76 percent had large farm size.

**Annual Income:** The respondents' annual income ranged from Tk. 36 to Tk. 81.2 thousands with mean of Tk. 56.55 thousand. Almost sixty six percent of

the total farmers had medium income compared to 14.71 percent of them having low income and 29.6 percent high income.

**Social participation:** The social participation scores of the farmers ranged from 0 to 9, the mean being 1.62. It was found that fifteen percent of the farmers had low participation, 20.59 percent of them had medium participation and only 64.71 percent farmer had no participation.

**Use of ICT materials:** Use of ICT materials of the respondents ranged from 0 to 11 with an average of 5.8. Almost sixty two of the respondents had low level of use of ICT materials compared to 20.59 percent having very low and 17.6 percent of the respondent had medium level of use of ICT materials.

**Farming experience:** Farming experience ranged from 2 to 70 years with a mean value of 30.34. The highest proportion (71.57%) of the farmers had medium farming experience followed by high farming experience (12.64%) and low farming experience (15.69%).

**Cosmopolitaness:** Cosmopolitaness scores of the farmers varied from 5 to 19 having an average 13.39. The highest proportion (74.51%) of the farmers had low cosmopolitaness compared to 7.48% having medium cosmopolitaness and 17.65% having very low cosmopolitaness.

**Agricultural knowledge:** The agricultural knowledge score of the farmers ranged from 11 to 50 with an average 39.65. The highest proportion (80.39%) of the farmers had high agricultural knowledge as compared to 15.67% with medium agricultural knowledge and zero percent with low agricultural knowledge.

**Innovativeness:** The innovativeness scores of the respondents ranged from 1 to 19, the mean being 13.57. The highest proportion (83.33%) of the farmers had medium innovativeness, 14.7 percent had low innovativeness and only 1.96 percent farmers had high innovativeness.

#### **5.1.3.2 Impact of information and communication technologies perceived by the farmers**

Farmers generally used several types of communication media in receiving information. The selection of communication media by the farmers varied from person to person, situation to situation. It also varied on the basis of nature, validity, reliability, availability and even personal liking and disliking.

3. The statistical analysis showed a highly significant positive relationship of education of the farmers with their impact of ICTs use. Therefore, it may be concluded that education plays an important role increases the impact of information and communication technologies in receiving agricultural information.
4. Farm size of the framers had highly positive significant relationship with the impact of information and communication technologies use. This fact leads to the conclusion that larger farm size of the farmers encouraged them and leads them to higher Impact of ICTs use regarding agricultural information.
5. Annual income of the farmers had a highly positive significant relationship with the impact of information and communication technologies use. It may be concluded that the availability of money is more essential to reduce financial hardship of the farmers and allow them to access information sources which kept good impact on them.
6. Social participation of the respondents had a positive insignificant relationship with their impact of ICTs use. The finding leads to the conclusion that the farmers with social exposure are not expected to have any interest in using different information sources.
7. Use of ICT materials by the framers had positive highly significant relationship with the impact of information and communication technologies use. This fact leads to the conclusion that higher use of ICT materials encouraged farmers and leads them to higher Impact of ICTs use regarding agricultural information.
8. Farming experience had negative and no significant relationship with the impact of information and communication technologies use. This lead to conclusion that the more the farming experiences have it's no effect of impact of ICTs use.
9. Cosmopoliteness of the farmers had highly positive significant relationship with the impact of information technologies use. It leads to the conclusion that cosmopoliteness helps an individual to collect new ideas and information from different sources and form good impact of ICTs use.
10. A highly significant and strong positive relationship between agricultural knowledge of the farmers and their impact o fuse of ICTs in receiving agricultural information implied that those farmers had more agricultural knowledge; they have better Impact on use of different information and communication technologies regarding agriculture.

11. Innovativeness of the farmers had a significant positive relationship with their impact of ICT's use. The having moderate innovativeness, they are able to adopt new technologies and ideas. It can be concluded that innovativeness is a valuable factors for getting good impact of ICTs.

### **5.3 Recommendations**

#### **5.3.1 Recommendations for policy implications**

On the basis of the findings and conclusion of the study, the following recommendations for policy implication are made:

1. Considering the overall situation, it was recommended that care should be taken by the GOs, NGOs, DAE and other development agencies in properly handling communication media with the farmers and disseminate ICT materials to farmers. It should be remembered that failure of one effort may lead to reduce credibility of a particular communication medium which may take long time to overcome associated psychological barriers for proper use of ICTs. Further, development in human societies results from their continuous improvement where agricultural and other socio-economic information available to them play a very important role.
2. The study reveals that the farmers having better education could improve the existing status of using communication media. As forty eight percent of the farmers in the study area had no education to primary level of education, non-formal education facilities (i.e. mass education program) should be extended to them by Extension Agents of both GOs and NGOs.
3. It was revealed that the farmers with better social participation could expose themselves more within his locality and also with various information sources and communication technologies. Therefore, group approach of extension could effectively be used by different extension agencies as well as communication media in disseminating information. Different motivational programs by the concerned organizations could encourage them further in the use of more communication media to address their problems.
4. Agricultural knowledge showed a positive and significant relationship with their use of ICTs. It is recommended to arrange adequate training programs for the farmers and other instructional methods to increase their agricultural knowledge.
5. Cosmopolitaness of the farmers had a significant and positive relationship with their impact of ICTs use. Though cosmopolitaness, an individual

becomes aware of the recent information on the various aspects of cultivation. Consequently they become motivated to adopt the take media information and use modern technologies due to influence by others. The findings of the study lead to the conclusion that for become successful farmer, they need to be cosmopolite for their awareness of ICTs use.

### **5.3.2 Recommendations for future study**

Short term and sporadic study being conducted in some specific location cannot provide all information for proper understanding about different activities and related matters. Future studies should be undertaken covering more dimensions in the related matters. The following recommendations are suggested in this connection:

1. It is strongly felt that study of this nature be replicated in other parts of Bangladesh. This recommendation is made because the study area at Patuakhali Shadar Upazilla in Patuakhali district is not typical of the situation in the entire country.
2. This study investigated the effects of eleven characteristics of the farmers on their impact of information and communication technologies use. Therefore, it is recommended that further study should be conducted involving other characteristics (farm facilities, social status, marketing facilities etc.) in this regard to better interpret the unexplained variations.
3. Similar study should also be replicated in future for studying any change of pattern regarding impact of ICTs use among the same population of the present study area to arrive at generalizations for policy implications.
4. On the basis of the characteristics pattern of farming population, more researches should be conducted to investigate the comparative impact of ICTs use with other extension method and also identify the factors influencing impact of ICTs use, its utilization as well as impact of receiving information by the farmers.
5. In this study, only the survey method (quantitative tool) was used for collection of data. It is recommended to conduct further research using some other qualitative tools (eg. Focus group discussion (FGD), case study, problem free analysis etc.) in order to achieve more accuracy of information.

## BIBLIOGRAPHY

- Ahmed, H. 1977. Use of Information Sources by the Farmers in the Adoption of Improved Farm Practices in Jute cultivation . Unpublished M.Sc. (Ext. Ed.) Thesis. Bangladesh Agricultural University, Mymensingh.
- Ailin-Ton, J. 1991. Addressing the information needs of farmers and the extension services: the Malaysia Experiment Quarterly Bulletin of IAALD. 36 (1-2): Pp 36-39.
- Anisuzzaman, M. 2003. Use of Communication Media by the Farmers in the Adoption of Improved Rice Production Technology. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- BBS. 2004. Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics, Statistical division, Ministry of Planning, Government of People's Republic of Bangladesh, Dhaka.
- Beal, G. M. and D. N. Sibley. 1967. Adoption of Agricultural Technology by the Indians of Guatemala, A Summary, Rural Sociology Report 62, Iowa state University, Ames, Iowa.
- Bhuiyan, M.S.I. 1988. Use of Communication Media by The Farmers in the Adoption of Selected Improved Farm Practices in Rice cultivation. M.Sc. (Ext. Ed.) Thesis. Department of Agricultural Extension and Teacher's Training, Bangladesh Agricultural University, Mymensingh.
- CGIAR. 1995. Renewal of the CGIAR: sustainable agriculture for food security in developing country. Ministerial-level Meeting, Lucerne, Switzerland, February 9-10, 1995. CGIAR, Washington, D.C. USA. Pp 133.
- Chanhan, K.N.K. and B.P. Sinha. 1979. Effectiveness of TV and its Combination in Transferring Technologies Know-how to Farmers. Indian Journal of Extension Education. 15 (1&2): Pp 9-18.
- Cherihan, A. and A. Chandra. 1989. Impact of TV on Aquistion and Retention of Knowledge by Rural People. Indian Journal of Extension Education. 25 (3 & 4): Pp 28-32.
- Diaz-Knauf, K., C. Ivankovich, F. Aguilar, C. Bruhn and H. Schulz. 1993. Consummer Attitude Towards Food Safety to Production in Costa Rica. Journal of Food Service System. 7(2): Pp 105-115.



- Forno, D.A. 1999. Sustainable development starts with agriculture. In: Sustainable solutions: the action report of the sustainable agriculture initiative. Novello Press Ltd., London. UK. Pp 8-11.
- Goode, W.J. and P.K. Hatt. 1952. Methods of Social Research. New York: McGraw-Hill Book Company, Inc.
- Halim, A. 1982. Schooling, Extension and Agricultural production. Bangladesh Journal of Agriculture, 6(4); Pp.7(1).
- Hooda. R. S. 1989. Study of Communication Behaviour of Farmers in Hisar District with Special Emphasis of Associated Constraints, *Thesis Abstract*, vol. xv, No. 4, December 1989, Directorate of Publications, Haryana Agricultural University, Hisar, India, Pp. 215.
- Hossain, M.A. 1971. Adoption of Improved Farm Practices by the Transplanted Aman Growers in Gouripur Union of Mymensingh District. (M.Sc. Ext. Ed.) Thesis, BAU. Mymensingh.
- Hossain, M.D. 1981. Relationship of Selected characteristics of the Jute growers with their adoption of improved practices of Jute cultivation. M.Sc. (Ext. Ed.) Thesis, Bangladesh Agricultural University, Mymensingh.
- Hossain, S. M. A. and B.R. Crouch. 1992. Patterns and Determinants of Adoption of Farm Practices : Some evidence from Bangladesh. *Agricultural system*. 38(1): Pp 1-15.
- HRDP. 2002. Training manual winter vegetable and Spices Production. FAO/UNDP/ASDB Project BGD/87/025, Dhaka. Department of Agricultural Extension and Bangladesh Agricultural Development Corporation, Dhaka. Pp. 43-47.
- Huque, M.M. 1982. Masagana 99 Farmers' Perception of the Effectiveness of Communication Media and their use in Bay. Laguna. M.S. Thesis. University of the Philippines at Los Banos.
- Josi, N.N. and S.N. Laharia. 1990. Content Analysis of Krishi Darshan Program. Indian Journal of Extension Education. 21 (1&2): 22-31.
- Kabir, M.K. and M.K. Bhattachargee. (1994). Impact of Radio and Television on Rural People. Bangladesh Academy of Rural Development. Comilla.
- Kaini, B.R. 2007. Roles of Information and Communication Technologies (ICTs) to Alleviate Poverty through Agricultural Development: ICT Initiatives in Agricultural Research and Extension System. ICT for Agricultural Research and Development. Pp 67-77.
- Karim, A. M. A. 2005. Information Media Used by the cotton Farmers in Producing cotton in a Ten-country Area of North central Texas. M.S. Thesis, Texas A & M University.

- Kashem, M. A. and E. Jones. 1988. Small Farmers Contact with Information Sources and its Relationship with Some Selected Characteristics, *Bangladesh Journal of Extension Education*, 3(1): Pp 1-7.
- Kashem, M.A. and A. Halim. 1991. Use of Communication Media in the Transfer of Technologies to Farmers: A Farm Level Study. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh and Bangladesh Agricultural Research Council, Dhaka.
- Khalil, M. I. 1998. Information Sources Used by Farmers in Producing HYV Rice. M.S. (Ag. Ext. Ed) Thesis, Department of Agricultural Extension Education, Institute of Postgraduate Studies in Agriculture (IPSA), Salna, Gazipur.
- Khan, M.M.R. 1996. Use of Information sources by the Resource-poor Farmers in Receiving Information related to Cultivation of Selected Winter Vegetable M.Sc.(Ext. Ed.) Thesis. Bangladesh Agricultural University, Mymensingh.
- Knox, J.W. 1962. Relative Value of Mass Media in Extension (4ba). Master Report (M. Ed. in Ext. Ed.). Colorado State University.
- Laharia, S. N. and N.N. Joshi (1992). Farm Telecast Viewing Behaviour of Farmers. *Indian Journal of Extension Education*. 28 (1&2): Pp 15-22.
- Latif, M. A. 1974. How Farmers Receive Agricultural Information. M. Sc. (Ex. Ed.) Thesis, Bangladesh Agricultural University, Mymensingh.
- O' Farrell, C. 2003. Global Trends and Major Issues of ICT Application in Agriculture. Paper presented at APO seminar on Information And Communication Technology (ICT) for Improved Agricultural Productivity and competitiveness, held in Yogyakarta, Indonesia during 8-12 September 2003.
- Orojubi, J.O. 1980. Source of Agricultural Information and Advice Available to Nigerian Farmers: Advantage and Limitation. Ahmadu Bello University. Zaria, Nigeria.
- Pandian, S. 2002. Impact of Video Education on Knowledge Retention. *Indian Journal of Extension Education*. 38 (3&4): Pp 153-157.
- Papa, A. G. 1991. Intensity of Extension Contact and Innovativeness of Multiple Cropping Farmers in four Upland Town of Cavite. Philippines Collage. Laguna. The Philippines.
- Parvez, M.A.Q. 1977. Farmers Exposure to Agricultural Radio Programme and its Related Aspects. An M.Sc. Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

- Rahman, M. M. 1974. An Investigation into the Use of Communication Sources by the Registered jute Seed Growers of Meherpur Thana. M. Sc. (Ex. Ed.) Thesis, Bangladesh Agricultural University, Mymensingh.
- Rahman, M. M. 1996. Factors Affecting the Communication Behaviour of Winter Vegetable Growers of Sherpur Thana under Bogra District. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Institute of Postgraduate Studies in Agriculture (IPSA), Salna, Gazipur.
- Reddy, G. Y. 1982. Role of communication in rural Development for Eradication of Rural Poverty. *Indian Journal of Regional Science*. 14 (2): 109-119.
- Rogers, E. M. 1962. *Diffusion of Innovation*. New York: The Free Press.
- Rogers, E. M. 1983. *Diffusion of Innovation (Third Editoin)*. New York: The Free Press.
- Sarker, S. 1995. Communication Media Used by the Small Farmers in Receiving Agricultural Information. M.Sc. (Ext. Ed.) thesis, Dept. of Agricultural Extension education, BAU, Mymensingh.
- Sawheny, M.M. 1969. Farm Practice Adoption and the Use of Information Sources and Media in a Rural Community in India. *Rural Sociology*, 32, Madison University of Wisconsin.
- Shin, W.R. and J.F. Evans. 1991. Where staff get information. *Journal of Extension*. 29(3). Retrieved 25 May 2004 from <http://www.joe.org.1991february.a5.html>.
- Sianturi, M. 1992. Communication Support , Resources and Structures of Smallholders Rubber Development Project and Adoption of Rubber Technology in Taluk kuantan Unit Riau Province, Indonesia. Philippines Collage, Laguna, The Philippines.
- Singh, K. N. and Ch. Shankariah. 1969. Communication Strategy for Developing Countries with Speacial References to India a View Point-A Paper Presented at the 11<sup>th</sup> World Conference. Society for International Development, held from November 14-17, at New Delhi.
- Singh, R. and S. K. Sharma. 1973. A Comparative Study of Adoption of HYV Program by the Farmers' of TV and non-TV Villages. *Indian Journal of Extension Education*. 9 (3&4): Pp 92-101.
- Tanvir, A. 2007. Roles of Information and Communication Technologies (ICTs) for Alleviate Poverty through Agricultural Development in SAARC Countries: Country Paper Pakistan. *ICT for Agricultural Research and Development*. Pp 67-77.

- Uddin, M. A. 1993. Information Received by the Sugarcane Growers in Kot Chandpur Thana. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Ullah, A. K. M. 1996. Information Media Used by Vegetable Growers in Kashmpur Union under Gazipur Sadar Thana. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Institute of Postgraduate Studies in Agricultural (IPSA), Salna, Gazipur.
- World Bank. 1992. Agricultural Knowledge and Information System and Poverty Reduction, World Bank Discussion Paper.

# Appendix A

English version of the Interview schedule:

Department of Agricultural Extension and Information System  
Sher-e- Bangla Agricultural University  
Sher-e- Bangla Nagor, Dhaka-1207.

## INTERVIEW SCHEDULE FOR A RESEARCH STUDY ON

### **IMPACT OF USE OF ICTs (INFORMATION & COMMUNICATION TECHNOLOGY) BY THE FARMERS OF BANGLADESH**

Serial no.....

Name of the respondent:.....

Village..... Union.....

Upazila..... District.....

(Please answer to the following questions)

**1. Age:**

How old are you? ..... years.

**2. Level of Education:**

What is your level of education?

I. Can not read and write .....

II. Can sign only .....

III. Read up to class .....

**3. Farm size (in ha):** Give a description of your land ownership and land.

Sl. No.	Types of ownership	Area	
		Local Unit	Hectare
1	Homestead (Including pond & garden)		
2	Own land under own cultivation		
3	Own land given to others on barga		
4	Land taken from others on barga		
5	Land taken from others on lease		
	Total		

#### 4. Annual Income (in taka):

##### A. Income from agricultural crops:

Sl. No.	Name of crops	Production (Kg or Mound)	Value / Kg or Mound	Total value (Tk)
1	Aus			
2	Aman			
3	Boro			
4	Wheat			
5	Jute			
6	Pulse			
7	Oil crops			
8	Spices			
9	Vegetables			
10	Fruits			
11	Others			
12	Sugarcane			
13	Others (specify)			
	Sub-total (A)			

##### B. Income from domestic animals and Fisheries:

Sl. No.	Source of income	Total production (Kg/Mounds)	Value/ Kg or Mound	Total value (Tk)
1	Livestock			
2	Poultry			
3	Fisheries			
	Sub-total (B)			

##### C. Income from non-agricultural sources:

Sl. No.	Sources of income	Total value (Tk)
1	Service	
2	Business	
3	Day labor	
4	Other family members	
5	Others (if any)	
	Sub-total (C)	

Grand total = A+B + C = ----- TK

## 5. Social participation:

Please mention your nature of participation (past or present) in the following social organization:

Sl. No.	Name of organization	No	Duration of participation (years)		
			As ordinary member	As executive member	As President/ Secretary of the committee
1	Krishak sambay samity				
2	Bazar committee				
3	Cooperative Society				
4	NGO (specify the name)				
5	Youth club				
6	School/college/ Madrasha committee				
7	Mosque/Mondir/Girza committee				
8	Union council				
9	Others (specify)				

## 6. Use ICT materials:

SL. No.	Items	Extent of use			
		use regularly (3)	use most often (2)	use occasionally (1)	don't use at all (0)
1	TV Programs				
2	Radio Programs				
3	Telecommunication				
4	Poster				
5	Newspaper				
6	Multimedia				
7	Internet				

## 7. Farming experience:

How many years you are involved with agricultural farming? .....Years.

## 8. Cosmopolitenes:

(Please mention the frequency of visit of the following places. (Please tick mark in right space)

SL. No.	Name of visit	Frequency of visit				
		Regularly	Often	occasionally	Rarely	Not at all
1.	Others village	10-12 times/ month ( )	9-10 times/ month ( )	5-9 times/ month ( )	1-4 times/ month ( )	0 ( )
2.	Others union	4-5 times/ month ( )	3-4 times/ month ( )	2-3 times/ month ( )	1 times/ month ( )	0 ( )
3.	Upazilla sadar	10-12 times/ year ( )	9-10 times/ year ( )	5-9 times/ year ( )	1-4 times/ year ( )	0 ( )
4.	Others upazilla sadar	8-10 times/ year ( )	7-8 times/ year ( )	4-7 times/ year ( )	1-2 times/ year ( )	0 ( )
5.	Own district	6-8 times/ year ( )	5-6 times/ year ( )	3-5 times/ year ( )	1-2 times/ year ( )	0 ( )
6.	Others district	3-4 times/ year ( )	2-3 times/ year ( )	2 times/ year ( )	1 times/ year ( )	0 ( )
7.	Regional agril. Research institute	3 times/ year ( )	2-3 times/ year ( )	2 times/ year ( )	1 times/ year ( )	0 ( )
8.	Capital city	4 times/ life ( )	3 times/life ( )	2 times/life ( )	1 times/life ( )	0 ( )

## 9. Agricultural Knowledge:

SL No.	Questions	Score	
		Weighted	Obtained
1.	Name five high yielding varieties (HYV) of rice suitable for Transplanted Aman (T. Aman) rice.	5	
2.	Name four HYV rice suitable for Aus rice.	4	
3.	Mention two major functions of urea on rice cultivation.	2	
4.	Mention two major functions of TSP on rice cultivation.	2	
5.	State two major Functions of MP on rice cultivation.	2	
6.	Name three insecticides available in your local market.	3	
7.	What do you mean by balanced fertilizer?	4	
8.	Mention the component of compost.	4	
9.	Mention recommended fertilizer dose of urea, TSP and MP in Aman cultivation.	5	
10.	Mention the name of three crops cultivated for green manure.	3	
11.	Mention three harmful insects of your area.	3	
12.	Mention three important disease of rice.	3	
13.	State two methods of controlling rat in rice field.	2	
14.	Name four modern varieties of sweet potato.	4	
15.	Name two high yielding varieties of sugarcane.	2	
16.	Mention two important diseases of sugarcane.	2	
	Total	50	



### 10. Innovativeness:

(Please give your information about the use of following technologies)

SL. No.	Name of technology	Period of adoption (after hearing)			
		Within 2 years	Within 4 years	After 4 years	Don't use
1.	Cultivation of modern variety of crops				
2.	Use of power pump				
3.	Use of compost				
4.	Use of bio-fertilizer				
5.	Use of guti urea				
6.	Use of mixed fertilizer				
7.	Use of power tiller				
8.	Use of IPM				
9.	Plantation of tree in the fellow area or beside the road				

### 11. Impact of use of ICTs:

Please mention how much change occurred by the use of following media:

SL. No.	Items	Extent of impact				
		No Change	Small change	Moderate Change	High change	Excellent change
1	TV Programs					
2	Radio Programs					
3	Telecommunication					
4	Poster					
5	Newspaper					
6	Multimedia					
7	Internet					

Thank you for your kind cooperation and help

**Interviewed by-**

**Name:**

\_\_\_\_\_  
Signature with date

# Appendix B

## Bangla version of the Interview schedule

কৃষি সম্প্রসারণ ও ইনফর্মেশন সিস্টেম বিভাগ  
শেরে বাংলা কৃষি বিশ্ববিদ্যালয়  
শেও বাংলা নগর, ঢাকা-১২০৭.

কৃষকদের মতামত গ্রহণের সাক্ষাৎকার অনুসূচী :  
বাংলাদেশের কৃষকদের উপর তথ্য ও প্রযুক্তির ব্যবহারের প্রভাব।

ক্রমিক নং : .....  
উত্তর দাতার নাম : .....  
গ্রাম : ..... ইউনিয়ন : .....  
থানা : ..... জেলা : .....

১. আপনার বয়স কত? ..... বছর।

২. আপনি কত দূর লেখাপড়া করেছেন?

- ◆ লেখাপড়া জানি না .....
- ◆ শুধু নাম দস্তখত করতে পারি .....
- ◆ আমি ..... শেনী পর্যন্ত পড়েছি।

৩. খামাড়ের আয়তনঃ

ক্রমিক নং	জমির প্রকার	পরিমাণ	
		স্থানীয় একক	হেক্টর
১	বসত বাড়িতে জমির পরিমাণ		
২	নিজ চাষ কৃত জমি		
৩	বর্গ দেওয়া জমি		
৪	বর্গ নেওয়া জমি		
৫	বন্দক নেওয়া জমি		
	মোট		

৪. আপনার গত বছরের আয়ের বিবরণ দিনঃ

I. জমির ফসল :-

- ◆ ধান হতে আয় ..... টাকা।
- ◆ গম হতে আয় ..... টাকা।
- ◆ ডাল শস্য হতে আয় ..... টাকা।
- ◆ আখ হতে আয় ..... টাকা।

II. গৃহপালিত পশুপাখি:-

- ◆ গরু-বাছুর হতে আয় ..... টাকা।
- ◆ হাস-মুরগী হতে আয় ..... টাকা।
- ◆ মাছ হতে আয় ..... টাকা।

III. অকৃষি খাত:-

- ◆ ব্যবসা হতে আয় ..... টাকা ।
- ◆ চাকুরী হতে আয় ..... টাকা ।
- ◆ অন্যান্য উৎস হতে আয় ..... টাকা ।

৫. সামাজিক কাজের সাথে জরিত করণঃ

ক্রমিক নং	জরিত প্রতিষ্ঠানের নাম	জরিত থাকার সময়			
		জরিত নই	সাধারণ সদস্য	কার্যনিবাহি কমিটির সদস্য	কার্যনিবাহি কমিটির কর্মকর্তা
১	কৃষক সমবায় সমিতি				
২	বাজার কমিটি				
৩	সমবায় সমিতি				
৪	এ.জি.ও.				
৫	যুব সংগ				
৬	স্কুল/মাদ্রাসা/কলেজ কমিটি				
৭	মসজিদ/মনদীর/গিরজা কমিটি				
৮	ইউনিয়ন কাউন্সিল				
৯	অন্যান্য				

৬. তথ্য ও প্রযুক্তির উপকরণ সমূহের ব্যবহারে দক্ষতাঃ

ক্রমিক নং	উপকরণের নাম	দক্ষতার ধরণ			
		বেশ ভাল ভাবেই পারি	পারি	মোটামুটি পারি	পারি না
১	রেডিও				
২	টেলিভিশন				
৩	টেলিফোন				
৪	পোস্টার				
৫	খবরের কাগজ				
৬	মাল্টিমিডিয়া				
৭	ইন্টারনেট				

৭. কৃষি কাজে অভিজ্ঞতাঃ

কৃষি কাজে আপনার অভিজ্ঞতা কত দিনের? .....বছর ।

৮. বাহিরের পরিবেশের সাথে সম্পর্কঃ

ক্রমিক নং	পরিদর্শনকৃত স্থানের নাম	পরিদর্শনের ধরণ				
		নিয়মিত (৪)	প্রায়ই (৩)	মাঝে মাঝে (২)	খুবই কম (১)	মোটাই না (০)
১	অন্য গ্রাম	প্রতি মাসে ১০-১২ বার ( )	প্রতি মাসে ৯-১০ বার ( )	প্রতি মাসে ৫-৮ বার ( )	প্রতি মাসে ১-৪ বার ( )	মাসে একবার ও নয় ( )
২	অন্য ইউনিয়ন	প্রতি মাসে ৬-৭ বার ( )	প্রতি মাসে ৪-৫ বার ( )	প্রতি মাসে ২-৩ বার ( )	প্রতি মাসে ১ বার ( )	মাসে একবার ও নয় ( )
৩	উপজেলা সদর	প্রতি বছরে ১০-১২ বার ( )	প্রতি বছরে ৭-৯ বার ( )	প্রতি বছরে ৪-৬ বার ( )	প্রতি বছরে ১-৩ বার ( )	মাসে একবার ও নয় ( )
৪	অন্য উপজেলা সদর	প্রতি বছরে ৭-১০ বার ( )	প্রতি বছরে ৫-৬ বার ( )	প্রতি বছরে ৩-৪ বার ( )	প্রতি বছরে ১-২ বার ( )	মাসে একবার ও নয় ( )
৫	নিজ জেলা	প্রতি বছরে ৬-৭ বার ( )	প্রতি বছরে ৫ বার ( )	প্রতি বছরে ৩-৪ বার ( )	প্রতি বছরে ১-২ বার ( )	মাসে একবার ও নয় ( )
৬	অন্য জেলা	প্রতি বছরে ৪ বার ( )	প্রতি বছরে ৩ বার ( )	প্রতি বছরে ২ বার ( )	প্রতি বছরে ১ বার ( )	মাসে একবার ও নয় ( )
৭	বিভাগীয় কৃষি গবেষণা কেন্দ্র	প্রতি বছরে ৪-৫ বার ( )	প্রতি বছরে ৩ বার ( )	প্রতি বছরে ২ বার ( )	প্রতি বছরে ১ বার ( )	মাসে একবার ও নয় ( )
৮	রাজধানী	জীবনে ৫ বার ( )	জীবনে ৩- ৪ বার ( )	জীবনে ২ বার ( )	জীবনে ১ বার ( )	মাসে একবার ও নয় ( )

৯. কৃষি সংক্রান্ত জ্ঞানঃ

ক্রমিক নং	প্রশ্ন	নম্বর	
		মোট নম্বর	প্রাপ্ত নম্বর
১	উচ্চ ফলনশীল পাঁচটি রোপা আমনের জাতের নাম বলুন।	৫	
২	উচ্চ ফলনশীল চারটি আউশ ধানের জাতের নাম বলুন।	৪	
৩	ধান চাষে ইউরিয়ার প্রধান দুইটি কাজ উল্লেখ করুন।	২	
৪	ধান চাষে টি. এ.পি. প্রধান দুইটি কাজ উল্লেখ করুন।	২	
৫	ধান চাষে এম.পি. প্রধান দুইটি কাজ উল্লেখ করুন।	২	
৬	বাজরের তিনটি কীটনাশকের নাম বলুন।	৩	
৭	সুষম সার বলতে কি বুঝেন।	৪	
৮	কম্পোস্ট সারের উপাদান গুলো কি কি?	৪	
৯	আমন চাষে ইউরিয়া, টি.এস.পি., এম.পি. সারের পরিমাণ উল্লেখ করুন।	৫	
১০	সবুজ সার এর জন্য ব্যবহৃত তিনটি ফসলের নাম বলুন।	৩	
১১	আপনার এলাকার তিনটি পোকাকার নাম বলুন।	৩	
১২	আপনার এলাকার ধানের তিনটি রোগের নাম বলুন।	৩	
১৩	ইদুর দমনের দুইটি পদ্ধতির নাম বলুন।	২	
১৪	মিষ্টি আলুর চারটি উচ্চফলনশীল জাতের নাম বলুন।	৪	
১৫	আখের দুইটি উচ্চফলনশীল জাতের নাম বলুন।	২	
১৬	আখের দুইটি রোগের নাম বলুন।	২	
মোট		৫০	

১০. নতুন কলাকৌশল গ্রহণের তৎপরতাঃ

ক্রমিক নং	কলাকৌশলের নাম	কলাকৌশল ব্যবহার শুরুর সময়কাল (প্রথম শোনার পর)			
		দুই বছরের মধ্যে	চার বছরের মধ্যে	চার বছর পর	মোটের না
১	উন্নত জাতের ফসল চাষ				
২	সেচ যন্ত্রের ব্যবহার				
৩	জৈব সার ব্যবহার				
৪	সবুজ সার ব্যবহার				
৫	গুটি ইউরিয়ার ব্যবহার				
৬	মিশ্র সার ব্যবহার				
৭	যান্ত্রিক লাঙ্গল ব্যবহার				
৮	আই. পি.এম. ব্যবহার				
৯	রাস্তার পাশে বৃক্ষ রোপন				

১১. তথ্য ও প্রযুক্তির ব্যবহারের প্রভাবঃ

ক্রমিক নং	উপকরণ	প্রভাবের ধরণ				
		পরিবর্তন হয়নি	সমান্য পরিবর্তন হয়েছে	মধ্যম মানের পরিবর্তন হয়েছে	উচ্চ মানের পরিবর্তন হয়েছে	খুবই ভাল পরিবর্তন হয়েছে
১	টেলিভিশন					
২	রেডিও					
৩	টেলিফোন					
৪	পোস্টার					
৫	খবরের কাগজ					
৬	মাল্টিমিডিয়া					
৭	ইন্টারনেট					

॥ ধন্যবাদ ॥

সাক্ষাৎকার গ্রহণকারী স্বাক্ষর ও তারিখ

## Appendix C

Correlation matrix showing interrelationship among all the variables

	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>
X <sub>1</sub>	1	-.147	-.321**	-.227*	-.158	-.120	.930**	-.523**	-.114	-.445**	-.163
X <sub>2</sub>	-.147	1	.462**	.225*	.085	.791**	-.108	.604**	.652**	.588**	.820**
X <sub>3</sub>	-.321**	.462**	1	.852**	.263**	.488**	-.254*	.718**	.803**	.769**	.553**
X <sub>4</sub>	-.227*	.225*	.852**	1	.263**	.250*	-.172	.512**	.567**	.545**	.289**
X <sub>5</sub>	-.158	.085	.263**	.263**	1	.166	-.127	.129	.167	.208*	.180
X <sub>6</sub>	-.120	.791**	.488**	.250*	.166	1	-.093	.558**	.678**	.531**	.962**
X <sub>7</sub>	.930**	-.108	-.254*	-.172	-.127	-.093	1	-.441**	-.041	-.356**	-.116
X <sub>8</sub>	-.523**	.604**	.718**	.512**	.129	.558**	-.441**	1	.715**	.930**	.612**
X <sub>10</sub>	-.114	.652**	.803**	.567**	.167	.678**	-.041	.715**	1	.774**	.748**
X <sub>11</sub>	-.445**	.588**	.769**	.545**	.208*	.531**	-.356**	.930**	.774**	1	.609**
X <sub>12</sub>	-.163	.820**	.553**	.28**	.180	.962**	-.116	.612**	.748**	.609**	1

\* Correlation is significant at 0.05 level of Probability

\*\* Correlation is significant at 0.01 level of Probability

X<sub>1</sub> = Age

X<sub>2</sub> = Education

X<sub>3</sub> = Farm size

X<sub>4</sub> = Annual Income

X<sub>5</sub> = Social Participation

X<sub>6</sub> = Use of ICT materials

X<sub>7</sub> = Farming Experience

X<sub>8</sub> = Cosmopolitaness

X<sub>9</sub> = Agricultural knowledge

X<sub>10</sub> = Innovativeness

X<sub>11</sub> = Impact of ICT