“USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) BY THE FARMERS IN RECEIVING AGRICULTURAL INFORMATION ’’

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USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) BY THE FARMERS IN RECEIVING AGRICULTURAL INFORMATION

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CERTIFICATE

This is to certify that the thesis enlighten, **"USE OF INFORMATION AND COMUUNICATION TECHNOLOGIES (ICTs) BY THE FARMERS IN RECEIVING AGRICULTURAL INFORMATION"** 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 conducted by **MD. RAMIZ UDDIN, Registration no. 09-03565** under my supervision and guidance. No part of this thesis has been submitted for any other degree or diploma.

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

Dated:
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Dedicated to

My

Beloved FATHER

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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
E-mail:		Electronic mail
el a!	:	Associates
i.e.	:	That is
NS	:	Not-significant
*	:	Significant at 0.05 level of probability
**	:	Significant at 001 level of probability of Degrees of Freedom
SPSS	:	Statistical Package for Social Science
Fig.	:	Figure
Tk.	:	Taka
B	:	Multiple Regressions
b	:	Regression

USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) BY THE FARMERS IN RECEIVING AGRICULTURAL INFORMATION

MD RAMIZ UDDIN

ABSTRACT

The purpose of the study was to determine the extent of use of Information and Communication Technologies (ICTs) by the farmers in receiving agricultural information and to explore the contribution of selected characteristics of respondents on their ICTs use in receiving agricultural information. The study was conducted in two villages namely Rampur & Madhabpur of Ghagutia union in Homna upazilla of comilla district. Data were collected from 110 farmers by using a pre-tested interview schedule during the period from 15 January to 15 March, 2015. Appropriate scales were developed to measure the variables of the study. Descriptive statistics, multiple regression (B) tests were used for analysis. The study revealed that about two third (64.5%) of the respondents' had medium use of ICTs in receiving agricultural information compared to 13.6 % and 21.8 % having low and high use of ICTs in receiving agricultural information respectively. Education, farm size, annual family income, problem confronted in ICTs use and cosmopoliteness had significant contribution on their use of ICTs and provided 51.5 percent contribution to use of ICTs in receiving agricultural information.

INTRODUCTION

1.1 General Background

Bangladesh is an agricultural country. Agriculture is the main occupation of the people employing *51.7* percent of the labor force. This sector directly contributes 16.01 percent of the Gross Domestic product (World Bank, 2015). Agriculture supplies raw materials for industrial production and food stuff for human and animal consumption. Improvement of agriculture has crucial importance for economic development of the country. Crop production of Bangladesh needs to be maximized in order to meet the increasing food demand and other basic requirements. Bangladesh cannot produce enough food to her population. 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. Agricultural production can be increased if appropriate technologies are received by the farmers who are the primary unit of adoption of improved practices. Diffusion of proper knowledge on modem agriculture among the rural people demands effective communication system. In addition immediate and effectiveness are also valuable dimensions for communication of technological messages (Halim and Miah, 1996).This study investigates the use and appropriation of ICTs (Information and Communication Technologies) by rural Bangladeshi farmers. It examines farmers' information needs and how and to what extent those needs can be addressed through the use of different ICTs tools and applications and their appropriation in the settings of rural Bangladesh. It has been suggested that ICT applications and services can enable farmers to obtain information on input and output prices, the weather and so forth. The information provided needs to be situationally relevant if it is to enable farmers to improve their farm income and/ or reduce their production

cost. It is also important to investigate whether or not farmers find it easy to access the information, generated by ICTs. CTs could use to facilitate, strengthen, and replace an existing information systems and networks. It could regard as both a driver and an enabler. ICTs spread formation of knowledge societies in rural areas of the developing countries, which can realize when knowledge and information are effectively improved agricultural and rural development (Gregg&Irani 2004).The use of internet email Microsoft PowerPoint and other WebPages for increase the development skills in the dissemination of agricultural information. ICTs such as Radio T.V, mobile phones, and Internet among others are required for effective extension information among farmers (Arokoyo, 2005).It was showed that main problem of the poverty illiteracy and sharing information among developing countries is poor communication technology lack of infrastructures and limited access in developing world. The shortages of information were also a factor in restricting economic advancement for developing countries. Especially agriculture sector is facing many problems in obtain new information about market price, weather updates and other related issues (Man & Sadiya, 2009).There is no doubt that ICTs is a challenge and an opportunity for developing countries. ICTs are powerful tools for handling and spreading information. It has impact on all aspects of life by reducing time, distance and the information gap. ICTs are increasing day by day for greater and faster interaction within different groups of people from different societies especially among farmers.

So it is clear that farmers are the key elements in the process of transfer of technology. It is quiet logical to say that message can exist in different channels, however the choice of channels often is an important factor for a client. Considering the above facts the researcher felt a thrust to conduct a study with the hope to identity the use of Information and Communication technologies (ICTs) by the farmers in receiving agricultural information.

1.2 Statement of the problem:

Information and Communication technologies (ICTs) are the important sources of extension teaching and communication. They play vital roles in presenting technological thoughts, ideas and information to the farmers. In view of the preceding discussion, the researcher undertook this problem entitled 'Use of Information and Communication technologies (ICTs) by the Farmers in receiving Agricultural Information'. This study tried to explore the contribution on the extent of use of ICTs by the farmers in receiving agricultural information and their selected characteristics (independent variable) of the farmers such as age, education, farm size, farming experience, annual family income, organizational participation, Problems confronted by the farmers in using ICTs for receiving agricultural information, cosmopoliteness, and innovativeness.

Any agricultural information can be diffused within a short time directly to the farmers by using ICTs. The use of Information and Communication technologies (ICTs) for receiving agricultural information is highly dependent on the selection of the extent of service, type of information, Its uses and scope of the application in the real situation. However, it is needed to ascertain the extent of use of ICTs by the farmers in receiving agricultural information having the following questions in mind:

1. To what extent the farmers use ICTs in receiving agricultural Information?
2. What are the characteristics of farmers towards the use of 1CTs?
3. What are the contributions of the characteristics of farmers with their use of ICTs in receiving agricultural information?
4. What are the problems confronted by the farmers in using ICTs?

On the basis of the above discussion, the researcher undertook a piece of study, entitled "use of Information and Communication technologies (ICTs) by the farmers in receiving agricultural information."

1.3 Objectives:

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

1. To assess the extent of use of Information and Communication technologies (ICTs) by the farmers in receiving agricultural information.

2. To determine and describe the following selected characteristics of the farmer.

- Age
- Education
- Farm size
- Farming experience
- Annual family income
- Organization participation
- Problems confronted by the farmers in using ICTs (Materials) for receiving agricultural information.
- Cosmopoliteness
- Innovativeness

3. To explore the contribution of the selected characteristics of the farmer on their use of ICTs in receiving agricultural information.

1.4 Scope and Limitations of the study:

The finding of the study will be particular applicable to the Rampur and Madhabpur villages of Ghagutia union under Homna Upazila of Comilla district. These findings may also be applicable in other areas of Bangladesh where the physical, socio-economical and cultural conditions are same as the study area. Thus, the findings of the study may be beneficial for 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 main purpose of the study was to determine the extent of use of Information and Communication Technologies (ICTs) by the farmers in receiving agricultural information. 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 throughout the study.

i. The study was conducted in only Rampur&Madhabpur villages of Ghagutia union of Homna upazilla of comilla district.
ii. 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.
iii. The farmers possessed many characteristics and their characteristics were varied to a great extent. Among those characteristics only 09 (Nine) characteristics were selected for investigation in the study.
iv. Information used by the farmers for various purposes such as farming, business, politics, religion etc. this study investigated the use of ICTs by the farmers in receiving agricultural information related to cultivation.

v. The researcher was dependent on the data furnished by the selected famers during their interviews.

1.5 Assumptions:

An assumption is "The supposition that an apparent fact or principle is true in the light of available evidence" (Good, 1945). The following assumptions were made in conducting the study:

i. The respondents included in the sample of the study were able to provide their opinions and were competent enough to satisfy the queries.
ii. The information provided by the respondents was reliable.
iii. The ICTs users included in the sample were the actual representative of the population.
iv. 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.
v. The finding of the study will be useful for planning and execution of the extensive and more helpful for effective use of ICTs in receiving agricultural information.
vi. The information and communication technologies (ICTs) used by the farmers are linearly related with their selected characteristics.

Study on the use of information and communication technologies (ICTs) by the farmers in receiving agricultural information is conducted in very limited area of Bangladesh. A few studies in this regard have so far been conducted, therefore, the study will add to the body of knowledge about the information and communication technologies(ICTs) used by the farmers.

1.6 Definition of the Terms

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, computer, satellite, Radio, Tele-vision, over cable or aerials, multimedia, poster, newspaper etc. In this study only six selected technologies (i.e., Radio, Tele-vision, Mobile, computer, Multimedia and Internet) have been taken into consideration.

Age

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

Education

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

Family size

Family size of a farmer was defined as the number of individuals in his family living together including himself, his wife children and other dependent member.

Farming Experience

The period of time a farmer practices agricultural work. It is calculated in actual years at the time of interviewing.

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.

Organizational participation

Organization participation of a famer refer to his direct contact with various organizations within a specific period of time. Participation in an organization refers to his taking part in the organization as ordinary member, executive member or executive officer.

Problems confronted by the farmers in using ICTs (Materials) for receiving agricultural information

Problem referred to a difficult about which something to be done. Problem faced by the farmers in this study was defined as the extent of difficulties during the use ICTs.

Cosmopoliteness

It referred to the degree or the frequency of movement of the farmers to outside places from his working place.

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).

Use of ICT materials

Use of ICT materials referred the rate of using various ICT materials like radio, tele-vision, newspaper, mobile phone , internet etc by the respondents.

Radio

Radio is a powerful and popular audio media which falls in mass media. It conveys message from one station to all who listen radio program. It makes things excitingly alive and believable. Furthermore, it can motivate, stimulate, induce belief, create and change basic and attitudes and it reaches to a large number of people inexpensively.

Television

Television is an audio visual media for diffusing information and fall under mass media along with news, various educational programs, agricultural programs etc. It is a media that can support the effects of extension staff in spreading awareness, giving warnings, facilitating farmers to farmer's communication etc.

Mobile phone

A small telephone that people can take with them and use outside their homes called mobile phone. Mobile is popular and powerful interpersonal communication media.

Multimedia

Multimedia is the field concerned with the computer-controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally.

Internet

An electronic communications network that connects computer networks and organizational computer facilities around the world.

REVIEW OF LITERATURE

The researcher made an extensive search of available literature for the present research. Available literature was intensively reviewed to find out work in the world and almost in Bangladesh with the major objectives of the study. There are three sections in this Chapter. First section deals with the concept of use of information and communication technologies by the farmers in receiving agricultural information and the second section is devoted to a discussion on the findings of studies exploring contribution of the selected characteristics of the respondents with ICTs use and the third section presents the conceptual framework of the study.

2.1 Concept on use of Information and Communication Technologies by the farmers in receiving agricultural information

A.T. Lucky (2012) noticed that ICT channels had positive impact on the awareness of agricultural information. The reason advanced by farmers for increase productivity were, adequate information from ICT channels about recommended farm practices, increase farm size, use of improved varieties. Finally, the study clearly showed the importance of using ICT channels in the dissemination of agricultural information and consequently in agricultural development in the state. The relevance of radio, farming programmers, extension bulletins in the local languages and the distribution of transistor radio by the extension programmer in IAR is a step to making communication more effective so as to achieve the intended goals.

A.T. Lucky (2012) Radio and television can get information across to every nook and corner of the rural areas where it is very difficult to make direct contact.

A.T. Lucky (2012) telephone is a quick way of making "contact" with the extension workers or farmers. Whenever we want to, it does not need any traveling up and down. Questions can be asked by farmers and answered by extension worker on the telephone on the spot without wasting too much time especially very urgent questions.

According to the World Bank (2011)**,** market data feeds directly to farmers via electronic display boards in 31 centers spread across Ethiopia as well as on the exchange's website.

Fafchamps and Minten **(**2011**)** studied the benefits that Indian farmers derive from SMS asked markets weather and crop advisory information. Using a controlled randomized experiment in several villages of Maharashtra, they did not find statistically significant effect of treatment on the price received by farmers, on crop losses resulting from rainstorms, or on the likelihood of changing crop varieties and cultivation practices.

(Gakuru *et al*. 2009**)** In Tanzania, building on the utility of mobile phones as recording tools, listening devices, money-makers, and catalysts for dialogue, community radio stations are incorporating mobile technology into programming and it is being used for advisory services in agriculture.

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.

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.

Kaini (2007) observed that ICT had its 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.

Radio plays the most significant rote of any communication technology in the transfer of information in African countries since spoken word on broadcast radio is the principal means of information transfer where literacy rates are low.

Yckini and Hussein (2007) pointed out that there has not been any option of the new ICTs by research and development organizations for development oriented activities in Nigeria. They further observed that effective information dissemination for agricultural research and development in the developing countries is not optimal between the national and international research institutions. There equally exists a great problem in the transfer of information from the research institutions to the National extension systems, and a greater one in disseminating to the information users especially farmers. This means that there is a divide in knowledge between delivery institutions and rural farmers. This gap in knowledge is further heightened by the fact that farmers' access to the new ICTs is very scarce in the rural areas. There is need therefore to examine factors which enhance or hinder farmer's access to and use of new ICTs in Edo State.

Jenson *et al*. (2007) have shown that farmers with access to market information obtain higher farm prices. The Mozambique agricultural marketing service (SIMA) collects and disseminates nation-wide and provincial data on market prices, product processing and availability through a variety of media including text messages, email, internet, national and rural radios, television and newspapers.

Pandian *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.

Egbule and Njoku (2001) in their study on communication technologies for adult education in Nigeria found that ICTs has performed poorly in disseminating requisite agricultural information to farmers, although there is a positive correlation between communication technologies usage and farm yield.

According to McKinlay (2001) certain socio - economic characteristic of the farmers would affect his request for and utilization of agricultural information.

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 stated 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 "ApnarShasthya" 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 KrishiDarshan Program (KDP) of Delhi Doordarshan Kenda was very useful. The study implied that the perception of usefulness increased with the increase in one's penodicity of viewing the program.

Sianturi (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 percent of the farmers had high intensity of extension contact while only forty seven percent 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.

2.2 Review of Studies on the Selected Characteristics of Farmers and use of information and Communication technologies (ICTs)

2.2.1 Age and use of Information and Communication technologies (ICTs)

Bhuiyan (1988) found in his study that age of the farmers had significant negative correlation with the use of communication media in the adoption of selected improved farm practices.

Sarker (1995) observed a negatively insignificant relationship between age of the small farmers and their use of communication technologies in receiving agricultural information. Most of the research findings on age and adoption of improved fanning practices showed that either the variables are of independent or they have negative relationships. This means that age of the farmers do not possess any significant influence upon their use of communication media in receiving agricultural information as well as the farming practices.

Nuruzzaman (2003) conducted a study and found that age of the farmers had significant negative relationship with the use of ICTs.

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

Pandian et al. (2007) found that the age farmers had direct positive effect between age of the farmers and Impact of use of Video Education on Knowledge Retention.

Ullah (1996) observed that age of farmers showed a negative but no 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.

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 use of information communication technologies (ICTs) 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 use of Information and Communication technologies (ICTs)

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

Sarker (1995) found a highly positive significant relationship between education of the small farmers and their use of information & communication media.

Nuruzzaman (2003) in his study observed that education of the farmers had significant positive relationship with their use of ICTs.

Mollab (2006) observed in his study that education of the farmers had significant positive relationship with the rice production technologies.

Nuruzzaman (2003) in his study observed that education of the farmers had significant positive relationship with their use of mass media.

Mollah (2006) observed in his study that the education of the farmers had significant positive relationship with the rice production technologies.

Pandian *el. 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 farmer's education with their perception of effectiveness of television programs.

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 (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 use of Information and Communication technologies (ICTs)

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

Sarker's (1995) study showed that farm size of the small farmers possesses a significant amount of influence upon their decision on using communication media of information. Majority of the researchers opined that the farm size has relationship with the use of various communication media adoption of improved farming practices.

Anisu.zzaman (2003) found that the farm size of the respondents had no significant relationship with their use of communication technologies.

Nuruzzaman (2003) in his study conducted that farm size of the farmers had no significant relationship with the use of communication technologies.

Khatun (2006) in her study concluded that farm size of the respondents had significant positive relationship with their homestead gardening.

Anisuzzaman (2003) found that the farm size of the respondents had no significant relationship with their use of communication media.

Nuruzzaman (2003) in his study conducted that farm size of the farmers had no significant relationship with the use of communication technologies.

Pandian *et. al.* (2002) found negative insignificant relationship and direct negative effect of respondent's farm size with 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 use of various information and communication technologies and adoption of improved farming practices.

2.2.4 Farming experience and use of Information and Communication technologies (ICTs)

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

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

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

2.2.5Annual family income and use of Information and Communication technologies (ICTs)

Bhuiyan (1988) reported that the regression co-efficient of income towards use of communication media were statistically not significant and was concluded that income was not related to the comprehensive use of the communication media by the farmers.

Nuruzzarnan (2003) reported that the annual income of the farmers had no significant relationship with their use of communication technologies.

Anisuzzaman (2003) observed that the annual income of the respondents had no significant relationship with their use of communication media.

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 farmer's 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 use of information and communication technologies use.

2.2.6 Organization participation and use of Information and Communication technologies (ICTs)

Bhuiyan (1988) observed that the regression coefficient of organizational participation towards use of communication media was statistically not significant and was concluded that organizational participation was not related to comprehensive use of communication media by the farmers.

Sarker*(1995)* in his study revealed that the use of communication media by the small farmers had significant positive correlation with their organizational participation.

Nuruzzaman (2003) found that organizational participation of the farmers had positive and significant relationship with their use of communication technologies.

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

Chandra and Raddy (2004) found positive insignificant relationship of respondent's organizational participation with impact of use of television program.

On the basis of research finding mentioned above it may be concluded that the organizational participation may effect of maintaining exposure with various information & communication sources.

2.2.7Problem faced by farmer during use of Information and Communication technologies (ICTs)

Ullah (1996) in a study observed that farmers had lack of knowledge about use of information sources.

Hossain and Crouch (1992) reported that there is little response of information service provider to providing their service to farmers about new technologies.

2.2.8 Cosmopoliteness and use of Information and Communication technologies (ICTs)

Nuruzzaman (2003) in his study found that cosmopoliteness of the farmers had positive and highly significant relationship with their use of communication technologies in receiving agricultural information.

Annisuzzaman (2003) concluded that the cosmopoliteness of the respondents had significant positive relationship with their use of communication media.

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

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

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

Anisuzzaman(2003) observed in his study that cosmopoliteness 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 cosmopolitcncss of the farmer and their impact of various information and communication technologies use arc dependent on each other.

2.2.9 Innovativeasess and use of Information and Communication technologies (ICTs)

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.

Nuruzzaman (2003) found that innovativeness of the farmers had positive and significant relationship with their use of communication media.

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

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 contributions of the 09 selected characteristics of the farmers (independent variables) on their use of ICTs (dependent variable).

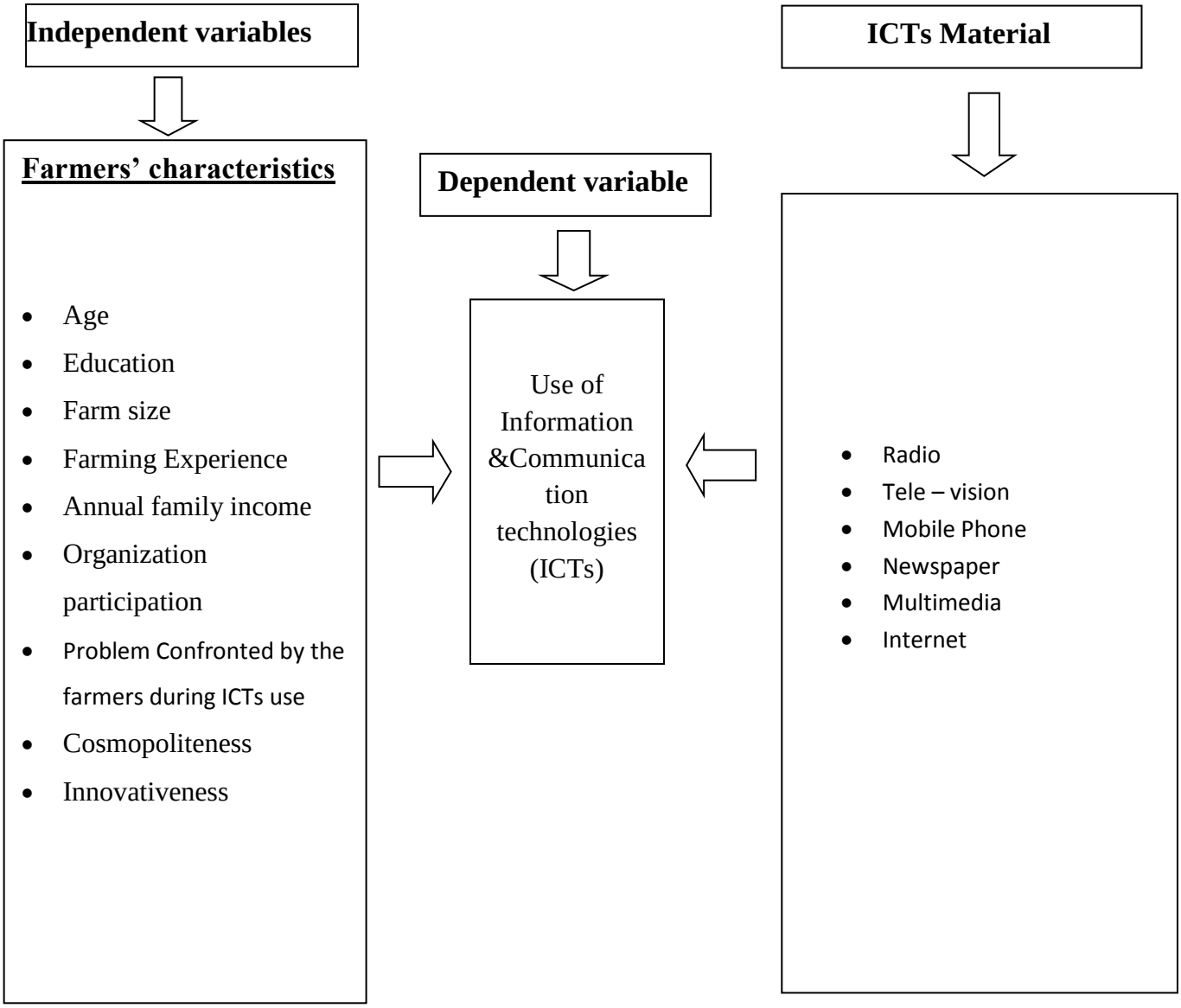

Figure 2.1 Conceptual Framework of the Study

METHODOLOGY

Methodology is very important in any research. It 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.

Methodology is very important in any research. The basic materials for conducting any research are the unbiased information and facts. The purpose of this chapter is to describe the study area, research design and sampling procedure.

3.1. Locale of the study

Ghagutia union of Homna upazilla under Comilla district was selected purposively as the study area. The study area consists of 20 villages. But only two villages were selected by following simple random sampling technique. These villages constituted the locale of the study. The names of the villages are Rampur and Madhabpur. The physical, social and cultural and heritage of this area were similar in many cases with other eastern areas of the country. A map of Comilla district showing the Homna upazilla and another showing the locale of the study area have been presented in Figure 3.1 and 3.2-

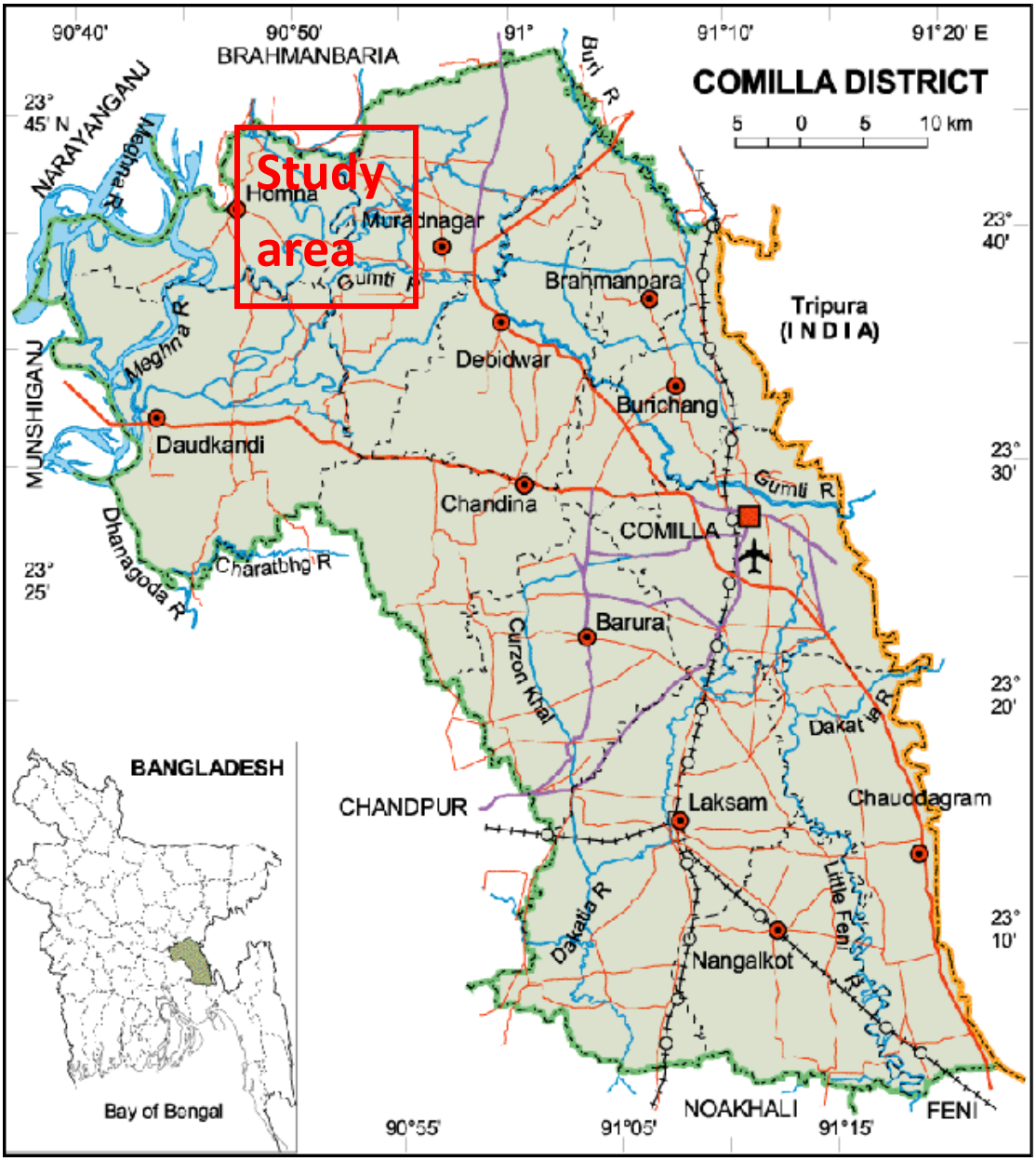

Figure 3.1 Map of Comilla district showing Homna upazilla

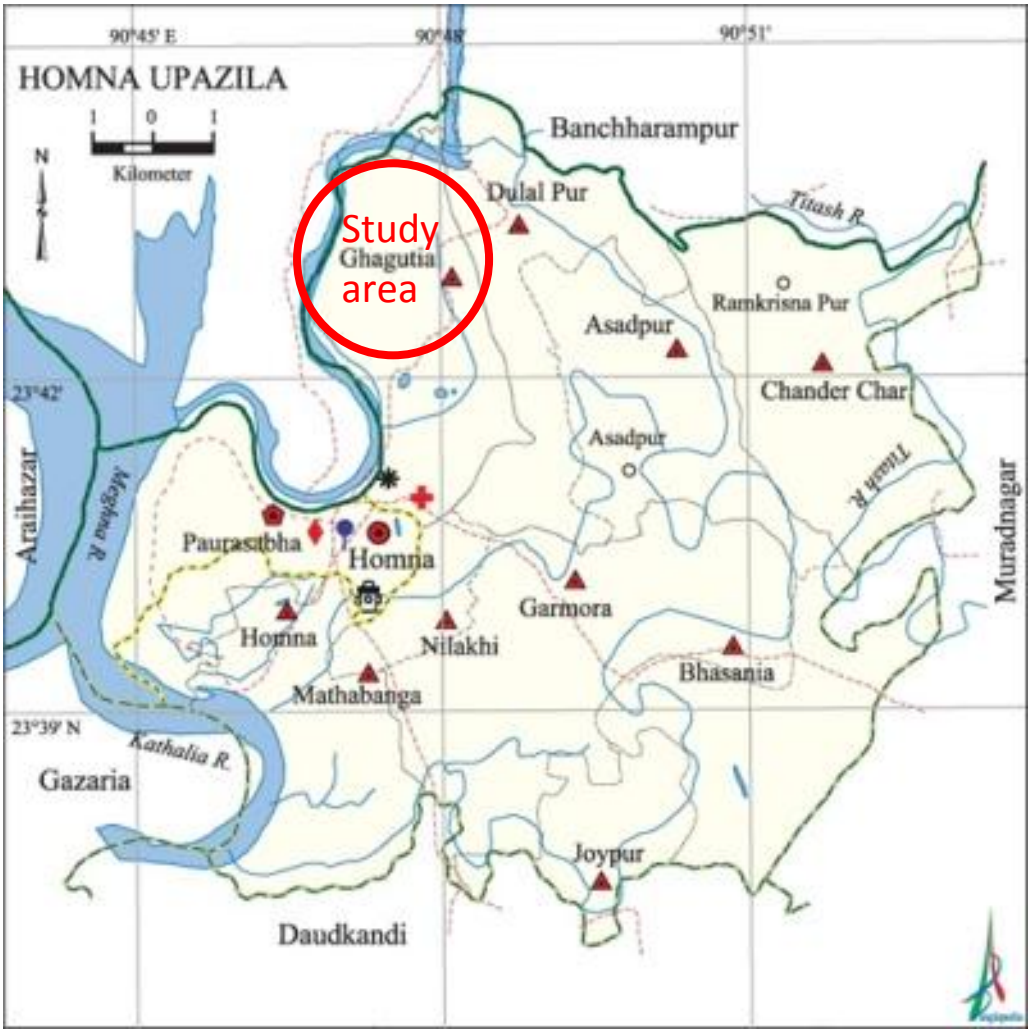

Figure 3.2 Map of Homna Upazilla showing Ghagutia union

3.2. Population and Sampling Design

The researcher himself with the cooperation of local leaders and concerned with Sub- Assistant Agriculture Officer (SAAO) collected an updated list of all the farmers of the selected villages of respective union. The total number of farm families in these villages was 1230; where 668 farm family heads from Rampur village and 562 from madhabpur village under the union of Ghagutia constituted the population of the study. The total number of farmers was 1230 which constituted the population of the study.

3.2.1. Study Group (SG) Sampling

There are several methods for determining the sample size. Here, researcher used Yamane's formula for study group:

$$n = \frac{z^2 P(1-P)N}{z^2 P(1-P) + N\,(e)^2}$$

Where,

n = Sample size;

N, Population size = 1230;

e, The level of precision = 9% ;

z = the value of the standard normal variable given the chosen Confidence level (e.g., z = 1.96 with a confidence level of 95 %) and

P, The proportion or degree of variability = 50%;

So, the sample size (n) is = 110.

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 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 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 use of Information and Communication Technologies (ICTs). 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, education, farm size, farming experience, annual family income, and organization participation, problem faced by the farmers during ICTs use, cosmopoliteness and innovativeness were 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. Use of ICTs by the farmers was 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

Age of a farmer was measured in terms of years from his birth to the time of interview. The age of a respondent was measured in terms of actual years on the basis of his response.

3.4.1.2 Education

Education was measured in terms of years of schooling completed by an individual in educational institutions. The education score was computed for each respondent by giving one score for each year of successful schooling completed. The person who could sign only was given a score of 0.5 and who did not read and write was a given score of 0. For example, when a respondent read up to class 8 his/her score will be 8.

3.4.1.3 Farm size

Farm size of a respondent was measured by the land area possessed by him. Data obtained in response to questions under item No. 3 of the interview schedule formed the basis for determining the farm size of the respondent. Here, farm size was computed by using the following formula:

Farm size = A+B+C+1/2(D+E) +F

Where,

A = Homestead area

B = Own land under own cultivation

C = Own pond and garden

D = Own land given on borga to others

E = Land taken on borga from others

F = Land taken on lease from others

The respondent has given information for their farm size in local measurement unit. Finally, it was converted into hectare and was considered as the farm size score of a respondent.

3.4.1.4 Farming experience

Farming experience of individual is one of the important factors. 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. For example, if farmers had 10 years farming experience he /she get 10 score as per year score is 1.

3.4.1.5 Annual income

Annual family income of a respondent was measure in taka on the basis of his/her total yearly earnings from agriculture and other sources in which the respondent was involved.. The price of the other enterprises (i.e. Livestock-cows, goats, poultry, fish etc.) was also added to the earnings. Earnings of each respondent from different sources (like service, business and labor) were also included in calculating the income. Yearly earnings from farming and other sources were also added together to obtain total income of a respondent. A score of one (1) was given for each one thousand taka.

3.4.1.6 Organization participation

Organizational participation of the respondent was measured on the basis of the nature of his /her involvement and duration of participation in different organizations during the time of interview. Participation score was computed in the following manner for each organization.

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

Organizational participation (OP) scores of a respondent for each organization were computed by using following formula:

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

Where,

OP= Organizational participation

P_{OM} =Participation as ordinary member

P_{EM} = Participation as executive committee member

P_{EO}= Participation as executive officer

Y=Duration of participation in year

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

3.4.1.7 Problems confronted by the farmers in using ICTs materials for receiving agricultural information

Problems confronted means unwanted situation generated during using ICTs materials. For this purpose five point rating scale was used.

Extent of the problem	Score
Very high	4
High	3
Moderate	2
Little	1
Not at all	0

Thus problem faced by farmers during ICTs use could range from 0 to 20. Where 0 indicates no Problem 20 indicates highest problem.

3.4.1.8 Cosmopolitensess

Cosmopoliteness of a respondent was measured in terms of his or her nature of outside visit (Seven different places) external to his/her own social system. For this purpose, four- point rating scale was used.

Measurement of cosmopoliteness of the respondents:

Nature of visit	**Score**
Regularly (1time/ day)	3
Occasionally (1time/ 3days)	2
Rarely (1 time/week)	1
Not at all (0 time)	0

Logical frequencies of visits were considered for each alternative response for each place as shown in item number 8 of interview schedule.

Cosmopoliteness score of the respondents was determined by adding all te scores from all the items. Thus, the cosmopoliteness score of the respondents could range from 0-15, where 0 indicates no cosmopoliteness and 15 indicates highest cosmopoliteness.

3.4.1.9 Innovativeness

According to Rogers (1995) it is the degree of adoption a new technology to which an individual or other unit of adoption is relatively earlier than the other member of the social system. Innovativeness of a respondent was measured by computing an innovativeness score on the basis of his/her extent of use 15 selected modern Agricultural practices. Scores were assigned on the basis of time dimension in the following manner-

Extent of adoption	Score assigned
Within 1 year of hearing	4
Within >1-2 years of hearing	3
Within >2-3 years of hearing	2
After years 3 of hearing	1
Never use	0

Innovativeness score of a respondent was obtained by adding his/her score for all the items. Therefore, the possible innovativeness score of the respondents could range from 0 to 60, 0 indicating no innovativeness and 60 indicating very high innovativeness.

3.4.2 Measurement of dependent variables

Use of Information and communication technologies (ICTs) materials:

Usages of ICTs referred to the frequency of ICTs material use by the farmers. It was expressed in the score.. This variable appears in item number 10 in the interview schedule as presented in Appendix-A.

The usages of ICTs scoring system for each item was done in the following manner-

Extend of use	Score
Regularly	3
Often	2
Rarely	1
Not at all	0

The score for use of ICTs were determined by adding all the scores obtained from all the items. Thus, the score of the use of ICTs could range from 0-18, where 0 indicates no use and 18 indicates highest use of ICTs.

ICT= Re×3+Of×2+R×1+No×0

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 prove valid or invalid of a proposition. In any event, however, it leads to a practical test. In studying contribution between variables, research hypotheses are formulated which state anticipated contribution between variables. However, for statistical test it becomes necessary to formulate null hypothesis.

A null hypothesis states that there is no contribution among the variables. If a null hypothesis is rejected on the basis of a statistical test, it is assumed that there is a contribution between the concerned variables.

The following null hypotheses were formulated for this study:

"*There is no contribution of the selected characteristics of the farmers on their use of ICTs.*

3.6 Collection of Data

After completion of field survey all the data of the interview schedule were compiled. Local units were converted into standard unit. Appropriate scoring technique was followed to convert the qualitative data into quantitative forms. The responses of the individual respondent contained in the interview schedules were transferred to a master sheet for entering the data in the computer. As soon as the data entered into the computer, it was then analyzed in accordance with the objectives of the study.

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 data were analyzed in accordance with the objectives of the proposed research work. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. The statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Sciences) computer program, version 20. In order to estimate the contribution of the selected characteristics of farmers in their use of ICTs, multiple regression analysis (B) was used. Throughout the study, ten percent (0.1) level of significance was used as the basis for rejecting any null hypothesis. If the computed value of (B) was equal to or greater than the designated level of significance (*p*), the null hypothesis was rejected and it was concluded that there was a significant contribution between the concerned variable. Whenever the computed value of (B) was found to be smaller at the designated level of significance (*p*), the null hypothesis could not be rejected. Hence, it was concluded that there was no contribution of the concerned variables on the use of ICTs.

The model used for this analysis can be explained as follows:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + e;$$

Where, Y = is the Use of ICTs,

Of the independent variables, x_1 is the respondent's age, x_2 is education, x_3 is farm size, x_4 is farming experience, x_5 is the annual family income, x_6 is organization participation, x_7 is problem confronted by farmers in ICTs use, x_8 is cosmopoliteness, and x_9 is innovativeness. The regression coefficients of the corresponding independent variables and e are random error, which is normally and independently distributed with zero mean and constant variance.

RESULTS AND DISCUSSION

Result and discussion is a mirror of a research work. A consequential and detailed discussion on the findings of the scientific research study has been presented in this chapter. The chapter includes three sections. In the first section, independent variables i.e. characteristics of the respondents have been discussed. The second section dealt with dependent variable i.e., Use of ICTs by the farmers in receiving agricultural information and finally, the contribution of the independent variables have been discussed in the third section.

4.1 Selected Characteristics of the respondents

Nine characteristics of the farmers were selected to describe and to find out their contribution with their ICTs used for receiving Agricultural information. These selected characteristics were age, education, family size, farming experience, farm size, annual family income, organization participation, problem confronted by farmers during ICTs use, Innovativeness, and Cosmopoliteness. The noticeable topographies of the nine characteristics of the farmers, each of which constituted an independent variable are discussed below:

4.1.1 Age

The age of the sample farmers ranged from 23 to 60 years with an average of 41.98 and standard deviation of 10.042. The respondents were classified into three categories on the basis of their age (Table 4.1) according to department of youth development.

Table 4.1. Distribution of the farmers According to their age

Category	Age range	Observed range	Respondents		Mean	SD
			Number	Percent (%)		
Young age	Up to 35	23– 60	27	24.5	41.98	10.042
Middle age	36 - 50		62	56.4		
Old age	> 50		21	19.1		
Total	30 - > 50		110	100.00		

Data showing that the highest value of proportion 56.4 percent farmers were middle type of age compared to 19.1 percent old and 24.5 percent being young type of aged farmer. According to Lion Berger, elderly farmers seem to be somewhat less motivated to use ICTs than younger ones. Young and middle aged people generally show more favorable attitude towards to ICTs use. The extension agents can target those people in designing their extension activities.

4.1.2 Education

Education of the respondents was measured by following the procedure as discussed earlier in Chapter 3. The education ranged from 0-12, with an average of 4.523 and standard deviation of 4.4301. The respondents were classified into five categories on the basis of their education (Table 4.2)

Table 4.2. Distribution of the farmers according to their education

Category	Scoring	Respondents		Mean	SD
		Number	Percent (%)		
Can't read or sign	0	35	31.8	4.523	4.430
Can sign only	0.5	17	15.5		
Primary education	1 – 5	11	10		
Secondary education	6 – 10	42	38.2		
Higher secondary or above	> 10	05	4.5		
Total	0 - 12	110	100.00		

It is determined from the Table 4.2 that 38.2 percent comprised secondary education, 31.5 percent comprised of cant read and sign, 15.5 percent of the respondents were can sign only, 10 percent respondents had primary education and 4.5 percent had above secondary education. Table 4.2 also shows that above 48.2 percent out of the selected respondents got primary to secondary level of education.

The findings indicate that education of an individual is likely to be more receptive to the modern facts and ideas; they have much mental strength in deciding on a matter related to problem solving or adoption of technologies in their daily life. Thus, farming community in the study area may be well considered as a suitable ground for the adoption of technologies, or execution of change program whatever needed.

4.1.3 Farm size

Farm size varied from .2 to 1.49 hectare with an average of .691 hectare and standard deviation of .299. The respondents were classified into five categories on the basis of their farm size (Table 4.3) according to DAE.

Table 4.3. Distribution of the farmers according to their farm size

Category	Score range (hectare)	Observed range (hectare)	Respondents		Mean	SD
			Number	Percent (%)		
Landless	≤.02	.2-1.49	0	0	.691	.299
Marginal	.021-.2		1	.90		
Small	.21-1.0		90	81.8		
Medium	1.0-3.0		19	17.3		
Large	>3.0		0	0		
Total	≤.02 - >3.0		110	100.00		

Data in the Table 4.3 reveal that 81.8 % of the total respondent had small farm where, 17.3 percent had medium farm, .90 percent had marginal farm. Table 4.3 also shows that overwhelming majority (99.1%) of the total respondent as well as ICTs user had small to medium size of farm. The average farm size of the farmers of the study area (1.03 hectares) was higher than that of national average (0.60 hectare) of Bangladesh. The farmer with marginal farm size has very little scope to experiment about new technologies as their earnings depend on agriculture. On the other hand the farmer with large farm size can easily adopt new innovation in a part of their farm as experiment and they play the role of early adopters.

4.1.4 Farming Experience

Farming experience of the respondents varied from 4 to 45 with a mean of 15.48 and standard deviation 9.329. On the basis of farming experience, the respondents were classified into three categories according to mean ± standard deviation as shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their farming experience

Category	Score range	Respondents		Mean	SD
		Number	Percent (%)		
Low	≤ 5	7	6.4	15.48	9.329
Medium	6-24	83	75.5		
High	>24	20	18.2		
Total	≤ 5–>24	110	100.00		

Data shown in the Table 4.4 revealed that 75.5 percent of total respondents had medium farming experience followed by 18.2 percent had high and 6.4 percent had low farming experience.

4.1.5 Annual family income

The annual income ranges were between 90 to 900 thousands taka with the mean and standard deviation of 247.5 and 128.848 respectively. Their earning from both Agriculture sector and non Agriculture sector, they were classified into three categories according to mean ± standard deviation. The categories and distribution of the respondents were shown in Table 4.5.

Table 4.5. Distribution of the farmers according to their annual family income

Category	Scoring (000 taka)	Observe range	Number of respondents		Mean	SD
			Number	Percent (%)		
Low	≤158	90 - 900	22	20.0	247.50	128.848
Medium	159-375		76	69.1		
High	>375		12	10.9		
Total	≤158 - >375		110	100.00		

Data in the Table 4.5 show that 69.1 percent of the farmers had medium annual income, 20.0 percent of the respondents had low annual income and 10.9 percent had high annual income.

The observations showed that the average income of the farmers was 247.50 that were a medium category income because the percent of medium category farmers were higher than other two categories and more than half of the farmers belonged to medium category farmers. The other reason might be due to the fact that most of the farmers of the study area were not only engaged in agriculture, but also they were engaged service, business etc. Farmers with the low income generally hesitate to adopt new technologies in their own farms because of their lower risk bearing ability and their inability to make necessary financial investment.

4.1.6 Organization Participation

In this study, the researcher finds out some field level data and knowledge about organization participation of the farmers. Their observed range about organization participation was from 0 to 13 with a mean and standard deviation of 4.45 and 2.195 respectively. Their farmers' score were classified into four categories according to their organizational participation. The distribution of the respondents according to their participation has been presented in Table 4.6.

Table 4.6. Distribution of the farmers according to their organization participation

Category	Scoring (days)	Observed range	Respondents		Mean	SD
			Number	Percent (%)		
No participation	0	0 - 13	2	1.8	4.45	2.195
Low	0.1-1		6	5.5		
Medium	2-6		86	78.2		
High	>6		16	14.5		
Total	0 - >6		110	100.00		

The table showed that the percentage of no participation, low participation, medium participation and high participation were 1.8%, 5.5%, 78.2% and 14.5 respectively. The surveyor found that, there almost 1.8% of total farmers had no any kind of organizational participation exposure, while 5.5% and78.2% farmers had low and medium participation exposure. Farmers of high participation exposure were 14.5% compared to others categories. Participation makes the farmers skilled and helps them to acquire deep knowledge about the respected aspects. Organizational participated farmers can face any kind of challenges about the adverse situation in their cultivation. So, they show favorable attitude toward use of ICTs.

4.1.7 Problem confronted by farmer during ICTs use

. The observed range about Problem confronted by farmer during ICTs use was from 4 to 26 with a mean and standard deviation of 11.41 and 3.140 respectively. Their problem score were classified into four categories according to mean ± standard deviation .The distribution of the respondents according to their problem has been presented in Table 4.7

Table 4.7 Distribution of the farmers according to their problem confronted during ICTs use

Category	Scoring (days)	Observed range	Respondents		Mean	SD
			Number	Percent (%)		
No problem	0	4 - 26	0	0	11.41	3.140
Low	1-7		5	4.5		
Medium	8-14		91	82.7		
High	>14		14	12.7		
Total	0 - >14		110	100.00		

The table showed that the percentage of no problem, low problem, medium problem and high problem were 0%, 4.5%, 82.7% and 12.7 respectively. The surveyor found that, there almost 0% of total farmers had no any kind of problemin ICTs use, while 4.5% and 82.7% farmers had low and medium problem in ICTs use. Farmers of high problem in ICTs use were 12.7% compared to others categories.

4.1.8 Cosmopoliteness

The observed cosmopoliteness scores of the respondents ranged from 1 to 13 against the possible range of 0 to 15. The mean score was 5.87 with the standard deviation of 2.147. Based on the observed cosmopoliteness scores, the respondents were classified into three categories according to mean ± standard deviation as shown in Table 4.8

Table 4.8. Distribution of the farmers according to their cosmopoliteness

Category	Scoring	Observed range	Respondents		Mean	SD
			Number	Percent (%)		
		1-13			5.87	2.147
Low	≤ 2		3	2.7		
Medium	3-7		80	72.7		
High	> 7		27	24.6		
Total	≤ 2 – > 7		110	100		

Data contained in the Table 4.8 showed that 72.7 percent of the total respondents had medium cosmopoliteness as compared to 2.7 percent having low and only 24.6 percent had high cosmopoliteness. Data also revealed that majority (97.3 percent) of the respondents were under medium to high cosmopoliteness where 75.4 percent of the respondents were under medium to low cosmopoliteness.

4.1.9 Innovativeness

The observed innovativeness scores of the respondents ranged from 10 to 41 against the possible range of 0 to 60. The average and standard deviation were 26.45 and 6.398 respectively. Based on the innovativeness scores the respondents were classified into three categories as shown in Table 4.9.

Table 4.9 Distribution of the farmers according to their innovativeness

Category	Scoring	Observed range	Respondents		Mean	SD
			Number	Percent (%)		
		10-41			26.45	6.398
Low	≤19		19	17.3		
Medium	20-32		74	67.3		
High	>32		17	15.4		
Total	0 - 30		110	100.00		

Data presented in Table 4.9 indicate that overwhelming 17.3 percent of the respondents had low innovativeness as compared to 67.3 percent medium and only 15.4 percent high innovativeness. Data also revealed that majority (84.6 percent) of the respondents were under medium to low innovativeness. The innovativeness also refers to proneness of an individual to accept new ideas and practices.

4.2. Use of ICTs

Use of ICTs by the respondents varied from 3 to 20 with a mean of 9.71 and standard deviation 3.698. On the basis of ICTs use, the respondents were classified into three categories according to mean ± standard deviation as shown in Table 4.10

Table 4.10 Distribution the farmers according to their Use of ICTs

Category	Score range	Respondents		Mean	SD
		Number	Percent (%)		
Low	≤ 5	15	13.6	9.71	3.698
Medium	6-12	71	64.6		
High	>12	24	21.8		
Total	≤ 5–>12	110	100.00		

Data shown in the Table 4.10 revealed that two third (64.5percent)of total respondents had medium use of ICTs in receiving agricultural information compared to 13.6 % and 21.8 % having low and high use of ICTs in receiving agricultural information respectively.

4.3. Contribution of different individual characteristics of the respondents in their use of ICTs

In order to estimate the contribution of the selected characteristics of the farmers on their use of ICTs by the farmers from the independent variables, multiple regression analysis was used which is shown in the table 4.11

Table 4.11. Multiple regression coefficients of contributing factors on the use of ICTs

Dependent variable	Independent variables	B	*p*	R^2	Adj. R^2	F	*P*
Use of ICTs	Age	-.052	.244	.555	.515	13.83	.000***
	Education	.218	.002**				
	Farm size	-2.202	.097*				
	Farming Experience	-.024	.613				
	Annual Family Income	.007	.018**				
	Organization Participation	.032	.829				
	Problems confronted by Farmers	-.282	.015**				
	Cosmopoliteness	.598	.000***				
	Innovativeness	-.017	.756				

*** Significant at p<0.01. ** Significant at p<0.05. * Significant at p<0.1.

The data in Table 4.11 test the final null hypothesis: There is no contribution of the selected characteristics (age, education, farm size, farming experience, annual family income, organization participation, problem confronted by farmers in ICTs use, Cosmopoliteness, and Innovativeness of the farmers on their use of ICTs.

In order to assess which factors contribute to the use of ICTs by the farmers, multiple regression analysis was used. Table 4.10 shows that there is a significant contribution of respondents' education, farm size, annual family income, problem confronted by the farmers in ICTs use. Here, cosmopoliteness was the most important contributing factors (significant at the 1% level of significance) while education, annual family income and problems confronted by farmers were also contribute (significant at the 5% level of significance). Farm size is also the important contributing factors (significant at the 10% level of significance).

The variation 55.5% ($R^2 = 0.555$) in the respondents' changed use of ICTs can be attributed to their education, farm size, annual family income, problem confronted by the farmers in ICTs use, cosmopoliteness making this an excellent model (see 4.11). The F value indicates that the model is significant ($p<0.000$). However, each predictor may explain some of the variance in respondents' use of ICTs simply by chance. The adjusted R-square value penalizes the addition of extraneous predictors in the model, but values of 0.515 still show that the variance in respondents' use of ICTs can be attributed to the predictor variables rather than by chance, and that both are suitable models (Table 4.11). In summary, the models suggest that the respective authority should consider the respondents' education, farm size, annual family income, problem confronted by the farmers in ICTs use, and cosmopoliteness.

SUMMARY, CONCLUSION AND RECOMMENDATION

This chapter presents summary of findings, conclusions and recommendations of the study.

5.1 Summary of findings

The major findings of the study are summarized below:

5.1.1 Individual characteristics of the farmers

Findings in respect of the 09 selected characteristics of the farmers are summarized below:

Age: The highest value of proportion 56.4 percent of the ICTs user were middle type of age compared to 19.1 percent old and 24.5 percent being young type of age.

Education: Almost all of the farmers had different level of education. Among them 38.2 percent comprised secondary education, 10 percent comprised of primary education, 15.5 percent of the respondents were can sign only, 31.8 percent respondents were can't read or sign and 4.5 percent had above secondary education.

Farm size: 81.8% of the total respondent had small farm where, 17.3 percent had also medium farm and.90 percent had marginal farm.

Farming experience: 75.5 percent of total respondents had medium farming experience followed by 18.2 percent had high and 6.4 percent had low farming experience.

Annual family income: It was found that 69.1 percent of the farmers had medium annual income, 20.0 percent of the farmers had low annual income and 10.9 percent had high annual income.

Organization participation: It was found that the percentage of no participation, low participation; medium participation and high participation were 1.8%, 5.5%, 78.2% and 14.5 respectively.

Problem confronted by farmers in ICTs use: It was found that the percentage of no problem, low problem; medium problem and high problem were 0%, 4.5%, 82.7% and 12.7 respectively.

Cosmopoliteness: It was found that 72.7 percent of the total respondents had medium cosmopoliteness as compared to 2.7 percent having low and only 24.6 percent had high cosmopoliteness. Data also revealed that majority (97.3 percent) of the respondents were under medium to high cosmopoliteness where 75.4 percent of the respondents were under medium to low cosmopoliteness.

Innovativeness: It was found that 17.3 percent of the respondents had low innovativeness as compared to 67.3 percent medium and only 15.4 percent high innovativeness. Data also revealed that majority (84.6 percent) of the respondents were under medium to low innovativeness.

Use of ICTs: The study revealed that highest proportion (64.5 %) of the respondents' had medium use of ICTs in receiving agricultural information compared to 13.6 % and 21.8 % having low and high use of ICTs in receiving agricultural information respectively.

5.1.2 Contribution of respondent's personal characteristics on use of ICTs

There is a significant contribution of respondents' education, farm size, annual family income, problem confronted by the farmers in ICTs use, cosmopoliteness. Of these, cosmopoliteness was the most important contributing factors (significant at the 1% level of significance) while education, annual family income and problems confronted by farmers were also contribute (significant at the 5% level of significance). Farm size are also the important contributing factors (significant at the 10% level of significance).

55.5% (R^2 = 0.555) of the variation in the respondents' changed use of ICTs can be attributed to their respondents' education, farm size, annual family income, problem confronted by the farmers in ICTs use, cosmopoliteness making this an excellent model. The F value indicates that the model is significant ($p<0.000$).

5.2 Conclusion

Findings of the present study and the logical interpretation of other relevant facts prompted the researcher to draw the following conclusions:

1. Education had a significant contribution on their use of ICTs. Therefore, it may be concluded that more the level of education of the farmers more the use of ICTs.

2. Farm size had a significant contribution on their use of ICTs. Therefore, it may be concluded that more the level of farm size of the farmers more the use of ICTs.

3. Annual family income had a significant contribution on their use of ICTs. Therefore, it may be concluded that more the level of annual family income of the farmers more the use of ICTs.

4. The percentage of no problem, low problem, medium problem and high problem were 0%, 4.5%, 82.7% and 12.7 respectively. Therefore, it may be concluded that less problem in ICTs use of the farmer's increase their ICTs use in receiving agricultural information.

5. Overwhelming 2.7 percent of the respondents had low cosmopoliteness as compared to 72.7 percent medium and 24.6 percent high cosmopoliteness. Data also revealed that majority (97.3 percent) of the respondents were under medium to high cosmopoliteness. Therefore, it may be concluded that more cosmopoliteness of the farmers' increase their ICTs use in receiving agricultural information.

5.3 Recommendations

5.3.1 Recommendations for policy implications

On the basis of experience, observation and conclusions drawn from the findings of the study following recommendations are made:

1. Given that the urgent need for increasing ICTs use, it is recommended that the DAE may take effective steps for strengthening extension services in order to change using percentage of the farmers regarding ICTs uses.

2. Education of the respondent had significant positive contribution on their use of ICTs. Therefore it may be recommended that DAE should conduct several awareness programs for the none and less educated farmers.

3. Farm Size of the respondent had significant contribution on their adoption of IPM practices. Therefore it may be recommended that awareness program for the small farmer should be taken.

4. Annual family income had significant positive contribution on their use of ICTs. Therefore, it may be recommended that, DAE should conduct more awareness program for the lower category farmer to get necessary agricultural information through ICTs use.

5. Problem confronted by the farmers in ICTs use had significant contribution on their use of ICTs. Therefore, it may be recommended that, DAE should set more efficient service providers in the rural level to minimize their problem.

6. cosmopoliteness had significant positive contribution on their use of ICTs. Therefore, it may be recommended that, DAE should conduct more participation programs on ICTs use that would make the farmers more aware to get necessary agricultural information through ICTs use.

5.3.2 Recommendations for further study

A small and limited research work cannot provide unique and universal information related to use of ICTs by the farmers in receiving agricultural information. Further studies should be undertaken on related matters. On the basis of scope and limitations of the present study and observations made by the researcher, the following recommendations are made for further study:

1. The study was conducted in only Rampur & Madhabpur villages of Ghagutia union of Homna upazilla of comilla district. Similar studies should be conducted in other parts of the country to get a clear picture of the whole country which will be helpful for effective policy formulation.

2. It is difficult to determine actual user of ICTs from the farmers. Measurement of use of ICTs by the farmers is not free from questions. Therefore, more reliable measurement of concerned variable is necessary for further study.

3. To measure use of ICTs by the farmers‟ the researcher developed a scale and the validity of the scale may be verified by further studies using the same scale.

4. The present study was undertaken to explore contribution of 09 selected characteristics of the farmers with their use of ICTs. Therefore, it could be recommended that further studies should be designed considering other agricultural and non-agricultural activities and including other characteristics of the farmers that might affect the use of ICTs.

5. In the present study age, farming experience, organization participation, and innovativeness had no significant contribution on their use of ICTs. In this connection, further verification is necessary.

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APPENDIX-A

English Version of the Interview Schedule

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University, Dhaka-1207.

Interview schedule for data collection for the research on

"USE OF INFORMATION & COMMUNICATION TECHNOLOGIES (ICTs) BY THE FARMERS IN RECEIVING AGRICULTURAL INFORMATION"

(The interview schedule is entitled for a research study)

Serial No. :

Name of the respondent :

Village :

Union : Upazilla : Homna

District : Comilla Occupation: Farming

(Please answer the following questions. Secrecy will be strictly maintained.)

1. Age

How old are you? Age…….years

2. Education

Please mention your educational status-

(a) Can't read and write…….

(b) Can sign only……..…..

(c) Read up to class ……...

(d) Others (specify) ……

3. Farm size

Please mention your land area-

Sl.No	Types of land	Area(Local)	Area(hector)
A	Own homestead		
B	Own land under own cultivation		
C	Own pond and garden		
D	Own land given on borga to others		
E	Land taken on borga from others		
F	Land taken on lease from others		
Total area = A+B+C+1/2(D+E)+F			

4. Farming Experience:

How many years you are engaged in Agricultural farming?

..... Years

5. Annual family income:

Please state your annual income from different sources:

(A)Agriculture

Sl.No.	Sources of income	Amount(Tk.)
1	Crops	
2	Livestock	
3	Fishes	
4	Poultry	
5	Others	
Total		

(B)Non-Agriculture

Sl.No.	Sources of income	Amount(Tk.)
1	Service Own- Other Members-	
2	Business	
3	Laboring	
4	Others	
Total		

Grand Total = A+B = …….Tk

6. Organizational Participation

Please mention your participation with the following organization:

Sl. No.	**Name of the organization**	**Nature of participation (years)**			
		No participation(0)	**Ordinary member(1)**	**Executive member(2)**	**President/ Secretary (3)**
1.	Farmers' association				
2.	School Committee				
3.	Bazar Committee				
4.	Co-operative society				
5.	NGO organized society				
6.	Mosque committee				
7.	Others				

7. Problems confronted by the farmers in using ICTs (Materials) for receiving agricultural information.

Sl. No.	Problems	Extent of problem					Total
		Very High (4)	High (3)	Moderate (2)	Little (1)	Not at all (0)	
1	Lack of Knowledge						
2	High cost of ICTs (Materials)						
3	Unavailability of ICTs (Materials)						
4	Inefficiency of Information service Provider						
5	Lack of co-operation from others						

8. Cosmopoliteness

Please mention your frequency of visits to the following places:

SI. No.	**Place of Visiting**	**Frequency of visit (yearly)**			
		Regularly (3)	**Occasionally (2)**	**Rarely (1)**	**Never (0)**
1	Visit to other villages	**1t/daily**	**1t/3days**	**1t/week**	
2.	Visit to own Thana	**1t/weekly**	**1t/15 days**	**1t/month**	
3.	Visit to own district	**1t/3months**	**1t/6months**	**1t/1yr**	
4.	Visit to other thana/district	**1t/3months**	**1t/6months**	**1t/yr**	
5.	Visit to capital city	**1t/1yr**	**1t/2yrs**	**1t/3yrs**	
Total					

Here, 1t= one time

9. Innovativeness

Please indicate when you started using the following technologies:

Sl. No.	Name of the technology	Degree of Innovativeness				Never Used
		Within 1 year of hearing	Within >1-2 years of hearing	Within >2-3 years of hearing	After 3 years of hearing	
1	Use of Bio fertilizer					
2	Use of leaf color chart					
3	Use of perching in the field					
4	Use of tractor, power tiller					
5	Use of seed treatment with agrosan					
6	Use of bamboo booster in the rice field					
7	Use of plant extract(Neem oil)					
8	Use of light trap for insect control					
9	Artificial pollination					
10	Use of sex pheromone					
11	Collection and destroy of eegs and larvae of insects(Manual)					
12	Use of super granular urea					
13	Use of sweeping net					
14	Use of hybrid rice variety					

15	Use of balanced fertilizer					

10. Please mention how frequently you use the following ICTs materials in receiving Agricultural information:

Sl. No.	**Name of ICTs materials**	**Extent of use**			
		Regularly (4)	**Often (3)**	**Rarely (1)**	**Never (0)**
1.	Radio	1time/day	1t/3d	1t/7d	
2.	Tele-vision	1t/d	1t/3d	1t/7d	
3.	Mobile phone	1t/d	1t/3d	1t/7d	
4.	Newspaper	1t/d	1t/3d	1t/7d	
5.	Multimedia	1t/week	1t/15d	1t/1month	
6.	Internet	1t/week	1t/15d	1t/m	

Thanks for your kind co-operation.

DATE: Signature of interviewer