FARMERS` PERCEPTION ON THE EFFECTIVENESS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN RECEIVING AGRICULTURAL INFORMATION

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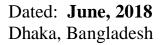Sher-e-Bangla Agricultural University,
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CERTIFICATE

This is to certify that the thesis entitled "**FARMERS` PERCEPTION ON THE EFFECTIVENESS OF INFORMATION AND COMMUNICATION TECHNOLOGY 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 **KHAIRUL ISLAM, Registration No. 12-04830** 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: **June, 2018**
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Dedicated to
My
Beloved Parents

ACKNOWLEDGEMENT

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ABBREVIATIONS AND ACRONYMS

AICC: Agricultural Information & Communication Center

AIS: Agricultural Information System

BBS: Bangladesh Bureau of Statistics

BOC: Basis of Categorization

DAE :   Department of Agricultural Extension

E-mail: Electronic mail

el a! :   Associates

Fig: Figure

GO :   Government Organization

ICT :   Information and Communication Technology

i.e. :   That is

NGO :   Non Government Organization

NS :   Not-significant

r :   Correlation co-efficient

SAU: Sher-e-Bangla Agricultural University

SD: Standard Deviation

SPSS :   Statistical Package for Social Science

TV :   Television

Tk. :   Taka

* :   Significant at 0.05 level of probability

** :   Significant at 0.01 level of probability of Degrees of Freedom

FARMERS` PERCEPTION ON THE EFFECTIVENESS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN RECEIVING AGRICULTURAL INFORMATION

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ABSTRACT

The main purpose of the study was to determine farmers' perception on the effectiveness of information and communication technology in receiving agricultural information and to explore the relationship of the selected charecterestis of the farmers with their perception. The study was conducted in six upazillas namely Narsingdi Sadar, Monohordi, Shibpur, Polash, Raipura & Belabo under Narsingdi district. Data were collected from 109 farmers by using a pre-tested interview schedule during the period from 15 February to 15 April, 2018. Appropriate scales were developed to measure the variables of the study. Pearson Product Moment Correlation test was used to explore the relationships among the concerned variables. The study revealed that the highest proportion (57.8%) of the respondents' had medium level of perception on the effectiveness of information and communication technology in receiving agricultural information compared to 25.7 % and 17.5 % having low and high level of perception respectively. Significant relationship of focal variable was found with farmers' age, education, farming experience, cosmopoliteness, extent of using ICT, innovativeness and problem confronted by the farmers during ICT use. No significant relationship was found with farmers' farm size, annual family income and organizational participation. Based on the findings, it may be concluded that different government agencies of Bangladesh like DAE or AICC should review their training programs and make sound provisions so that the farmers understand the benefits of ICT and increase their perception level on the effectiveness of ICT in receiving agricultural information.

Key words: Perception, Effectiveness, ICT

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CHAPTER I
INTRODUCTION

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1.1 General Background

Information and communication technology (ICT) is the term used to describe the tools and the processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. According to UNESCO (2004), Information and Communication Technologies can be broadly explained as the technologies that facilitate communication, processing and transmission of communication by electronic means. It is one of the most aspired fields in today's world. The term ICT was coined by Stevenson in 1997. It includes a wide range of technologies starting from radio, television and telephone to modern technologies like mobile phone, multimedia, internet and satellite based communication systems. In recent years, there is a noticeable shift from the old ways of delivering information to the current ways of information delivery systems. Information and communication technology (ICT) is rapidly gaining the centre stage for future world economic growth and development. While ICT is gaining prominence as an engine for economic growth it also promises to have far reaching potential for the delivery of social services and enhancing the effectiveness of government organizations. With 6.8 billion mobile subscriptions globally, the global mobile cellular penetration rate has touched 96 per cent during 2013 (International Telecommunications Union, 2013), which clearly indicates the rapid spread of ICTs. Over the years its presence and more than that its importance has been gradually more felt in agriculture.

Bangladesh is an agricultural country with an area of 1,47,570 square kilometer. The economy of the country typically depending on agriculture which represents directly and indirectly, almost 23% of the country's gross domestic product (GDP) and employing 51.7% of the manual labor force. This sector directly contributes 16.01% 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 essential 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

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alarming and the food reserve is very poor. Besides this, there is no capacity 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 suitable technologies are used by the farmers, who are the primary unit of adoption on better practices. Therefore, proper operation 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.

Agricultural extension in the current scenario of rapidly changing world has been recognized as a mechanism for delivering the knowledge, information and advices as an input into modern farming. The benefits of ICTs in improvement and strengthening of agriculture sector in Bangladesh includes timely information on weather forecasts and calamities, better and location specific agricultural practices and advices, better marketing exposure and pricing, reduction of agricultural risks and improved incomes, better awareness and information, improved networking and communication, facility of online trading and e-commerce, better representation at various fore, authorities and online platform, etc. 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. Furthermore, different communication behaviors are 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. 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 Power Point and other Web Pages increase 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). 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 in 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 and television. But the very few researchers conducted research on farmers` perception on the effectiveness of using ICT for receiving agricultural information in Bangladesh. Considering the above facts the researcher felt a thrust to conduct a study with the hope to identify Farmers` Perception on the Effectiveness of Using Information & Communication Technology for 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, "Farmers` Perception on the Effectiveness of Information & Communication Technology in Receiving Agricultural Information". This study tried to explore some selected characteristics of the farmers such as age, education, farm size, farming experience, annual family income, organizational participation, cosmopoliteness, extent of using ICT, innovativeness and Problems confronted by the farmers in using ICT and their relationship with farmers` perception on the effectiveness of ICT in receiving agricultural information.

Any agricultural information can be diffused within a short time directly to the farmers by using ICTs. For identifying Farmers` Perception on the Effectiveness of Information & Communication Technology in Receiving Agricultural Information, it is necessary to know the answers of the following questions with an appropriate direction.

1. What is the extent of farmers' perception on the effectiveness of ICT in receiving agricultural information?
2. What are the problems faced by farmers in using ICTs?
3. Is there any relationship among the characteristics of farmers with their perception on the effectiveness of using ICT for receiving agricultural information?

On the basis of the above discussion, the researcher undertook a piece of study entitled "Farmers` Perception on the Effectiveness of Information & Communication Technology 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 and describe some selected characteristics of the farmers. The selected characteristics are:

- Age
- Education
- Farm size
- Farming experience
- Annual family income
- Organization participation
- Cosmopoliteness
- Innovativeness
- Extent of using ICT
- Problems faced in using ICT

2. To determine famers` perception on the effectiveness of ICT in receiving agricultural information
3. To explore the relationship of the selected characteristics of the farmers with their perception on the effectiveness of ICT in receiving agricultural information

1.4 Justification of the study

The main focus of the study was to assess the perception of the farmers on the effectiveness of ICT in receiving agricultural information. It is important to investigate whether or not farmers find it easy to access the information, generated by ICT. ICT spreads 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). ICTs such as Radio T.V, mobile phones, and Internet among others are required for effective extension information among farmers (Arokoyo, 2005). ICTs could use to facilitate, strengthen, and replace an existing information systems and networks. It could regard as both a driver and an enabler. Especially agricultural 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 ICT 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. But very few researchers conducted research on farmers` perception on the effectiveness of ICT in receiving agricultural information in Bangladesh. Considering the above facts the researcher deemed it a timely necessity to undertake the present study entitled "Farmers` perception on the effectiveness of ICT in receiving agricultural information".

1.5 Scope and Limitations of the Study

The finding of the study will be particularly applicable to the Narsingdi district. These findings may also be related in other areas of Bangladesh where the physical, socio-economical and cultural conditions are similar as the study area. The findings will be helpful to policy makers, as well as to the public and private agencies engaged in information and communication technology based extension services. The study can contribute to the existing body of study on the integration of information and communication technology for agricultural development.

The main purpose of the study was to determine farmers` perception on the effectiveness of ICT in receiving agricultural information. However, in order to conduct the research in a meaningful and convenient 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.

- The study was conducted in only Narsingdi district.
- Population for the present study was kept confined within the members of AICC because they are the reliable ICT using farmers.
- The farmers obsessed many characteristics and their characteristics were varied to a great degree. Among those characteristics only 10 (Ten) characteristics were selected for investigation in the study.
- Information used by the farmers for various purposes such as farming, business, politics, religion etc. but this study only investigated the famers` perception on the effectiveness of ICT in receiving agricultural information.
- The researcher was dependent on the data furnished by the selected famers during their interviews.
- The objectivity of the study is confined to respondents' ability to recall and also to their honesty in providing the essential information.
- Facts and figures collected by the investigator applied to the circumstances prevailing during the year 2018.

1.6 Assumptions

An assumption is "the supposition that an apparent fact or principle is true in the light of available evidence" (Goode, 1945). In this study, the researcher had the following assumptions in mind while undertaking this 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 effectiveness of ICT in receiving agricultural information.

VI. 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.

VII. Famers` perception on the effectiveness of ICT in receiving agricultural information is linearly related with their selected characteristics.

Study on the Famers` perception on the effectiveness of ICT in receiving agricultural information was 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 famers` perception on the effectiveness of ICT in receiving agricultural information.

1.7 Definition of the Key Terms

Information and Communication Technology (ICT):

ICT stands for Information and Communication Technology. Information and communication technology (ICT) is the term used to describe the tools and the processes to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. This includes the Internet, mobile telephone, computer, satellite, Radio, Television, over cable or aerials, multimedia, poster, newspaper etc. In this study only eight selected technologies (i.e., Radio, Television, Simple cell phone, Smart cell phone, Online/offline agricultural apps, Online news, Multimedia and Internet) have been taken into consideration.

AICC

AICC (Agriculture Information & Communication Centers) is the pioneer for disseminating agricultural information and technologies at the root level by using ICT through establishing 499 AICC clubs across the country. Different ICT devices like laptop, smart phone**,** internet, multimedia instruments etc were given to farmers operated centers along with necessary training by AICC.

AIS

Effective technology development and transfer depends on an interactive, holistic system, that (Roling, 1987) calls the agricultural information system (AIS).

Variable

A characteristic, number or quantity that increase or decrease over time or takes different values in different situation.

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.

Correlation analysis

Correlation analysis is a method of statistical evaluation used to study the strength of a relationship between two, numerically measured, continuous variables. This particular type of analysis is useful when a researcher wants to establish if there are possible relationships between variables.

Age

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

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.

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 borga, land taken from other as borga, land given lease, land taken as lease etc. Farm size was measured in terms of hectares.

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

Organizational 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 within a specified period of time.

Cosmopoliteness

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

Extent of using ICT materials

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

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).

Famers` perception on the effectiveness of using ICT for receiving agricultural information

Perception refers to the ability to see, hear, or become aware of something through the senses. Famers` perception on the effectiveness of using ICT for receiving agricultural information is the degree of respondents` perception on some selected effectiveness of using ICT for receiving agricultural information.

CHAPTER II
REVIEW OF LITERATURE

The purpose of this Chapter is to review the literatures having relevance to the present study. The researcher made an elaborate search of available literature for the above purpose. But, there is hardly any study dealing with the farmers` perception on the effectiveness of using ICT for receiving agricultural information. The researcher attempted to search the literatures on a number of studies have been conducted on farmers` perception on using ICT. Therefore, the findings of such studies related to the extent of farmers` perception on using ICT for receiving agricultural information and other partial studies have been reviewed in this Chapter. This chapter comprises of three sections. The first section deals with general findings on farmers` perception on the effectiveness of using ICT. The second section reviewed the studies on the relationship between the selected characteristics of farmers and their perception on the effectiveness of using ICT. Third and the final section deals with the conceptual framework of the study.

2.1 General findings on farmers' perception on the effectiveness of using ICT

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. He also found that 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.

Chanhan (1979) conducted a study on Farmers' Perception about ICT Application that majority (86.00%)of the farmers out of them 56.00 percent totally and 30.00 per cent partly assumed that development of Indian farmers is possible through Internet. 82.00 per cent of the farmers were wishing their children to make positive use of internet at the same time 81.00 per cent of them had opinion that farmers should make use of internet. He also noticed that farmers have real interest to be a part of Internet communication process thus, majority (78.00%) of the respondents were expecting to use Internet by their own while, 22.00 percent were wanted to use it with the help of others.

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 were 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.

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 to 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 (2007) has 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 Krishi Darshan 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.

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.

2.2 Review of Studies on the Relationship between Selected Characteristics of Farmers and Their Perception on the Effectiveness of ICT in Receiving Agricultural Information

2.2.1 Age and farmers' perception on the effectiveness of ICT in receiving agricultural information

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

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

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

Ullah (1996) observed that age of farmers showed a negative but no significant relationship with their use of different information media.

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

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

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

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.

Most of the research findings on age and farmers` perception on the effectiveness on using ICT for receiving agricultural information showed that either the variables are independent or they have negative relationships. This means that age of the farmers do not possess any significant influence or posses negative impact upon farmers` perception on the effectiveness of using ICT for receiving agricultural information.

2.2.2 Education and farmers' perception on the effectiveness of ICT

Mollah (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 ICTs.

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

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

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

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.

Sarker (1995) found a highly positive significant relationship between education of the small farmers and their use of information & communication media
Bhuiyan (1988) showed that education had positive and significant contribution to the comprehensive use of information and communication media.

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.

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

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 perception of using ICTs for receiving agricultural information.

2.2.3 Farm size and farmers' perception on the effectiveness of ICT

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 technologies.

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

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

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.

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

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

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.

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.

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

Majority of the researchers opined that the farm size had no relationship with their perceived use of various information and communication technologies and adoption of improved farming practices.

2.2.4 Farming experience and farmers' perception on the effectiveness of ICT

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

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

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

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

2.2.5 Annual family income and farmers' perception on the effectiveness of ICT

Pal (2009) conducted a study on the perception of organic farmers regarding introduction of ICT in organic farming. The study showed that annual family income had no significant relationship with farmer's perception.

Roy (2009) stated that annual family income had a positive significant relationship with farmer's perception.

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

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 on the Impact of Video Education on Knowledge Retention.

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.

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.

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

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

2.2.6 Organizational participation and farmers' perception on the effectiveness of ICT

Pal (2009) conducted a study on the perception of organic farmers regarding introduction of ICT in organic farming. The study revealed that organizational participation had no significant relationship with farmer's perception.

Roy (2009) stated that organizational participation had no significant relationship with farmer's perception.

Cherihan, A. and A. Chandra (1989) found positive insignificant relationship of respondents social participation with impact of use of television program.

Uddin (2004) studied on fanners' perception of sustainable agriculture and concluded that organizational participation of the farmers had a significant positive relationship with their perception of sustainable agriculture.

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.

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

2.2.7 Cosmopoliteness and farmers' perception on the effectiveness of ICT

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.

Ullah (1996) in a study observed that cosmopoliteteness 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.

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

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

2.2.8 Extent of using ICT and farmers' perception on the effectiveness of ICT

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

2.2.9 Innovativeness and farmers' perception on the effectiveness of ICT

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

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

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.

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

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2.2.10 Problems faced in using ICT and farmers' perception on the effectiveness of ICT

Pal (2009) conducted a study on the perception of organic farmers regarding introduction of ICT in organic farming. The study revealed that several constraints in using organic fertilizer had a negative significant influence on the farmers' perception.

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

2.3 The Conceptual Framework of the Study

It is evident from the past studies that every occurrence or phenomenon is the outcome of a number of variables, which may, or may not be interdependent or interrelated with each other. In other words, no single variable can contribute wholly to a phenomenon. Variables together are the cause and the phenomenon is effect and thus, there is cause effect relationship everywhere in the universe. The conceptual framework was kept in mind framing the structural arrangement for the variables. This study was concerned with the farmers` perception on the effectiveness of using ICT for receiving agricultural information as predicted variable and the selected characteristics of the farmers as experimental variables. It is impossible to deal with all characteristics in a single study. It was therefore, necessary to limit the characteristics, which include age, education, farm size, farming experience, annual family income, organizational participation, cosmopoliteness, extent of using ICT, innovativeness, problem faced by farmers during ICT use. The conceptual model of the study has been presented in Figure 2.1.

Experimental Variables

Focal Variable

Characteristics of farmers

- Age
- Education
- Farm size
- Farming Experience
- Annual family income
- Organizational participation
- Cosmopoliteness
- Extent of using ICT
- Innovativeness
- Problems faced in using ICT

Farmers' perception on the effectiveness of ICT in receiving agricultural information

Figure 2.1 The conceptual framework of the study

CHAPTER III
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. 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

The study was conducted in Narsingdi district. Area of Narsingdi district is 1,411 sq km and located with the gps coordinates of 23° 55' N latitude and 90° 43' E longitude. Six upazilas under Narsingdi district was purposefully selected as locale of the study. Chinshpur village under Narsingdi Sadar upazila, Tatardi village under Monohordi upazila , Soikarchor villege under Shibpur upazilla, Narsinghapur village under Polash upazila , Dhukundi village under Raipura upazila, Rahimerkandi village under Belabo upazila were purposively selected as locale of the study.

Figure 3.1 A map of Narsingdi district showing all the upazillas

3.2 Selection of Sample and Sampling Technique

It was impossible to interview all the ICT using famers in the study areas due to limitations of time and resources. For this reason the investigation randomly selected six AICC club of DAE, Bangladesh from the study area. A total of 218 ICT using farmers AICC club were listed which constituted the population of the study. For proportionate representation 109 farmers were selected as the sample of the study by taking 50% of the farmers from each of the six clubs following stratified random sampling method. A reserve list of 12 farmers also prepared for use in case of unavailability of the respondents for any reason. The distribution of the population and the reserve list has been shown in table 3.1

Table: 3.1 Population and sample of the study area

District	Upazilla	Village	AICC club name	Number of the Population	Sample size	Reserve list
Narsingdi	Narsindi Sadar	Chinishpur	Chinishpur AICC	36	18	2
	Monohordi	Tatardi	Tatardu ICM Club	40	20	2
	Shibpur	Saikarchor	Saikarchor ICM Club	44	22	2
	Polash	Narsinghapur	Narsinghapur Mahila CIG club	32	16	2
	Raipura	Dhukundi	Dhukundi ICM club	36	18	2
	Belabo	Rahimer Kandi	Rahimer Kandi IPM Krishak Samiti	30	15	2
Total				**218**	**109**	**12**

3.3 Instruments for Data Collection

In order to collect relevant data from the respondents an interview schedule was prepared keeping the objectives of the study in mind. Both open and closed form questions were used in the questionnaire. Simple and direct questions were included in the schedule to ascertain experimental and focal variables. The interview schedule was pre-tested with 10 farmers of the study area. On the test experiences, necessary additions and modifications of the schedule were done.

Appropriate scales were developed to operationalize some characteristics of the farmers. The interview schedule was prepared both in English an Bengali. A copy of the interview schedule in English version is presented in the Appendix-I.

3.4 Collection of Data

Data were collected personally by the researcher himself through face to face interview from the selected respondents. Interviews were usually conducted with the respondents in their own AICC club. While starting interview with any respondent the researcher took all possible care to establish rapport with him/her so that he/she did not hesitate to furnish proper responses to the questions and statements in the schedule. However, if any respondent failed to understand any question the researcher took care to explain the issue. The researcher received excellent co-operation from the respondents and others concerned during the time of interview. The entire process of collecting data took place during 15 November to 28 December 2018.

3.5 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.

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 relationship with farmers' perception on the effectiveness of using ICT for receiving

agricultural information. Based on this experience, literature for the study, discussion with relevant experts and academicians and also with the research supervisor, the researcher selected 10 characteristics. Age, education, farm size, farming experience, annual family income, organizational participation, cosmopoliteness, extent of using ICT, innovativeness, problem faced by farmers during ICT use as the experimental variables. On the other hand, famers` perception on the effectiveness of using ICT for receiving agricultural information were the main focal variable of the study.

3.6 Measurement of Variables

In order to conduct the study in accordance with the objectives, it was necessary to measure the selected variables. The selected characteristics of the farmers constituted the variables of the study. To keep the research manageable, ten experimental variables were selected for the study. The procedures of measurement of the selected variables were as follows:

3.6.1 Age

The age of individual is one of the important factors pertaining to his personality make up which can play an important role in his adoption behavior. The age of respondent growers was measured by counting the actual years from his/her birth to the time of interview on the basis of his statement. It was measured in terms of actual years. No fraction of year was considered. A score of one (1) was assigned for each years of age. Age was placed in item no. 1 of the interview schedule (Appendix-I).

3.6.2 Education

Education was measured in terms of grades of formal education (school/college) completed by an individual. It was expressed in terms of years of schooling. A score of one (1) was assigned for each year of schooling completed (item no. 2, Appendix-I). For example, if the respondent passed the S.S.C. examination, his education score was given as 10, if he passes the final examination of class seven, his education score was given as 7. If the respondent did not know how to read and write, his education score was given as "0" (zero). A score of 0.5 (half) was given to that respondent who could sign his name only.

3.6.3 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:

$$\text{Farm size} = A+B+C+1/2(D+E)+F$$

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 decimal unit. Finally, it was converted into hectare and was considered as the farm size score of a respondent. This variable appears in item number three (3) in the interview schedule as presented in Appendix-I.

3.6.4 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. This variable appears in item number four (4) in the interview schedule as presented in Appendix-I.

3.6.5 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. This variable appears in item number five (5) in the interview schedule as presented in Appendix-I.

3.6.6 Organizational 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.

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

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

$$OP = P_{om} + 2P_{em} + 3P_{eo}$$

Where,

OP = Organizational participation

Pom = Participation as ordinary member

Pem = Participation as executive committee member

Pemo = Participation as executive officer

Organizational participation score of a respondent was determined by summing the participation score of all organizations. This variable appears in item number six (6) in the interview schedule as presented in Appendix-I.

3.6.7 Cosmopolitensess

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

Nature of visit	Score
Regularly	3
Occasionally	2
Rarely	1
Never	0

Logical frequencies of visits were considered for each alternative response for each place as shown in item number 7 of interview schedule (Appendix-I). Cosmopoliteness score of the respondents was determined by adding all the scores from all the items. Thus, the cosmopoliteness score of the respondents could range from 0-18, where 0 indicates no cosmopoliteness and 18 indicates highest cosmopoliteness.

3.6.8 Extent of using ICT

Extent of using ICT is referred to the frequency of ICTs material (8 items of ICT materials) used by the farmers. It was expressed in the score. 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
Never	0

This variable appears in item number eight (8) in the interview schedule as presented in Appendix-I. 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 0-24, where 0 indicates no use and 24 indicates highest use of ICTs.

Extent of using ICT of a respondent were computed by using following formula:

$$Ext.ICT = Re \times 3 + Of \times 2 + R \times 1 + N \times 0$$

Here,

Ext.ICT = Extent of using ICT

Re = Regularly

Of = Often

R = Rarely

N = Never

3.6.9 Innovativeness

According to Rogers (1995), it is the degree of adoption of 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 using 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 3 years of hearing	1
Never used	0

This variable appears in item number nine (9) in the interview schedule as presented in Appendix-I. 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 40, 0 indicating no innovativeness and 40 indicating very high innovativeness.

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3.6.10 Problems faced in using ICT

Problems faced in using ICT means unwanted situation generated during using ICT materials by the farmers. Problems faced in using ICT by the farmers were measured on the basis of extent of the problems faced in using ICT. The following scores were assigned against each of the problems:

Extent of the problem	Score
High problem	3
Medium problem	2
Low problem	1
No problem	0

This variable appears in item number ten (10) in the interview schedule as presented in Appendix-I. Problems faced in using ICT were measured by asking by asking the farmers 5 questions related to different ICT using problems. Thus, Problems faced in using ICT score of a respondent could range from 0 to 15 where 0 indicated no problem in using ICT and 15 indicated high problem faced by the farmers in using ICT.

3.6.11 Measurement of famers` perception on the effectiveness of ICT in receiving agricultural information

Farmers' perception on the effectiveness of ICT in receiving agricultural information was the main focus of the study. On the basis of this main aspect, the researcher obtained knowledge by visiting the study area, discussing with the farmers and local leaders at the time of collecting data. Besides, the researcher discussed with the Agriculture Extension Officer, Sub Assistant Agriculture Officer (SAAO) and other related persons of the respective study area. Farmers' perception on the effectiveness of ICT in receiving agricultural information was measured on the basis of 10 common perception statements. which the farmers faced on using ICT. Each farmer indicated the extent of his/her perception on the effectiveness of ICT in receiving agricultural information by checking any one of the following four responses.

These were strongly agree, agree, disagree and strongly disagree. Scores were assigned in the following manner:

Extent of farmers' perception	Score assigned
Strongly agree	4
Agree	3
Disagree	2
Strongly disagree	1

The scores for responses against all the 10 perceptions were added together to obtain one's perception score. Therefore, perception score of the respondents could range from 10 to 40. Where 10 indicates lowest level of perception and 40 indicates highest level of perception.

3.7 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 relationship 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 relationship 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 relationship of the selected characteristics of the farmers and their perception on the effectiveness of ICT in receiving agricultural information".

3.8 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.

3.9 Statistical Treatment

The data after collection were coded, compiled, tabulated and analyzed in accordance with the objectives of the study. Various statistical measures such as range, mean, percentage, standard deviation were used in categorizing and describing the selected personal characteristics of the respondents. For clarity of understanding tables were used for presentation of data. Pearson`s Product Moment Correlation Co-efficient (r) test was used to explore the relationships among variables. Throughout the study five percent (0.05) level of probability and one percent (0.01) level of probability were used to reject any null hypothesis.

CHAPTER IV
RESULTS AND DISCUSSION

Result and discussion is a reflection 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, selected characteristics of the respondents have been discussed. The second section deals with farmers' perception on the effectiveness of ICT in receiving agricultural information and finally, the relationship between of selected characteristics of the farmers and farmers' perception on the effectiveness of ICT in receiving agricultural information have been discussed in the third section.

4.1 Selected Characteristics of the respondents

Ten characteristics of the farmers were selected to be described and to find out their contribution with farmers' perception on the effectiveness of ICT in receiving agricultural information. These selected characteristics were age, education, family size, farming experience, farm size, annual family income, organization participation, cosmopoliteness, extent of using ICT, innovativeness, and problem confronted by farmers during ICTs use. The noticeable topographies of the ten characteristics of the farmers are discussed below:

4.1.1 Age

The age of the sample farmers ranged from 24 to 65 years with an average of 38.715 and standard deviation of 11.712. 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	BOC (Year)	Observed Range (Year)	Respondents		Mean	SD
			Number	Percent (%)		
Young aged	≤35		58	53.2		
Middle aged	36 – 50		29	26.6		
Old aged	> 50	24-65	22	20.2	38.715	11.712
Total			109	100		

Data shows that the highest value of proportion 53.2 percent farmers were young type of aged compared to 26.6 percent Middle and 20.2 percent being old aged farmer. According to Lion Berger, elderly farmers seem to be somewhat less motivated to use ICTs than younger ones. Young people are generally receptive to new ideas and things. Young and middle aged people generally show more favorable attitude towards ICT use. However, they might have valuable opinion in regard to the extent of perception on the ICT in receiving agricultural information.

4.1.2 Education

Education of the respondents was measured by following the procedure as discussed earlier in Chapter 3. The education ranged from 0-17, with an average of 5.977 and standard deviation of 4.853. 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	BOC (Score)	Observed range (Score)	Respondents		Mean	SD
			Number	Percent (%)		
Can't read or sign	0		28	25.7		
Can sign only	0.5		13	11.9		
Primary education	1 – 5		5	4.6	5.977	4.853
Secondary education	6 – 10	0-17	59	54.1		
Higher secondary or above	> 10		4	3.7		
Total			109	100		

It is determined from the Table 4.2 that 54.1 percent of the farmers had secondary education, 25.7 percent of the farmers can`t read or sign, 11.9 percent of the respondents can sign only, 4.6 percent respondents had primary education and 3.7 percent had above secondary education. Table 4.2 also shows that above 58.7 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.

The result also showed that if the farmer had more educational status then he/she had a more positive and favorable perception on using ICT for receiving agricultural information. Finally education develops mental and psychological ability of a person to understand, decide and adopt new practices and ideas. Hence, it is expected that education is one of the important factors in determining farmers` perception on ICT in receiving agricultural information.

4.1.3 Farm size

Farm size of the farmers varied from 0.004 to 2.96 hectare with an average of 1.007 hectare and standard deviation of 0.698. The respondents were classified into five categories on the basis of their farm size (Table 4.3) according to DAE, Bangladesh.

Table 4.3 Distribution of the farmers according to their farm size

Category	BOC (Hectare)	Observed range (Hectare)	Respondents		Mean	SD
			Number	Percent (%)		
Small	0.2-1		60	55		
Medium	1-3	0.004-2.96	48	44	1.007	0.698
Large	>3		1	0.9		
Total			109	100		

The Table 4.3 shows that the highest proportion (55 percent) of the respondents belonged to small farm size, while 44 percent belonged to medium farm size 0.9 percent belonged to large farm size. Thus, most (99 percent) of the farmers were in the categories of small to medium farm size. The average farm size of the farmers of the study area (1.007 hectares) was higher than that of national average (0.60 hectare) of Bangladesh. The farmer with small 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 score of the respondents varied from 2 to 50 with a mean of 18.394 and standard deviation 12.120. 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	BOC (Years)	Observed range (Years)	Respondents		Mean	SD
			Number	Percent (%)		
Low	≤12		54	49.5		
Medium	13-24		21	19.3		
High	> 24	2-50	34	31.2	18.394	12.120
Total			109	100		

Data shown in the Table 4.4 revealed that 49.5 percent of total respondents had low farming experience followed by 31.2 percent had high and 19.3 percent had medium farming experience.

4.1.5 Annual family income

The annual income score ranges were between 40 to 860 thousands taka with the mean and standard deviation of 199.58 and 173.898 respectively. On the basis of AFI, the farmers 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	BOC (Thousand Taka)	Observed range (Thousand Taka)	Respondents		Mean	SD
			Number	Percent (%)		
Low	≤250		82	75.2		
Medium	251-600	40-860	22	20.2	199.58	173.898
High	> 600		5	4.6		
Total			109	100		

Data in the Table 4.5 show that 75.2 percent of the farmers had low annual income, 20.2 percent of the respondents had medium annual income and 4.6 percent had high annual income.

The observations showed that the average income of the farmers was 199.58 that were low category income because the percent of low category farmers were higher than other two categories and more than half of the farmers belonged to low category farmers. 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 Organizational participation

In this study, the researcher finds out some field level data and knowledge about organization participation of the farmers. Their observed score range about organizational participation was from 1 to 4 with a mean and standard deviation of 2.211 and 0.962 respectively. The farmers 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 organizational participation

Category	BOC (Score)	Observed range	Respondents		Mean	SD
			Number	Percent (%)		
Low	0-1		69	63.3		
Medium	1-2		28	25.7		
High	2-3	1-4	12	11	2.211	0.962
Total			109	100		

The table shows that the percentage of low participation, medium participation and high participation were 63.3%, 25.7% and 11% respectively. Farmers under low participation category exposure were higher (63.3%) 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 Cosmopoliteness

The observed cosmopoliteness score of the respondents ranged from 4 to 18 against the possible range of 0 to 18. The mean score was 9.119 with the standard deviation of 2.418. Based on the observed cosmopoliteness scores, the respondents were classified into three categories according to mean ± standard deviation as shown in Table 4.7

Table 4.7 Distribution of the farmers according to their cosmopoliteness

Category	BOC (Score)	Observed range	Respondents		Mean	SD
			Number	Percent (%)		
Low	≤7		18	16.5		
Medium	8-11		75	68.8		
High	>11	4-18	16	14.7	9.119	2.418
Total			109	100		

Data contained in the Table 4.7 shows that 68.8 percent of the total respondents had medium cosmopoliteness as compared to 16.5 percent having low and only 14.7 percent had high cosmopoliteness. Data also revealed that majority (85.3 percent) of the respondents were under low to medium cosmopoliteness. Whereas 83.5 percent of the respondents were under medium to high cosmopoliteness.

4.1.8 Extent of using ICT

Use of ICT was scored by the respondents varied from 6 to 18 with a mean of 11.458 and standard deviation 3.606. Possible ICT using scores of the respondent ranged from 0-24. On the basis of ICTs use, 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 extent of using ICT

Category	BOC (Score)	Observed range (Score)	Respondents		Mean	SD
			Number	Percent (%)		
Low	≤8		34	31.2		
Medium	9-14		46	42.2		
High	>14	6-18	29	26.6	11.458	3.606
Total			109	100		

Data shown in the Table 4.8 reveals that 42.2 percent of total respondents had medium use of ICTs in receiving agricultural information compared to 31.2 % and 26.6 % having low and high use of ICTs in receiving agricultural information respectively.

4.1.9 Innovativeness

The observed innovativeness scores of the respondents ranged from 8 to 37 against the possible range of 0 to 40. The average and standard deviation were 24.623 and 6.967 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	BOC (Score)	Observed range (Score)	Number	Percent (%)	Mean	SD
			Respondents			
Low	≤18		20	18.3		
Medium	19-30		63	57.8		
High	>30	8-37	26	23.9	24.623	6.967
Total			109	100		

Data presented in Table 4.9 indicates that 18.3 percent of the respondents had low innovativeness as compared to 57.8 percent medium and 23.9 percent high innovativeness. Data also revealed that majority (81.7 percent) of the respondents were under medium to high innovativeness. The innovativeness also refers to proneness of an individual to accept new ideas and practices.

4.2 Problems faced in using ICT

The observed score range of problems faced by farmer during ICT use was from 5 to 15 with a mean and standard deviation of 11.229 and 2.436 respectively. The possible range of problems faced by farmer during ICT use was from 0-15. Their problem score were classified into three categories according to mean ± standard deviation .The distribution of the respondents according to their problem has been presented in Table 4.10

Table 4.10 Distribution of the farmers according to their problems faced in using ICT

Category	BOC (Score)	Observed range (Score)	Number	Percent (%)	Mean	SD
			Respondents			
Low	≤9		25	22.9		
Medium	10-13		67	61.5		
High	>13	5-15	17	15.6	11.229	2.436
Total			109	100		

The table shows there are almost 15.6% of total farmers had high problem in ICTs use, while 61.5% and 22.9% farmers had medium and low problem in ICTs use.

4.3 Farmers' perception on the effectiveness of ICT in receiving agricultural information

Farmers' perception on the on the effectiveness of ICT in receiving agricultural information was measured by computing perception score which could range from 10 to 40. However, the observed scores ranged from 21 to 38 with an average of 29.073 and the standard deviation was 3.463. Based on their observed perception score the respondents are classified into three categories as shown in Table 4.11

Table 4.11 Distribution of farmers based on their perception

Category	BOC (Score)	Observed range (Score)	Respondents		Mean	SD
			Number	Percent (%)		
Low	≤26		28	25.7		
Medium	27-32		63	57.8		
High	>32	21-38	18	16.5	29.073	3.463
Total			109	100		

Data contained in the table 4.11 indicate that the majority (57.8 percent) of the respondents had medium perception while 25.7 percent of them had low perception and 16.5 percent of them had high perception towards the effectiveness of ICT in receiving agricultural information.

4.4 Relationship of different individual characteristics of the respondents with farmers` perception on the effectiveness of ICT in receiving agricultural information

This section deals with the results exploring the relationship among the variables of the study. The experimental variables were age, education, farm size, farming experience, annual family income, organizational participation, cosmopoliteness, extent of using ICT, innovativeness, problems faced by the farmers in using ICT. And the focal variable was the farmers' perception on the effectiveness of ICT in receiving agricultural information.

Pearson's product moment correlation co-efficient 'r' has been used to test the hypotheses concerning the relationships among the variables. Five percent (0.05) and one percent (0.01) level of probability were used as the basis for acceptance or rejection of a hypothesis. The result of co-efficient of correlation among the variables were presented in the table 4.13

Table 4.12 Relationship among the experimental and focal variables (N = 109)

Focal variable	Experimental variables	Correlation co-efficient (r) with farmers' perception (N=109)
Farmers' perception on the effectiveness of ICT in receiving agricultural information	Age	-0.237*
	Education	0.456**
	Farm size	0.034^{NS}
	Farming Experience	-0.247**
	Annual family income	-0.041^{NS}
	Organizational participation	0.117^{NS}
	Cosmopoliteness	0.210*
	Extent of using ICT	0.254**
	Innovativeness	0.200*
	Problems faced in using ICT	-0.303**

^{NS} Not significant

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Tabulated value of 0.1 level = 0.254

Tabulated value of 0.05 level = 0.164

Statistically significant and insignificant relationships were observed when the computed values of 'r' were higher and lower than the tabulated value respectively. However, the results of inter relationships among different variables are presented in Appendix-II.

4.4.1 Age and farmers' perception

The correlation coefficient between age of the farmers and their perception on the effectiveness of ICT in receiving agricultural information was "**-0.237**" as shown in Table 4.12. The correlation coefficient between age and their perception was larger than the tabulated values at 0.05 level of probability (Table 4.12). So, the null hypothesis was rejected. Therefore, there was significant and negative relationship between age of the farmers and their perception on the effectiveness of ICT in receiving agricultural information. This represents that age of the farmers was an important factor in farmers` perception on the effectiveness of ICT in receiving agricultural information. But with the increase of age especially the adult people increase the fear of using ICT i.e. mobile and this is a very common scenario almost all over Bangladesh. Thus the result of the present study is very much logical in the context of Bangladesh. Thus, negative- significant correlation was obtained in the present study. Similar relationships were revealed by Nuruzzaman (2003), Khan (1996) and Bhuyan (1988).

4.4.2 Education and farmers' perception

The correlation coefficient between education of the farmers education level and their perception on the effectiveness of ICT in receiving agricultural information was "**0.456**" as shown in Table 4.12. The correlation coefficient "r value" was larger than the tabulated value at 0.01 level of probability. So, the concerned null hypothesis was rejected. Thus, it may be concluded that there was significant and positive relationship between education and perception on the effectiveness of ICT in receiving agricultural information. Actually more educated farmers have more positive perception for effectiveness of ICT in receiving agricultural information which is less to the illiterate farmers. Therefore, farmers' perception on the effectiveness of ICT in receiving agricultural information was varied positively with the educational level of the farmers. Mollab (2006), Nuruzzaman (2003), Anisuzzaman (2003), Ullah (1996), Sarker (1995) and Bhuyan (1988) also observed similar findings in their respective studies.

4.4.3 Farm size and farmers' perception

The correlation coefficient between farm size of the farmers and their perception on the effectiveness of ICT in receiving agricultural infotmation was "**0.034**" as shown in Table 4.12. The correlation coefficient "r value" was smaller than the tabulated value at 0.05 level of probability. So, the concerned null hypothesis was accepted. Thus, it may be concluded that there was no relationship between farm size and perception on the effectiveness of using ICT for receiving agricultural information. Anisuzzaman (2003), Nuruzzaman (2003) and Huque (1982) also observed similar findings in their respective studies.

4.4.4 Farming experience and farmers' perception

The correlation coefficient between farming experience and their perception on the effectiveness of ICT in receiving agricultural information was "**-0.247**" as shown in Table 4.12. The correlation coefficient "r value" was larger than the tabulated value at 0.01 level of probability. So, the concerned null hypothesis was rejected. Thus, it may be concluded that there was significant and negative relationship between farming experience the and their perception on the effectiveness of ICT in receiving agricultural information. This means the farmers with high farming experience are old aged farmers. Like farmers` age farming experience has negative significant relationship with their perception on the effectiveness of using ICT for receiving agricultural information. Khalil (1998) also observed similar findings in his respective study.

4.4.5 Annual family income and farmers' perception

The correlation coefficient between annual family income and their perception on the effectiveness of ICT in receiving agricultural informtion was "**-0.041**" as shown in Table 4.12. The correlation coefficient "r value" was smaller than the tabulated value at 0.05 level of probability. So, the concerned null hypothesis was accepted. Thus, it may be concluded that there was no relationship between annual family income and their perception on the effectiveness of ICT in receiving agricultural information. The study conducted by Pal (2009) Anisuzzaman (2003), Nuruzzaman (2003) and Huque (1982) similar findings in their respective studies.

4.4.6 Organizational participation and farmers' perception

The correlation coefficient between organizational participation of the farmers and their perception on the effectiveness of ICT in receiving agricultural information was "**0.117**" as shown in Table 4.12. The correlation coefficient "r value" was smaller than the tabulated value at 0.05 level of probability. So, the concerned null hypothesis couldn`t be rejected. Thus, it may be concluded that there was no relation between organizational participation and perception on the effectiveness of using ICT for receiving agricultural information. Roy (2009) also found similar relationships in his study.

4.4.7 Cosmopoliteness and farmers' perception

The correlation coefficient between cosmopoliteness of the farmers and their perception on the effectiveness of ICT in receiving agricultural information was "**0.210**" as shown in Table 4.12. The correlation coefficient between age and their perception was larger than the tabulated values at 0.05 percent level of probability (Table 4.12). So the null hypothesis was rejected. Therefore, there was significant and positive relationship between cosmopoliteness of the farmers and their perception on the effectiveness of using ICT for receiving agricultural information. Similar relationships were revealed by Nuruzzaman (2003), Anisuzzaman (2003) and Ullah (1996)

4.4.8 Extent of using ICT and farmers' perception

The correlation coefficient between education of the farmers extent of using ICT and their perception on the effectiveness of ICT in receiving agricultural information was "**0.254**" as shown in Table 4.12. The correlation coefficient "r value" was larger than the tabulated value at 0.01 level of probability. So, the concerned null hypothesis was rejected. Thus, it may be concluded that there was significant and positive relationship between education and perception on the effectiveness of using ICT for receiving agricultural information. Actually more ICT use have more positive perception for effectiveness of ICT in receiving agricultural information. Reddy (1986) also observed similar findings in his study.

4.4.9 Innovativeness and farmers' perception

The correlation coefficient between innovativeness of the farmers and their perception on the effectiveness of ICT in receiving agricultural information was "**0.200**" as shown in Table 4.12. The correlation coefficient between age and their perception was larger than the tabulated values at 0.05 percent level of probability (Table 4.12). So the null hypothesis was rejected. Therefore, there was significant and positive relationship between innovativeness of the farmers and their perception on the effectiveness of using ICT for receiving agricultural information. Similar relationships were revealed by Nuruzzaman (2003), Pandian *et al.* (2002), Kashem and Halim (1991) and Beal (1967).

4.4.10 Problems faced in using ICT

The correlation coefficient between problem confronted by the farmers during ICTs use their perception on the effectiveness of using ICT for receiving agricultural information was "**-0.303**" as shown in Table 4.12. The correlation coefficient "r value" was larger than the tabulated value at 0.01 level of probability. So, the concerned null hypothesis was rejected. Thus, it may be concluded that there was significant and negative relationship between farming experience the and their perception on the effectiveness of ICT in receiving agricultural information. Pal (2009) also observed similar findings in his study.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

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

5.1 Summary of findings

5.1.1 Individual characteristics of the farmers (Experimental variables)

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

Age

Age of the farmers ranged from 24 to 65 years with the average of 38.715 years and the standard deviation was 11.712. Highest proportion (53.2 percent) of the farmers was under young aged category compared to 26.6 percent Middle and 22.2 percent being old type of aged farmer.

Education

Education score of the respondents ranged from 0 to 17 with the average of 5.977 and the standard deviation was 4.853. Highest proportion (54.1 percent) of the farmers was under secondary level of education. 25.7 percent of farmers can`t read or sign, 11.9 percent of the respondents were can sign only, 4.6 percent respondents had primary education and 3.7 percent had above secondary education.

Farm size

The farm size of the farmers in the study area varied from 0.004-2.96 (ha.). The average farm size was 1.007 ha. and the standard deviation was 0.698. The highest proportion (55 percent) of the respondents belonged to small farm size, while 44.9 percent of the farmers were in the categories of medium to large farm size.

Farming experience

Farming experience of the respondents varied from 2 to 50 with a mean of 18.394 and standard deviation 12.120.. Highest proportion (49.5 percent) of the farmers was under low farming experience.

Annual family income

The annual income ranges were between 40 to 860 thousands taka with the mean and standard deviation of 199.58 and 173.898 respectively. Majority of the farmers (75.2) percent of the farmers had low annual income. 20.2 percent of the respondents had medium annual income and 4.6 percent had high annual income.

Organizational participation

Scores of famres` organizational participation ranged from 1 to 4 with a mean and standard deviation of 2.211 and 0.962 respectively. The percentage of low participation, medium participation and high participation were 63.3%, 25.7% and 11% respectively. Farmers of low participation exposure were 63.3% compared to others categories.

Cosmopoliteness

Scores of farmers` cosmopoliteness ranged from 4 to 18 against the possible range of 0 to 18. The mean score was 9.119 with the standard deviation of 2.418. Majority (68.8 percent) of the respondents had medium cosmopoliteness as compared to 16.5 percent having low and only 14.7 percent had high cosmopoliteness.

Extent of using ICT

Use of ICTs by the respondents varied from 6 to 18 with a mean of 11.458 and standard deviation 3.606. Possible ICT using scores of the respondent ranged from 0-24. Majority (42.2 percent) of total respondents had medium use of ICTs in receiving agricultural information compared to 31.2 % and 26.6 % having low and high use of ICTs in receiving agricultural information respectively.

Innovativeness

Scores of the respondents ranged from 8 to 37 against the possible range of 0 to 40. The average and standard deviation were 24.623 and 6.967 respectively. Majority (57.8 percent) of farmers had medium innovativeness. 18.3 percent of the respondents had low innovativeness and 23.9 percent high innovativeness.

Problems faced in using ICT

Scores of problem confronted by farmer during ICT ranged from 5 to 15 with a mean and standard deviation of 11.229 and 2.436 respectively. The possible range about problem confronted by farmer during ICT use was from 0-15. The percentage of low problem, medium problem and high problem faced by farmers were 22.9%, 61.5% and 15.6 respectively.

5.1.2 Farmers` perception on the effectiveness of ICT in receiving agricultural information (Focal variable)

Farmers` possible perception score ranged from 10 to 40. However, the observed scores ranged from 21 to 38 with an average of 29.073 and the standard deviation was 3.463. Majority (57.8 percent) of the respondents had medium perception while 25.7 percent of them had low perception and 16.5 percent of them had high perception towards the effectiveness of using ICT for receiving agricultural information.

5.1.3 Relationships between different individual characteristics of the respondents and farmers` perception on the effectiveness of ICT in receiving agricultural information

Out of ten experimental variables, four characteristics of the respondents such as Education, Cosmopoliteness, Extent of using ICT and Innovativeness had significant positive relationship with their perception on the effectiveness of ICT in receiving agricultural information, but Age, Farming experience and Problem confronted by the farmers during ICT use were negatively correlated with their perception. The remaining independent variables *e.g.* Farm size, Annual family income and organizational participation did not show any significant relationship with their perception.

5.2 Conclusions

The findings and relevant facts of research work prompted the researcher to draw following conclusions.

1. Finding shows that majority (57.8 percent) of the respondents had medium perception towards the effectiveness of ICT in receiving agricultural information. Therefore, it can be concluded that farmers` perception on the effectiveness of ICT in receiving agricultural information is near to satisfactory level.

2. The findings indicate that a negatively significant relationship had been observed between age of farmers and their perception on the effectiveness of ICT in receiving agricultural information. Therefore, it can be concluded that increasing of age decrease farmers` perception regarding effectiveness of ICT in receiving agricultural information.

3. Level of education of the farmers showed the important contributing factor to the farmers` perception on the effectiveness of ICT in receiving agricultural information. This means that high literacy and educational level among the farmers might have influenced the farmers` perception on the effectiveness of ICT in receiving agricultural information. Conclusion could be drowned that these farmers could have more perception on the effectiveness of ICT in receiving agricultural information, if government takes more educational project to make them more educated.

4. The findings indicate farming experience had a negative significant contribution on farmers` perception on the effectiveness of ICT in receiving agricultural information. Because farming experience of farmers increases with the age of farmers.

5. Overwhelming 68.5 percent of the respondents had medium level of cosmopoliteness and had a positive significant contribution on farmers` perception on the effectiveness of ICT in receiving agricultural information. Therefore, it may be concluded that high cosmopoliteness encourages the farmers` perception on the effectiveness of ICT in receiving agricultural information.

6. The findings indicate that Extent of using ICT had a positive significant contribution on farmers` perception on the effectiveness of ICT in receiving agricultural information. Therefore, it may be concluded that if level of ICT use of the farmers is increased the farmers` perception on the effectiveness of ICT in receiving agricultural information will be increased.

7. Innovativeness had a positive significant contribution on farmers` perception on the effectiveness of ICT in receiving agricultural information. Therefore, it may be concluded that higher the level of innovativeness of the farmers higher the farmers` perception on the effectiveness of ICT in receiving agricultural information.

8. The findings indicate that problems faced by the farmers in using ICT had a negative significant relationship with their perception on the effectiveness of ICT in receiving agricultural information. The above facts lead to the conclusion that higher the problems faced by the farmers in using ICT, lower would be favorable perception on the effectiveness of ICT in receiving agricultural information.

5.3 Recommendations
5.3.1 Recommendations for policy implications

On the basis of observation and conclusions drawn from the findings of the study following recommendations are made.

1. It may be recommended that agricultural extension agencies especially the DAE or AICC Bangladesh should review their training programs and make sound provisions so that the farmers understand the benefits of using ICT for receiving agricultural information. The DAE and other non-governmental organizations should strengthen their extension activities.

2. The concerned authorities like DAE or AICC, should take necessary steps to increase the level of education of the farmers as it is an important fact in contributing farmers perception on the effectiveness of ICT in receiving agricultural information. AICC should conduct several awareness programs for the none and less educated farmers

3. Age and farming experience of the respondent had significant negative contribution on their perception on the effectiveness of ICT in receiving agricultural information. Therefore it may be recommended that DAE or AICC should conduct several awareness programs for the old aged farmers and make young aged farmers more efficient through training programs.

4. Cosmopoliteness was an important contributing factor on their perception on the effectiveness of ICT in receiving agricultural information. Therefore, it may be recommended that, DAE or AICC should conduct more participation programs on ICT use that would make the farmers more aware to get necessary agricultural information through ICT use.

5. Extent of using ICT was an important contributing factor on their perception on the effectiveness of ICT in receiving agricultural information. Therefore, it may be recommended that, DAE or AICC should conduct more training programs on ICT use that would make the farmers more aware to get necessary agricultural information through ICT use.

6. Innovativeness was an important contributing factor on their perception on the effectiveness of ICT in receiving agricultural information. Therefore, it may be recommended that, AICC should conduct more schooling programs on new ICT use that would make the farmers more adapted in ICT use.

7. Problems faced in using ICTs had negative significant contribution on their perception on the effectiveness of ICT in receiving agricultural information. Therefore, it may be recommended that, DAE or AICC should set more efficient service providers in the rural level to minimize their problem.

5.3.2 Recommendations for further study

A small and limited research work cannot provide unique and universal information related to farmers` perception on the effectiveness of ICT 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 six upazillas under Narsingdi 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. Measurement of farmers` perception on the effectiveness of ICT in receiving agricultural information is not free from questions. Therefore, more reliable measurement of concerned variable is necessary for further study.

3. To measure farmers` perception on the effectiveness of ICT in receiving agricultural information 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 10 selected characteristics of the farmers with their perception on the effectiveness of ICT in receiving agricultural information. 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 farmers` perception on the effectiveness of ICT in receiving agricultural information.

5. In the present study farm size, annual family income and organization participation had no significant contribution on farmers` perception on the effectiveness of ICT in receiving agricultural information. In this connection, further verification is necessary.

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(English Version of the Interview Schedule)

Sher-e-Bangla Agricultural University

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

Interview schedule for data collection for the research on
"**FARMERS` PERCEPTION ON THE EFFECTIVENESS OF USING INFORMATION**

AND COMMUNICATION TECHNOLOGY FOR RECEIVING AGRICULTURAL

INFORMATION"

Serial No. :
Name of the respondent :

Village :   **Upazilla:**

District : Narsingdi   **Occupation: Farmer**

Mobile:

(*Please answer the following questions. Provided information will be kept as confidential.*)
1. Age
How old are you? Age…………….years

2. Education
Please mention your educational status as follows:

- (a) Can't read and write …………………………
- (b) Can sign only………..……………………….
- (c) Read up to or equivalent to class ………..........

3. Farm size : Please mention your land area:

Sl.No	Types of land	Area	
		Local unit ( )	**Hectare**
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	Fisheries	
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 organizations:

Sl. No.	Name of the organization	Nature of participation (years)			
		No Participation (0)	Ordinary Member (1)	Executive Member (2)	Executive officer (3)
1	Farmers' association/ AICC				
2	Bazar Committee/ Mosque committee				
3	Co-operative society				
4	NGO organized society				
5	Others				

7. 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	10-11 times/month ( )	5-9 times/month ( )	1-4 times/month ( )	0 times/month ( )
2	Visit to own upazilla	8-10 times/year ( )	4-7 times/year ( )	1-3 times/year ( )	0 times/year ( )
3	Visit to other upazilla	8-10 times/year ( )	4-7 times/year ( )	1-3 times/year ( )	0 times/year ( )
4	Visit to own distict	6-8 times/year ( )	3-5 times/year ( )	1-2 times/year ( )	0 times/year ( )
5	Visit to other district	3-4 times/year ( )	2-3 times/year ( )	1 times/year ( )	0 times/year ( )
6	Visit to capital city	4 times/ year ( )	2 times/year ( )	1 times/year ( )	0 times/year ( )

8. Extent of using ICT

Please mention how frequently you use the following ICT materials for receiving Agricultural information:

Sl. No.	Name of ICTs Materials	Extent of use			
		Regularly (3)	Often (2)	Rarely (1)	Never (0)
1	Radio	5-6 days/week ( )	3-4 days/week ( )	1-2days/week ( )	0 days/week ( )
2	Television	5-6 days/week ( )	3-4 days/week ( )	1-2 days/week ( )	0 days/week ( )
3	Simple cell phone	10-15 times/day ( )	5-10times/day ( )	1-5 times/day ( )	0 times/day ( )
4	Smart cell phone	10-15 times/day ( )	5-10times/day ( )	1-5 times/day ( )	0 times/day ( )
5	Online/offline agricultural apps	5-6 days/week ( )	3-4 days/week ( )	1-2 days/week ( )	0 days/week ( )
6	Online news	5-6 days/week ( )	3-4 days/week ( )	1-2 days/week ( )	0 days/week ( )
7	Multimedia	5-6 days/week ( )	3-4 days/week ( )	1-2 days/week ( )	0 days/week ( )
8	Internet	5-6 days/week ( )	3-4 days/week ( )	1-2 days/week ( )	0 days/week ( )

9. Innovativeness
Please indicate when you have started using the following technologies:

Sl. No.	Name of the technology	Degree of Innovativeness				Never Used (0)
		< 1 year of hearing (4)	>1-2 year of hearing (3)	>2-3 year of hearing (2)	> 3 years of hearing (1)	
1	Use of Bio fertilizer					
2	Use of leaf color chart					
3	Use of tractor, power tiller					
4	Use of plant extract(Neem oil)					
5	Use of light trap for insect Control					
6	Artificial pollination					
7	Use of sex pheromone					
8	Use of super granular urea					
9	Use of hybrid rice variety					
10	Use of balanced fertilizer					

10. Problems faced in using ICT
Please indicate the severity of Problems faced by you in using ICT for receiving agricultural information:

Si. No.	Problems	Severity of Problems			
		High Problem (3)	Medium Problem (2)	Low Problem (1)	No Problem (0)
1	Lack of valid information				
2	Lack of information of all crops				
3	Availability of internet				
4	Availability of ICT tools				
5	Lack of technical knowledge				

11. Farmers' perception on the effectiveness of using ICT for agricultural information

Please indicate your opinion on the effectiveness of using ICT for agricultural information on the following items:

Sl. No.	Farmers' perception	Extent of farmer's perception			
		Strongly agree (4)	Agree (3)	Disagree (2)	Strongly disagree (1)
1	Increase knowledge on farming activities				
2	Increase information availability				
3	Improve information seeking behavior				
4	Enhance accuracy of information				
5	Enhance timeliness of information				
6	Improve access to agricultural market				
7	Improve access to credit institutions				
8	Improve awareness of agricultural events and news				
9	Enhance decision making				
10	Reduce cost of interaction among stake holders				

(Thanks for your kind co-operation.)

DATE: **Signature of interviewer**

APPENDIX-II

Correlation matrix showing interrelationship among all the variables

Variables	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	Y
X_1	1	-	-	-	-	-	-	-	-	-	-
X_2	-.621**	1	-	-	-	-	-	-	-	-	-
X_3	.270**	.066	1	-	-	-	-	-	-	-	-
X_4	.953**	-.617**	.250**	1	-	-	-	-	-	-	-
X_5	-.078	.231*	.284**	-.067	1	-	-	-	-	-	-
X_6	.216*	.160	.318**	.209*	.099	1	-	-	-	-	-
X_7	.080	.278**	.410**	.106	.362**	.442**	1	-	-	-	-
X_8	-.632**	.631**	-.015	-.626**	.175	.161	.330**	1	-	-	-
X_9	.108	.128	.385**	.184	.028	.335**	.375**	.040	1	-	-
X_{10}	.280**	-.490**	-.212*	.300**	-.244*	-.321**	-.481**	-.401**	-.137	1	-
Y	-.237*	.456**	.034	-.247**	-.041	.117	.210*	.254**	.200*	-.303**	1

Note: *. Correlation is significant at the 0.05 level (2-tailed).

 **. Correlation is significant at the 0.01 level (2-tailed).

X_1 = Age

X_2 = Education

X_3 = Farm size

X_4 = Farming experience

X_5 = Annual family income

X_6 = Organizational participation

X_7 = Cosmopoliteness

X_8 = Extent of using ICT

X_9 = Innovativeness

X_{10} = Problem confronted by farmers during ICT use

Y = Farmers` perception on the effectiveness of using ICT for receiving agricultural information