

**INTENTION TO USE INFORMATION AND COMMUNICATION
TECHNOLOGIES (ICTs) IN AGRICULTURE:
WOMEN'S PERSPECTIVE**

**A THESIS
BY**

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A Thesis

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Dedicated To



My Beloved Parents



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CERTIFICATE

This is to certify that thesis entitled “**INTENTION TO USE INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs) IN AGRICULTURE: WOMEN’S PERSPECTIVE**” 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 bonafide research work carried out by **MST. AFROZA HAQUE**, Registration No. **10-03815** under my supervision and guidance. No part the thesis has been submitted for any other degree or diploma.

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

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LIST OF THE ABBREVIATION AND ACRONYMS

SAU	Sher-e-Bangla Agricultural University
BBS	Bangladesh Bureau of Statistics
NGO	Non-Government Organization
SIM	Subscriber Identity Module
AICC	Agricultural Information Communication Centre
UISC	Union Information Service Centre
ICT	Information and Communication Technology
TV	Television
E-mail	Electronic mail
i.e.	That is
NS	Non-significant
Fig.	Figure
Tk.	Taka
B	Partial Regression Co-efficient
b	Regression

Intention to use Information and Communication Technologies (ICTs) in Agriculture: Women's Perspective

ABSTRACT

Intention to use Information and Communication Technologies (ICTs) in agriculture is becoming crucial at the present time. However, a gender specific study regarding intention to use ICTs in agriculture is not well focused. The purpose of this study was to determine women farmers' intention to use ICTs in agriculture and to explore the contribution of the selected factors to their intention to use ICTs in agriculture. The study was conducted in six villages of Pairabond union of Mithapukur upazila in Rangpur district. Data were collected from 114 women farmers by using a pre-tested interview schedule during the period from 18 February to 12 March, 2016. Appropriate scales were developed to measure the variables of the study. Descriptive statistics, multiple regressions were used for analysis. The study revealed that majority (55.26%) of the respondents had medium intention to use ICTs in agriculture as compared to 22.81 percent and 21.93 percent of them had high and low intention to use ICTs in agriculture, respectively. The findings showed that ICTs self-efficacy, usefulness and use of ICTs in agriculture purpose were found to be significant predictors and altogether explained 61.80 percent of the variation of women farmers' intention to use ICTs in agriculture. The present study revealed that women farmers' intention to use ICTs in agriculture have merits which need special consideration. Availability of reliable need based farming information through ICTs and its better accessibility should be ensured by the technology diffusion agencies.

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Bangladesh is mainly a rural based agricultural country with an area of 1,47,570 square kilometer. The development of agriculture is mostly dependent on the use of modern technologies by the farmers. About 16 percent of the country's Gross Domestic Product (GDP) and 47 percent of the employment opportunity comes from agriculture (BBS, 2016). Agriculture plays a very important role in rural and national development. There is a strong relationship between gender, agriculture and development. The world women reports stated that women are twice as likely to be involved in agricultural related activity as men (United Nations, 2000). In any farming system, it is important to recognize the various roles of women. Many women experience a life that a complex web of multi roles and multi-tasks which requires the average woman to conduct different things in a bid to fulfill her family needs. Women in rural communities are extensively involved in arduous farm operations and agricultural activities, from planting to harvesting and other post harvesting operations. These women have been using and managing natural resources, collecting food etc. for their livelihoods. In Bangladesh, women provide 56 percent of labor in agriculture through production, processing and marketing of food (Hossain, 2013). They assist not only on family farms but also on household activities. So, the Bangladeshi women are in an important position to contribute to agriculture sector. This sector faces major challenges like low yield, post-harvest losses, effect of climate change etc. to increase production in a situation of dwindling natural resources. ICT plays an important role in addressing those challenges.

Most rural women farmers are illiterate, poor and do not adopt new technologies because their lack of knowledge and cash. New technologies are usually introduced to help men, increase productivity (Hilda, 2000). Women farmers are often depicted as an exploitable instrument and as such weak and ignorant. Their lack of involvement in decision making and policy formulations has impeded sustainable development in the agricultural sector and it has resulted due to decision makers' negligence of the key issues affecting women. Despite the technological advances in irrigation, crop varieties, agro forestry, fertilizers

etc. most technologies do not reach female farmers, as they receive no information. Agricultural extension services, which are central to economic development programs, are non-existence, weak or unsatisfactory. Unfortunately, even where extension services are available, the content and mode of service delivery are often insensitive to the needs of female farmers. ICTs can play an important role for development of female farmers through equipping them with information needs.

It is observed that with the help of ICT tools, knowledge is acquired faster and is better incorporated in the field (Dunn, 1995). ICT can afford inexpensive access to vast amount of information and networks, access to not only production information but also market information. Union Information Service Centre (UISC) has been established in villages where rural female farmers can tap these resources and access information using new ICTs. Besides, by using cell phones, female farmers can access to call centers, extension agents for information like fertilizer application, pesticide application etc. However, very few studies have been conducted to know the present scenario of ICT uses by the female farmers. So, it is imperative to know the women farmers' intention to use ICTs and the factors contributing to their intention to use ICTs in agriculture.

1.2 Statement of the Problem

Accurate and timely information are vital for quality farming. Small-scale farmers, particularly rural women, suffer from receiving time-sensitive information for their farming due to many challenges like literacy, low mobility and lack of resources. Despite women provide more than 50% of the labor force in Bangladesh agriculture and their contribution to agriculture is invaluable, they traditionally depend on the male members of their families for information regarding their farming proven as inadequate to meet the needs of demand-driven agriculture. As a result, women farmers often need to compromise with their farming quality, quantity and marketability. However, rather depending on the male partners of a farm households or waiting for extension agents for information, women farmers can easily overcome those barriers and easily access to farming information through ICT-based application, particularly mobile phone. ICTs on one hand will be the solution for farm women's poor mobility problem, on the other hand empower them to make their decisions in dependently. However, literacy problems, lack

of resources and low ICT skill are seem to be the key challenges for farm women to use ICTs for their farming. Therefore, considering the challenges and at the same time realizing the promises the following research questions have been formulated:

- ✓ What are the selected socio-economic characteristics of the women farmers?
- ✓ What is the women farmers' intention to use ICTs in agriculture?
- ✓ What are the factors that influence women farmers' intention to use ICTs in agriculture?
- ✓ What are the contributions of the selected factors to women farmers' intention to use ICTs in agriculture?

1.3 Objectives of the Study

The following objectives were framed out in order to give an appropriate track to the research work:

1. To describe selected socio-economic characteristics of the women farmers. The selected characteristics are:
 - a. Age
 - b. Education
 - c. Marital status
 - d. Occupation
 - e. Family size
 - f. Homestead size, and
 - g. Annual family income;
2. To determine and describe farm women's intention to use ICTs in agriculture;
3. To describe selected factors that influence farm women's intention to use ICTs in agriculture. The factors are :
 - a. ICT ownership
 - b. ICTs self-efficacy

- c. Usefulness of ICTs in agriculture
 - d. Use of ICTs in general purpose, and
 - e. Use of ICTs in agriculture purpose;
4. To determine the extent to which the selected factors contribute to farm women's intention to use ICTs in agriculture.

1.4 Justification of the Study

More than half of the country's agricultural workforce is women. To overcome the limitations of the traditional extension approaches to disseminate farming information to the women clients, use of ICTs in agriculture is a viable alternative. Government and non-government organizations have been trying to popularize ICTs use in agriculture among the farming communities. Though few studies have been conducted targeting male farmers on use of ICTs in agriculture but there is a lack of adequate understanding on what are the factors that influence women farmers' intention to use ICTs in agriculture. These facts indicate the need for an investigation to ascertain the factors contributing women farmers' intention to use ICTs in agriculture sector. Findings of this study, therefore, would be helpful to the policy makers and extension workers in planning and execution of programmes for disseminating application of ICTs among the women farmers. The findings of the study would also manifest the extent of application of ICTs in agricultural sector by the women farmers and would be able to give a hypothetical thought all over the nation. It is expected that this study would inspire other researchers to conduct same sorts of research in other parts of the country. Lastly, it is assumed that recommendations of this study would be helpful in formulating effective extension programs that would increase the rate of intention to use ICTs in agricultural sector by farmwomen and meet up their demand for time-sensitive farming information.

1.5 Assumptions of the Study

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

1. The respondents included in the sample of the study were able to provide their opinions and were competent enough to satisfy the queries.
2. The information furnished by the female farmers was reliable.
3. The farm women who use ICTs included in the sample were the representative of the population.
4. The data collected from the respondent were free from interviewer bias.
5. The finding of the study will have general applications to other parts of the country with similar personal, socio-economic and cultural conditions.

1.6 Limitations of the Study

Considering the time, money and other necessary resources available to make the study manageable and meaningful, it was necessary to consider the following limitations:

1. The study was confined Pairaband union under Mithapukur upazila of Rangpur district. There are twenty-one villages in Pairaband union. Among them, only six villages were selected purposefully for this study.
2. There were many farm women in the study area, but only the farm women who are experienced with any ICT tool were considered for this study.
3. For information about the study, the researcher was dependent on the data furnished by the randomly selected farm women with ICT experience.
4. Characteristics of the farmers were many and varied but only seven socio-economic characteristics were selected for investigation in this study. On the other hand, factors influencing women framers' intention to use ICTs in agriculture were restricted to only five.
5. During data collection the researcher had to depend on data furnished by the respondents. As most of the farmers do not keep records of their farming activities, they furnished information to the different questions by recall.
6. Women farmers' intention to use ICTs in agriculture could be measured in various ways. However, in this study, it was measured considering respondents degree of intention to use ICTs for four types of agricultural purposes.

7. The present study highlighted a new dimension of research in the field of agricultural extension in Bangladesh. So, the researcher could not provide sufficient evidence in equipping her study report with relevant literature reviews.

However, the findings may also be applicable to other areas of Bangladesh where the physical, socio-economic and cultural conditions do not differ much with those of the study area.

1.7 Definition of Terms

Age

Age of a respondent refers to the period of time in complete years from the time of birth to the date of interview.

Education

Empirically it is defined to the development of desirable changes in knowledge, skill and attitudes in an individual through reading, writing, working, observation and other selected activities. It is measured on the basis of classes passed from a formal educational institution by the women farmers.

Occupation

Occupation refers to the everyday activities that people do as individuals, in families and with communities to occupy time and bring meaning and purpose to life. Occupations include things people need to, want to and are expected to do.

Family size

Family size refers to the number including the respondent himself, his wife, children and other permanent dependents, who lived and ate together in a family unit.

Annual family income

This refers to the yearly income of a farmer and his family members from various sources of income like agriculture, livestock, fisheries, business etc. during last year.

Marital status

One's situation with regard to whether one is single, married, separated, divorced, or widowed.

Homestead area

It refers to the area owned by a rural women family including house on which the family carries on household and farming operations.

Information and Communication Technology (ICT)

ICT is an extended term for information technology (IT) which stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.

Cell phone/ Mobile phone

A portable telephone that sends and receives radio signals through a network of short-range transmitters located in overlapping cells throughout a region, with a central station making connections to regular telephone lines. It is also known a cellular telephone, mobile phone.

Voice call

Voice call refers to dial someone's phone number and speak to them by phone.

SMS

SMS means Short Messaging System or Short Message Service: a feature on a mobile phone that allows a user to send or receive written messages.

MMS

MMS means Multimedia Messaging Service, a method of transmitting graphics, video or sound files and short text messages over wireless networks, mobile phones.

Video call

Video call refers to a call made via a mobile phone with a camera and a screen which allowing the participants to see each other when they talk.

ICTs ownership

The ultimate and exclusive right conferred by a lawful claim or title, and subject to certain restrictions to enjoy, occupy, possess, rent, sell, use, give away, or even destroy an item of property. Thus, ICTs ownership refers to enjoy, occupy, posses, uses ICTs by the women farmers.

ICTs self-efficacy

Self-efficacy referred as personal efficacy, is confidence in one's own ability to achieve intended results. Thus, ICTs self-efficacy refers to one's confidence in operating or using ICTs to complete a particular task without the help of others.

Usefulness of ICTs in agriculture

Usefulness of ICTs in agriculture refers to solving agricultural problems using ICTs.

Use of ICTs in general purpose

Use of ICTs in general purposes refers to frequency of using ICTs for receiving general information rather than agriculture.

Use of ICTs in agriculture purpose

Use of ICTs in agriculture purpose refers to frequency of using ICTs for receiving agricultural information, e.g., talking to input dealers or marketers or extension support staffs in seeking agricultural information.

Intention to use ICTs in agriculture

Intention means the act or fact of intending, determination to do a specified thing or act in a specified manner. Thus, intention to use ICTs in agriculture refers to one's degree of intention to use ICTs for various agricultural purposes.

CHAPTER II

REVIEW OF LITERATURE

ICTs generally convey messages to a large group of audience irrespective of distance and acts as distance learning mode to the farming community in its simple form. The purpose of this Chapter is to present a brief review of literature having relevance to the present investigation. In order to focus the pertinent reviews, this Chapter has been divided into three sections. First section deals with the findings on intention to use ICTs in agriculture; second section is devoted to a discussion on the findings on the factors influencing intention to use ICTs in agriculture. The third and final section presents the conceptual framework of the study.

2.1 Application of ICTs in Agriculture

Aminuzzaman *et al.* (2003) observed a study on induction of ICTs as a strategic tool for agricultural development and reported that ICTs helped farmers in crops production by using clear and focused services but the main limitations to the adoption of ICTs in agriculture appeared to lie in the education levels and cultural backgrounds of rural communities, as well as a lack of motivation stemming from the farmers' perception of the scant usefulness of ICTs and their limited digital skills. Connectivity was another important obstacle, despite regional advances.

Kamal (2014) conducted a study on ICTs for agriculture in Africa and reported that African agriculture was predominantly rain-fed, had low-yielding production, and lacks access to critical information, market facilitation, and financial intermediation services. The role that ICT could play in addressing these challenges was increasing as personal ICT devices such as mobile phones or tablets were becoming more widely available. ICT, when embedded in broader stakeholder systems, could bring economic development and growth as it could help bridge critical knowledge gaps. Mobile technology, on the other hand, was increasingly being adopted as the technology of choice for delivery of ICT services and solutions. The wider adoption of ICTs in agriculture has strategic importance to five main stakeholder groups: businesses, farmers, researchers, government, and citizens.

Dickerson (1992) found that majority of the farmers were satisfied for using ICTs because they got information timely about new technology, disease, pest, insecticide and weather condition. The study revealed major constraints to the use of ICTs to include lack of sufficiently trained computer personnel, lack of confidence in operating modern ICTs, erratic and fluctuating power supply, poor finance, lack of internet access in the rural areas and high cost of ICTs hardware and software's, among others. The study concludes with the need to have a National Agricultural Extension Policy on the use of ICTs with major emphasis on access, availability and use.

Yakubu (2013) observed a study on application of Information and Communication Technology to agriculture and animal husbandry and found that ICTs (specially mobile phone) helped farmers for enhancing productivity, informed about disease and medicine, saving transportation cost, etc. but lack of knowledge was the main limitation of application of ICTs in agricultural sector.

Omotayo (2005) conducted a study on the use of ICTs by staff of the women in agriculture (WIA) of Nigeria and reported that majority of the WIA staff had access to telephone, television and radio, respectively, very few of them had access to digital ICT facilities (computer, Internet and printer). Radio, video machine, television and telephone were used by the respondents to a large extent in reaching out to farmers. They were satisfied and highly intended for using ICTs in agricultural aspect.

2.2 Factors Influencing Intention to Use ICTs in Agriculture

2.2.1 ICTs ownership

Kaushik and Singh (2004) conducted a study on factors influencing the use of mobile phones in communicating agricultural information and reported that with mobile phones farmers had made tentative decisions much more easily than without and farmers got, exchanged, and manipulated information quickly. The study found that the ownership of mobile phones by agricultural stakeholders had widely spread and increasingly assist to overcome isolation and made communication between rural people, particularly farmers' easier. Mobile phones are, therefore, becoming increasingly important to agro-based entrepreneurs as an infrastructural device for improving efficiency of agriculture markets, promoting investment, and contributing to empowerment. Akanda (1994) found that daily

income and education level were found to be determinants of ownership and use of mobile phone.

McNamara (2009) concluded that mobile phones are becoming increasingly important to agro-based entrepreneurs as an infrastructure service for improving efficiency of agriculture markets, hence contributing to female farmers' empowerment. Mobile phones helped them to easily obtain agricultural information when they needed. Moreover other evidence found that mobile phone ownership farmers used to make decisions on the best time to sell crops and livestock, because farmers could get instant information on prices at different market places (Ashraf *et al.*, 2005).

Aminuzzaman *et al.* (2003) found a positive correlation between mobile phones ownership and access to agricultural system.

2.2.2 ICTs Self-efficacy

Karimi *et al.* (2011) showed that among technical factors encouraging ICT usage, access to a specialized person who can solve technical difficulties when facing, got second rank by vocational agricultural educators in Iran. Moreover, other intimation found that there was a strong positive relationship between self-efficacy and application of ICTs in agriculture (Harker and Akkeren, 2002).

Sarker (1996) had undertaken a study to determine ICTs self-efficacy of rural farmer and explained that frequent usage and exposure to ICT must be considered if someone wants to form a positive attitude towards ICTs. When people frequently use and expose to ICT, it informed them that ICT was helpful and beneficial to them thus creating a positive attitude towards ICT usage.

Burrell (2008) noticed that specifically focused on six variables that have the potential to influence conception towards ICT usage and the variables are self-efficacy, perceived usefulness, perceived ease of use, subjective norm compatibility and job relevance. There were a lot of existing papers that have proven that influence of self-efficacy, perceived usefulness and perceived ease of use compatibility, and subjective norm on ICT usage. Therefore, it can be conclude that self-efficacy was a dominant factor for ICT adoption and use.

2.2.3 Usefulness of ICTs in agriculture

Heeks and Molla (2009) studied on the role of ICTs in agricultural production on Africa and reported that ICTs played a significant role in a country's development. The main objective of that paper was to assess if at all on the proliferation of ICTs of the African continent had any significant impact on agricultural production. The results found that ICTs played significant role in enhancing agricultural production while mobile phones remain a significant contributor to agricultural growth. The result also found that certain socio-economic characteristics such as higher education and skills were prerequisites for effective improvement in agricultural production due to the adoption and utilization of new technologies. Other notification found that there was a strong relationship between usefulness of ICTs and use of ICTs in agriculture (Nahar, 1996).

Meera *et al.* (2004) reported that farmers had the real need to access about market information, land records and services, accounting and farm management information, management of pests and diseases, rural development programmes and ICT could help accessing these services. They found that ICTs helped farmers to get timely information however sufficient availability of ICT facilities was limited.

Sahota (2009) studied the importance of mobile phone in agriculture in Ghana and reported that mobile technology in agriculture is a well-established service that had been operating in Ghana since 2005. Result found that mobile phones stimulate the development of agricultural information and advisory services that are commercially sustainable, build services that impact farmers' income and productivity, reduce the barriers for operators to launch and improve Farmer Services Test (FST) and prove models for delivering agricultural information services.

Molony (2008) conducted a study on use of ICTs in crop production in India and reported that agriculture is an important sector where the majority of the rural population in developing countries depending on it. The paper analyzed how ICTs used to evaluate scenarios of changing demographics, economic, and technological and agro climatic circumstances affecting agricultural production. Innovation in ICTs was expanding rapidly and touches almost all areas of human activity. Induction of ICTs as a strategic tool for agricultural development which could help in crop production. Result further

revealed that ICTs helped farmers in receiving clear and focused services, simple and user friendly, accurate and timely information, well organized and easy to find agricultural information.

Meera *et al.* (2004) reported that ICT would enable extension workers to gather, store, retrieve and disseminate a broad range of information needed by small producers such as information on best practices, new technology, better prices of inputs and outputs, better storage facilities, improved transportation links, collective negotiations with buyers, information on weather. Other evidences suggest that the emergence of new agricultural development paradigms had led to challenging the conventional methods of delivering important services to citizens and the transformation of traditional societies into knowledge societies. ICTs had been developed as a tool for achieving meaningful societal transformation which was believed to provide a reliable network in agricultural sector. ICT had been utilized as an extension tool, which has enhanced the information flow between agricultural extension services and their clients (Zijp, 1994).

2.2.4 Use of ICTs in agriculture purpose

Anandarajayasekeram *et al.* (2008) observed that fishermen from Nigeria were well aware of and used telephone (GSM), television and radio for their contacts and enquiries and information search. However, lack of enabling government policies on ICTs, relative low level of fish production, maintenance problems and rural poverty pose serious constraints to ICTs use by fish farmers. It was being recommended that a positive policy change by government towards promoting ICTs education and provision of infrastructures to consolidate farmers' training be made, to enhance concerted use of ICTs facilities by fish farmers in their profession.

Agwu *et al.* (2008) conducted a study on extent of use of ICT by various animal husbandry organizations in India. A wide range of ICT applications ranging from Radio, TV, mobile phone, Internet, video conference, teleconference, personal computers, fax, information kiosks, to multimedia compact disks were considered. The finding reported mobile phone was one of the common ICTs that used by various animal husbandry organizations as it found to be useful for quick and effective sharing of information. Radio was reported as useful for transmitting timely information, particularly weather

information. TV used more widely for viewing the films on various aspects of livestock farming to farmers during extension activities and training programmes. Cooperative and private organizations also used Internet to know updated information. However, lacks of knowledge, training facilities, availability of network were the main barriers for improvement of ICT applications (Chhachhar *et al.*, 2014).

2.2.5 Use of ICTs in general purpose

Jensen (2007) reported the relationship between the intensity of use ICTs as a source of business information and business performance. The study further asserted that cellular phones, the Internet, radio, and web-based applications have become increasingly important in sharing and disseminating information and knowledge about the market that help people to find out the most profitable marketing choices, reduce communication gap, receive timely information and ultimately enhance business efficiency (Anandajayasekeram *et al.*, 2008).

Chowdhury (2006) reported that globalization and innovations in technology had led to an increased use of ICTs in all sectors and education was no exception. Use of ICTs in education was widespread and continually growing worldwide. It believed that ICTs can empower teachers and learners, making significant contributions to learning and achievement. Of the teachers interviewed on the effectiveness of ICTs in education majority of them felt that introduction and use of ICTs adequately will be extremely effective in children's learning and achievement. Technology was the most effective way to increase the students' knowledge (Siddiqui, 2003). Therefore, ICT, particularly the Internet, plays an imminent role in the process of integrating technology into the educational activities. It increased variety of educational services and medium, promoted equal opportunities and technology literacy to obtain education & information, developed a system of collecting & disseminating educational information and promoted technology literacy.

2.3 The Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. Properly constructed hypothesis of any research contain at least two variables

namely, “dependent variable” and “independent variable”. Selection and measurement of those variables are also crucial. A dependent variable is that which appears, disappears or varies as the researcher introduces, remove or varies the independent variables (Townsend, 1953). An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon. It is evident that earlier studies mainly focused on applications and limitations of using ICTs in agriculture. Those studies were not gender specific. There were very few studies that focus on women farmers’ intention to use ICTs in agriculture.

This is also pertinent to state that this study aims to investigate the ICT-related phenomenon to users’ intention to use ICTs in agriculture rather than women farmers’ socio-economic and demographic factors. While it is understood that socio-economic and demographic factors might exert influence over users’ behavioral pattern of ICT use by identifying ICT-related factors and their influences, this research aims to provide more insights of the underlying phenomenon of interest. To overcome those research gaps, the following conceptual framework has been formulated as shown in Figure 2.1.

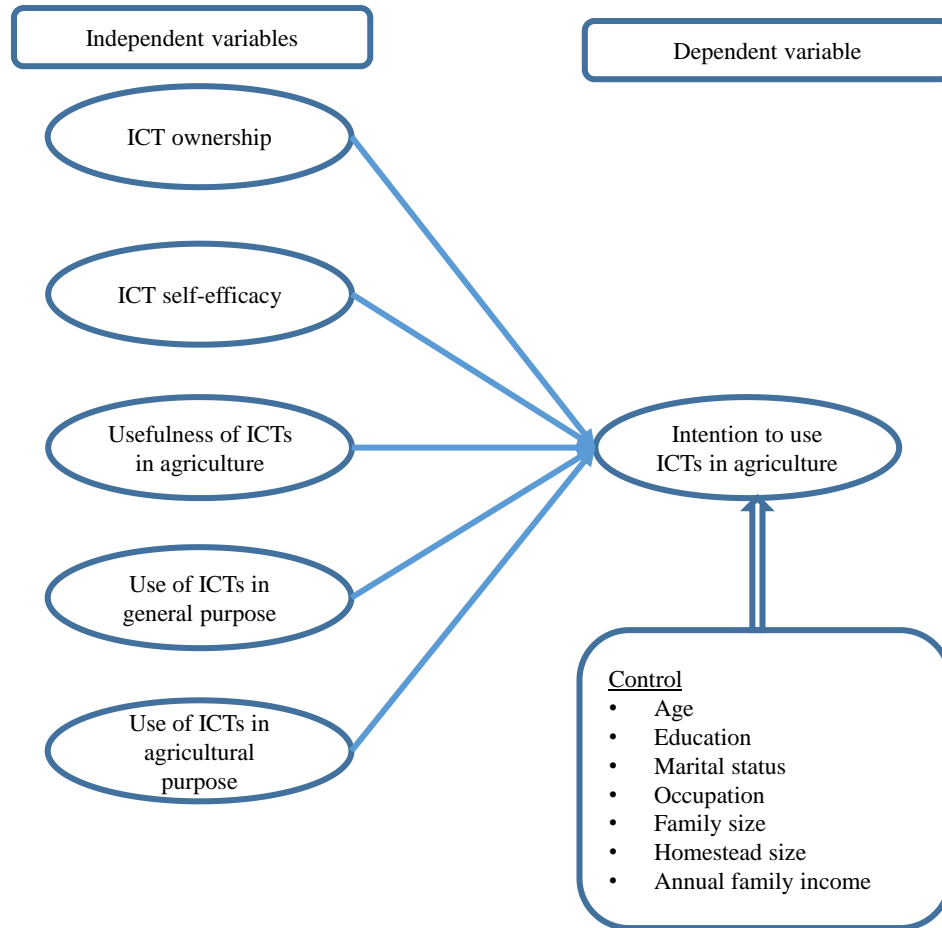


Figure 2.1 The conceptual model of this study

CHAPTER III

METHODOLOGY

Methodology consists of methods and procedure of data collection, measurement of variables and data analysis. The basic materials for conducting any research are the unbiased information and facts. Methodology should be appropriate so that the researcher will be able to arrive at correct decision. Construction of researcher methodology requires a vast knowledge, experience and skill. Keeping this in mind, the research went through previous studies, obtained views from supervisors and experts regarding all aspects of this piece of the study. Finally, it was possible to construct a useful methodology that led the researcher in a right direction in order to accomplish the study.

3.1 Locale of the Study

This study was conducted at the area of Pairaband union of Mithapukur upazila under Rangpur district. Pairaband union was selected purposively since the researcher is familiar with the socio-economic condition of the study area and has good access to the farm households. Mithapukur is located between 25.5417°N and 89.2833°E. It has total area of 515.62 square km. This upazila is situated at about 22 kilometer south of Rangpur district. For clarity of understanding, a map of Rangpur district showing Mithapukur upazila and another map of Mithapukur upazila showing Pairaband union are presented in Figure 3.1 and Figure 3.2, respectively.

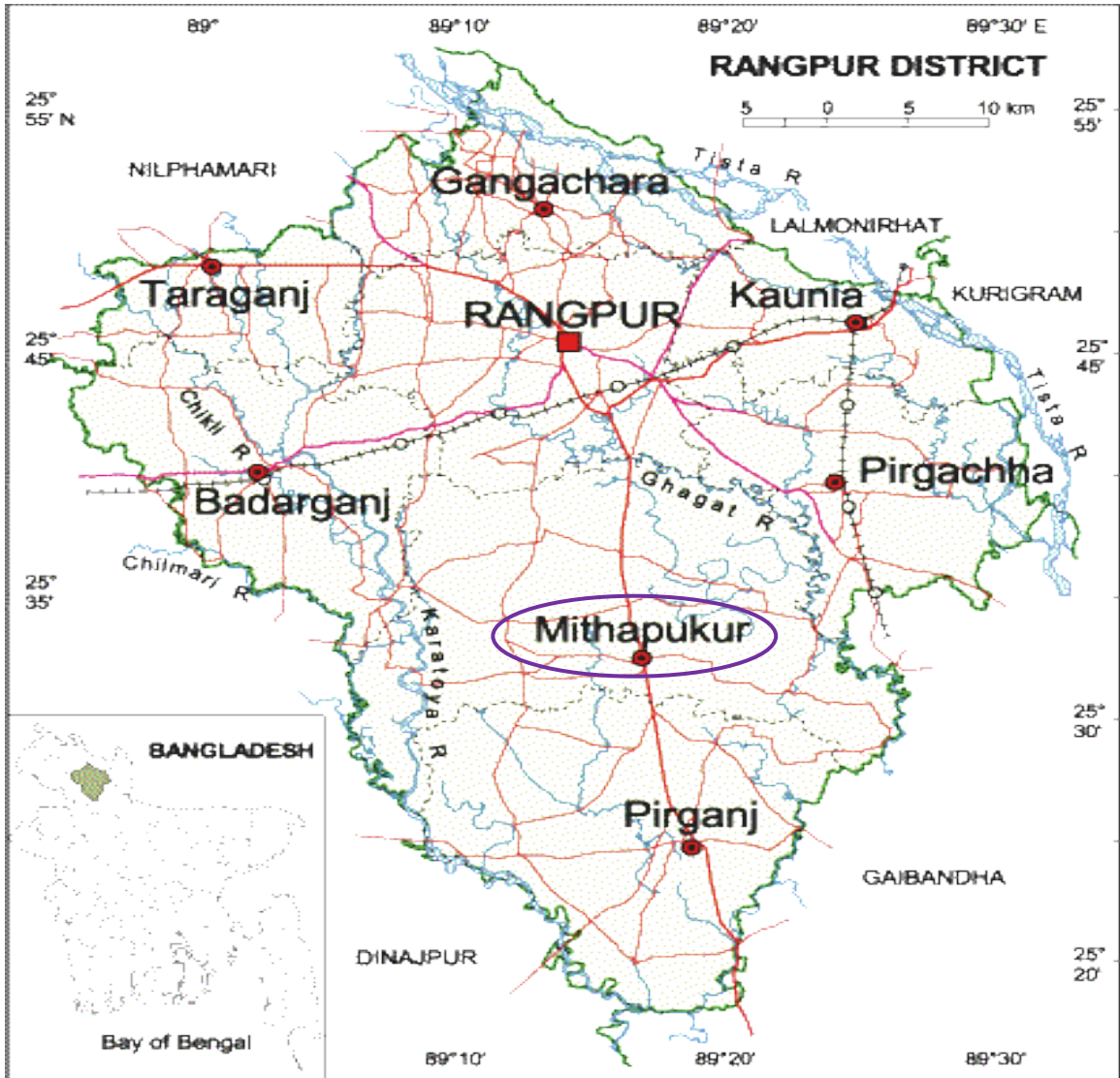


Figure 3.1 A map of Rangpur district showing Mithapukur upazila

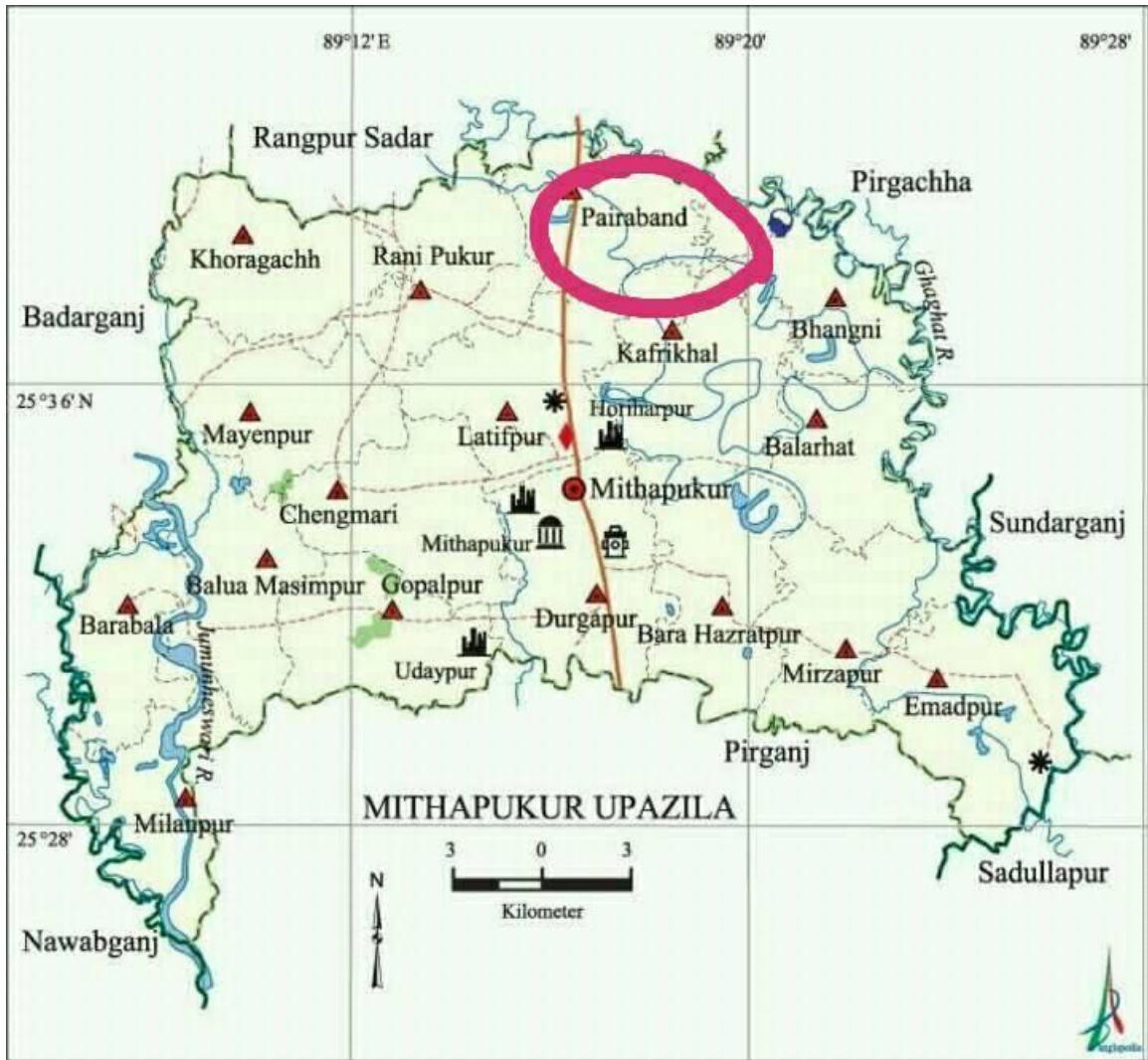


Figure 3.2 A map of Mithapukur upazila showing Pairaband union

3.2 Population and Sample of the Study

Data were collected from a sample rather than the whole population. Pairaband union has 21 villages out of which 6 villages were randomly selected. The villages were Bishwanathpur, Chuhar, Islampur, Joyrampur Anwar, Lahani and Salaipur. Then a list of ICTs using female farmers of those villages was prepared with the help of the Sub Assistant Agriculture Officers (SAAOs) of the concerned areas. The total numbers of women farmers using ICTs of those villages were 2408 which constituted population of the study. According to Yamane's (1967) formula, the sample size was determined as 114. In calculating sample size from the following formula, 9% precision level, 50% degree of variability and value of Z= 1.96 at 95% confidence level were chosen:

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

Where;

n = Sample size

N = Population size

e = The level of precision

Z = The value of the standard normal variable at the chosen confidence level

P = The proportion or degree of variability

Thus, 114 women farmers are drawn from the population by using proportionate random sampling technique. A reserve list of 10 farmers was also prepared which was used if any selected respondent was not available for interview. The distribution of the population and the sample size is presented in Table 3.1.

Table 3.1 Distribution of the population, sample and reserve list

Name of village	Population	Sample	Reserve list
Bishwanathpur	583	28	2
Chuhar	686	32	3
Islampur	243	11	1
Joyrampur Anwar	271	13	1
Lahani	375	18	2
Salaipur	250	12	1
Total	2408	114	10

3.3 Instrument for Collection of Data

In order to collect relevant data from the respondents an interview schedule was prepared keeping the objectives of the study in mind. Simple and direct question were included in the schedule. The interview schedule was pre-tested with 12 farmers of the study area. On the test experiences, necessary additions, corrections and modification of the schedule were done. Valuable suggestions and comments were received from the research supervisor and co-supervisor. The schedule was prepared in Bengali. This helped the respondents to understand the questions and also to furnish the required information. A copy of the interview schedule in English version is presented in the Appendix-A.

3.4 Collection of Data

Data were collected from female farmers of those villages through face to face interview. Interview schedule was prepared earlier for collecting the data. Interviews were usually conducted with the respondents during the leisure time. Before going to the respondents for interview, they were informed earlier so that they might be available at their respective residence at the scheduled time. Interviews were usually conducted with the respondents in their home.

3.5 Selection of Variables of the Study

Selection of inappropriate and inconsistent type of variables may lead to the misleading and unfruitful results. Before setting the variable of the study, the researcher himself visited the study area and talked to the women farmers and she was able to observe the selected characteristics of the women farmers (in the study area). Based on this experience, review of literature, discussion with the research supervisor, co-supervisor, the researcher selected the concerned variables. An independent variable is that factor which is manipulated by the researcher in her attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variables (Townsend, 1953).

The dependent variable is often called ‘criterion or predicted variable’ whereas independent variable is called ‘treatment, experimental or antecedent variable’. Islam

(1998) stated variable as any measurable characteristics, which can assume varying different values in successive individual cases.

3.5.1 Socio-economic characteristics of the women farmers

Seven socio-economic characteristics of the women farmers were selected for the study. These were age, education, marital status, occupation, family size, homestead size and annual family income.

3.5.2 Factors influencing intention to use ICTs in agriculture

Considering literature review and pre-test experiences, five factors were selected that influence women farmers' intention to use ICTs in agriculture. These were ICTs ownership, ICTs self-efficacy, usefulness of ICTs in agriculture, use of ICTs in general purpose and use of ICTs in agriculture purpose.

3.5.3 Dependent variable

Intention to use ICTs by the women farmers was selected as the dependent 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. This section contains procedures for measurement of variables of the study. The procedures followed in measuring the variables are presented below:

3.6.1 Measurement of the women farmers' selected socio-economic characteristics

The procedures of measurement of the selected socio-economic characteristics are given below:

3.6.1.1 Age

The age of individual is one of the important factors pertaining to her personality make up (Afroz, 2014) which can play an important role in using ICTs in agriculture. The age of a respondent was measured by counting the actual years from her birth to the time of interview on the basis of her 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.

3.6.1.2 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. For example, if the respondent passed the S.S.C. examination, her education score was given as 10, if passes the final examinations of class Seven (VII), her education score was given as 7. If the respondent did not know how to read and write, her education score was given as '0' (zero). A score of 0.5 (half) was given to that respondent who could sign her name only.

3.6.1.3 Marital status

Marital status is a distinct option that describes a person's relationship with a significant other. Married, divorced, separated, widowed and un-married are examples of marital status. Following scoring system was used to categorize marital status:

Marital status	Assigned score
Married	1
Divorced	2
Separated	3
Widowed	4
Un-married	5

3.6.1.4 Occupation

Occupation is one component of socio-economic status (SES), summarizing the power, income and educational requirements associated with various positions in the occupational structure (Hanif, 2000). Following scoring system was used to categorize occupation:

Occupation	Assigned score
Farming	1
Daily labor	2
Business	3
Service	4
Home maker	5
Others	6

3.6.1.5 Family size

Family size of a respondent was determined on the basis of the total number of members in the family. The family members included herself, spouse, sons, daughters and other dependents. The actual number of family members made the family size score of the respondents. For example, if a respondent had five members in her family, the score of her family size was given as "5".

3.6.1.7 Homestead size

Homestead is the home and adjoining land with any buildings that is occupied usually by a family as its principal residence. Homestead size score was assigned as one (1) for each decimal land.

3.6.1.8 Annual family income

Income of a respondent was measured in term of taka. Family income of a respondent was computed on the basis of total yearly earning from agriculture and other sources (service, business, day labor etc.) by the respondent herself and other family members. The value of all agricultural crops, livestock, poultry, egg, fisheries, fruits, vegetables etc. were taken into consideration. The income score was assigned as one (1) for each one thousand taka of income.

3.6.2 Measurement of factors influencing intention to use ICTs in agriculture

3.6.2.1 ICTs ownership

ICTs ownership means possession and access to ICT tools such as, mobile phone, SIM card, Internet, computer, television and radio. Scoring was assigned 1 for self-owned

device, 0.5 for shared access and 0 for no access. Thus, ICTs ownership score of a respondent was obtained by adding scores for all six items. ICTs ownership score of a respondent could range from 0 to 6 where ‘0’ indicating no ICTs ownership and ‘6’ indicating maximum ICTs ownership.

3.6.2.2 ICTs self-efficacy

ICTs self-efficacy means a respondent’s confidence in operating ICTs to complete a particular task without the help of others. ICTs self-efficacy was measured by constructing an attitude scale with three statements. The respondents were asked to express their opinions in the forms of "strongly agree", "agree", "no opinion", "disagree", and "strongly disagree". Score were assigned for the alternative responses of three positive statements are as follows:

Opinion	Assigned score
Strongly disagree	1
Disagree	2
No opinion	3
Agree	4
Strongly agree	5

Thus, ICTs self-efficacy score of a respondent could range from 3 to 15, where ‘3’ indicating low self-efficacy and ‘15’ indicating very high self-efficacy.

3.6.2.3 Usefulness of ICTs in agriculture

Usefulness of ICTs in agriculture means the quality of having utility and especially practical worth or applicability in improving agricultural system. Likert-type scale was used to determine the usefulness of ICTs in agriculture activities. The variable was measured by constructing a scale of six statements. The respondents were asked to express perceived usefulness of ICTs for agricultural purpose in a scale ranging from ‘strongly disagree’ to ‘strongly agree’. Score were assigned for the alternative responses of six statements are as follows:

Opinion	Assigned score
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

The score of usefulness of ICTs in agriculture as perceived by the respondents could range from 6 to 30, where ‘6’ indicating low usefulness and ‘30’ indicating very high usefulness of ICTs in agriculture.

3.6.2.4 Use of ICTs in general purpose

Use of ICTs in general purpose was measured on the basis of a respondent’s frequency of using the ICTs (Mobile phone, Internet, Computer, TV and Radio) for different purposes other than agriculture. The scoring was done in the following manner:

Frequency of use	Assigned score
Not at all	0
Rarely	1
Occasionally	2
Often	3
Regularly	4

Thus, use of ICTs in general purpose score of a respondent was obtained by adding scores for all 5 items. The score of a respondent could range 0 to 20, where ‘0’ indicating no use at all and ‘20’ indicating maximum use.

3.6.2.5 Use of ICTs in agriculture purpose

Use of ICTs in agriculture purpose was measured on the basis of a respondent’s frequency of using ICTs like mobile phone, internet, computer, Union Information Services Centre, AICC, call center, TV and radio particularly for farming purpose. Score

was assigned on the basis of number of time a respondent was using the specific tool. The scoring was done in the following manner:

Frequency of use	Assigned score
Not at all	0
Rarely	1
Occasionally	2
Often	3
Frequently	4

Thus, the use of ICTs in agriculture purpose scores of a respondent was obtained by adding scores for all 8 items. The score of a respondent could range from 0 to 32, where ‘0’ indicates no use at all and ‘32’ indicating maximum use.

3.6.3 Measurement of dependent variable

Intention to use ICTs in agriculture by the women farmers was the dependent variable of the study. It was measured on the basis of a respondent’s degree of intention on four statements by using a 5-point rating scale. The scoring was done in the following manner:

Degree of intention	Assigned score
Strongly disagree	1
Disagree	2
Undecided	3
Agree	4
Strongly agree	5

Thus, the intention to use ICTs in agriculture score of a respondent was obtained by adding scores for all 4 statements. Intention to use ICTs in agriculture score of a respondent could range from 4-20, where ‘4’ indicating very low intention to use of ICTs in agriculture and ‘20’ indicating highest extent of intention to use of ICTs in agriculture.

3.7 Data Coding and Tabulation

Data were coded into a coding sheet. Data collected thus from the respondents were compiled, tabulated, analyzed in accordance with the objectives of the study by using SPSS v.23. The qualitative data were converted into quantitative form by mean of suitable scoring techniques for the purpose of analysis.

3.8 Categorization of Data

For describing the variables, the respondents were classified into several categories in respect of each of the variable. The categories of the selected socio-economic characteristics of the farmers were developed by considering the nature of distribution of the data and the general conditions prevailing in the social system. However, the possible scores were used as the basis of categorization for the rest of the variable.

3.9 Hypothesis of the Study

‘A hypothesis is a conjectural statement of the relationship between two or more variables’ (Manheim, *et. al.*, 1977). It may seem contrary to, or in accord with common sense. Moreover, a hypothesis is an inference which has to be proven. It may prove to be correct or incorrect in any circumstances, however, it leads to an empirical test. The following research hypotheses have been formulated to test the relationship between the selected factors and farm women’s intention to use ICTs for their farming.

SI No.	Hypotheses
H1	The higher the ICT ownership, the higher the respondents’ intention to use ICTs for farming.
H2	The higher the ICT self-efficacy, the higher the respondents’ intention to use ICTs for farming.
H3	The higher the perceived usefulness of using ICTs, the higher the respondents’ intention to use ICTs for farming.
H4	The higher the use ICTs (general purpose), the higher the respondents’ intention to use ICTs for farming.
H5	The higher the use ICTs (agricultural purpose), the higher the respondents’ intention to use ICTs for farming.

CHAPTER IV

RESULTS AND DISCUSSION

The findings of the study and interpretation of results have been presented in this Chapter. The findings of this study are presented in four sections. In the first section, selected socio-economic characteristics of the women farmers have been discussed. The second section dealt with intention to use ICTs in agriculture. Third section described selected factors influencing intention to use ICTs in agriculture and the last section dealt with contribution of the selected factors to women farmers' intention to use ICTs in agriculture.

4.1 Selected Socio-economic Characteristics of the Respondents

Seven socio-economic characteristics of the female farmers were selected to describe. These selected socio-economic characteristics were age, education, marital status, occupation, family size, homestead size and annual family income. The salient features of the seven characteristics of the female farmers are presented in Table 4.1.

Table 4.1 Salient features of the selected socio-economic characteristics of the respondents

Characteristics	Measuring units	Observed Range	Mean	Standard deviation
Age	Year	21-52	37.82	7.88
Education	Years of schooling	0.5-12	7.36	2.66
Family size	No. of members	3-10	4.83	1.21
Homestead size	Decimal	4-32	10.82	5.06
Annual family income	Thousand Taka	100-360	186.89	51.59

4.1.1 Age

The age of an individual is one of the most important factors pertaining to her/his personality makeup which play an important role in her/his adoption behavior (Tripp and Woolley, 1989). Age of the farmers ranged from 21 years to 52 years having average of 37.42 with standard deviation of 7.88. On the basis of age of the female farmers, they were classified into three categories as shown in Table 4.2.

Table 4.2 Distribution of the respondents according to their age

Category	Frequency	Percent	Mean	Standard Deviation
Young aged (up to 35 years)	49	43	37.82	7.88
Middle aged (36-50 years)	61	53.50		
Old aged (>50 years)	04	3.5		
Total	114	100		

Data presented in Table 4.2 shows that the highest proportion (53.50%) of the women farmers were middle aged, compared to 43 percent of them were young aged and only 3.5 percent were old aged. The data also revealed that an overwhelming majority of (96.50%) of the respondents were young to middle aged. The findings indicated that decision making relating to application of ICTs in agricultural sector in the study area would be dominated by young to middle aged farmers are receptive to new idea and things. They have a favorable attitude towards trying of new ideas. The extension agents can make use these views and options in designing their extension activities.

4.1.2 Level of education

The education scores of female farmers ranged from 0.5 to 12 with a mean and standard deviation of 7.18 and of 2.98, respectively. On the basis of their educational scores, the female farmers were classified into four categories as shown in Table 4.3.

Table 4.3 Distribution of the respondents according to their level of education

Category	Frequency	Percent	Mean	Standard Deviation
Illiterate (0-0.5)	8	7.00	7.18	2.98
Primary education (1-5)	47	41.24		
Secondary education (6-10)	50	43.87		
Above secondary education (>10)	9	7.89		
Total	114	100		

Data presented in Table 4.3 indicate that 43.87 percent women farmers had secondary education, where as 41.24 percent and 7.89 percent of them had primary and above secondary level of education, respectively where 7 percent of the respondent were illiterate. The finding also reveals that an overwhelming majority (93%) of the

respondents had primary to above secondary education. Educated 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 use of ICTs in agriculture.

4.1.3 Marital status

Marriage is a respected institution; it bestows on people social status, recognition and makes persons to be considered responsible (Ahmed, 2000). Marital status of respondent shows a positive attitude to use of ICTs in agriculture (Majumder, 1983). The marital status of the respondents were classified into five categories as shown in Table 4.4.

Table 4.4 Classification of the respondents according to their marital status

Categories	Respondents	
	Number	Percent
Married	88	77.19
Divorced	3	2.63
Separated	2	1.75
Widowed	8	7.02
Un-married	13	11.40
Total	114	100

Data in Table 4.4 show that the highest proportions (77.19%) of the respondents were married as compared 11.40 percent were un-married, 7.02 percent were widowed, 2.63 percent were divorced and 1.75 percent were separated. It was indicated that most of the female farmers were married and involved in farming activities.

4.1.4 Occupation

The effects of ICTs on employees depend heavily on both their skills and the nature of the occupational restructuring (Annoret *al.*, 2006). The occupations of the respondents were classified into six categories as shown in table 4.5.

Table 4.5 Distribution of the respondents according to their occupation

Categories	Respondents	
	Number	Percent
Farming	81	71.05
Daily labor	10	8.77
Business	12	10.53
Service	5	4.39
Home maker	4	3.51
Others	2	1.75
Total	114	100

Data in Table 4.5 show that the highest proportion (71.05%) of the respondents' occupation was farming as compared to 10.53 percent were business, 8.77 percent were daily labor, 4.39 percent were service, 3.51 percent were home maker and 1.75 percent was others.

4.1.5 Family size

The family size of the rural women and their participation in any rural development activities showed close relationship with each other (Basak, 1997). The number of family members of the respondents ranged from 3 to 10 members, with an average of 4.83 and standard deviation of 1.21. On the basis of family size, women were classified into three categories as shown in Table 4.6.

Table 4.6 Classification of the respondents according to their family size

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Small family (up to 4 members)	52	45.6	4.83	1.21
Medium family (5-7 members)	55	48.2		
Large family (above 7 members)	7	6.1		
Total	114	100		

Data in Table 4.6 reveal that the highest proportion (48.2%) of the respondent had medium family size, while 45.6 percent had small family size and 6.1 percent had big family size. Such finding is quite normal as per Bangladesh situation.

4.1.6 Homestead size

Homestead area refers to the home and adjoining land owned by a rural women family on which the family carries on household and farming operations. Homestead area of the farmers ranged from 4 to 21 decimal with a mean and standard deviation of 10.82 and of 5.05 respectively. Based on homestead area respondents were classified into three categories as shown in Table 4.7.

Table 4.7 Distribution of the respondents according to their homestead size

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Small homestead (up to 8 decimal)	49	42.98	10.82	5.05
Medium homestead (9-12 decimal)	39	34.21		
Large homestead (above 12 decimal)	26	22.80		
Total	114	100		

Data in Table 4.7 show that highest proportion (42.98%) of the respondents had small homestead as compared to 34.21 percent had medium and 22.80 percent large homestead. The findings also indicated that more than three-fourth 77.19 percent of the respondents had low to medium homestead size.

4.1.7 Annual family income

In this study, annual income of the respondent was considered as the earnings of all the active members of the family in previous year from all available sources. Annual family income ranged from 100 to 360 thousand taka with a mean and standard deviation of 186.89 and of 51.59 thousand taka respectively. Based on their annual income, the female farmers were classified into three categories as shown in Table 4.8.

Table 4.8 Distribution of the respondents according to their annual family income

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low income (up to 120 thousand taka)	38	33.33	186.89	51.59
Medium income (121-200 thousand taka)	69	60.53		
High income (above 200 thousand taka)	7	6.14		
Total	114	100		

Data in Table 4.8 show that highest proportion (60.53%) of the respondents had medium annual income while 33.33 percent had low income and 6.14 percent had high annual family income. The findings indicate that most of the farmers in the study area were in low to medium income group. This might be due to the fact that, the farmers of the study area were engaged only in agriculture. They earned little from other sources such as service, business.

4.2 Intention to use ICTs in agriculture

ICTs tools had a significant direct effect on the intention to use of information technology (Hyesung, 2004). Women farmers' intention to use ICTs in agriculture was the dependent variable of the study. Intention to use ICTs in agriculture observed scores ranged from 5 to 16 against the possible ranged from 4 to 20 with an average of 11.41 and standard deviation of 2.93. On the basis of intention to use ICTs in agriculture possible scores, the respondents were classified into three categories as shown in Table 4.9.

Table 4.9 Distribution of the respondents according to their intention to use ICTs in agriculture

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low intention (4-8 score)	25	21.93	11.41	2.93
Medium intention (9-14 score)	63	55.26		
High intention (15-20 score)	26	22.81		
Total	114	100		

Data in Table 4.9 show that the highest proportion (55.26%) of the respondents had the medium intention to use ICTs in agriculture while 21.93 percent had low intention and 22.81 percent had high intention to use ICTs in agriculture. The findings also reveal that

more than three-fourth (78.07%) of the farmers had medium to high intention to use ICTs in agriculture. This could be due to the fact that most of the female farmers were young to middle in aged, had moderate education and annual income which enable them to accept risk. On the other hand, level of education, ICTs self-efficacy, usefulness of ICTs in agriculture, extent of use of ICTs in agricultural purpose led to enhance women farmers' intention to use ICTs in agriculture.

4.3 Selected factors influencing Intention to Use ICTs Agriculture

Individual's degree of intention to use ICTs in agriculture is affected largely by different factors. Five factors were selected to find out their contribution to the intention to use of ICTs in agriculture. The salient features of these factors are presented in Table 4.10.

Table 4.10 Salient features of the selected factors

Characteristics	Measuring Unit	Range		Mean	Standard deviation
		Possible	Observed		
ICTs ownership	Score	0-6	2-6	4.13	1.03
ICTs self-efficacy	Score	3-15	6-15	9.68	2.55
Usefulness of ICTs in agriculture	Score	6-30	16-30	23.08	4.13
Use of ICTs in general purposes	Score	0-20	4-20	10.14	3.23
Use of ICTs in agricultural purposes	Score	0-32	4-21	9.06	3.29

4.3.1 ICTs ownership

Ownership of mobile phone helps formers to get information about product's price, volume, quality, place of purchase, and/or place of sale are easily and early than others (Omotayo, 2005). ICTs ownership shows helpful characteristics for receiving information easily and timely. ICTs ownership observed score ranged from 2 to 6 against the possible range from 0 to 6 with an average of 4.13 and 38 standard deviation of 1.014. On the

basis of ICTs ownership possible scores, the respondents were classified into three categories as shown in Table 4.11.

Table 4.11 Distribution of the respondents according to ICTs ownership

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low ICTs ownership (0-2 score)	11	9.6	4.13	1.03
Medium ICTs ownership (>2-4 score)	69	60.50		
High ICTs ownership (>4-6 score)	34	29.80		
Total	114	100		

Data in Table 4.11 show that the highest proportion (60.50%) of the respondents had medium ICTs ownership as compared to 29.80 percent had high ICTs ownership and 9.6 percent had low ICTs ownership. The findings also reveal that an overwhelming majority (90.30%) of the respondents had medium to high ICTs ownership. The reason might be most of the women farmers' had self-owned mobile phone, SIM card, TV and radio devices.

4.3.2 ICTs self-efficacy

Provision of self-efficacy or confident to use ICTs tools observed as an important positive factors for application of ICTs in agriculture (Gupta, 1995). ICTs self-efficacy plays an important role for in agricultural sector. ICTs self-efficacy observed score ranged from 6 to 15 against the possible range from 3 to 15 with an average of 9.86 and standard deviation of 2.55. On the basis of ICTs self-efficacy possible scores, the respondents were classified into three categories as shown in Table 4.12.

Table 4.12 Distribution of the respondents according to their ICTs self-efficacy

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low ICTs self-efficacy (3-7)	20	17.54	9.86	2.55
Medium ICTs self-efficacy (8-11)	61	53.51		
High ICTs self-efficacy (12-15)	33	28.95		
Total	114	100		

Data in Table 4.12 show that the highest proportion (53.51%) of the respondents had medium ICTs self-efficacy as compared to 28.95 percent had high ICTs self-efficacy and

17.54 percent had low ICTs self-efficacy. The findings also reveal that more than two-third (71.05%) of respondents had low to medium ICTs self-efficacy. This is due to the fact that women farmers had sufficient knowledge on how to use mobile phone however they were not familiar with other ICT tools like computer and internet.

4.3.3 Usefulness of ICTs in agriculture

Quick solution of pest and disease is one of the main usefulness of ICTs in agriculture (Singh, 2004). Usefulness of ICTs in agriculture observed score ranged from 16 to 30 against the possible range from 6 to 30 with an average of 23.04 and standard deviation of 4.133. On the basis of usefulness of ICTs possible scores, the respondents were classified into three categories as shown in Table 4.13.

Table 4.13 Distribution of the respondents according to their perceived usefulness of ICTs in agriculture

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low useful (6-13)	0	0	23.04	4.133
Moderate useful (14-22)	53	46.49		
High useful (23-30)	61	53.51		
Total	114	100		

Data in Table 4.13 show that the highest proportion (53.51%) of the respondents perceived ICTs as high useful in agriculture, 46.49 percent perceived moderate useful but none of them found ICTs as low useful in agriculture. The reason of moderate to high usefulness of ICTs in agriculture might be most of the women farmers save time and overcome geographical barrier in communicating agricultural information using ICTs.

4.3.5 Use of ICTs in general purpose

Use of ICTs in general purpose observed score ranged from 4 to 20 against the possible range from 0 to 20 with an average of 10.14 and standard deviation of 3.24. On the basis

of use of ICTs in general purpose possible scores, the respondents were classified into three categories as shown in Table 4.14.

Table 4.14 Distribution of the respondents according to their use of ICTs in general purpose

Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low use (0-7 score)	23	20.18	10.14	3.24
Moderate use (8-14 score)	77	67.54		
High use (15 -20 score)	14	12.28		
Total	114	100		

Data in Table 4.14 show that the highest proportion (67.54%) of the respondents had moderate use of ICTs in general purpose while 20.18 percent respondents had low use and 12.18 percent had high use of ICTs in general purpose. The findings also reveal that more than three-fourth (79.82%) of the respondents had moderate to high use of ICTs in general purpose. This is due to the fact that mobile phone had highly used for general communication purpose while TV and radio had used for recreation purpose mostly.

4.3.6 Use of ICTs in agriculture purpose

Mobile phone, radio, television are most common ICT tools used by the farmers (Cebeci and Aykut, 2003). Use of ICTs in agricultural purpose observed scores ranged from 4 to 21 against the possible range from 0 to 32 with an average of 9.06 and standard deviation of 3.29. On the basis of use of ICTs in agriculture purpose possible scores, the respondents were classified into three categories as shown in Table 4.15.

Table 4.15 Distribution of the respondents according to use of ICTs in agriculture purpose

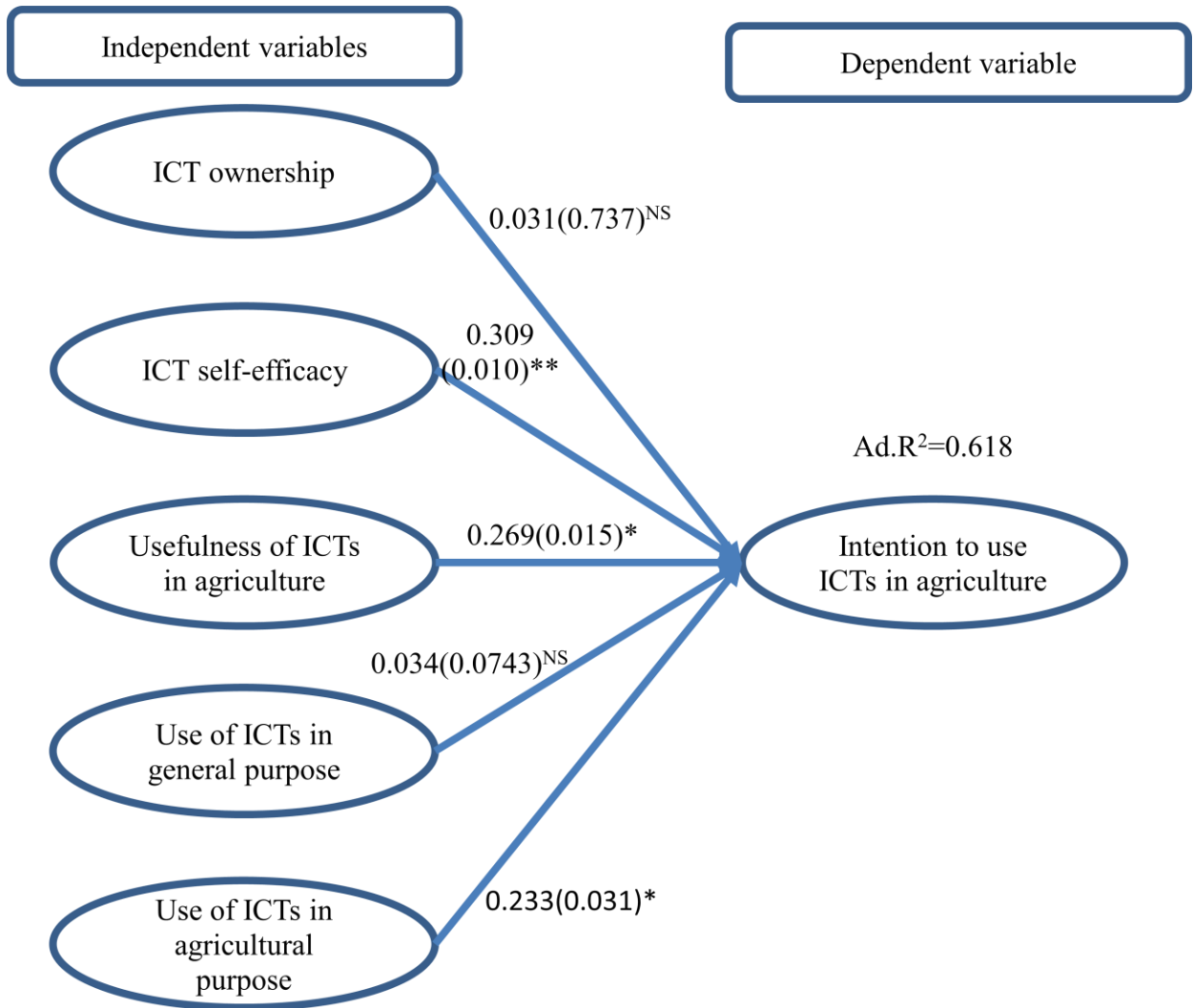
Categories	Respondents		Mean	Standard deviation
	Number	Percent		
Low use (0-10 score)	85	74.56	9.06	3.29
Moderate use (11-20 score)	28	24.56		
High use (21-32 score)	01	0.88		
Total	114	100		

Data in Table 4.15 show that the highest proportion (74.56%) of the respondents had low use of ICTs in agriculture purpose as compared to 24.56 percent had moderate and 0.88 percent had high use of ICTs in agriculture purpose. The findings also reveal that almost three-fourth(74.56%) of the women farmers had low use of ICTs in agriculture purpose. The reason might be most of the women farmers did not know about farmers' help line (call centre, krishijigyasha, etc.) and had little access to UISC, AICC.

4.4 The Contribution of the Selected Factors to Women Farmers' Intention to Use ICTs in Agriculture

For this study 5 factors were selected and each of the factors was treated as independent variables. The selected factors were ICTs ownership (x_1), ICTs self-efficacy (x_2), usefulness of ICTs in agriculture (x_3), use of ICTs in general purpose (x_4) and use of ICTs in agriculture purpose (x_5). Intention to use ICTs in agriculture(Y) was the only dependent variable of the study.

To explore contribution of the selected factors to women farmers' intention to use ICTs in agriculture, multiple regression co-efficient was administered and all five independent variables were entered within the model. The summary of multiple regression analysis is shown in Figure 4.1.



$R^2=0.635$, $F=37.512$, $p=0.000$

Figure 4.1 The structural model showing regression co-efficients

Data in Figure 4.1 show that ICTs self-efficacy, usefulness of ICTs in agriculture and use of ICTs in agriculture had significant contribution to women farmers' intention to use ICTs in agriculture which altogether explained 63.50 percent ($R^2 =0.635$) of the variation of women farmers' intention to use ICTs in agriculture. The F value indicates that the model is significant at $p < 0.000$.

However, each predictor may explain some of the variance in respondents' intention to use of ICTs in agriculture simply by chance. The adjusted R-square value penalizes the addition of extraneous predictors in the model, but values of 0.618 still show the variance in respondents' intention to use ICTs in agriculture can be attributed to the predictor

variables rather than by chance and both are suitable models (Table 4.14). In summary, the models suggest that the respective authority should consider increasing ICTs self-efficacy, usefulness of ICTs in agriculture and use of ICTs in agriculture purpose which are briefly explained below:

4.4.2 Contribution of ICTs self-efficacy to women farmers' intention to use ICTs in agriculture

Multiple regressions show that respondents' ICTs self-efficacy had significant positive contribution to their intention to use ICTs in agriculture and it was the highest contributor (Figure 4.1). The reason might be the women farmers who had more ICTs self-efficacy enable them to grow more desire for multiple uses of ICTs. As most of the women farmers were involved with farming and faced problems which might influence their intention to use of ICTs in agriculture for solving farming problems.

4.4.3 Contribution of perceived usefulness of ICTs in agriculture to women farmers' intention to use ICTs in agriculture

From multiple regressions, it found that usefulness of ICTs in agriculture had second highest contribution to respondents' intention to use ICTs in agriculture. The reason might be the ICTs had facilitate women farmers to maintain relationship with others for farming purpose like getting need-based information, receiving information timely, reducing cost in obtaining information, saving time in communicating information which might influence their intention to use ICTs in agriculture.

4.4.2 Contribution of use of ICTs in agriculture purpose to women farmers' intention to use ICTs in agriculture

Multiple regressions show that use of ICTs in agriculture purpose had significant positive contribution to women farmers' intention to use ICTs in agriculture and it was the third highest contributor. The reason might be the benefits of using ICTs in agriculture influences women farmers' intention to use ICTs in agriculture. Use of ICTs provide quick and easy solution of farming problems like pest and disease infestation, fertilizer application dose, current market price of products, weather information etc. which might enhance women farmers' intention to use ICTs in agriculture.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This Chapter summarizes the significant explorative results of the selected socio-economic characteristics of the women farmers, their intention to use ICTs in agriculture, selected factors and their contribution to farm women's intention to use ICTs in agriculture. It also constructs some conclusions and recommendations for policy actions as further steps in disseminating intention to use ICTs in agricultural sector by the women farmers. This Chapter finally recommends probable research endeavors that can be carried out in future.

5.1 Summary of Findings

Interpretation of the results and the findings of the study have been presented elaborately in Chapter 4. The summarized findings of the study are now described below:

5.1.1 Selected socio-economic characteristics of the women farmers

Age

The highest proportion (53.50%) of the women farmers was in middle aged category as compared to 43.87 percent and 3.50 percent of them being young and old aged category, respectively.

Education

The highest proportion of (43.87%) the women farmers had secondary education, while 41.24 percent primary education and 7.89 percent had above secondary education. Only 7 percent of them had no formal education but could sign only.

Marital status

Overwhelming majority (77.19%) of the respondents was married, while 11.40 percent un-married, 7.02 percent widowed, 2.63 percent divorced and 1.75 percent separated respectively.

Occupation

The highest proportion (71.05%) of the women farmer's occupation was farming as compared to 10.53 percent business, 8.77 percent daily labor, 4.39 percent service, 3.51 percent home maker and 1.75 percent was involved in others occupation.

Family size

The highest proportion (48.20%) of the women farmers had medium family size, while 45.60 percent and 6.10 percent belonged to the small family and large family, respectively.

Homestead area

The highest proportion (42.98%) of the respondents had small homestead, while 34.21 percent medium and 22.80 percent had large homestead, respectively.

Annual family income

The highest proportion (60.53%) of the respondents had medium income, whereas 33.33 percent and 6.14 percent of them had low and high income, respectively.

5.1.2 Women farmers' intention to use ICTs in agriculture

The majority (55.26%) of the respondents had moderate intention to use ICTs in agriculture, while 21.93 percent and 22.81 percent of them had low and high intention to use ICTs in agriculture respectively.

5.1.3 Factors influencing women farmers' intention to use of ICTs in agriculture

ICTs ownership

The highest proportion (53.51%) of the female farmers had medium ICTs ownership, whereas 29.80 percent and 9.6 percent of them had high and low ICTs ownership, respectively.

ICTs self-efficacy

The highest proportion (53.51%) of the respondents had medium ICTs self-efficacy as compared to 28.95 percent and 17.54 percent of them had high and low ICTs self-efficacy, respectively.

Usefulness of ICTs in agriculture

The majority (53.51%) of the respondents perceived ICTs as high useful in agriculture, while 46.49 percent had moderate useful in agriculture but not found ICTs as low useful in agriculture, respectively.

Use of ICTs in general purpose

The highest proportion of the respondents (67.54%) had moderate use of ICTs in general purpose, while 20.18 percent had low use and 12.28 percent had high use of ICTs in general purpose, respectively.

Use of ICTs in agriculture purpose

The highest proportion of the respondents (74.56%) had low use of ICTs in agriculture purpose, while 24.56 percent had moderate use and 0.88 percent had high use of ICTs in agriculture purpose, respectively.

5.1.4 Contribution of the selected factors to women farmers' intention to use ICTs in agriculture

ICTs self-efficacy, usefulness of ICTs in agriculture and use of ICTs in agriculture purpose had significant positive contribution to women farmers' intention to use ICTs in agriculture. These three factors jointly explained 61.80 percent of the variation of women farmers' intention to use ICTs in agriculture.

5.2 Conclusions

A conclusion presents the statements based on major findings of the study and these statements mostly confirm to the objectives of the research in the shortest form. It presents the direct answers of the research objectives, or it relates to the hypothesis

(Labon and Schefter, 1990). Findings of the present study and the logical interpretation of other relevant facts prompted the researcher to draw the following conclusions:

- ✓ The findings of the study reveal that more than three-fourth (78.07%) of the women farmers' had medium to high intention to use ICTs in agriculture. On the contrary, overwhelming majorities (96.50%) of the respondents were young to middle aged and 93 percent of them had primary to above secondary education. Therefore, it may be concluded that there is a good ground for disseminating agricultural information among women farmers using ICTs.
- ✓ ICTs self-efficacy had highest contribution to women farmers' intention to use ICTs in agriculture. On the contrary, more than two-third (71.05%) of the respondents had low to medium ICTs self-efficacy. This facts lead to the conclusion that any arrangement made to increase ICTs self-efficacy of the women farmers would ultimately increase their intention to use ICTs in agriculture.
- ✓ Usefulness of ICTs in agriculture had second highest contribution to women farmers' intention to use ICTs in agriculture. On the other hand, more than half (53.51%) of the women farmers perceived ICTs as high useful in agriculture. Therefore, it may be concluded that any action taken to increasing perception of the women farmers on usefulness of ICTs in agriculture would eventually increase their intention to use ICTs in agriculture.
- ✓ Use of ICTs in agriculture purpose had third highest contribution to women farmers' intention to use ICTs in agriculture. On the contrary, almost (74.56%) of the farmers had low use of ICTs in agriculture. Therefore, it may be concluded that attempts should be taken to increase use of ICTs in agriculture by the women farmers which would virtually increase their desire to more use of ICTs in agriculture.

5.3 Recommendations

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

5.3.1 Recommendations for policy implication

The findings of the study indicate that intention to use ICTs in agriculture by the women farmers were encouraging. Therefore, it was recommended that agricultural information diffusion agencies like DAE, AIS, NGOs, television and call centre operator should select, prepare need-based farming information targeting women farmers.

- ✓ ICTs self-efficacy had highest contribution to women farmers' intention to use ICTs in agriculture. Therefore, it was recommended that attempts should be taken by DAE, AIS, UICC and NGOs to increase ICTs self-efficacy of the women farmers through organizing training, method demonstration especially on use of mobile, Internet, computer for searching agricultural information.
- ✓ Women farmers' perception on usefulness of ICTs in agriculture had the 2nd highest contribution to their intention to use ICTs in agriculture. Therefore, it was recommended that actions like motivational campaigns, ICT fair, presentation of success story on using ICTs should be organized by the extension service providers and ICT division for increasing women farmers' perception on usefulness of ICTs in agriculture.
- ✓ Use of ICTs in agriculture purpose of the respondent had the 3rd highest contribution to their intention to use ICTs in agriculture. Therefore it was recommended that attempts like availability of need-based farming information, reducing farming information search cost, reducing ICT service cost, reliability of farming information etc. should be ensured by the concerned authorities like DAE, BTRC.

5.3.2 Recommendations for further study

A small and limited research work cannot provide unique and universal information related to application of ICTs by the women farmers. 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:

- ✓ The present study was done in the six villages of Pairabond union of Mithapukur upazila in Rangpur district. It is suggested that similar study should be done in different parts of the country.
- ✓ The current study concentrated on the contribution of only five selected factors to women farmers' intention to use ICTs in agriculture. So, it is recommended that further study should be conducted with other factors for determining the intention to use ICTs in agriculture.
- ✓ It is difficult to determine the appropriate intention to use ICTs in agriculture by the women farmers. Determination of intention to use ICTs in agriculture is not free from any limitation. More reliable measurement of the concerned variables is necessary for determining intention to use ICTs in agriculture.
- ✓ Research should also be undertaken to identify the factors causing hindrance towards intention to use ICTs in agriculture.

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APPENDIX-A

English Version of the Interview Schedule

Dept. of Agricultural Extension & Information System

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AN INTERVIEW SCHEDULE

on

**“Intention to Use Information and Communication Technologies (ICTs) in
Agricultural Sector: Women’s Perspective”**

Date :.....

Respondents No :.....

Name of the respondent :

Village :

Union :

Upazila :

District :

Contact Number :

Please answer the following questions:

1. Age :

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

2. Level of education:

Please mention your level of education:

- a) I cannot read and write (.....)
- b) I can sign only (.....)
- c) I studied up to class (.....)

3. Occupation:

- a) Farming
- b) Daily labor
- c) Business
- d) Service
- e) Home maker
- f) Others

4. Family size:

How many members are there in your household including you?

5. Marital Status:

- a) Married
- b) Divorced
- c) Separated
- d) Widowed
- e) Un-married

6. Annual family income:

Mention your last year annual family income from the following sources:

Income sources		Income in '000' Tk.
A.	Agricultural sources	
	1) Crop	
	2) Livestock	
	3) Poultry	
	4) Fisheries	
B.	Non-Agricultural sources	
	i) Business	
	ii) Job	
	iii) Laborer	
	iv) Others	
Total Income:		

7. Homestead size:

Please mention your size of the homestead.....decimal

8. ICTs ownership: Please mention your possession and access to the following ICTs.

Sl. No.	Items	Possession Status			Sl No.	Items	Possession Status		
		Self	Shared Access	No Access			Self	Shared Access	No Access
New Media					Traditional Media				
1.	Mobile Phone				1.	TV			
2.	SIM Card				2.	Radio			
3.	Internet								
4.	Computer/Laptop /Tab Other Communication Devices								

9. ICTs self-efficacy: Please state your degree of agreement and disagreement with the following statements.

Sl. No.	Items	Strongly disagree	Disagree	No comment	Agree	Strongly Agree
1.	I can use ICTs without help from others					
2.	I face no problem to operate ICTs					
3.	I have the knowledge & skill about ICTs					

10. Usefulness of ICTs in agriculture: Please state your degree of agreement and disagreement with the following statements.

Sl. No.	Items	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1.	I can maintain relationship with others for farming purposes by using ICTs					
2.	I can get need-based farming information by using ICTs					
3.	I can receive farming information timely by using ICTs					
4.	I can reduce information search cost in obtaining agricultural information by using ICTs					
5.	I can save time in communicating agricultural information by using ICTs					
6.	I can overcome geographical barrier in communicating agricultural information by using ICTs					

11. Use of ICTs in general purpose: Please mention your frequency of using the following ICTs for different purposes.

Sl. No.	Items	Not at all	Rarely	Occasionally	Often	Frequently
New Media						
1.	Mobile phone (voice call, SMS, etc.)	No use	1 times/ week	2-3 times/ week	4-6 times/ week	>6 times / week
2.	Internet	No use	1 times/ month	2-3 times/ month	4-6 times/ month	>6 times month
3.	Computer/ Laptop /Tab/ Other communication device)	No use	1 times/ month	2-3 times/ month	4-6 times/ month	>6 times month
Traditional Media						
1.	TV Programme	No use	1 times/ week	2-3 times/ week	4-6 times/ week	>6 times week
2.	Radio Programme	No use	1 times/ week	2-3 times/ week	4-6 times/ week	>6 times week

12. Use of ICTs in agriculture purpose: Please mention your frequency of using the following ICTs for receiving farm-related information, e.g., talking to input dealers or marketers or extension support staffs in seeking agricultural information.

Sl. No.	Items	Not at all	Rarely	Occasionally	Often	Frequently
New Media						
1.	Mobile phone (voice call, SMS, etc.)	No use	1-2 times/ month	3-4 times/ month	4-6 times/ month	>6 times/ month
2.	Internet	No use	1 times/ month	2 times/ month	3 times/ month	> 3 times/ month
3.	Computer/ Laptop /Tab/ Other communication device)	No use	1 times/ month	2 times/ month	3 times/ month	>3 time/ month
4.	Union Information Service Centre (UISC)	No use	1 times/ month	2 times/ month	3 times/ month	3 times/ month
5.	Agricultural Information Communication Center (AICC)	No use	1 times/ month	2 times/ month	3 times/ month	>3 times/ month
6.	Farmer's Help Line (Call center) [Krishijigyasha(7676), BanglalinkKris hibazaar (2474), GP Krishisheba(27676), Agricultural Call Center(16123)]	No use	1 times/ month	2 times/ month	3 times/ month	>3 time /month
Traditional Media						
1.	Farm related TV Programme	No use	1 times/ week	2 times/ week	3 times/ week	>3 times/ week
2.	Farm related Radio Programme	No use	1 times/ week	2 times/ week	3 times/ week	>3 times/ week

13. Intention to use of ICTs in agriculture: Please state your degree of agreement and disagreement with the following statements.

Sl. No.	Items	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
1.	I intend to use ICTs for homestead gardening					
2.	I intend to continue use ICTs for crop production					
3.	I intend to use ICTs for livestock production					
4.	I intend to use ICTs for marketing purposes					

Thank you for your kind co-operation.

Signature of the interviewer

Date: