EFFECTIVENESS OF AGRICULTURAL INFORMATION AND COMMUNICATION CENTER (AICC) FOR DISSEMINATING AGRICULTURAL INFORMATION

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EFFECTIVENESS OF AGRICULTURAL INFORMATION AND COMMUNICATION CENTER (AICC) FOR DISSEMINATING AGRICULTURAL INFORMATION

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CERTIFICATE

This is to certify that the thesis entitled "**Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating 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 and Information System embodies the result of a piece of bona fide research work carried out by **Saima Bila Setu**, Registration **No. 14-05978** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated: June, 2021
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Dedicated
to
My Beloved Parents

ACKNOWLEDGEMENT

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ABSTRACT

The purposes of the study were to: i. determine the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information as perceived by the farmers ii. explore the contribution of the selected characteristics of the AICC member farmers to their perceived effectiveness of AICC for disseminating agricultural information, and iii. determine the problems faced by the AICC members for disseminating agricultural information. Member farmers of nine selected AICCs by taking one from each of nine Upazillas of Faridpur district of Dhaka division constituted the population of the study. A total of 90 farmers were finally selected by using simple random sampling which constituted the sample of the study. Data were collected from the farmers during 1st to 31rd January 2021 by using a pre-tested interview schedule. Seven selected characteristics of the farmers were considered as the independent variables. Overwhelming majority (80%) of the respondent farmers perceived medium effectiveness of AICC, while 7.8% of them perceived low and 12.2% of them perceived high effectiveness of AICC for disseminating agricultural information. On the basis of Standardized Effectiveness Index (SEI) "usability of information" ranked first followed by "solving farming problems", "getting farming information", "usefulness of farming information", "clarity of information", "completeness of information", "understandability of information", "developing farming condition", "getting weather information for better agriculture", "getting information to improve knowledge on balanced use of natural resources", "getting agricultural input price information" and "getting agricultural product selling price". Use of ICT (X_7), ICT using experience (X_5) and ICT using confidence (X_6) of the farmers had significant positive contribution to their perceived effectiveness of AICC for disseminating agricultural information. Each of these three (3) variables had indirect effect on effectiveness of AICC for disseminating agricultural information through other two (2) variables. Two-third (66.7%) of the farmers faced moderate problem in getting services from AICC, while 27.8%% and 5.5% farmers faced low and severe problem respectively in getting services from AICC. Based on descending order of Standardized Problem Faced Index (SPFI), limited availability of ICT tools and technology in AICC ranked first problem followed by "technical problems of different ICT based media in AICC", "low bandwidth speed of internet in AICC", "lack of training facilities on ICT among farmers", "lack of operational knowledge of computer", "lack of management of AICC activities", "lack of adequate skill among service providers in AICC", "low awareness among rural farmers about AICC", "shyness/scared of using ICT" and "cost of using ICT services from AICC". Supervising authority of AICC, such as Agriculture Information Service (AIS) with the help of the Department of Agricultural Extension (DAE) and other advisory service providing organizations should take necessary action to enhance the activities of AICC by increasing their advisory services, necessary supports and minimizing farmers problems for disseminating agricultural information.

INTRODUCTION

1. 1 General Background

Agriculture is a dynamic sector in Bangladesh which needs regular adoption of new farm technologies in order to meet the growing demands of food items and other related production inputs. Agriculture is one of the largest producing sectors of the economy since it comprises about 13.40% of the country's GDP and employs around 40.6% of the total labor force (BBS, 2021). A plurality of Bangladeshis earn their living from agriculture. Crop production of Bangladesh needs to be maximized in order to meet the increasing food demand and other basic requirements. 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 knowledge of their use should reach to the farmers within a shortest possible time and that should be done very effectively. The agricultural system of Bangladesh has a long history of coping with the challenges. Over time, the system has progressed in a surprising way. The addition of Information and Communication Technologies (ICT) improved the system's ability to meet the difficulties. Agricultural extension agency are currently disseminating agricultural innovations developed by agricultural research institutes to farmers. The use of Information and Communication Technology (ICT) to disseminate agricultural technologies has been shown to improve agricultural production (Rahman and Islam, 2015).

Agricultural Information and Communication Center (AICC) is a novel idea for agricultural extension service delivery in Bangladesh that is based on information and communication technology (Das, 2015). AICC delivers up to

date information on crop cultivation, animal and fish farming, local and worldwide market information, disaster management information and the dissemination of new agricultural technologies. Agriculture Information Service (AIS) under the Ministry of Agriculture, has a strategic goal to create AICC in each community (AIS, 2013). The AICC's main goals are to build e-agriculture, give ICT facilities to all types of farmers, and spread agricultural information through the media. Agricultural Extension services are critical for maintaining good productivity and efficient resource utilization in a country's agricultural sectors, as well as providing farmers with critical access to the knowledge, information, and technology they need to improve productivity and thus improve the quality of their lives and livelihoods (Anderson, 2007). As a result, it is critical to offer farmers with high quality information and knowledge in a timely manner. The farm family to grassroots level extension agent ratio is 1000:1, which is extremely low (Rahman and Islam, 2015). As a result, both the government and the business sector should take steps to offer timely, need based information. The Ministry of Agriculture of the People's Republic of Bangladesh has previously made a number of measures. These include the establishment of AICC, the development of an agriculture related bangla website, the establishment of a community radio station, the establishment of a mobile based agricultural extension service, the establishment of a call center, the launch of an e-book, the launch of an online farmer television channel, and the launch of an online fertilizer recommendation system, among other things (AIS, 2013). DAE personnel in Bangladesh have produced and used several apps such as Krishoker Janala, Krishikotha, Krishoker Digital Thikana, and Rice Knowledge Bnak apps made by BRRI and Krishi Projukti Bhandar apps developed by BARI (Krishi Dairy, 2017).

Information and Communication Technology (ICT) has emerged as a viable extension tool for strengthening development processes in general and agricultural development in particular (Kashem *et al.* 2010). The use of Information and Communication Technology (ICT) to provide farm information to the farming community has been discovered to be successful. It could allow

extension service providers to collect, store, retrieve, and transmit a wide range of information to crop producers, such as best practices, new technology, lower input and output costs, better storage facilities, improved transformation links and weather, among other things. In various parts of Bangladesh, 499 AICCs have been created (Krishi Dairy, 2017). The effective adoption of agricultural inputs, market decision making, and the acceptance of scientific methodologies can all be aided by the dissemination of pertinent information to farming communities (Kiplang'at j. 1999). It is critical to effectively disseminate information to agricultural and rural areas. Efficient farming is frequently built due to a limited ability to obtain knowledge and information in a timely and appropriate manner. As a result, closing the productivity gap between research stations and farmer' fields in the delivery of agricultural information services is critical in the fight against poverty and hunger. Recognizing this, AIS establish AICC in several rural locations, which is the focus of this research. While the Agricultural Information and Communication Center (AICC) transfers information, knowledge and technologies to farmers, this study will assess how effective the AICC service is.

1.2 Statement of the problem

Agricultural Information and Communication Center (AICC) is considered as an ICT innovation of Agriculture Information Service (AIS). It plays vital role in presenting technological thoughts, ideas and information to the farmers. In view of the preceding discussion, the researcher undertook this problem entitled, "Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information". This study tried to describe some selected characteristics of the farmers such as age, education, annual family income, ICT ownership, ICT using experience, ICT using confidence, use of ICT, problem faced in getting advisory service from AICC as the experimental variables and to determine the contribution of the selected characteristics of the farmers to their perceived effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information.

Any agricultural information can be diffused within a short time directly to the

farmers by using AICC. For identifying farmers' perception on the Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information and other aspects of the study, it was necessary to know the answers of the following questions:

1. What was the extent of farmers' perception on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information?

2. What were the salient features of the selected characteristics of the farmers?

3. Was there any contribution and effect of the selected characteristics of farmers to/on their perception on the effectiveness of AICC for disseminating agricultural information?

4. What are the problems faced by the farmers in getting advisory service from AICC?

On the basis of the above discussion, the researcher undertook a piece of study entitled "Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating 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 determine the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information as perceived by the farmers

2. To determine and describe some selected characteristics of the farmers

3. To explore the contribution and effect of the selected characteristics of the farmers to/on their perceived effectiveness of AICC for disseminating agricultural information

4. To determine and compare the problems faced by the farmers in getting advisory services from AICC and drawing suggestions to minimize the problems

1.4 Justification of the study

The main focus of the study was to assess the perception of the farmers on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information. It is important to investigate whether or not farmers find it easy to access the AICC. Agricultural Information and Communication Center (AICC) spreads information and knowledge in rural areas of the developing countries. Knowledge and information are effectively improved agricultural and rural development (Gregg & Irani, 2004). Use of ICT as source of information dissemination 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).Information & Communication Center (ICT) has impact on all aspects of life by reducing time, distance and the information gap. Use of Agricultural Information and Communication Center (AICC) are increasing day by day for greater and faster interaction within different groups of people from different societies especially among farmers and AIS targets to establish more AICC which will cover each village of Bangladesh. But very few researchers conducted research on farmers' perception on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information in Bangladesh. Considering the above queries, the researcher deemed it a timely necessity to undertake the present study entitled "Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information".

1.5 Scope and Limitations of the Study

The findings of the study will be particularly applicable to the Faridpur district purposively selected as the locale of the study. Faridpur district has nine (9) Upazillas. All of the Upazillas were purposively selected as the study area for this research. These findings may also be related in other areas of Bangladesh where the physical, socioeconomic 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 effectiveness of Agricultural Information and Communication Center (AICC) for disseminating 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:

1. The study was conducted in only Faridpur district.

2. Population for the present study was kept confined within the members of AICC because they are the reliable to perceive about the effectiveness of Agricultural Information and Communication Center (AICC).

3. Farmers obsessed many characteristics and their characteristics were varied to a great degree. Among those characteristics, only seven (7) characteristics were selected for investigation in the study.

4. Information used by the farmers for various purposes such as farming, business, politics, religion etc. but in this study, only investigated the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information.

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

6. The objectivity of the study is confined to respondents' ability to recall and also to their honesty in providing the essential information.

7. Facts and figures collected by the investigator applied to the circumstances prevailing during the year 2021.

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:

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 provided by the respondents was reliable.
3. The AICC beneficiaries included in the sample were the actual representative of the population. The researcher who acted as interviewer was well adjusted to the social and cultural environment of the study area. Hence, the data collected by her from the respondents were free from bias.
4. The findings of the study will be useful for planning and execution of the extensive and more helpful for effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information.
5. 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.
6. Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information is linearly related with their selected characteristics.

Study on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information was conducted in 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 Agricultural Information and Communication Center (AICC) for disseminating agricultural information.

1.7 Definition of the Key Terms

AICC: Agricultural Information & Communication Center (AICC) established under AIS, 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 who are registered and operated AICC.

AIS: Effective technology development and transfer depends on an interactive, holistic system,   that calls the agricultural information system (AIS) (Roling, 1987).The system includes: a research subsystem ; a dissemination subsystem ;a user subsystem. The system must perform six basic functions in order to ensure the initiation and the continuation of the information flow process: (a) identification of problems at producer level ; (b) generation of innovations; (c) validation under farmers' conditions; (d) dissemination; (e) utilization; and (f) evaluation.

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.

Annual family 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.

ICT ownership: ICT ownership, can be defined as processes where local stakeholders take control and responsibility for the use, implementation, and monitoring of activities related to devices for information and communication purpose.

ICT using Experience: The period of time a farmer uses ICT devices for information   and communication purpose. It is calculated in actual years at the time of interviewing.

ICT using confidence: ICT using confidence can be define as the understanding of a problem or problems related to ICT uses. The higher confidence of a person will be more critical understanding of problems related to ICT uses will be achieved. Thus, through understanding issues of ICT tools in using and learning activities improve understanding of the owned ICT materials.

Use of ICT: Use of ICT referred the rate of using various devices for information and communication by the respondents for information interchange, devices like laptop, smart phone, internet, multimedia instruments etc.

Effectiveness of AICC

Effectiveness of Agricultural Information and Communication Center (AICC) refers to the degree to which AICC is successful for disseminating agricultural information among the farmers.

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 Agricultural Information and Communication Center (AICC) for disseminating agricultural information. The researcher attempted to search the literatures on a number of studies have been conducted on effectiveness of Agricultural Information and Communication Center (AICC). Therefore, the findings of such studies related to the extent of effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information and other partial studies have been reviewed in this Chapter. This chapter deals with general findings on the effectiveness of using ICT, relationship/association between the selected characteristics of the respondents and the effectiveness of AICC, research gap and the conceptual framework of the study.

2.1 General findings on the effectiveness of using ICT

Information and Communication Technologies (ICTs) as defined in this study, relate to all digital information handling and communication technologies, which are significantly more prevalent, particularly in developing countries' rural areas. Davenport and Prusak (1998) digital ICTs (also known as "new ICT"), as well as hard technologies like radio, television, and analogue telecommunication networks, and soft technologies like books, manuals, and newspapers, are all examples of information handling technologies/ICTs. Radio, television, the telephone, and email are examples of beneficial ICT that provide information to the poor and allow them to increase their productivity and revenue. Ssewanyana (2007) reported that in African rural settings, cell phones can sometimes perform successfully when combined with other traditional modes of communication. Bertolini (2004) argued that when comparing the costs and benefits of ICT development, creative ways such as combining ICT based information sources (such as agricultural information systems) with conventional sources (such as

radio broadcasting) should be considered. According to Asia-Pacific Association of Agricultural Research Institutions (APAARI) (2004) for farmers' information needs to be satisfied through use of ICTs are for market related information including price trends, accessing input and support services to be met and getting solutions to individual and community agricultural problems, especially diagnosis of disease and pest problems.

Balaji et al. (2007) radio, television, and mobile phones, in particular, can help to speed up agricultural development by increasing access to informational knowledge services. ICT can be considered as a beneficial instrument in enhancing linkages between research, farmers, and agricultural extension systems from the standpoint of agricultural knowledge and information systems (AKIS).

Sife et al. (2010) described ICTs are effective tools for providing information services because they allow for two way communication and the provision of several services at the same time. Das (2015) showed that 27.47% AICC respondents obtain information from AICC centers while 5.26% AICC farmers get from toll free call-center because they are aware of the services. About 34% of AICC farmers opined that AICCs influence average increase of crop production and about 26% of the farmers believe that their production has increased due to the use of modern technologies learnt from AICCs. Kafura *et al*. (2016) concluded a study and found that few farmers were searching information in AICCs for their farm related issues. They also observed that in AICCs farmers looked for a wide range of information on different farm aspects which may be indicating the effectiveness of the AICC. Mainly farmers asked to the center for agricultural information specially related to crop production and pest control. Hasan *et al*. (2009) found that farmers visited to different ICT centers for seeking agricultural, health and environmental information. Sometimes the AICC provides public service like showing results of public examinations like SSC or JSC examinations. It's also an income source of center. Khan *et al*. (2016) Major proportion of the farmers considered the AICCs as either low or moderately effective to disseminate agricultural information. Pandit and Miah (2015)

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showed that average 50 farmers per day are getting benefit from AICC and through AICC rural farmers can actively participate in the farm telecast and farm broadcast programs by phone in programme to get their desired information.

Aker, Mbiti and Jensen, (2010) in development policy and research, the use of ICT for development has gotten a lot of attention.

De Janvry, Fafchamps, & Sadoulet, (1991) reported that farmers frequently react to price signals in ways that depart from what typical microeconomic demand and supply theory predicts.

Schultz (1964) notes that farmers are surprisingly efficient, given the limits they encounter and the environment in which they operate.

Singh, Squire, & Strauss (1986) following work on agricultural household models that explicitly accounts for farm households' dual roles as producers and consumers of often the same consumables and production factors, a substantial literature has emerged that can explain smallholder behavior as a rational response to missing, incomplete, or inefficient markets.

Foster and Rosenzweig (2010) model technology adoption through extension and demonstrate how learning can minimize uncertainty about a new technology's profitability. Information & Communication Technologies (ICTs) have the potential to change the aforementioned exante risk management measures available to households in a variety of ways. Through contact centers or information offered online, ICTs may make agricultural knowledge and best practices more accessible.

Dercon (2002) price risk is expected to be reduced significantly if traders and agro-processors have access to price information from other marketplaces as well as contact information for traders and agro-processors. Crop (perceived) riskiness will be influenced by weather forecasts. Information & Communication Technologies (ICTs) may also improve the effectiveness of risk management through crop sales. When common shocks occur, many families may opt to sell crops all at once, causing the market to crash. The ineffectiveness of savings as a risk management approach is considerably reduced by the negative correlation

between food and crop prices. There are a number of studies that investigate the effect of ICT on overall market efficiency and arbitrage.

Jensen (2007) found that the introduction of cell phones in Indian fishing communities reduces price dispersion between markets and eliminates waste, consistent with increased spatial arbitrage.

Aker and Fafchamps (2015) found that the introduction of mobile phones promotes grain market integration in Niger, but Aker and Fafchamps (2015) found that producer price dispersion diminishes with the introduction of mobile phones, but only for perishable crops. There have also been a number of studies on the impact of using ICT to provide price information on excess sharing. Svensson and Yanagizawa (2009) reported that price information supplied by radio had a considerable impact, resulting in a 15% increase in the price farmers received.

Goyal (2010) examines the use of internet kiosks to provide price information to Indian soybean growers that sell to wholesale market merchants. She discovered that providing farmers with price information results in a 1–3% boost in farmer prices.

In India, Fafchamps and Minten (2012) looked into the influence of an SMS based pricing dissemination service and found no effect on the price allegedly received.

According to Courtois and Subervie (2015) price information provided through the well known e-Soko initiative led in a 10% increase in maize prices and an 8% increase in groundnut prices in Northern Ghana.

In Rwanda, Futch and McIntosh (2009) found no pricing implications as a result of the adoption of mobile phones. Another characteristic of smallholder farmers is their lack of acceptance of new technologies (Quizon, Feder, & Murgai, 2001), and mobile technology provides a cost effective way to transfer information to remote locations (Nakasone, Torero and Minten, 2014).

Timeliness of information is also important for the effectiveness of extension systems, according to Anderson and Feder (2010).

According to Aker (2011) could be because such knowledge is more subtle and difficult to express. There are no research that we are aware of that look into the impact of extension information supplied via ICTs on agricultural knowledge, practices, or outcomes.

Modern communication technologies, such as the mobile phone or the internet, are critical for development communication and can help a country's socioeconomic advancement. Lucky (2012) found that ICT based communication channels are critical in the spread of agricultural information and, as a result, in agricultural development. Farmers can use ICTs to contact directly with extension agents, ask questions, and receive answers without having to travel to an agricultural extension office or wasting time, which is especially useful for urgent issues. Electronic media, such as radio, television, and the Internet, may deliver information to even the most remote locations where direct contact is difficult.

The modern channels of communication, such as radio and television, as well as the internet, appear to be accessible to urban individuals and elites (Samanta, 1986), however the advent of low cost computing devices such as mobile phones has created a significant opportunity for rural people to stay up to date with advisory services.

The use of new technologies in farming information transfer and future perspectives on new technologies as a power of advancement in poor nations were studied. They discovered that print media, electronic media, radio, and television broadcasts are key sources of information dissemination (Wate and Rivera, 1991).

In terms of time, cost, and distance, ICTs were particularly efficient in improving agricultural programs by facilitating access to new technology, production inputs and market information. He also noted that information and communication technology (ICT) had both direct and indirect effects on poverty reduction. The main direct consequence was better earnings from agricultural production as a result of the adoption of new technology and the main indirect benefit was the

creation of jobs as a result of agricultural commercialization. As a result of the adoption of ICT based services, farmers are able to obtain more information and increase the production of their crops (Kaini, 2007).

Yckini and Hussein (2007) reported that transfer of technology for agricultural research and development in the developing countries is not optimal between the national and international research institutions. This problem is greatly exist even in the transfer of information from the research institutions to the national extension systems, particularly to the end users, i.e., farmers. This means that there is a divide in knowledge between delivery institutions and rural farmers. Despite farmers' access to the internet is still very low in the rural areas, mobile phone based applications might help to overcome those barriers.

Mobile phones can help farmers learn more about agricultural technology by enhancing access to and use of information about them. At each stage of the agricultural production process, farmers require information on a number of topics. Personal interactions, radio and newspapers have traditionally delivered such information in many poor countries. Mobile phones, in comparison to conventional mechanisms, can greatly cut the expenses of obtaining agricultural information.

Mobile phone supports access to information about agricultural technologies and extension services. There are several potential mechanisms including improving access to information from private sources or through agricultural extension services; improving the management of input and output supply chains; facilitating the delivery of other services; increasing the accountability of extension services and increasing linkages with research systems (Aker, 2011).

Rural development can be aided by ICTs by providing rural farmers with new knowledge, up to date information and entrepreneurship skills. Telecenters, according to Parvyn Wamahiu and Etta (2003) have the potential to alter the lives and livelihoods of many people in the developing world, particularly those living in distant areas.

In Tanzania, community radio stations are adopting mobile technology into programming and it is being utilized for agricultural advising services, based on the usability of mobile phones as recording tools, listening devices, money makers, and catalysts for discourse, according to a research (Gakuru et al. 2009).

Overa (2006) found that both producers and traders benefited significantly from their use. The increased speed of communication allowed for more efficient information flows within the network of value chain actors, which saved time and money. As a result, supply and demand were more aligned, and compliance with trading contract requirements was better monitored. Early users of cell phones had one effect: they enhanced their existing merchant relationships and networks, which were established on strong lineage based social systems. New market participants were able to swiftly establish solid trade reputations and encourage the formation of more efficient trading networks by using mobile phones.

According to Jensen (2007), fisherman who used a cell phone to acquire market information received better pricing. This could also be useful for broadcasting weather information. The Mozabique Agricultural Marketing Service (SIMA) collects and disseminates data on market prices, product processing, and availability using a range of media, including text messages, e-mail, the internet, national and rural radio, television and newspapers. As a result, if used properly, ICTs can be beneficial.

Along with the traditional method of technology transmission, a well designed and implemented system could be an efficient way to increase agricultural advising services.

Farmers had a genuine need for market information, land records and services, accounting and farm management information, pest and disease management, rural development programs, and ICT might assist them in gaining access to those services. Information & Communication Technologies (ICTs) help farmers to get timely information yet availability of ICTs is remained limited (Meera S.N. 2004).

2.2 Relation/Association between the selected characteristics of the respondents and the Effectiveness of Agricultural Information & Communication Center (AICC) or related matters

2.2.1 Age and perceived effectiveness of AICC

During the researcher's literature review, no findings on this topic were obtained.

2.2.2 Education and perceived effectiveness of AICC

Kafura et al.(2016) reported that education has a favorable and considerable impact on the effectiveness of agricultural information sources. Education had a good and important impact on the widespread usage of information and communication technologies (Bhuiyan,1988). Education of the winter vegetable growers had moderate association with their use of different information sources (Rahman, 1996).

The 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 (Ullah, 1996).

2.2.3 Annual family income & perceived effectiveness of AICC

Farmers with higher incomes are more likely to get agricultural technology information from AICC than farmers with lower incomes. Farmers with higher incomes invest more in their agricultural fields, necessitating more advanced technology and information, as a result of which they visit AICC and receive a variety of information for their agricultural development. Rich farmers, on the other hand, receive information via SMART phone rather than AICC, however they may also learn it from their own Upazilla AICC. (Kafura et al.2016).

Khan et al. (2016) farmers with larger farms are more likely to make a profit. They are not only involved in rice farming, but also in vegetable farming, poultry and duck farming, animal rearing, and fish farming, all of which contribute significantly. The farmers who have more income are supposed to have more demand of information related to farming activities. So, they have greater access

to AICC and perceived more effective rather than farmers having low family income.

2.2.4 ICT ownership & perceived effectiveness of AICC

Within the first seven months, agricultural call center service employed the mobile phone hotline, with an average of 7.5 phone calls per farmer (Cole & Fernando, 2012). The adoption of mobile phones has exploded as a result of rapid technological advancement. Farmers have picked up on this trend as well. They use cell phones to exchange market data, weather reports, and business information. Farmers can sell their products directly to brokers or agents thanks to technological advancements. Farmers made tentative decisions considerably more readily with mobile phones than without, and farmers obtained, exchanged and manipulated information swiftly, according to the use of mobile phones in

transmitting agricultural information. The findings 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).

2.2.5 ICT using experience & perceived effectiveness of AICC

Shin and Evans (1991) discovered a strong and favorable link between ICT using experience and the effectiveness of AICC. Pandian,S.(2002) discovered a direct link between the influence of video education on knowledge retention and farmers' farming experience. In contrast, Khalil (1998) found that farmers' farming experience was unrelated to their usage of various information sources in his study. However it is assumed that respondents with higher ICT use experience may perceive more effectiveness of AICC. Thus they are positively associated.

2.2.6 ICT using confidence & perceived effectiveness of AICC

 In developing countries, rural communities, particularly farmers, face a variety of hurdles and obstacles when it comes to employing information technology tools such as cellphones. Technical, economical, social, and illiteracy are some of these issues. The lack of literacy and the poor quality of service provided by service providers are major challenges in creating ICT initiatives in rural areas. In the creation and usage of technology, a lack of technological understanding was a major issue. Because the majority of rural people are illiterate, they are unable to learn and use technology tools such as cell phones and the Internet (Samuel, et al. 2005).

2.2.7 Use of ICT for agricultural information & perceived effectiveness of AICC

According to Lio and Liu (2006), there is a substantial link between the use of ICT and the productivity of SAAOs. They believed that using ICTs could help farmers strengthen their bargaining power. Small scale farmers are better able to compete with larger operators now that they have access to information. They can also gain information about crop selection, design products for niche markets and advertise the items directly to consumers. Small farmers are at the whim of global market pressures if they lack access to knowledge and communication capabilities. While a few studies have found that ICT has a considerable positive impact on development, others have been more cautious or even critical. According to Cullen (2003), new technologies can coexist with older ones, but this typically leads to a digital divide. It also implies that the potential cost of resources spent bridging the digital divide may cause other development goals to be overlooked. According to Mutula (2005), resources used to close the digital divide would have a greater impact if they were used to satisfy the basic needs of the poor. He goes on to ask about the outcomes of effective ICT use. Other researchers, Kirlidog and Aydemir (2005), have highlighted reservations about the adoption of western born ICTs in emerging cultures. However, it is now widely established that if used properly, ICT may contribute positively to

development (Heeks, 1999). Use of ICTs either for home or farm related purposes indicate acceptance of those systems by its users. In order words, the more the use of ICTs, the more its users' perceived it as effective. Therefore, it may be concluded that the more use of ICT positively leads to higher perceived effectiveness of AICC.

2.3 Problem faced in getting advisory services from AICC & perceived effectiveness of AICC

Rashid and Islam (2016) identified some problems while farmers using the e-agriculture that, technical problems of different ICT based media in AICC, limited availability of ICT tools and technology in AICC and lack of appropriate ICT based service offers to targeting rural farmers in AICC also some constrains to receive agricultural information from AICC. On the other hand, farmers thought that, lack of management of AICC activities/services and cost of using ICT services from AICC aren't such a problem like above problems because AICC was established in an existing well arranged IPM or ICM club and agricultural information were provided as cost free service from AICC among the member or non member farmers.

2.4 Research Gap

Use of Agricultural Information and Communication Center (AICC) 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 Agricultural Information and Communication Center (AICC) & on the contribution of the selected factors of the farmers to their perception on the effectiveness of AICC for disseminating agricultural information. To the best of the researcher no researchers conducted research on the direct and indirect contribution of the selected factors of the farmers to their perception on the effectiveness of AICC for disseminating agricultural information. Considering the above issues, the researcher deemed it a timely necessity to undertake the present study entitled "Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information.

2.5 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. Conceptual framework is the answer of research questions. 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 effectiveness of Agricultural Information and Communication Center (AICC) for disseminating 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, annual family income, ICT ownership, ICT using experience, ICT using confidence and use of ICT. Problem faced by farmers in getting advisory services from AICC might have influence on the effectiveness of Agricultural Information & Communication Center (AICC). The conceptual model of the study has been presented in Figure 2.1.

Independent variables

1. Age
2. Education
3. Annual family income
4. ICT ownership
5. ICT using experience
6. ICT using confidence
7. Use of ICT

Dependent variable

Effectiveness of Agricultural Information & Communication Center (AICC)

Suggestions to minimize the problems

Problem faced by farmers in getting advisory service from AICC
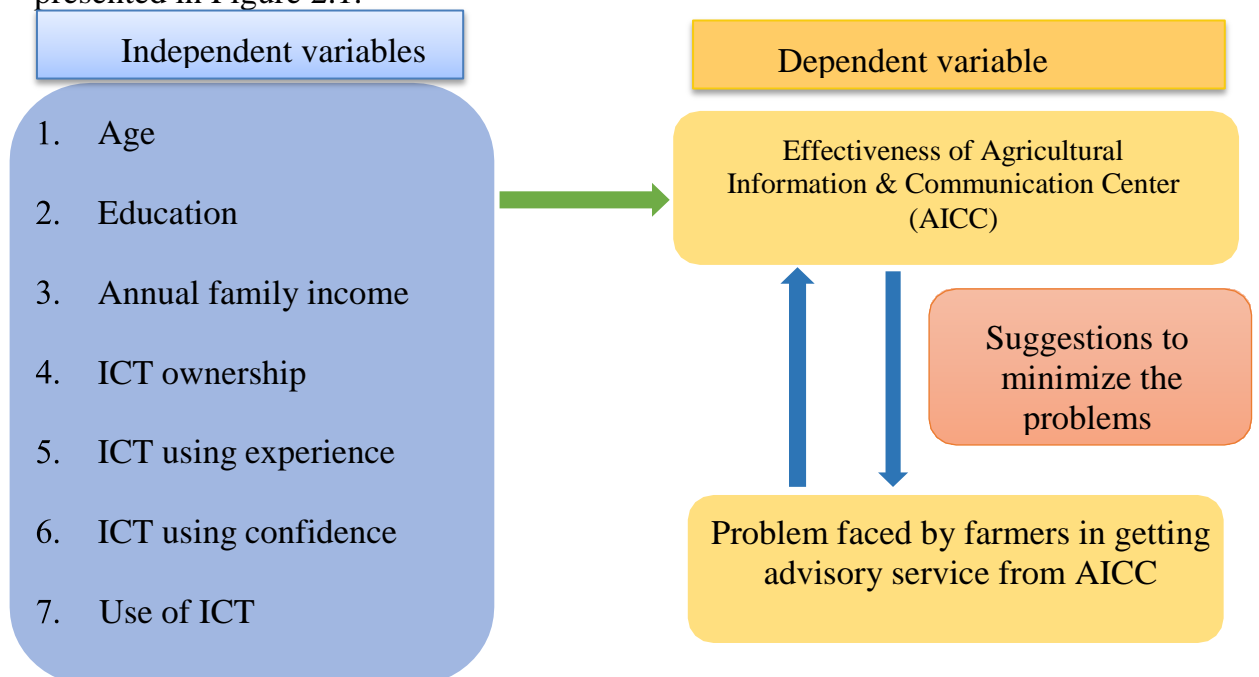
Figure 2.1 The conceptual framework of the study

<div align="center">**CHAPTER III**</div>

<div align="center">**METHODOLOGY**</div>

Methodology in any research deserves a very careful consideration in conducting scientific research. 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, etc.

3.1. Locale of the study

The study was conducted in Faridpur district. Faridpur district was purposively selected as the locale of the study. There are nine (9) Upazillas in Faridpur district. All of these were selected as the locale for this research. A map of Faridpur district showing all the Upazillas is presented in Figure 3.1

Figure 3.1 A map of Faridpur district showing all the Upazillas

3.2 Population of the study

There were nine (9) AICCs in nine (9) upazilla of Faridpur district. A total 439 farmers were found to be members of nine (9) AICCs, that constituted the population of the study.

3.3 Selection of Sample and Sampling Technique

It was impossible to interview all the famers in the study areas due to limitations of time and resources. For this reason, data were collected from the sample farmers rather than population. For proportionate representation, 90 farmers were selected as the sample for the study by taking about 20% of the farmers from each nine AICCs following random sampling method. A reserve list of 19 farmers also prepared (approximately 20% of the sample) for use in case of unavailability of the respondents for any reason. The distribution of the population, sample and the reserve list has been shown in Table 3.1.

Table: 3.1 Population, sample and reserve list of the study

District	Upazilla	No. of AICC members	Sample size	Reserve list
Faridpur district	Faridpur sadar	24	05	1
	Charvadrason	72	15	3
	Alfadanga	40	08	2
	Sadarpur	153	31	6
	Madhukhali	20	04	1
	Vanga	27	06	1
	Nagarkanda	45	09	2
	Shaltha	40	08	2
	Boyalmari	18	04	1
Total		439	90	19

3.4 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 20 farmers of the study area. On the pre-test experiences, necessary additions and modifications of the schedule were done. Appropriate scales were developed to operationalize the characteristics of the farmers. The interview schedule was prepared in Bengali for data collection. A copy of the interview schedule in English version is presented in Appendix-I.

3.5 Variables of the Study

In 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 literatures to widen her understanding about the nature and scope of the variables involved in the research studies. Before selecting variables, the researcher herself visited the study area and talked to the local farmers intimately and she was able to observe the various factors of the farmers, which might have contribution to the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information to the farmers. Based on this experience, literatures for the study, discussion with relevant experts and academicians and also with the research Supervisor, the researcher selected seven (7) characteristics such as age, education, annual family income, ICT ownership, ICT using experience, ICT using confidence and use of ICT as the experimental independent variables. On the other hand, effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information were the main focal/dependent variable of the study. Problems faced by the farmers in getting advisory services from AICCs was also considered for the study to improve the advisory service delivery system of AICC.

3.6 Measurement of independent 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, seven 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/her adoption behavior. The age of respondent farmers was measured by counting the actual years from his/her birth to the time of interview on the basis of his/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 year 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 successful 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/her education score was given as 10, if he/she passes the final examination of class seven, his/her education score was given as 7. If the respondent did not know how to read and write, his/her education score was given as '0' (zero). A score of 0.5 (half) was given to that respondent who could sign his/her name only.

3.6.3 Annual family income

Annual family income of a respondent was measure in thousand ('000') 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

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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 three (3) in the interview schedule as presented in Appendix-I.

3.6.4 ICT ownership

ICT ownership of individual is one of the important factors. Ownership can play an important role on the use of ICT. The ICT ownership of a respondent farmer was measured by determining the possession over the required devices as self, shared access and no access of three selected ICT devices like:

i. Cell phone

ii. Internet and

iii. Computer/laptop/tab/other communication device

Scores of 2,1 and 0 were assigned to self, shared access and no access respectively for each device. Thus, the ICT ownership score ranged from 0-6, where '0' indicated no ownership of ICT and '6' indicated highest ownership of ICT.

3.6.5 ICT using experience

ICT using experience of individual is one of the important factors. Experience can play an important role on the use of ICT. The ICT using experience of a respondent farmer was measured by counting the actual years of his/her use of the ICT devices at the time of interview on the basis of his/her statement. It was measured in terms of actual years. No fractional year was considered for the study. For example, if farmers had 5 years ICT using experience, he /she get 05 score as per year score is 1. This variable appears in item number five (5) in the interview schedule as presented in Appendix-I.

3.6.6 ICT using confidence

ICT using confidence is referred to the level of expertise of ICTs material (10 utilities of ICT materials) used by the farmers. It was expressed in score. The confidence scoring system for each item was done in the following manner:

Confidence Level	Score
Highly confident	3
Fairly confident	2
Little confident	1
Not at all confident	0

This variable appears in item number six (6) in the interview schedule as presented in Appendix-I. The score for ICT using confidence were determined by adding all the scores obtained from all the items. Thus, the score of ICT using confidence could range from 0-30, where '0' indicates no confidence and '30' indicates highest confidence of ICT use.

3.6.7 Use of ICT

Use of ICT is referred to the frequency of ICT materials (7 items of ICT) used by the farmers. It was expressed in score. The usages of ICTs scoring system for each item was done in the following manner:

Extend of use	Score
Frequently	4
Often	3
Occasionally	2
Rarely	1
Not at all	0

This variable appears in item number seven (7) 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 0-28, where '0' indicates no use and '28' indicates highest use of ICTs.

3.7 Measurement of effectiveness of AICC for disseminating agricultural information

The effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information to the farmers was the main focus or dependent variable 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. The effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information to the farmers was measured on the basis of 12 common perception items. Each farmer indicated the extent of his/her perception on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information by checking any one of the following four alternative responses.

These were highly effective, moderate effective, low effective and not at all effective. Scores were assigned in the following manner as used by Ahsan(2020):

Extent of effectiveness	Score assigned
Highly effective	3
Medium effective	2
Low effective	1
Not at all effective	0

The scores for responses against all the 12 items were added together to obtain one's perception on the effectiveness of AICC for disseminating agricultural information. Therefore, effectiveness score of the respondents could range from 0 to 36, where 0 indicates lowest level of effectiveness and 36 indicates highest level of effectiveness of AICC for disseminating agricultural information. An Effectiveness Index (EI) was computed for each effectiveness item by using the formulae:

EI= $f_h \times 3 + f_m \times 2 + f_l \times 1 + f_n \times 0$ Where, EI= Effectiveness Index

f_h = Frequency of respondents perceived high effectiveness

f_m= Frequency of respondents perceived moderate

effectiveness

f_l= Frequency of respondents perceived low effectiveness

f_n= Frequency of respondents perceived not at all effectiveness

Effectiveness Index (EI) for each effectiveness could range from 0 to 270, where '0' indicating lowest effective and '270' indicating highest effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information.

Standardized Effectiveness Index (SEI) was also prepared for each effectiveness item by using the following formulae:

$$SEI = \frac{EI \text{ of the item}}{\text{Highest possible EI (i.e, 270)}} \times 100$$

Thus, the SEI of the items could range from 0-100, where '0' indicating not at all effective and '100' indicates highest effectiveness of AICC for disseminating agricultural information. Based on the descending order of SEI, rank order was made to compare the effectiveness of items.

3.8 Problems faced in getting advisory services from AICC

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

Extent of the problem	Score
Severe problem	3
Moderate problem	2
Low problem	1
No problem	0

This variable appears in item number eight (8) in the interview schedule as presented in Appendix-I. Problems faced in getting advisory services from AICC were measured by the scores against all the problems by the farmers in getting advisory services from AICC. Thus, Problems faced in getting advisory services from AICC score of a respondent could range from 0 to 30 where '0' indicated no problem in getting advisory services from AICC and '30' indicated high problem faced by the farmers in getting advisory services from AICC.

Problem Faced Index (PFI) was computed for each problem to compare the severity of the problems by using the following formulae:

PFI$= f_s \times 3 + f_m \times 2 + f_l \times 1 + f_n \times 0$ Where, PFI= Problem Faced Index

F_s = Frequency of respondents perceived severe problem f_m= Frequency of respondents perceived moderate problem f_l= Frequency of respondents perceived low problem

f_n= Frequency of respondents perceived no problem

Problem Faced Index (PFI) of the problems could range from 0 to 270, where '0' indicating no problem and '270' indicating severe problem faced by the farmers in getting advisory services from AICC.

Standardized Problem Faced Index (SPFI) was also determined for each problem item by using the following formulae:

$$ \text{SPFI} = \frac{\text{PFI of the problem}}{\text{Highest possible PFI (i.e, 270)}} \times 100 $$

Thus, the SPFI of the problem could range from 0-100, where '0' indicating no problem and '100' indicates severe problem faced by the farmers in getting advisory services from AICC. Rank order was made based on the descending order of the SPFI to compare the severity of the problems.

3.9 Collection of Data

Data were collected personally by the researcher herself through face to face interview from the selected respondents. Interviews were usually conducted with the respondents in their own AICCs. 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 cooperation from the respondents and others concerned during the time of interview. The entire process of collecting data took place during 1-31 January 2021.

3.10 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 contribution of the independent variables to dependent variable. If a null hypothesis is rejected on the basis of a statistical test, it is assumed that there is a contribution of the independent variables to dependent variable. The following null hypotheses were formulated for this study:

"*There is no contribution of the selected characteristics of the farmers to their perceived effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information*".

3.11 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 her 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 chapter.

3.12 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 was used in categorizing and describing the selected personal characteristics of the respondents. For clarity of understanding tables were used for presentation of data. Initially, Spearman's rank Correlation Co-efficient (r) was used to explore the relationships among the variables. Full model regression analysis was also done. Due to misleading results from multi-collinearity, Step-wise multiple regression was used to find out the contribution of the independent variables separately to the dependent variable. Finally, path analysis was done to find out the direct and indirect effects of the independent variables to the dependent variable. Throughout the study five percent (0.05) level of probability was used to reject any null hypothesis.

CHAPTER IV

RESULTS AND DISCUSSION

Results and discussion are 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 in following four sections:

First section: Effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information to the farmers

Second section: Selected characteristics of the farmers

Third section: Contribution and effect of the selected characteristics of the farmers to/on their perceived effectiveness of AICC for disseminating agricultural information

Fourth section: Problems faced by the farmers in getting advisory services from AICC and suggestions to minimize the problems

4.1 Effectiveness of Agricultural Information & Communication Center for disseminating agricultural information

Farmers' perception on effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information was measured by computing perception score which could range from 0 to 36. However, the observed scores ranged from 8 to 29 with an average of 19.42 and the standard deviation was 4.18. On the basis of effectiveness of AICC for disseminating agricultural information, the respondents were classified into following three categories:

Categories	Basis of categorization
Low	up to 12
Medium	13-24
High	above 24

Distribution of the farmers according to effectiveness of AICC for disseminating agricultural information is shown in Table 4.1.

Table 4.1 Distribution of the farmers according to effectiveness of AICC as perceived by them

Category	Respondents		Mean	SD
	Number	**Percent**		
Low	7	7.8	19.42	4.18
Medium	72	80.0		
High	11	12.2		
Total	90	100		

Data contained in the Table 4.1 indicate that the overwhelming majority (80%) of the respondent farmers perceived medium effectiveness of Agricultural Information and Communication Center (AICC), while 7.8% of them perceived low effectiveness and 12.2% of them perceived high effectiveness of AICC for disseminating and receiving agricultural information . Khan et.al.(2016) found that major proportion of the farmers considered the AICCs either low or moderately effective to disseminate agricultural information.

4.1.1 Item-wise Effectiveness of AICC for disseminating Agricultural Information

Twelve items were considered to determine the effectiveness of AICC for disseminating agricultural information. Attempt was taken to compare the items based on the descending order of the Standardized Effectiveness Index (SEI) of the items. Measuring procedure of SEI is presented in chapter III .

The observed Standardized Effectiveness Index (SEI) of the items ranged from 23.70 to 72.59 against the possible range of 0-100.Standardized Effectiveness Index (SEI) of the selected items are shown in Table 4.2.

On the basis of SEI, it was observed that "usability of information" ranked first followed by "solving farming problems" and "getting farming information". Fourth to twelve ranked items were "usefulness of farming information", "clarity of information", "completeness of information", "understandability of information", "developing farming condition", "getting weather information for better agriculture", "getting information to improve knowledge on balanced use of natural resources", "getting agricultural input price information" and "getting agricultural product selling price".

Table 4.2 Effectiveness Index (EI) with Rank Order

Sl No.	Effectiveness	Extent of effectiveness with number of respondents					EI	SEI (%)	Rank Order
		Highly effective	Moderately effective	Low effective	Not at all effective	Total			
1	Getting farming information	15	70	5	0	90	190	70.37	3rd
2	Getting weather information for better agriculture	0	8	61	21	90	77	28.52	9th
3	Getting information to improve knowledge on balanced use of natural resources	0	9	53	28	90	71	26.29	10th
4	Getting agricultural input price information	0	10	50	30	90	70	25.92	11th
5	Getting agricultural product selling price	0	8	48	34	90	64	23.70	12th
6	Solving farming problems	22	57	11	0	90	191	70.74	2nd
7	Usefulness of farming information	16	67	7	0	90	189	70.00	4th
8	Developing farming condition	3	73	14	0	90	169	62.59	8th
9	Clarity of information	10	70	10	0	90	180	66.66	5th
10	Completeness of information	11	64	15	0	90	176	65.18	6th
11	Understandability of information	11	63	16	0	90	175	64.81	7th
12	Usability of information	29	48	13	0	90	196	72.59	1st

Data in Table 4.2 show that "usability of information" got the highest SEI (72.59) and hence it was considered as the 1st ranked effective item among all the items. This was due to farmers were able to apply the information that they get from AICC.

"Solving farming problems" got the second highest SEI (70.74) and thus stood second in the rank order among the items. It means that information getting from AICC were effective to solve the farming problems.

"Getting farming information" got the third highest SEI (70.37) and thus stood third in the rank order among the items. It means that farmers were getting effective farming information from AICC.

"Usefulness of farming information" got the fourth highest SEI (70.00) and thus stood fourth in the rank order among the items. Therefore, it may be said that the farming information getting from AICC were useful.

"Clarity of information" got the fifth highest SEI (66.66) and thus stood 5th in the rank order among the items. It means that information getting from AICC were clear to farmers to solve the farming problems.

"Completeness of information" got the sixth highest SEI (65.18) and thus stood 6th in the rank order among the items. Therefore, it may be said that information getting from AICC were complete to understand &solve the farming problems.

"Understandability of information" got the seventh highest SEI (64.81) and thus stood 7th in the rank order among the items. It means that the farming information getting from AICC were easily understandable to farmers.

"Developing farming condition" got the eighth highest SEI (62.59) and thus stood 8th in the rank order among the items. Therefore, it may be said that the farming information getting from AICC were help to betterment farming condition.

"Getting weather information for better agriculture" got the ninth highest SEI (28.52) and thus stood 9th in the rank order among the items. It means that farmers were getting less weather information from AICC.

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"Getting information to improve knowledge on balanced use of natural resources" got the tenth highest SEI (26.29) and thus stood 10th in the rank order among the items. Therefore, it may be said that farmers were getting less information to improve knowledge on balanced use of natural resources.

"Getting agricultural input price information" got the eleventh highest SEI (25.92) and thus stood 11th in the rank order among the items. It means that farmers were getting comparatively less agricultural input price information from AICC.

"Getting agricultural product selling price" got the twelve highest SEI (23.70) and thus stood 12 in the rank order among the items. Therefore, it may be said that the farmers were getting most less agricultural product selling price information from AICC.

4.2 Selected Characteristics of the farmers

Seven characteristics of the farmers were selected to be described and to find out their contribution to their perceived effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information to the farmers. These selected characteristics were age, education, annual family income, ICT ownership, ICT using experience, ICT using confidence and use of ICT. The noticeable topographies of the seven characteristics of the farmers are discussed below:

Table 4.3: The Sailent Features of the Selected Characteristics of the Farmers

Selected Characteristics	Measuring Unit	Rang		Mean	SD
		Possible	Observed		
Age	Score (Year)	-	20-80	44.93	12.86
Education	Score (Year of schooling)	-	0-17	8.03	4.19
Annual family income	Score ('000'taka)	-	50-1500	335.0	337.98
ICT ownership	Score	0-6	1-6	3.62	1.29
ICT using experience	Score (Year)	-	1-20	10.71	4.67
ICT using confidence	Score	0-30	4-30	19.33	8.33
Use of ICT	Score	0-28	4-23	11.96	4.98

4.2.1 Age

The age of the sample farmers ranged from 20 to 80 years with an average of 44.93 years and standard deviation of 12.86. The respondents were classified into following three categories based on their age:

Categories	Basis of categorization (Years)
Young aged	up to 35
Middle aged	36-50
Old aged	>50

Distribution of the farmers according to their age is shown in Table 4.4

Table 4.4 Distribution of the farmers According to their age

Categories (Year)	Respondents		Mean	SD
	Number	**Percent**		
Young aged	27	30.0	44.93	12.86
Middle aged	38	42.2		
Old aged	25	27.8		
Total	90	100		

Data revealed that the highest proportion (42.2%) of the farmers were middle aged compared to 27.8% old and 30% young aged. Khan et al.(2016) also found that most of the respondents were middle aged. Young people are generally receptive to new ideas and things. Actually, young and middle aged people generally may perceive effectiveness of AICC for disseminating Agricultural Information.

4.2.2 Education

Education score of the farmers ranged from 0-17, with an average of 8.03 and standard deviation of 4.19. Education of the respondents was measured by following the procedure as discussed earlier in Chapter 3. Based on their educational scores, the farmers were classified into following five categories:

Categories	Basis of categorization (Year of Schooling)
Can't read or write	0
Can sign only	0.5
Primary education	1-5
Secondary education	6-10
Above secondary education	> 11

Distributions of the respondents according to their education are presented in Table 4.5.

Table 4.5 Distribution of the farmers according to their education

Categories (Score)	Respondents		Mean	SD
	Number	**Percent**		
Can't read or write	1	1.1	8.03	4.19
Can sign only	10	11.1		
Primary education	20	22.2		
Secondary education	39	43.4		
Higher secondary or above	20	22.2		
Total	90	100		

It is determined from the Table 4.5 that majority proportion (43.4%) of the farmers had secondary level of education compared to 22.2% respondents had primary education and 22.2% had above secondary education. only 1.1% of the farmers can`t read or sign, 11.1% of the respondents can sign only. Table 4.2 also revealed that 98.9% of the selected AICC members were literate.

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 problems solving or adoption of technologies in their daily life. Education had positive and significant contribution to the comprehensive use of information and communication media. (Bhuiyan, 1988). 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 to the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information to the farmers. 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 the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information to the farmers.

4.2.3 Annual family income

The annual income score of the respondents ranged from 50 to 1500 with the mean of 335.01 and standard deviation of 337.98. On the basis of annual family income, the respondents were classified into following three categories:

Categories	Basis of categorization ('000' BDT.)
Low income	up to 100
Medium income	100-300
High income	above 300

Distribution of the farmers according to their annual family income is shown in Table 4.6.

Table 4.6 Distribution of the farmers according to their annual family income

Categories (Score)	Respondents		Mean	SD
	Number	**Percent**		
Low	12	13.3		
Medium	49	54.5	335.01	337.98
High	29	32.2		
Total	90	100		

Data in the Table 4.6 show that majority proportion (54.5%) of the farmers had medium annual income compared to 32.2% of the respondents had high annual income and 13.3% had low annual income. The observations showed that the average income score of the farmers was 335.01. Rich farmers also receiving information by using SMART phone rather than AICC while they may be learnt it also from their respective Upazilla AICC. (Kafura *et al*. 2016). 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.

4.2.4 ICT ownership

ICT ownership score of the farmers ranged from 1 to 6 against the possible range of 0- 6, with the mean of 3.62 and standard deviation of 1.29. On the basis of ICT ownership, the respondents were classified into following three categories:

Categories	Basis of categorization
Low ownership	up to 2
Medium ownership	3-4
High ownership	above 4

Distribution of the farmers according to their ICT ownership is shown in Table 4.7.

Table 4.7 Distribution of the farmers according to their ICT ownership

Categories (Score)	Respondents		Mean	SD
	Number	**Percent**		
Low	24	26.7	3.62	1.29
Medium	47	52.2		
High	19	21.1		
Total	90	100		

The Table 4.7 shows that highest proportion (52.2%) of the respondents belonged to medium ICT ownership category, while 26.7% belonged to low ICT ownership and 21.1% belonged to high ICT ownership category. The farmer with low ICT ownership has very little scope to experience about new technologies as their earnings depend on agriculture. On the other hand, the farmer with high ICT ownership can easily adopt new innovation in a part of their ICT using experience and they play the role of early adopters.

4.2.5 ICT using experience

ICT using experience score of the respondents varied from 1 to 20 with a mean of 10.71 and SD of 4.67. On the basis of ICT using experience, the respondents were classified into following three categories:

Categories	Basis of categorization (Year)
Low experience	up to 5
Medium experience	6-10
High experience	above 10

Distribution of the farmers according to their ICT using experience is shown in Table 4.8.

Table 4.8 Distribution of the farmers according to their ICT using experience

Categories (Score)	Respondents		Mean	SD
	Number	**Percent**		
Low	14	15.6		
Medium	35	38.8	10.71	4.67
High	41	45.6		
Total	90	100		

Data shown in the Table 4.8 revealed that majority proportion (45.6%) of the respondents had high ICT using experience compared to 38.8% had medium and 15.6% had low ICT using experience. A strong and favorable link between ICT using experience and the effectiveness of AICC (Shin and Evans1991). Respondents of the study were the members of AICC, which might be the cause for such type of finding.

4.2.6 ICT using confidence

ICT using confidence score of the respondents varied from 4 to 30 against the possible range of 0-30 with a mean of 19.33 and standard deviation of 8.33. On the basis of ICT using confidence, the respondents were classified into following three categories:

Categories	Basis of categorization
Low confidence	up to 10
Medium confidence	11-20
High confidence	above 20

Distribution of the farmers according to their ICT using confidence is shown in Table 4.9.

Table 4.9 Distribution of the farmers according to their ICT using confidence

Categories (Score)	Respondents		Mean	SD
	Number	**Percent**		
Low	19	21.1		
Medium	28	31.1	19.33	8.33
High	43	47.8		
Total	90	100		

Data shown in the Table 4.9 revealed that majority proportion (47.8%) of the respondents had high ICT using confidence, compared to 31.1% had medium and 21.1% had low ICT using confidence. As the respondents of the study were the members of AICC and they were using ICT, that is why similar result was found.

4.2.7 Use of ICT

Use of ICT was scored by the respondents varied from 4 to 23 against the possible range of 0-28 with a mean of 11.96 and standard deviation of 4.98. On the basis of use ICT, the farmers, were classified into following three categories:

Categories	Basis of categorization
Low	up to 9
Medium	10-18
High	above 18

Distribution of the farmers according to their extent of using ICT is shown in Table 4.10.

Table 4.10 Distribution of the farmers according to their use of ICT

Categories (Score)	Respondents		Mean	SD
	Number	**Percent**		
Low	33	36.7		
Medium	45	50.0	11.96	4.98
High	12	13.3		
Total	90	100		

Data shown in the Table 4.10 reveals that half (50%) of the respondents had medium use of ICT in disseminating agricultural information compared to 36.7% and 13.3% had low and high use of ICT in disseminating agricultural information respectively. However, it is now widely established that if used properly, ICT may contribute positively to development (Heeks, 1999). Use of ICT expected to increase the interest of farmers towards AICC.

4.3. Contribution and effects of selected characteristics of the farmers to/on their perceived effectiveness of AICC for disseminating agricultural information

Spearman's rank correlation 'r' was initially used to test the relationships among the variables. The result of co-efficient of correlation among all the variables are presented in Appendix-II.

Correlation analysis showed that out of 7 characters, only five namely education, ICT ownership, ICT using experience, ICT using confidence, use of ICT of the farmers had significant positive relationship with their perceived effectiveness for disseminating agricultural information. Full model regression analysis was also done. Due to misleading results from multi-collinearity, Step-wise multiple regression was used to find out the contribution of the independent variables to the dependent variable. Finally, path analysis was done to find out the direct and indirect effects of the independent variables separately to the dependent variable.

4.3.1 Contribution of the selected characteristics of the farmers to their perceived effectiveness of AICC for disseminating agricultural information

Among the independent variables in isolation would not give a comprehensive picture of the contribution of independent variables to the effectiveness of AICC (dependent variable, Y). The different characteristics of the respondents may interact together to make a combined contribution to the effectiveness of AICC for disseminating agricultural information. Keeping this fact in view linear multiple regression analysis was used to assess the contribution of the independent variables to effectiveness of AICC for disseminating agricultural information.

Droper and Smith (1981) suggested running stepwise multiple regression analysis to insert variables in turn until the regression equation is satisfactory. Therefore, in order to avoid the misleading results due to the problem of multi-collinearity and to determine the best explanatory results, the method of step-wise multiple regressions was employed by involving the independent variables with the effectiveness of AICC for disseminating agricultural information. Therefore, in order to avoid the misleading results due to the problem of multi-collinearity and to determine the best explanatory results, the method of step-wise multiple regression was employed by involving following sets of independent variables with the effectiveness of AICC:

Set-I: All the selected seven (7) independent variables i.e., age (X_1), education (X_2), annual family income (X_3), ICT ownership (X_4), ICT using experience (X_5), ICT using confidence (X_6) and use of ICT (X_7).

After running this set of step-wise regression analysis, it was observed that out of seven (7) independent variables only three (3) variables namely, ICT using experience (X_5), ICT using confidence (X_6) and use of ICT (X_7) were entered into regression equation. The results of this set of step-wise regression are shown in Table 4.11.

Table 4.11 Summary of stepwise multiple regression analysis showing the contribution of all seven (7) independent variables to the effectiveness of AICC

Variables entered	Standardized Partial 'b' coefficient	Value of 't' (with probability level)	Adjusted R^2	Increase in R^2	Variation explained in percent
Use of ICT (X_7)	0.345	2.980 (0.004)	0.472	0.472	47.2
ICT using experience (X_5)	0.246	2.276 (0.025)	0.521	0.049	4.90
ICT using confidence (X_6)	0.237	2.094 (0.039)	0.539	0.018	1.80
Total				**0.539**	**53.9**

Multiple R   = 0.745

R-square   = 0.555

Adjusted R - square = 0.539

F-ratio   = 35.728 at 0.000 level of significance

Data presented in Table 4.11 indicated that the multiple R, R^2 and adjusted R^2 in the step-wise multiple regression analysis were 0.745, 0.555 and 0.539 respectively, and the corresponding F-ratio of 35.728 was significant at 0.000 level. The regression equation so obtained is presented below:

$$Y = 11.283 + 0.345X_7 + 0.246X_5 + 0.237X_6$$

Adjusted $R^2 = 0.539$

F-ratio $= 35.728$

Constant $= 11.283$

This indicated that the whole model of seven (7) variables explained 53.9 percent of the total variation to effectiveness of AICC. But since the standardized regression coefficients (Beta weight) of three (3) variables formed the equation and were significant, it might be assumed that whatever contribution was there, it was due to these three (3) variables.

Set-II: Significant five (5) variables by Spearman's rank correlation i.e. education (X_2), ICT ownership (X_4), ICT using experience (X_5), ICT using confidence (X_6), Use of ICT (X_7). It was observed that out of five (5) independent variables only three (3) variables namely ICT using experience(X_5), ICT using confidence (X_6) and Use of ICT (X_7) were entered into regression equation. It was noted that the two sets of Step-wise multiple regression analysis yielded same results, which is mentioned in Table 4.11. The regression equation so obtained is presented below:

$$Y = 11.283 + 0.345X_7 + 0.246X_5 + 0.237X_6 \qquad \text{Adjusted } R^2 = 0.539$$

$$\text{F-ratio} = 35.728$$

$$\text{Constant} = 11.283$$

This indicated that the whole model of five (5) variables explained 53.9 percent of the total variation in effectiveness of AICC. But since the standardized regression coefficients of three (3) variables formed the equation and were significant, it might be assumed that whatever contribution was there, it was due to these three (3) variables.

The objective of the Step-wise multiple regression models was to find out the contribution of the variables, which were significant only. As per these results, the contribution of the significant individual variables is discussed below:

Use of ICT (X_7)

The co-efficient of correlation showed significant positive relationship between use of ICT of the respondents and their perceived effectiveness of AICC for disseminating agricultural information. Step-wise multiple regression analysis indicated that use of ICT of the farmers had the highest significant and positive contribution (b=0.345) on their perceived effectiveness of AICC for disseminating agricultural information. Use of ICT was by far found to be the most important positive contributor to the effectiveness of AICC.

It is quite logical that the farmers who have more use of ICT would capable to get easily access information from AICC. This might be the reason for the existence of positive contribution of use of ICT to effectiveness of AICC.

ICT using experience (X_5)

The co-efficient of correlation showed significant positive relationship between experience of using ICT of the respondents and their perceived effectiveness of AICC for disseminating agricultural information. Step-wise multiple regression analysis indicated that experience of using ICT of the farmers had second highest significant and positive contribution on their perceived effectiveness of AICC for disseminating agricultural information. Actually, experience of using ICT of the farmers increases their perception on effectiveness of AICC for disseminating agricultural information, which might be the reason for this finding.

ICT using confidence (X_6)

The co-efficient of correlation showed significant positive relationship between confidence of using ICT of the respondents and their perceived effectiveness of AICC for disseminating agricultural information. Step-wise multiple regression analysis indicated that confidence of using ICT of the farmers had third (3rd) significant and positive contribution on their perceived effectiveness of AICC for disseminating agricultural information. Logically, confidence of using ICT of the farmers increases their perception on effectiveness of AICC for disseminating agricultural information.

4.3.2 Direct and Indirect Effects of the Selected Characteristics of the Farmers to their perceived effectiveness of AICC for disseminating agricultural information

In the present study Spearman's rank correlation test, full model linear multiple regression and stepwise multiple regression analysis were conducted. It was not possible to find out the direct effects and indirect effects separately by these tests. But, in path analysis, it was possible to get direct effects and indirect effects separately.

Path coefficient is simply a standardized partial regression coefficient and as such measures the direct influence of one variable upon another and permits the separation of the correlation coefficient into components of direct and indirect effects (Dewey and Lu, 1959). This allows the direct effect of an independent variable and its indirect effect through other variables on the dependent variable (Sasmal and Chakrabarty, 1978). Path coefficient analysis was employed in order to obtain clear understanding of the direct and indirect effects of selected independent variables. Path analysis was done involving the significant variables of step-wise multiple regression analysis.

Direct effect of an independent variable on dependent variable is the standardized beta co-efficient (value of 'b' of regression analysis) of the respective independent variable. Whereas indirect effect of an independent variable through channelled variable is measured by the following formulae:

$e = \sum bxr$ Where,

e = Total indirect effect of an independent variable

b = Direct effect of the variable through which indirect effect is channelled

r = Correlation co-efficient between respective independent variable and Variables through which indirect effect is channelled

Path coefficients showing the direct and indirect effects of significant three (3) independent variables step-wise multiple regression analysis on the effectiveness of AICC have been presented in Table 4.12 and diagrammatically shown in Fig.4.1

Table 4.12 Path coefficients showing the direct and indirect effects of selected characteristics of farmers on their perceived effectiveness of AICC for disseminating agricultural information

Independent variables	Variables through which indirect effects are channelled	Indirect Effects	Total indirect Effect	Direct Effect
Use of ICT (X_7)	ICT using experience (X_5)	0.178		
	ICT using confidence (X_6)	0.180	0.358	0.345
ICT using experience (X_5)	Use of ICT (X_7)	0.251		
	ICT using confidence (X_6)	0.162	0.413	0.245
ICT using confidence (X_6)	Use of ICT (X_7)	0.262		
	ICT using experience(X_5)	0.245	0.507	0.237
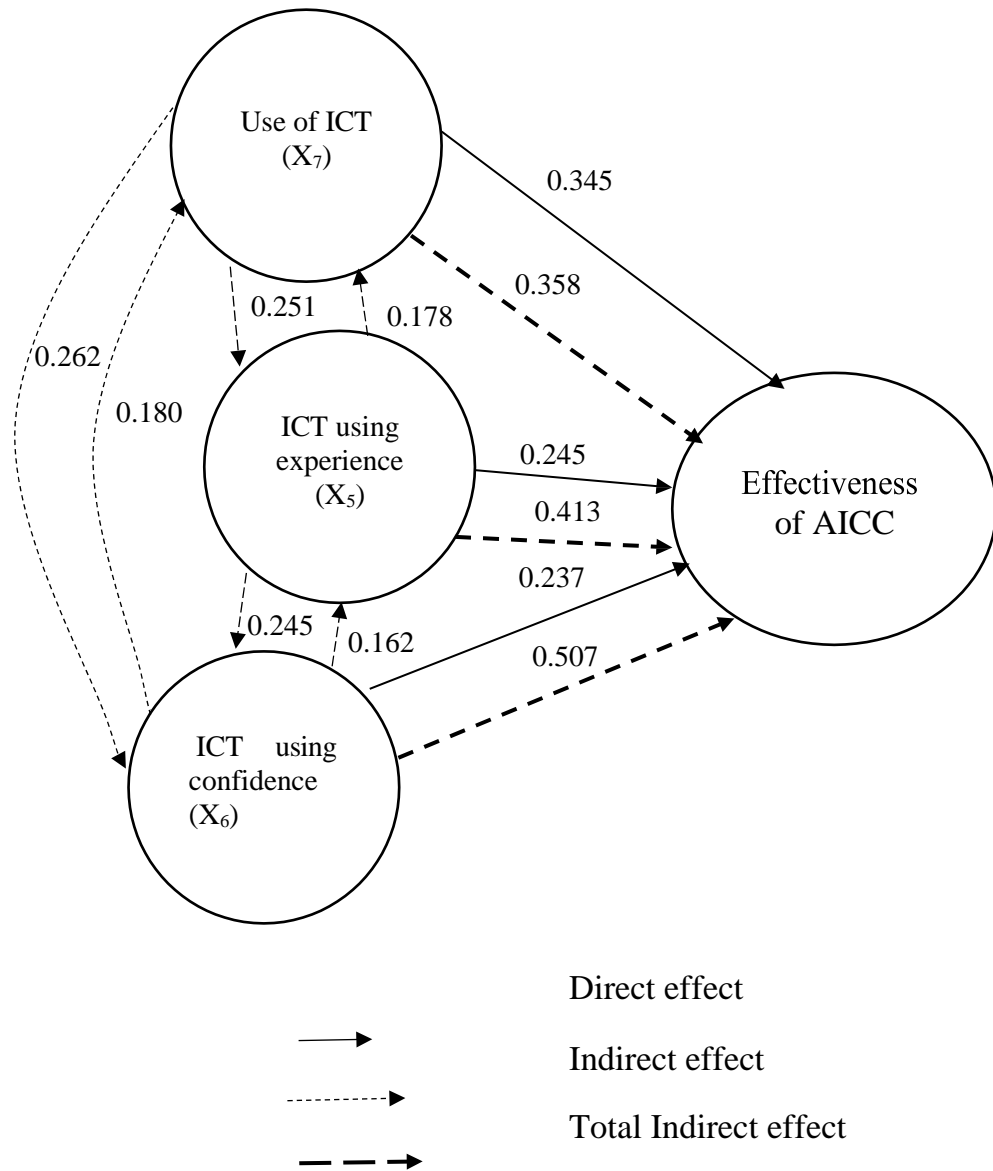
Fig. 4.1 Diagram showing the direct and indirect effect of variables on the effectiveness of AICC

Analysis of data furnished in Table 4.12 indicated that among the independent variables, farmers use of ICT (X_7) had the highest direct effect (0.345) in the positive direction followed by ICT using experience (X_5) in the positive direction (0.245) and ICT using confidence (X_6) in the positive direction (0.237) on their perceived effectiveness of AICC for disseminating agricultural information.

Here, it may be mentioned that without path co-efficient analysis it is not possible to know the indirect effects of an independent variable through other variables on the dependent variable. Therefore, emphasis has been given on the indirect effects which have been obtained from path co-efficient analysis (Table 4.12).

Farmers ICT using confidence (X_6) had the highest (0.507) total indirect effect followed by ICT using experience (X_5) (0.413) and use of ICT (X_7) (0.358) to their perceived effectiveness of AICC for disseminating agricultural information.

On the basis of path analysis, the independent variables having indirect effects on effectiveness of AICC have been presented below in descending order:

ICT using confidence (X_6): Path analysis showed that attitude towards confidence of using ICT (X_6) had the highest total indirect effect (0.507) and a positive direct effect of 0.237 (Table 4.12) on effectiveness of AICC. The indirect effect was mostly channeled positively through use of ICT (X_7) and ICT using experience (X_5).

ICT using experience (X_5): Path analysis showed that ICT use experience (X_5) had the 2nd highest total indirect effect (0.413) and a positive direct effect of 0.245 (Table 4.13) on effectiveness of AICC. The indirect effect was mostly and positively channeled through use of ICT (X_7) and ICT using confidence (X_6).

Use of ICT (X_7): Path analysis revealed that use of ICT use (X_7) had the 3rd highest total indirect effect (0.358) in descending order and highest positive direct effect of 0.345 (Table 4.12) on effectiveness of AICC. The indirect effect was mostly and positively channeled through ICT use experience (X_5) and ICT use confidence (X_6).

4.4 Problems faced by the farmers in getting advisory service from AICC

Problems faced in getting advisory service from AICC means unwanted situation generated during getting advisory service from AICC by the farmers. The observed score of problems faced by the farmers during getting service from AICC ranged from 3 to 23 against the possible range of 0-30 with a mean and standard deviation of 13.56 and 3.92 respectively. On the basis of problems faced in getting advisory service from AICC, the respondents were classified into following three categories:

Categories	Basis of categorization
Low	up to 10
Moderate	11-20
High	above 20

Distribution of the farmers according to in getting advisory service from AICC is shown in Table 4.13.

Table 4.13 Distribution of the farmers according to problems faced in getting advisory service from AICC

Category	Respondents		Mean	SD
	Number	**Percent**		
Low	25	27.8		
Moderate	60	66.7	13.56	3.92
High	5	5.5		
Total	90	100		

The Table 4.13 shows that, two- third (66.7%) of the farmers faced moderate problem in getting advisory service from AICC, while 27.8% and 5.5% farmers faced low and severe problem respectively in getting advisory service from AICC.

The observed Standardized Problem Faced Index (SPFI) of the problems ranged from 4.07 to 89.25 against the possible range of 0-100. Standardized Problem Faced Index (SPFI) of the selected problems is shown in Table 4.14 with rank order of the problems based on descending order of SPFI.

Table 4.14 Problem Faced Index (PFI) with Rank Order

Sl No.	Problems	Number of farmers based on extent of problems faced					PFI	SPFI (%)	Rank Order
		Severe problem	Moderate problem	Low problem	No problem	Total			
1	Lack of operational knowledge of computer	21	19	38	12	90	139	51.48	5th
2	Lack of training facilities on ICT among farmers	33	23	16	18	90	161	54.60	4th
3	Low awareness among rural farmers about AICC	2	10	36	42	90	62	22.96	8th
4	Lack of adequate skill among service providers in AICC	7	24	47	12	90	116	42.96	7th
5	Shyness/Scared of using ICT based media	0	1	26	63	90	28	10.37	9th
6	Low bandwidth speed of internet in AICC	25	35	19	11	90	164	60.74	3rd
7	Technical problems of different ICT based media in AICC	19	51	20	0	90	179	66.29	2nd
8	Limited availability of ICT tools & technology in AICC	68	15	7	0	90	241	89.25	1st
9	Lack of management of AICC activities	5	36	36	13	90	123	45.55	6th
10	Cost of using ICT services from AICC	0	0	11	79	90	11	4.07	10th

On the basis of descending order of SPFI, it was observed that "limited availability of ICT tools and technology in AICC" ranked first problem followed by "technical problems of different ICT based media in AICC", "low bandwidth speed of internet in AICC", "lack of training facilities on ICT among farmers", "lack of operational knowledge of computer", "lack of management of AICC activities", "lack of adequate skill among service providers in AICC", "low awareness among rural farmers about AICC", "shyness/scared of using ICT" and "cost of using ICT services from AICC.

Suggestions to minimize the problems

Attempts was taken to seek suggestions from the respondent AICC members to minimize the problems. Based on their responses important suggestions are mentioned in Table 4.15.

Table 4.15 Suggestions to minimize the problems as opined by the AICC members

Sl. No.	Problems	Suggestions
1	Limited availability of ICT tools and technology in AICC	• Government should provide all necessary ICT tools to the AICC. • Budget should be increased for buying ICT tools.
2	Technical problems of different ICT based media in AICC	• Proper internet connection should be assured. • Maintenance of ICT tools should be followed.
3	Low bandwidth speed of internet in AICC	• Bandwidth speed of internet should be confirmed.
4	Lack of training facilities on ICT among farmers	• Frequent training should be arranged for the farmers. • Technical assistance should be ensured for properly training arrangement.
5	Lack of operational knowledge of computer	• ICT based training program should be arranged. • Learning events like workshop, seminar etc. should be arranged for enhancing ICT knowledge.
6	Lack of management of AICC activities	• Leadership of AICC should be based on experience and skill. • Active member of AICC should be assigned for responsibility.
7	Lack of adequate skill among service providers in AICC	• Service providers of AICC should be trained up properly.
8	Low awareness among rural farmers about AICC	• Arranging group meeting with the local leader. • Arranging focus group discussion with local leader.
9	Shyness\Scared of using ICT based media	• To emphasize the importance of using ICT.
10	Cost of using ICT services from AICC	• The government should provide necessary subsidy to run AICC activities.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of findings

5.1.1 Effectiveness of Agricultural Information & Communication Center

Overwhelming majority (80%) of the respondents perceived medium effectiveness of Agricultural Information and Communication Center (AICC) while, 7.8% of them perceived low effectiveness and 12.2% of them perceived high effectiveness of AICC for disseminating agricultural information.

On the basis of Standardized Effectiveness Index (SEI) "usability of information" ranked first followed by solving farming problems", "getting farming information", "usefulness of farming information", "clarity of information", "completeness of information", "understandability of information", "developing farming condition", "getting weather information for better agriculture", "getting information to improve knowledge on balanced use of natural resources", "getting agricultural input price information", and "getting agricultural product selling price".

5.1.2 Selected characteristics of the farmers

Age: Highest proportion (42.2%) of the farmers were middle aged compared to 27.8% old and 30% young.

Education: Majority proportion (43%) of the farmers had secondary level of education compared to 22.2% and 22.2% had primary and above secondary level of education respectively. Only 1.1% of the farmers can`t read or sign and 11.1% of the respondents could sign their name only.

Annual family income: Majority proportion (54.5%) of the farmers had medium annual income compared to 32.2% of the respondents had high annual income and 13.3% had low annual family income.

ICT ownership: Highest proportion (52.2%) of the respondents belonged to medium ICT ownership category, while 26.7% belonged to low ICT ownership and 21.1% belonged to high ICT ownership category.

ICT using experience: Majority proportion (45.6%) of the respondents had high ICT using experience compared to 38.8% had medium 15.6% had low ICT using experience.

ICT using confidence: Majority proportion (47.8%) of the respondents had high ICT using confidence compared to 31.1% had medium and 21.1% had low ICT using confidence.

Use of ICT: Half (50%) of the respondents had medium use of ICT in disseminating agricultural information compared to 36.7% and 13.3% had low and high use of ICT in disseminating agricultural information respectively.

5.1.3 Contribution/Effect of different individual characteristics of the respondents to/on their perception on effectiveness AICC for disseminating agricultural information

Use of ICT (X_7), ICT using experience (X_5) and ICT using confidence (X_6) of the farmers had significant positive contribution to their perceived effectiveness of AICC for disseminating agricultural information. Each of these three (3) variables had indirect effect on effectiveness of AICC for disseminating agricultural information through other two (2) variables.

5.1.4 Problems faced in getting advisory service from AICC

Two-third (66.7%) of the farmers faced moderate problem in getting services from AICC, while 27.8%% and 5.5% farmers faced low and severe problem respectively in getting services from AICC.

Based on descending order of Standardized Problem Faced Index (SPFI), limited availability of ICT tools and technology in AICC ranked first problem followed by "technical problems of different ICT based media in AICC", "low bandwidth speed of internet in AICC", "lack of training facilities on ICT among farmers", "lack of operational knowledge of computer", "lack of management of AICC activities", "lack of adequate skill among service providers in AICC", "low awareness among rural farmers about AICC", "shyness/scared of using ICT" and "cost of using ICT services from AICC".

5.2 Conclusions

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

- Findings showed that overwhelming majority (80%) of the respondents perceived medium effectiveness compared to 7.8% perceived low and 12% perceived high effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information. Therefore, it can be concluded that farmers' perceived effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information was moderate which need to be improved.

- Half of the respondents had medium use of ICT compared to 37.6% and 13.3% had low and high use of ICT. Step-wise multiple regression analysis indicated that use of ICT of the farmers had strongly significant and positive contribution to their perceived effectiveness of AICC for disseminating agricultural information. It is therefore, concluded that use of ICT of the farmers increased their perceived effectiveness of AICC for disseminating agricultural information.

- Majority proportion (45.6%) of the farmers had high ICT using experience compared to 38.8% and 15.6% had medium and low ICT using experience. ICT using experience of the farmers had strongly significant and positive contribution to their perceived effectiveness of AICC for disseminating agricultural information. Therefore, it may be concluded that ICT using experience of the farmers increased their perceived effectiveness of AICC for disseminating agricultural information.

- Majority proportion (47.8%) of the farmers had high confidence compared to 31.1% and 21.1% had medium and low confidence of using ICT. Step-wise multiple regression analysis indicated that ICT using confidence of the farmers had strongly significant and positive contribution to their perceived effectiveness of AICC for disseminating agricultural information.

Therefore, it may be concluded that farmers having higher ICT using confidence perceived more effectiveness of AICC for disseminating agricultural information.

- Two-third (66.7%) of the farmers faced moderate problem in getting services from AICC, while 27.8%% and 5.5% farmers faced low and severe problem respectively in getting services from AICC.

Based on descending order of Standardized Problem Faced Index (SPFI), limited availability of ICT tools and technology in AICC ranked first problem followed by "technical problems of different ICT based media in AICC", "low bandwidth speed of internet in AICC", "lack of training facilities on ICT among farmers", "lack of operational knowledge of computer", "lack of management of AICC activities", "lack of adequate skill among service providers in AICC", "low awareness among rural farmers about AICC", "shyness/scared of using ICT" and "cost of using ICT services from AICC". Therefore, it may be concluded that here is scope to enhance the effectiveness of AICC by minimizing the sever and moderate problems of the farmers.

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.

- Overwhelming majority (87.5%) of the AICC Members perceived low to medium effectiveness of AICC for disseminating agricultural information. Therefore, it may be recommended that supervising authority of AICC, i.e AIS should take necessary action to enhance the activities of AICC by increasing it's advisory services and necessary supports.

- Use of ICT was an important contributing factor on their perception on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information. Therefore, it may be recommended that AICC should conduct more training programs on ICT use that would make the farmers more aware to get necessary agricultural information through ICT use.

- Experience of using ICT of the farmers had significant contribution to their perceived effectiveness of AICC for disseminating agricultural information. Therefore, it may be recommended that AIS and other advisory service providing organization could help AICC by providing ICT tools to increase the ICT using to increase the effectiveness of AICC for experience of AICC members disseminating agricultural information.

- Farmers' ICT using confidence was an important contributing factor on their perception on the effectiveness of AICC for disseminating agricultural information. Therefore, it may be recommended that, AIS with the help of DAE should provide more training programs for AICC Members on ICT use that would make the farmers more confident for using ICT which could ultimately increase the effectiveness of the member farmers for disseminating agricultural information.

- Majority (72.2%) of the farmers faced medium to severe problems in getting Service from AICC. Therefore, it may be recommended that AIS and other advisory service providing organizations should take necessary action to minimize severe and moderate problems of the AICC members by providing necessary training and supports for enhancing disseminating agricultural information.

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 Agricultural Information and Communication Center (AICC) for disseminating 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:

- The study revealed that use of ICT, ICT using experience and ICT using confidence had significant contribution to the effectiveness of AICC for disseminating agricultural information. Each of these three variables had indirect effect through other two variables. Therefore, it may be recommended that further research should be conducted to verify the results.

- The study was conducted in Faridpur 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.

- Measurement of farmers' perception on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information is not free from questions. Therefore, more reliable measurement procedure of concerned variable is necessary for further study.

- To measure farmers' perception on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating agricultural information the researcher developed a scale and the validity of the scale may be verified by further studies using the same scale.

- The present study was undertaken to explore contribution of seven (7) selected characteristics of the farmers to their perception on the effectiveness of Agricultural Information and Communication Center (AICC) for disseminating 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 Agricultural Information and Communication Center (AICC) for disseminating agricultural information.

References

AIS.(2013). Information   and Communication Technology in Agriculture. Agricultural Information Service, Ministry of Agriculture, Government of the People's Republic of Bangladesh, Dhaka.

Anderson,J.R.(2007). Agricultural Advisory Services, Background Paper for the World Development Report 2008. Agriculture and Rural Development Department, World   Bank, Washington DC.

Aker, J. C. and Mbiti,I.M.(2010). Mobile phones and economic development in Africa. *Journal of Economic Perspectives,* 24(3), 207–232.

Aker, J. C. (2010). Information from markets near and far: Mobile phones and agricultural markets in Niger. *American Economic Journal: Applied Economics,* 2(3), 46–59.

Aker, J. C. (2010). "Dial 'A' for Agriculture: Using Information and Communication Technologies for Agricultural Extension in Developing Countries." Tuft University, Economics Department and Fletcher School, Medford MA02155.

Aker, J.C. (2011). Dial 'A' for Agriculture: Using Information and Communication Technologies for Agricultural Extension in Developing Countries, Washington D.C. Centre for Global Development.

Aker, J. C. and Fafchamps, M. (2015). Mobile phone coverage and producer markets: Evidence from West Africa. World Bank Economic Review, 29(2), 262–292.

Anderson, J. R. and Feder, G. (2004). Agricultural extension: Good intentions and hard realities. World Bank Research Observer, 19(1), 41–60.

APAARI, (2004). Information and Communication Technologies in Agricultural Research for Development in the Asia-Pacific Region: A Status Report. Asia- Pacific Association of Agricultural Research Institutions, Bangkok, Thailand.130p.

Ashan,M.S.(2020).Effect of Crab Farming on the Livelihood as Perceived by Coastal Farmers. Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University.

Akanda, M.J.H .(1994). Mobile phone and Asian economic development , 25 (8), 209- 330.

BBS.(2021).Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics, Statistical division, Ministry of Planning, Government of People's Republic of Bangladesh, Dhaka.

Balaji, V., Meera, S. N. and Dixit, X. (2007). ICT enabled knowledge sharing in support of extension: Addressing the agrarian challenges of the developing world threatened by climate change, with a case study of India. *SAT eJournal4*(1):18.

Bhuiyan, M. S. L. (1988). Use of Communication Media by the Farmers in the Adoption of Selected Improved Farm Practices in Rice Cultivation. M.Sc.(Ext. Ed.) Thesis. Department of Agricultural Extension and Teacher's Training, Bangladesh Agricultural University, Mymensingh.

Bertolini, R. (2004). Making ICTs work for food security. 2020 Africa Conference Brief 11. International Food Policy Research Institute.

Courtois, P. and Subervie, J. (2015). Farmer bargaining power and market information services. *American Journal of Agricultural Economics,* 97(3), 953–977.

Cole, S. A. and Fernando, A. N. (2012). The Value of Advice : Evidence from Mobile Phone-Based.

Cullen.(2003). Effectiveness of TV and its Combination in Transferring Technologies. *Indian Journal of Extension Education*. 15 (L&2): Pp 9-18.

Das S. (2015). The Impact of ICT on agricultural extension service delivery: Experience form agricultural information & communication center in Bangladesh. *Bangladesh J. of Ext. Edu*. 27(1-2):67-79.

Davenport, T. and L. Prusak.(1998).Working Knowledge: How Organizations Manage What They Know. Cambridge, MA: Harvard Business School Press.

Dercon, S. (2002). Income risk, coping strategies and safety nets. World Bank Research Observer, 17 (2), 141–166.

De Janvry, A., Fafchamps, M. and Sadoulet, E.(1991). Peasant household behaviour with missing markets: Some paradoxes explained. *Economic Journal*, 101(409), 1400–1417.

Dewey, D.R. and Lu. K.H.(1959). A Correlation of and Path Co-efficient Analysis of Components of Crested Wheat Grass Seed Production. *Agronomy J.*, 51:515-518.

Droper, N.K. and Smith. H.(1981). Applied Regression Analysis. New York: John Wiley and Sons Inc.

Fafchamps, M. and Minten, B.(2012). Impact of SMS Based Agricultural Information on Indian Farmers. Unpublished manuscript.

Foster, A. D. and & Rosenzweig, M. R. (2010). Microeconomics of technology adoption.Annual Review of Economics, 2, 395–424.

Gabre-Madhin, E., Barrett, C. B., and Dorosh, P. (2002). Technological change and price effects in agriculture: conceptual and comparative perspectives. In T. Bonger,E. Gabre-Madhin, & S. Babu (Eds.), Agriculture technology diffusion and price policy (pp. 3–33). Washington, DC: Ethiopian Development Research Institute and the International Food Policy Research Institute.

Gakuru, M., Winters, K. and Stepman, F.(2009). Inventory of Innovative Farmer Advisory Services using ICTs. The Forum for Agricultural Research in Africa (FARA).

Goode, C.V. (1945). Dictionary of Education New York: McGraw Hill Book Company, Inc.

Goode, W.J. and P.K. Hatt.(1952). Methods of Social Research. New Yeti: McGraw-Hill Book Company, Inc.

Gregg, A. & S. Irani. (2004). Role of communication technologies in rural Development. *Journal of Regional Science.* 15 (2): 109-120.

Goyal, A. (2010).Information, direct access to farmers, and rural market performance in Central India. *American Economic Journal: Applied Economics,* 2, 22–45.

Hasan, R., Islam, S., Rahman, M.S. and K.N.A. Jewel. (2009). Farmers Access to Information for Agricultural Development in Bangladesh. *Bangladesh Research Publications Journal*, 2(1):319-331.

Heeks.(1999).Gender, ICTs and Agriculture. A Situation Analysis for the Consultative Expert Meeting of CTA's ICT Observatory meeting on Gender and Agriculture in the Information Society.

Jensen, R.(2007). The Digital Provide IT, Market Performance and Welfare in the South Indian Fisheries Sector. *Quarterly J. of Economics*, 122(3), 879-924.

Kafura, R.A., Afrad, M.S.I., Prodhan, F.A. and Chakraborty, D.B.(2016). Use of ICT as extension tool by the farmers of Gazipur district in Bangladesh. Indian *Research J. of Ext. Edu.* 16(2).

Khalil, M. I. (1998). Information Sources Used by Farmers in Producing HYV Rice.M.S. (Ag. Ext .Ed) Thesis, Department of Agricultural Extension Education, Institute of Postgraduate Studies in Agriculture (IPSA), Salna, Gazipur.

Kashem, M.A., Faroque, M.A.A., Ahmed,G.M.F. and S.E. Bilkis. (2010). The Complementary Roles of Information and Communication Technology In Bangladesh Agriculture. *Journal of Science Foundation*, 8(1&2): 161- 169.

Krishy Dairy,(2017). Krishy Dairy 2017. Agricultural Information Service, Ministry of Agriculture, Government of the People's Republic of Bangladesh, Dhaka.

Kaini, B.R.(2007). Roles of information and Communication Technologies (ICTs) to Alleviate Poverty through Agricultural Development: ICTs Initiatives in Agricultural Research and Extension System.

Khan, S.M., Rahman,H.M. and N.S.Uddin.(2016). "Effectiveness of AICC in technology transfer as perceived by the farmers". (Unpublished master's thesis). Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.

Kirlidog.and Aydemir. (2005).Relative Value of Mass Media in Extension (4ba). Master Report (M. Ed. In Ext. Ed.).Colorado State University.

Kiplang'at, J.(1999). An analysis of the opportunities for information technology in improving access, transfer and the use of agricultural information in the rural areas of Kenya. *Library Management*.

Lucky, A.T.(2012). Department of Library and Information Science, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.

Lio, M. and Liu, M. (2006). "ICT and Agricultural Productivity: Evidence from Cross-Country Data", *Agricultural Economics*, Vol. 34, Pp. 221-228.

Martiz, J. (2011). How mobile phones are transforming African Agriculture.*Agri4Africa*.

Meera,S.N.(2004). Information and Communication Technology in Agricultural Development: A Comparative Analysis of Three Projects from India. Agricultural Research & Extension Network.

Mutula.(2005). 'I Don't Trust the Phone; It Always Lies': Trust and Information and Communication Technologies in Tanzanian Micro and Small Enterprises. Information Technologies and International Development, 3(4): 67–83.

Man, J.W. and Sadiya, L.(2009). Role of communication technologies Eradicationof Rural Poverty. 15 (2): 109-120.

Nakasone, E., Torero, M., and Minten, B. (2014). The power of information: The ICT revolution in agricultural development. Annual Review of Resource Economics, 6, 533–550.

Overa, R. (2006). Networks, distance and trust: telecommunications development and changing trading practices in Ghana, *World Development*, 34(7):1301-1315.

Parvyn-Wamahiu, ETTA F (eds.).(2003). Information and communication technologies for development in Africa: The experience with community telecentres. Vol. 2.

Payne, J., and S. McCarthy, 2010. African Agriculture and ICT: An Overview. Briefing Paper. USAID.

Pandian, S.(2002). Impact of Video Education on Knowledge Retention. *Indian J. of Extension Education.* 38 (3&4): Pp 153-157.

Pandit, J.C. and M.A.M. Miah. (2015). Farmers Access to ICT Initiatives for Agricultural Information in Bangladesh. *Bangladesh Journal of Extensio Education.*27(1&2):81-92.

Quizon, J., Feder, G., Murgai, R. (2001). Fiscal sustainability of agricultural extension: The case of the farmer field school approach. Journal of International Agricultural and Extension Information, 8(1), 13–24.

Rahman,M.M.(1996). Factors Affecting the Communication Behavior of Winter Vegetable Growres of Sherpur Thana under Bogra District M.Sc.(Ag. Ext. Ed.) Thesis, Department of Agricultural Education, Institute of Postgraduate Studies in Agriculture (IPSA),Salna,Gazipur.

Rashid, S.M.M. and Islam, M.R.(2016). Problems faced by farmers in application of e- Agriculture in Bangladesh. *J. of Agril. Economics and Rural Dev*. 3(1):79- 84.

Rahman,M.H. and M.N.Islam.(2015). ICT in Modernizing Agricultural Extension Services in Bangladesh. *Bangladesh Journal of Extension Education,* 27(1&2):1-7.

Roling, N. (1987). Extension science, information systems in agricultural development. Cambridge Press. ISBN:0521-34437-5. New York. (231s).

Samanta, (1986). A Comparative Study of Adoption of UYV Program by the Farmers' of TV and non-TV Villages, *Indian Journal of Extension Education*. 9 (3&4):92-101.

Schultz, T. W. (1964). Transforming traditional agriculture (p. 212). New Haven, CT: Yale University Press.

Sife, A.S.(2010).Contribution of mobile telephone, radio and television to rural livelihoods and poverty reduction in Morogoro Region,Tanzania. PhD thesis, University of Dares Salaam,Tanzani.

Ssewanyana, J. K. (2007) a. ICT Access and Poverty in Uganda. International Journal of Computing and ICT Research, Vol. 1, No. 2.10-19.

Svensson, J., and Yanagizawa, D. (2009). Getting prices right: The impact of the market information service in Uganda. Journal of the European Economic Association, 7(2–3), 435–445.

Sasmal, B.C. and Chakrabarty.(1978).Correlation and path co-efficient analysis of yield component in mesta (*Hibiscus cannabinus* L.). *Indian J. of Heredity*. 10(2): 19-26.

Samuel, O., Akinsola, Marlien, E. H., and Jacob.(2005). ICT provision to disadvantaged urban communities: A study in South Africa and Nigeria. *International Journal of Education and Development Using ICT,* (1): 13-22.

S.J Singh, I. J., Squire, L., and Strauss, J. (Eds.).(1986). Agricultural household models: Extension, application and policy (p. 335). Baltimore, MD: Johns Hopkins University Press.

Schultz, T. W. (1964). Transforming traditional agriculture (p. 212). New Haven, CT: Yale University Press.

Shin, W.R. and J.F. Evans. (1991). Where staff get information. *Journal of Extension.*29(3). Retrieved 25 May 2004 from http://www.ioe.org. 1991 february.a5.html.

Wate, F.N. and W.M. Rivera. (1991). New Technology for Transferring Agricultural Information. School of Mass Communications. University of Yaounda, Yaunda, Cameroon.

Ullah, A. K. M. (1996). Information Media Used by Vegetable Growers in Kashempur Union Under GazipurSadar Thana, M.Sc. (Ag. Ext. Ed.) Thesis, Department ofAgricultural Extension Education, Institute of Post Graduate Studies in Agriculture (IPSA), Salna, Gazipur.

Yekini,O.T. and Hussein,I.A.(2007).An Assessment of the Relevance of Information Communication Technologies (ICTs) to Agriculture and Rural Development by Research and Extension Personals in South-Western Nigeria. *Nigerian J. of Rural Sociology*. Vol-1. 79-88.

English Version of the Interview Schedule

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University, Dhaka-1207

Interview Schedule for data collection for the Research on

EFFECTIVENESS OF AGRICULTURAL INFORMATION & COMMUNICATION CENTER (AICC) FOR DISSEMINATING AGRICULTURAL INFORMATION

Serial no: ....

Name of the respondent: …………………………………….

Cell Phone Number: …………………………………

Village:..

Thana: …………………………………………….

District: ………………………………….

1. Age

How old are you?

Ans:..................................... years

2. Education

What is the level of your education?

(Give tick mark against appropriate answer)

- Can not read & write ( )

- Can sign only ( )

- Read up to class ....

3. Annual family income

Please mention about your annual family income from different sources in the last year.

SL.NO.	Source of income	Amount of Taka
1.	Field crops(Rice, Wheat, Pulses,Oils etc.)	
2.	Vegetable & fruit production	
3.	Poultry rearing	
4.	Fish culture	
5.	Animal husbandry	
6.	Service	
7.	Business	
8.	Daily wage	
9.	Others (if any)	
	Total	

4. ICT ownership

Please mention your possession and access to the following ICTs.

SL.NO.	Items	Possession Status		
		Self	Shared access	No access
1.	Cell Phone			
2.	Internet			
3.	Computer/ Laptop/Tab/Other Communication device			

5. **ICT using experience**

How many years you are getting information using ICT ……… years?

6. ICT using confidence

Please mention how confident you are to use the following ICTs.

Sl. No.	Items	Confidence Level			
		Not at all Confident	Little confident	Fairly confident	Highly confident
1.	Receiving call by cell phone				
2.	Calling someone by using cell Phone				
3.	Receiving SMS				
4.	Sending SMS				
5.	Receiving MMS				
6.	Sending MMS				
7.	Watching video				
8.	Operate computer/ Laptop/ Tab/ other similar device				
9.	Completing task by using the internet				
10.	Using agricultural Apps				

7. Use of ICT for agricultural information

Please mention your frequency of use of the following ICTs for receiving farm related information e.g., talking to input dealers, marketers, extension support staffs etc.

Sl. No.	Items	Not at all	Rarely	Occasionally	Often	Frequently
1.	Cell phone (voice call, SMS, MMS, video)	No use	1-3times/ month	5-6times/ month	1-3times/ week	>3 times/ week
2.	Internet	No use	1-3times/ month	4- times/ month	1-3times/ week	>3 times/ week
3.	Computer/ Laptop/ Tab/ Other communication Device	No use	1-3times/ month	4- times/ month	1-3times/ week	>3 times/ week
4.	Union information service centre	No use	1-3times/ month	4-6 times/ month	1-3times/ week	>3 times/ week
5.	Agricultural informational service (AIS)	No use	1-3times/ month	4-6 times/ month	1-3times/ week	>3 times/ week
6.	Farmer help line (Krishi jiggasha: 7676), Banglalink krishibaza: 2474)	No use	1-3times/ month	4-6 times/ month	1-3times/ week	>3 times/ week
7.	Agricultural offline apps	No use	1-3times/ month	4-6times/ month	1-3times/ week	>3 times/ week

8. Problem faced in getting advisory Services from Agricultural Information and Communication Center

Please indicate the extent of Problem faced by you in using Agricultural Information and Communication Center.

Sl. No.	Problems	Severe Problem	Moderate Problem	Low Problem	No Problem	Important suggestions for minimizing the problems
1.	Lack of operational knowledge on computer					
2.	Lack of training facilities on ICT among farmers					
3.	Low awareness among rural farmers about AICC					
4.	Lack of adequate skill among service providers in AICC					
5.	Shyness/Scared of using ICT based media					
6.	Low bandwidth speed of internet in AICC					
7.	Technical problems of different ICT based media in AICC					
8.	Limited availability of ICT tools & technology in AICC					
9.	Lack of management of AICC activities					
10.	Cost of using ICT services from AICC					

9. Perceived Effectiveness of Agricultural Information and Communication Center

Please mention the extent of effectiveness of Agricultural Information and Communication Center for disseminating Agricultural information as perceived by you.

Sl. No.	Items	Highly effective	Medium effective	Low effective	Not at all effective
1.	Getting farming information				
2.	Getting weather information for better agriculture				
3.	Getting information to improve knowledge on balanced use of natural resources				
4.	Getting agricultural input price information				
5.	Getting agricultural product selling price				
6.	Solving farming problems				
7.	Usefulness of farming information				
8.	Developing farming condition				
9.	Clarity of information				
10.	Completeness of information				
11.	Understandability of information				
12.	Usability of information				

Thank you for your kind co-operation.

Correlation matrix showing interrelationship among all the variables.

Correlation Matrix

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	Y
X_1	-							
X_2	-0.255*	-						
X_3	-0.144[NS]	.259*	-					
X_4	-0.376**	0.541**	0.286**	-				
X_5	-0.110[NS]	0.352**	0.192	0.650**	-			
X_6	-0.281**	0.648**	0.315**	0.749**	0.683**	-		
X_7	-0.289**	0.497**	0.250*	0.820**	0.728**	0.758**	-	
Y	-0.068[NS]	0.221*	0.167	0.627**	0.639**	0.583**	0.660**	-

[NS] Not Significant, *Significant at 0.05 Level, **Significant at 0.01 Level

Legend

X_1	=	Age	X_5	=	ICT use experience
X_2	=	Education	X_6	=	ICT using confidence
X_3	=	Annual family income	X_7	=	Use of ICT
X_4	=	ICT ownership	Y	=	Perceived effectiveness of AICC