FARMERS' USE OF MOBILE PHONE FOR COMMERCIAL FISH FARMING IN PANCHAGARH DISTRICT

NAZNEEN AKTER LUCKY

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University Dhaka-1207

DECEMBER, 2021

FARMERS' USE OF MOBILE PHONE FOR COMMERCIAL FISH FARMING IN PANCHAGARH DISTRICT

BY

NAZNEEN AKTER LUCKY

REG. NO: 19-10277

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

Semester: July-December, 2021

Approved By:

Prof. Md. Mahbubul Alam, PhD
Supervisor
Department of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University Dhaka1207

Prof. M. Zahidul Haque
Co-Supervisor
Department of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University Dhaka1207

Prof. Dr. Mohammad Zamshed Alam
Professor & Chairman
Department of Agricultural Extension & Information System
Sher-e-Bangla Agricultural University Dhaka-1207

DEPARTMENT OF AGRICULTURAL EXTENSION

AND INFORMATION SYSTEM

Sher-e-Bangla Agricultural University

Sher-e-Bangla Nagar, Dhaka-1207

CERTIFICATE

This is to certify that the thesis entitled **"Farmers' use of Mobile Phone for Commercial Fish Farming in Panchagarh District"** 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 Nazneen Akter Lucky, Registration No. 19-10277 under my supervision and guidance. To the best of my knowledge, no part of the thesis has been submitted for any other degree or diploma. I further certify that any help or source of information received during the course of this investigation has been duly acknowledged.

Dated:

Dhaka, Bangladesh

Prof. Md. Mahbubul Alam, PhD
Supervisor
Department of Agricultural Extension and
Information System
Sher-e-Bangla Agricultural University
Dhaka-1207

DEDICATION

I dedicate this work to my mother Hasina Banu.

Thank you for giving me the foundation in life that has led me this far.

ACKNOWLEDGEMENT

All praises are to the 'Almighty Allah, Omnipresent and Omniscient, who enabled me to accomplish this research work.

The author reckons at first a great pleasure and honor to express her heartfelt gratitude, deepest sense of appreciation, best regards and profound indebtedness to her research supervisor, **Prof. Md. Mahbubul Alam, PhD**, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University, Dhaka for his scholastic guidance, continuous supervision, valuable suggestions and instructions, in completion of the research work as well as in preparing this manuscript.

The author is highly indebted and grateful to her respective teacher and co-supervisor, **Prof. M. Zahidul Haque**, Department of Agricultural Extension & Information System, Sher-e-Bangla Agricultural University, Dhaka, for his helpful comments and suggestions, sincere encouragement, heartfelt and generous cooperation in improving the manuscript.

The researcher reckons special thanks to Md. Abdullah Al Imran Upazila Fisheries Officer of Boda upazila and Kulin Chandra Field Assistant (NATP-2), Atwari upazila, for their cordial support. The researcher is grateful to Dipane Chandra, Md. Abdur Rouf, and Saju Rahman for their cordial help during the data collection of the study.

The author likes to extend cordial thanks to her mother Hasina Banu and thanks to her friends especially Ismath Zahan Sarker for their kind co-operation, and valuable advice during her study.

Finally, the researcher expresses her thanks, and gratefulness to all of her well-wishers and parents.

The Author

LIST OF CONTENTS

Chapter	Title	Page No.
	ACKNOWLEDGEMENT	v
	LIST OF CONTENTS	vi
	LIST OF TABLES	ix
	LIST OF FIGURES	x
	ABSTRACT	xi
I	INTRODUCTION	1
	1.1 Background of the Study	1
	1.2 Statement of the Research	2
	1.3 Objectives of the Study	3
	1.4 Scope and Limitations of the Study	3
	1.5 Assumptions of the Study	4
	1.6 Definition of Important Terms	4
II	REVIEW OF LITERATURE	7
	2.1 Concept of Information and Communication Technology	7
	2.2 Use of Mobile Phone by the farmers for Commercial Fish Farming	8
	2.3 Factors Influencing the Use of Mobile Phone	10
	2.4 Conceptual Framework of the Study	13
III	METHODOLOGY	15
	3.1 Research Design	15
	3.1.1 Locale of the study	15
	3.1.2 Population and sample size	16
	3.1.3 Instrument for data collection	17
	3.1.4 Collection of data	17

LIST OF CONTENTS (CONTD.)

Chapter	Title	Page No.
	3.1.5 Variables of the study	17
	3.1.5.1 Dependent Variable	18
	3.1.5.2 Independent Variables	18
	3.2 Measurement of the Variables	18
	3.2.1 Age	18
	3.2.2 Level of education	18
	3.2.3 Farming experience	18
	3.2.4 Annual family income	19
	3.2.5 Fish farm size	19
	3.2.6 Communication exposure	20
	3.2.7 Fisheries training received	20
	3.2.8 Usefulness of ICT in fish farming	20
	3.2.9 ICT self-efficacy	21
	3.2.10 Use of mobile phone	21
	3.3 Data Analysis	22
	3.3.1 Editing	22
	3.3.2 Coding and tabulation	22
	3.3.3 Categorization of data	22
	3.3.4 Method of data analysis	22
IV	RESULT AND DISCUSSION	23
	4.1 Use of mobile phone	23
	4.2 Selected Characteristics of the Farmers	23
	4.2.1 Age	24
	4.2.2 Level of education	25

LIST OF CONTENTS (CONTD.)

Chapter	Title	Page No.
	4.2.3 Farming experience	25
	4.2.4 Annual family income	26
	4.2.5 Fish farm size	26
	4.2.6 Communication exposure	27
	4.2.7 Fisheries training received	27
	4.2.8 Usefulness of ICT in fish farming	27
	4.2.9 ICT self-efficacy	27
	4.3 Contribution of Selected Factors of Fish Farmers in the use of Mobile Phone for Commercial Fish Farming	29
	4.3.1 Contribution of education on the usage of mobile phones by the farmers	29
	4.3.2 Contribution of communication exposure on the usage of mobile phone by the farmers for commercial fish farming	30
	4.3.3 Contribution of ICT self-efficacy on the usage of mobile phones by the farmer for commercial fish farming	31
V	SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	32
	5.1 Major Findings	32
	5.1.1 Selected factors that influence farmers use of mobile phone	32
	5.1.2 Use of mobile phone for commercial fish farming	34
	5.1.3 Contribution of the factors to farmers' use of mobile phone	34
	5.2 Conclusions	34
	5.3 Recommendations	35
	5.3.1 Recommendation for policy formulation	35
	5.3.2 Recommendation for further study	35
	REFERENCES	37
	APPENDIX-A	42

LIST OF TABLES

Table	Title	Page No.
3.1	Population & sample of the study	17
4.1	Distribution of farmers according to their mobile phone usage behavior	23
4.2	Descriptive statistics of the study	24
4.3	Distribution of farmers according to their age	24
4.4	Distribution of farmers according to their education	25
4.5	Distribution of farmers according to their fish farming experience	25
4.6	Distribution of farmers according to their annual family income	26
4.7	Distribution of farmers according to their fish farm size	26
4.8	Distribution of farmers according to their communication exposure	27
4.9	Distribution of farmers according to their fisheries training received	27
4.10	Distribution of farmers according to their usefulness of ICT	28
4.11	Distribution of farmers according to their ICT self-efficacy	28
4.12	Contribution of selected factors of fish farmers in the use of mobile phone for commercial fish farming	29

LIST OF FIGURES

Figure	Title	Page No.
2.1	Conceptual framework of the study	14
3.1	A map showing Atwari upazila	15
3.2	A map showing Boda upazilla	16

FARMERS' USE OF MOBILE PHONE FOR COMMERCIAL FISH FARMING IN PANCHAGARH DISTRICT

NAZNEEN AKTER LUCKY

ABSTRACT

The key concern of this study was to explore the mobile phone usage behavior of fish farmers for commercial fish farming. Four unions of Atwari and Boda upazila under Panchagarh district were randomly selected as the locale of the study. One hundred (100) farmers were selected as the sample for this study. Data for this study were collected through personal interviews by the researcher herself from July 31 to August 31, 2021. Data were analyzed by Multiple Regression Analysis using SPSS 23.0. Age, level of education, farming experience, annual family income, fish farm size, communication exposure, fisheries training received, usefulness of using ICT, ICT self-efficacy, use of mobile phone were the selected variables for the study. Highest (45%) proportion of the fish farmers frequently used mobile phones for their commercial fish farming. Others were often, occasional, rare or not at all users of mobile phone for commercial fish farming. Considering the inferential statistics, education, communication exposure, ICT self-efficacy had positive and significant contributions to mobile phone use, constituting 70.5% (R^2= 0.705) of the variance. Thus, the study concludes with the recommendation to enable a favorable environment to promote mobile phones in receiving fisheries production and its market information.

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Information and Communication Technologies (ICTs) offer many opportunities to transfer knowledge and information to its users. In the past, the adoption of the mobile phones was primarily by rich people residing in urban areas. Nowadays mobile phones have been adopted by rural and urban populations in developing countries and get a benefit and the latest information regarding weather, market and other related issues (Aker, 2011).

The fishing industry of Bangladesh comprises of three major sub sectors namely the artisanal, industrial and aquaculture. The awareness of the potential of aquaculture to contribute to domestic fish production has continued to increase in the country. This stems from the much-needed fish for domestic production and export. Many species are now being used as culture species consisting of native and exotic fish species. Indigenous or native species include different species of major and minor carps and exotic species includes different Chinese carps, catfishes, perches, etc. A variety of exotic fish species were introduced into fish culture system lately. Genetically Improved Farmed Tilapia (GIFT), Milkfish, Piranha, etc. are newly introduced fish of such type (Rahman, 2005).

Mobile phones significantly reduce communication and information costs for the rural poor. This not only provides new opportunities for rural farmers to obtain access to information on agricultural technologies, but also to use ICTs in agricultural extension services. Since 2007, there has been a proliferation of mobile phone-based applications and services in the agricultural sector, providing information on market prices, weather, transport and agricultural techniques via voice, short message service (SMS), radio and Internet.

Mobile phones have given new thinking and approach to farmers for deciding on getting the market information and weather from the concerned person. Now the farmers can communicate with customers to sell their product at a good price, and they can keep up to date with each other about the market and weather (Goodman, 2005). Farmers can easily get information from market buyers about their commodities prices from their

working places and long distance to market. It can be said that mobile phones have increased networks among larger communities and market buyers in remote areas. Mobile phones have brought significant changes in the prices of the product and farmers are now getting reasonable prices for their produce from the market.

Agricultural information can play a very important role in the development of small farmers. By using communication technologies, farmers can increase their product and their income. Farmers can directly communicate with buyers and customers to sell their products at a good price. Furthermore, in remote areas, farmers still face many problems in use of technologies due to lack of infrastructure and awareness among farmers. Mobile phone technologies have provided a good platform for farmers to share their knowledge and information with each other on time, such as market rates and weather information in developing countries (Munyua, 2007 and Lehr, 2007).

1.2 Statement of the Research Problem

Given the preceding discussion, the researcher undertook this problem entitled "Farmers Use of Mobile Phone for Commercial Fish Farming in Panchagarh District." This study mainly uses mobile phones with Internet or without Internet facilities as the communication media.

This study also tried to explain the contribution of some selected characteristics of the farmers such as age, education, farming experience, annual family income, income from fish farming, communication exposure, fisheries training received, usefulness of using ICT in fish farming, ICT self-efficacy of the farmers. The purpose of the study was to have answer to the following research questions:

- To what extent do farmers use mobile phones for accessing fisheries farming information?
- What are the selected factors that influence farmers to use mobile phones for accessing commercial farm-related information?
- To what extent farmers selected characteristics to contribute their use of mobile phones for accessing farm-related information?

1.3 Objectives of the Study

The objectives of the study are as follows:

i. To determine farmers' mobile phone usage behavior for commercial fish farming,
ii. To describe the selected characteristics of the farmers in relation to their mobile phone usage behavior for commercial fish farming,
iii. To explore the contribution of the selected characteristics of the farmers to their mobile phone usage behavior for commercial fish farming.

1.4 Scope and Limitations of the Study

The study was conducted at Boda and Atwari upazila of Panchagarh district. Nonetheless, the findings may likewise be appropriate to different regions of Bangladesh where the physical, financial and social conditions don't vary much with those of the study area. The motivation behind the study was to have a comprehension of mobile phones and their extent of use by farmers for information access. Considering the time and financial constraints the study was conducted with the listed limitations:

i. The study was limited to Maidandighi and Kajoldighi unions of Boda upazila and Mirzapur and Taria unions of Atwari upazila under Panchagarh district.

ii. The farmers had various characteristics but varied at a great extent. Among those only 9 (nine) characteristics were chosen for this research study.

iii. Population of this study was limited. One hundred (100) farmers were selected randomly as a research sample of the study.

iv. The researcher relied on the information outfitted by the selected farmers during their interview.

v. Different communication media used by the farmers had different purposes, for example, cultivating, business, legislative issues, religion, etc. This study examined the use of various media by the farmers in receiving agricultural information especially, mobile phones.

vi. The researcher gathered statistical data connected to the circumstance prevailing from 31 July to 31 August, 2021.

1.5 Assumptions of the Study

The following assumptions were made in conducting the study:

i. The respondents included in the study sample provided their opinions quite competently and satisfied the queries.
ii. The information that the farmers furnished were reliable.
iii. The mobile phone user farmers who included in the sample were the representative of the population.
iv. The collected data were reliable because the researcher who acted as an interviewer was well adjusted to the social environment of the study area.
v. The study's finding was useful for planning and executing the extensive and more effective use of mobile phones in receiving agricultural information.

1.6 Definition of Important Terms

For clarity of comprehension certain the accompanying terms used frequently all through the study are characterized and defined in alphabetical order:

Age

Age of the respondent was characterized as the timeframe from his birth to the time of interview.

Education

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

Communication

Communication is a process in which participants create and share information with one another in order to reach a mutual understanding. This definition implies that communication is a process of convergence (or divergence) as two or more individuals exchange information in order to move toward each other (or apart) in the meanings that they ascribe to certain events (Valente & Rogers, 1995).

Group media

Group media defines as the recurrence of exposure of the respondents to various group of information, for example, group discussion meetings, farm demonstration meeting, method demonstration meetings and result demonstration meetings.

Individual media

Individual media defines the recurrence of respondents' presentation to various individual information sources, for example, neighbors, companions, relatives, extension workers, local leader, and so on.

Information sources

The term data sources define the media or channels through which different data are diffused among the farmers on various aspects including crops, livestock, fisheries, social forestry, education and other similar matters.

Mass media

The mass media are the mean of communication or instrument or device through which messages are transmitted towards a generally extensive, heterogeneous, and mysterious crowd inside a moderately shorter coordinated structure the source of people's gathering. Mass media incorporated into the study were radio, TV, Internet, face book/tweeter, You Tube etc.

Organizational participation

It characterizes as a relationship of two or more persons which have no less than one face to face meeting per year. Cooperation in an association defines to his participation in the association as general member, executive member or executive officer.

Mobile phone

A portable telephone that sends and receives radio signals through a network of short-range transmitters located in overlapping cells throughout a region, with a central station making connections to regular telephone lines. Also called cellular telephone, mobile phone. A small telephone that people can take with them and use outside their homes called also mobile phone. This is popular and powerful interpersonal communication media.

Technology

Technology is the application of knowledge to reach practical goals. The word technology may also mean the product of such endeavor. The use of technology is widely prevalent in medicine, science, industry, communication, transportation and daily life. Technologies include utensils or machines and intangible tools such as software.

Technology is machinery and equipment that uses the application of scientific knowledge in a particular area for practical purposes, using technical processes, methods, or knowledge with, a function, purpose, or benefit, to improve human life.

ICT self-efficacy

Individuals' belief of their capability to perform a specific task using ICT tools or applications is called ICT self-efficacy. An individual's perceived confidence regarding his/her ability to use a computer (Compeau & Higgins, 1995). Perceptions of ability, beliefs about one's ability to perform a specific behavior or task on a computer is regarded as his/her self-efficacy.

Perceived usefulness

Perceived Usefulness (PU) is one of the independent constructs in the Technology Acceptance Model (TAM). This was defined by Fred Davis as "the extent to which a technology is expected to improve a potential user's performance" (Davis, 1989). It means whether or not someone perceives that technology to be useful for what they want to do.

CHAPTER II

REVIEW OF LITERATURE

The literature review summarizes and analyses previous research on the topic that the author is reporting on. This is an important section for showing readers what is already known about the topic and how the study expands on existing knowledge by introducing new ideas information that has not been discovered before. Therefore, attempt has been made in the present Chapter to review some pertinent reviews. The reviews are presented based on the major objectives of the study. Information collected from different sources are arranged into the following four sections:

2.1 Concept of Information and Communication Technology

Hingorjo & Memom (2021) showed that the majority of the fishermen of the Indus Delta region acknowledged the positive impact of mobile phones in terms of increasing the earnings from fisheries and reducing the risk of fish products wastage and the transport expenses in the fisheries profession.

The rapid expansion in the mobile phone subscription in rural areas provides a significant opportunity to use ICT devices for the modernization of traditional sources of livelihood in far-flung areas (Farooq, 2020).

Achora, Mwiie and Masabo (2019) indicated that mobile telephones were the most popularly used tools to share conservation agriculture information as reported by over 40% of the respondents. Other ICT pathways used included radio, websites information kiosks and newspapers. The results showed that the ICTs were limited to the traditional ICTs. Similar studies by various authors (Norberth, 2018;World Bank, 2017;Mtega & Msungu, 2013) showed that radio, mobile phones and television were still predominant ICTs preferred by smallholder farmers.

Alam & Uddin (2018) revealed that the majority of the respondents (64.5%) had medium usage of ICTs while 21.8% had high and 13.6% had low level of ICTs usage.

The rapid expansion of mobile phone networks in the recent past has unprecedentedly changed the overall communication scenario, especially in rural areas and has benefited the farmers in terms of farm production, planning, marketing of crops, and disaster risk reduction (Duncombe, 2016; Baumüller, 2018).

ICTs are playing a significant role in the development of the fisheries sector, as they enhance the income, productivity, and safety of the fishermen by providing them with an effective mechanism of information sharing (Sabu & Shaijumon, 2018).

Alkhadi and A. N. (2016) conducted a study on the broadness of ICT revealed that 90.3% of the respondents voiced the importance of mobile banking to the Saudi Arabian community. Almost half of the sample (54.8%) believes that both SMS and internet browsers are primary channels in delivering mobile banking services. However, the percentage for internet browsers was higher (35.5%) than for SMS (19.3%) and 19.4 % of the respondents believe that the most probable value of mobile banking is its ability to reach all kinds (various types) of consumers.

Alam S.M.N. (2015) showed that 89.7 % of the respondents had no use to low use of Cell Phone for receiving agricultural information and 10.3 % of the respondents had medium use to high use of Cell Phone for receiving agricultural information at Singair upazilla of Manikganj district in Bangladesh.

Uddin (2015) revealed that about two third (64.5%) of the respondents had medium use of ICT in receiving agricultural information compared to 13.6 % and 21.8 % having low and high use of ICT in receiving agricultural information respectively at Homna upazila of Comilla district in Bangladesh.

Lucky (2012) stated that telephone is a quick way of making "contact" with the extension workers or farmers. It does not need any traveling up and down. Questions can be asked by farmers and answered by an extension worker on the telephone without wasting too much time, especially very urgent questions.

The increasing usage of mobile phones results in direct contact of fish catchers with a wholesaler, reduction in price dispersion, and fewer chances of the wastage of the fish product (Jensen, 2007).

2.2 Use of Mobile Phone by Farmers for Commercial Fish Farming

The use of mobile phones helps reduce market efficiencies in the fisheries sector, which increases their income. In this context, studies conducted in different parts of the developing world indicate a positive impact of mobile phone use on the fish market due to the increased access of fishermen to relevant information (Salia *et al.,* 2011, Ahmed *et al.,* 2021).

Jensen (2007) found that the introduction of mobile phones decreased price dispersion and wastage by facilitating the spread of information for fishermen in Kerala. Both consumers and producers can be benefitted from using ICT. A product may find the most profitable channel for selling products and consumers can compare the products' prices across markets and decide about their shopping. The farmers with no mobile phones faced many problems selling their products and getting market-related information compared to mobile phone users. In rural areas, most farmers cannot contact agricultural experts due to a lack of communication. These people mostly depend on conventional methods of communication like personal contact, bulletin boards, price charts. Often, they failed to obtain necessary information when needed. Thus, accurate and timely information remains as one of the main problems especially for the smallholder farmers (Duncombe, 2011).

ICT can play an important role in adopting technologies in an early stage of development, like no tillage and the genetic modification technology revolution (Fischer *et al.*, 2009).

Meera *et al*., (2004) reported that farmers had the real need to access market information, land records and services, accounting and farm management information, management of pests and diseases, rural development programmers and ICT could help access these services. They found that ICT helped farmers to get timely information however, sufficient availability of ICT facilities was limited. ICT can help to exchange market information, weather report and business information. With the blessings of technology, the farmers can directly contact brokers or agents to sell their products. One of the perceived benefits of modern ICT is greater access to information about marketing prices. It is expected that price information can benefit by improving farmers' bargaining power with traders. Thus, enabling them to realize better prices and reduce arbitrage, wastage, or spoilage (Mittal *et al*., 2010).

Mobile phones have given new thinking and approach to farmers for deciding on getting the market information and weather from the concerned person. Now the farmers can communicate with customers to sell their products at a good price, and they can keep up to date with each other about market and weather (Bayes *et al*., 1999, Goodman, 2005).

Farmers can easily get information from market buyers about their commodities price from their working places and long distance to market. It can be said that mobile phones have increased networks among larger communities and market buyers in remote areas. The overall goal or expected outcome of this research is to see the potential of modern ICT to improve yields and income and to disseminate knowledge to farmers to help them manage risk in an informed manner. Modern ICT can play a role in bridging the information gap and reducing the information asymmetry between farmers and regions. The delivery of information through mobile phones can deliver localized content rapidly. It can thus enhance the dissemination of knowledge and information on technologies, inputs, markets and prices and help in better risk management. This can act as a catalyst to enable better adoption of improved technologies, seed varieties, and farming practices (Mittal, 2009).

Aker (2008) indicated that mobile phones have brought significant changes in the prices of grain and farmers are now getting reasonable prices for their produce from the market.

Mobile phones have provided good opportunities for farmers to directly communicate with buyers and traders to sell their products at a good price and arrive in the market to avoid waste. Furthermore, mobile phones have given a new approach to decide whether to sell their product at a good price or stay for a reasonable price in the market. Another study conducted in Ghana showed that before the mobile phones, farmers spent many days to reach in market but now mobile phones have made their life easy to communicate directly with customers and sell their produce on the spot (Smale & Tushemereiruwe, 2007).

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

2.3 Factors Influencing the Use of Mobile Phones for Commercial Farming

Age

Hingorjo & Memom (2021) found that the fishermen with an age category above 40 years were more convinced about the positive role of mobile phones in fisheries.

Jannat (2015); Okello *et al.* (2012) revealed that age significantly contributed to the impact of using ICT media by the farmers.

Ajani (2014) and Kafura (2015) reported a negative impact of the age of the farmers on the use of different ICT tools for agricultural purposes.

Education

Hingorjo & Memom (2021) found positive impact of education on their use of mobile phone. The ratio of fishermen acknowledging the role of mobile phones in increasing the earnings and reducing transport expenses, the role of the middle man and the wastage of the fish products was higher among the educated fishermen in comparison to their uneducated counterparts**.**

Alam & Uddin (2015) found that education showed a significant and positive contribution to their use of cell phones.

Jannat (2015); Abraham (2006) found that education significantly impacted their use of ICT media.

Farming experience

Rahman (2003) observed that the farming experience of the farmers had no significant contribution of farming experience of the farmers to their adoption of selected technologies by using TV.

Annual family income

Alam & Uddin (2015) revealed that annual family income significantly impacted the use of ICTs by farmers for agricultural information.

Farmers with higher incomes are more likely to get Technology information than farmers with lower incomes. Farmers with higher incomes invest more in their farms. Rich farmers' receiving information via smartphones showed a positive impact on agricultural farming (Kafura *et al.*, 2016).

Fish farm size

Islam (2005) found that farm size of the farmers had a positive and significant contribution to their use of communication media.

Anisuzzaman (1995) found that the farm size of the respondents had no significant contribution to their use of communication media.

Nuruzzaman (2003) in his study revealed, that the farm size of the farmers had no significant contribution to the use of mass media.

Communication exposure

Islam (2005) found that organizational participation of the wheat farmers had a significant positive contribution to their use of communication media. Elsewhere, Nuruzzaman (2003) reported that the organizational participation positively contributed farmers' use of mass media. Therefore, it is assumed that higher the participation in different organization, the higher the use of mobile devices.

Fisheries training received

Khan *et al.* (2017) reported that most of the farmers (92%) did not receive any training. However, evident showed that training helps to improve individual skills in using any technology. Based on that evident, one can conclude that receiving training on ICT uses, farmers use of mobile phone will also increase.

Usefulness of using ICTs

Many studies showed that access to communication technologies impacts the economic, poverty reduction, and agriculture development. The use of mobile phones could increase the efficiency of farmers by providing affordable access of communication technologies in rural areas of developing countries. Abraham (2006) conducted a study in Bangladesh and indicated that mobile phone use increased access to information among men and women and improved their living standards. Similar result was found by Aker (2008).

Role of ICT in agricultural production in Africa reported that ICT played a significant role in a country's development (Horestone, 2012). The main objective of that paper was to assess if the proliferation of ICT on the African continent had any significant impact on agricultural production. The results found that ICT played a significant role in enhancing agricultural production while mobile phones remain a significant contributor to agricultural growth. The result also found that certain socio-economic characteristics such as higher education level and skills were prerequisites for effective improvement in agricultural production due to the adoption and utilization of new technologies.

Farmers had the real need to access market information, land records and services, accounting and farm management information, pests and diseases, rural development

programs and hence ICT could help access those services. ICT projects dealing such services are extremely limited. ICT help farmers to get timely information, yet ICT availability remains limited (Meera, 2004).

Research conducted in Ghana reported that mobile phones stimulate the development of agricultural information and advisory services which positively impact farmers' income and agricultural production (Kora, 2010).

ICT self-efficacy

Compeau & Higgins (1995) defined computer self-efficacy as "an individual's ability to apply his or her computer skills to a wider range of computer related tasks". Therefore, computer self-efficacy represents an individual's perception of his abilities to use computers to perform a task.

Self-efficacy among farmers also causes positive effect in receiving agricultural information through different communication media.

Karimi (2011) showed that among technical factors encouraging ICT usage, access to a specialized person who can solve technical difficulties when facing, got second rank by vocational agricultural educators in Iran.

Burrel (2008) focused on six variables that can influence conception towards ICT usage: self-efficacy, perceived usefulness, perceived ease of use, subjective norm compatibility and job relevance. Many existing papers have proven the influence of self-efficacy, perceived usefulness and perceived ease of use compatibility, and subjective norm on ICT usage.

Frequent use and exposure to ICT help users to form a positive attitude toward ICT. Frequent use informs farmers' positive attitude towards ICTs that they might perceive it as beneficial for their farming. Evidence suggests that ICT self-efficacy and use of ICTs in agricultural marketing information are highly correlated (De Silva *et al*., 2010).

2.4 Conceptual Framework of the Study

This study is concerned with mobile Phones and its extent of use by farmers for commercial farming". Thus, the use of the mobile phones was the dependent variable and nine (9) selected factors of the farmers were considered as the independent variables viz. age, level of education, farming experience, annual family income, fish farm size, communication exposure, fisheries training received, usefulness of using ICT, ICT self-efficacy for this study.

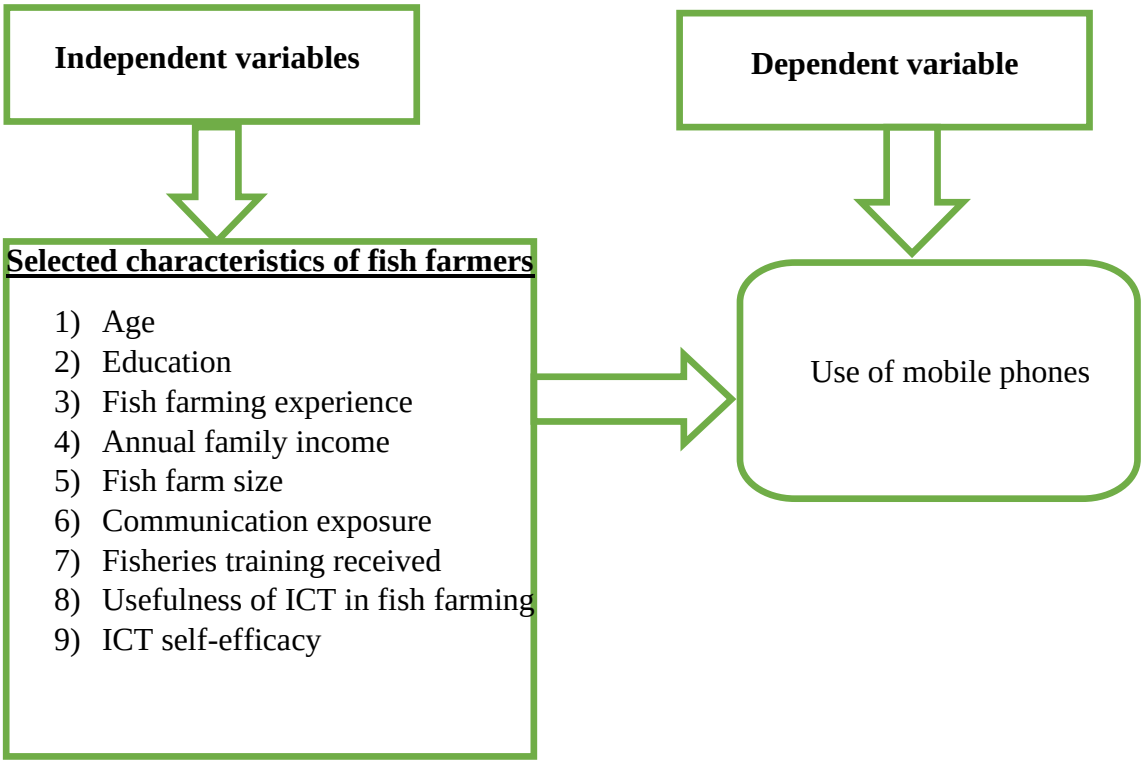


Figure 2.1 Conceptual framework of the study

CHAPTER III

METHODOLOGY

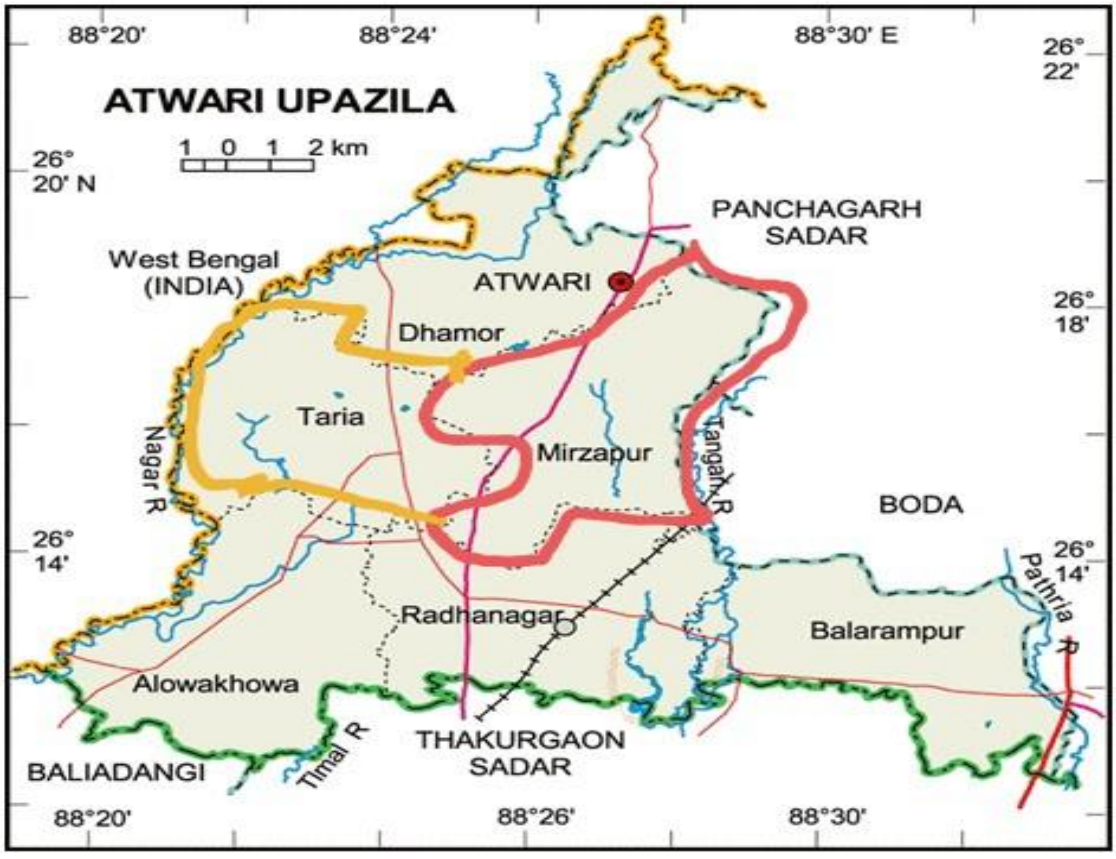
This section deals with the procedures and methods used in this study. This Chapter describes the overview of research design, measurement of variables and the methods applied in data analysis.

3.1 Research Design

3.1.1 Locale of the study

Panchagarh district is selected purposively as it is a potential district of Bangladesh for fisheries practices. There are five upazilas in Panchagarh district, among them Boda and Atwari upazilas were selected purposively. The study was conducted in four unions namely Maydandighi and Kajoldighi of Boda upazila; and Mirzapur and Taria of Atwari upazila. Before selecting these unions, the researcher conducted a thorough discussion with the concerned GOs, NGOs personnel, and local elites to contact targeted farmers. Figure 3.1 and 3.2 show the map of the locale of the study.

Figure 3.1 A map showing Atwari upazila



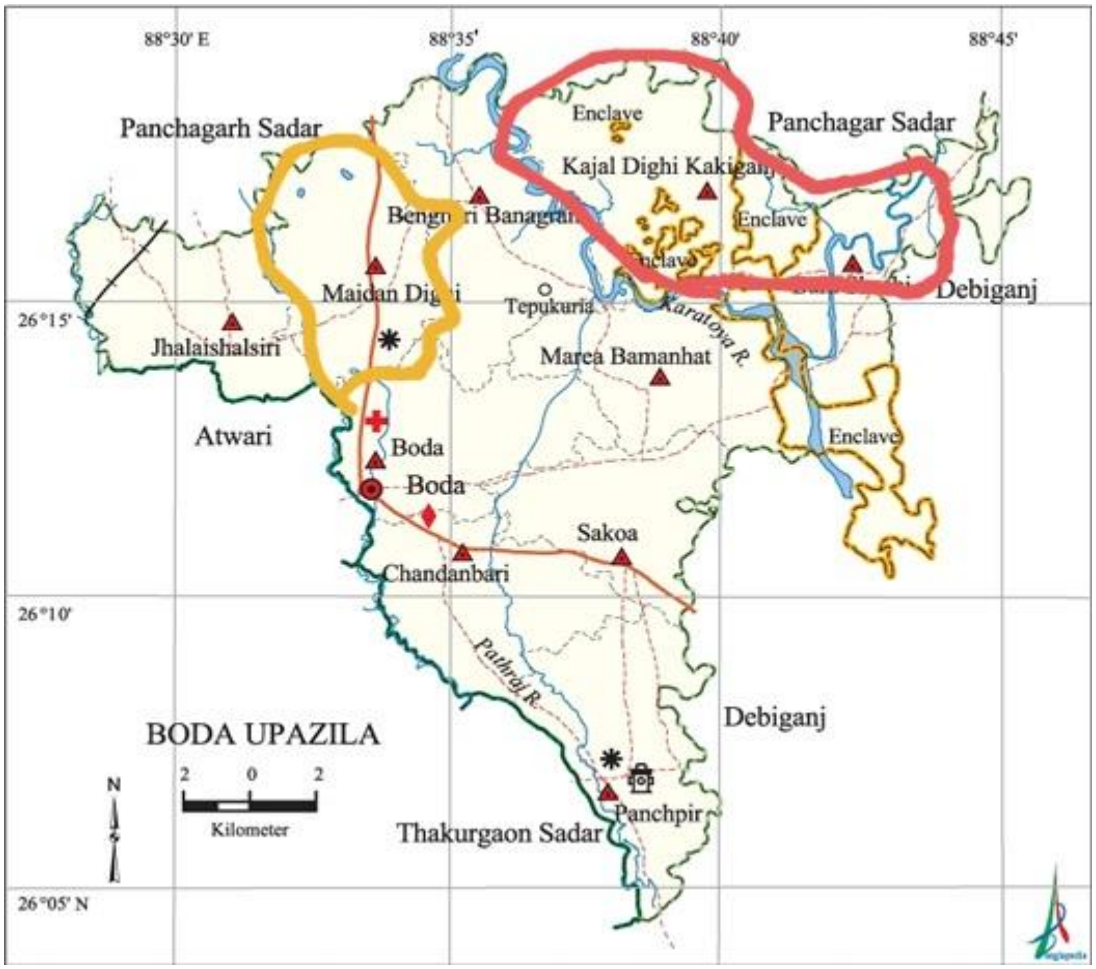


Figure 3.2 A map showing Boda upazila

3.1.2 Population and sample size

Farmers using mobile phones for commercial fish farming in Atwari and Boda upazila under Panchagarh district constituted the population of the study. The list of all the fish farmers of the selected unions were collected. Thus, a total of 640 fish farmers were constituted the population of this study. Due to time and fund constraints, data were collected from the sample rather than the whole population. Fish farmers were selected randomly and proportionately from the unions. Thus, 100 fish farmers were selected as the sample for this study using an online sample determination tool (www.surveysystem.com) at 95% confidence interval with a 9% error rate. Data collection was conducted only once they willingly agreed to participate in the survey voluntarily. The distribution of population and sample size are shown in Table 3.1.

Table 3.1 Population and sample of the study

Upazila	Union	Population size	Sample size	Reserve list
Atwary	Mirzapur	192	30	3
	Taria	128	20	2
Boda	Maydandighi	256	40	4
	Kajoldighi	64	10	1
Total		**640**	**100**	**10**

3.1.3 Instrument for data collection

Since the reasons for the study were to test the hypotheses and measure the variances, a cross-sectional survey strategy was operationalized. Henceforth, data were gathered utilizing an organized meeting plan. Remembering the targets, the study adjusted approved estimation things from earlier investigations, at whatever point conceivable. The beforehand prepared interview schedule was trialed and vital adjustments were completed. In most instances, both closed and opened form questions were used. Approved estimation of each construct with their literature sources was exhibited in an English version of the interview schedule as joined in Appendix-A.

3.1.4 Collection of data

Data for this study were collected through personal interviews by the researcher from July 31 to August 31, 2021. The interview schedule prepared earlier by the researcher was used to gather information. All possible efforts were made to explain the purpose of the study to the respondents in order to get valid and pertinent information from them. Interviews were conducted with the respondents at their homes. While starting interview with any respondent, the researcher took all possible care to establish rapport with them so that they did not feel uneasy or hesitation to furnish proper responses to the questions and statements in the schedule. The questions were explained and clarified whenever any respondent felt difficulty in understanding properly. None of the farmers was interviewed from the reserve list during final collection of data.

3.1.5 Variables of the study

Two types of variables were used for this study as follows:

3.1.5.1 Dependent variable

It is a variable that is the result, outcome, or effect of other variables. This variable is often known as the criterion or outcome variable. The dependent variable depends on the other variables, that is, the independent variable. In this study, the use of mobile phones for commercial fish farming was considered as the dependent variable.

3.1.5.2 Independent variable

It is a variable that the researcher can control over or manipulate to predict another variable (i.e., dependent variable). Therefore, this variable is often called a predictor variable or causal variable. In an experimental setting, a researcher wants to manipulate the variable or introduce new variable to see its effect on the dependent variable. In this study age, level of education, annual family income, farming experience, farm size, communication exposure, fisheries training received, the usefulness of using ICT, ICT self-efficacy were considered as independent variables.

3.2 Measurement of Variables

3.2.1 Age

Age of the fish farmer refers to the period of time from his birth to the time of interview. It was measured in terms of actual years based on his/her response to item No. 1 of the interview schedule (Appendix A).

3.2.2 Education

Education of a respondent was measured by the number of years of successful schooling. A score of one (1) was assigned for each year of schooling completed. For example, if a respondent completed study up to class five, his education score was assigned as 5. Education status of a respondent who could sign only was assigned a score of 0.5 while illiterate fish farmers were assigned a score of 0.

3.2.3 Fish farming experience

Experience in fish farming of the respondent was measured by the number of years a respondent engaged in fish farming. The measurement included from the year of starting of first farming till the year of data collection. A score of one (1) was assigned for each year of experience (Appendix-A).

3.2.4 Annual family income

Annual family income of a respondent was measured in thousand taka on the basis of total yearly earnings of his/her family from agriculture and non-agricultural sources. For determining agricultural income of a respondent, first, annual production of different farm out puts like fisheries, agriculture, livestock etc. was ascertained. Then the total market prices of the above items were determined on the basis of prevailing market price of the items at the time of interviewing. Income of the respondent and other members of his/her family from non–agriculture sources (services, business, others etc.) was also determined. Yearly earnings from agriculture and non-agriculture sources were added together to obtain the total income of the Respondents. Annual income of a respondent was measured in "000" BDT on the basis of total yearly earning from agricultural and non-agricultural sources by the respondent himself and other family members (Appendix-A).

3.2.5 Fish farm size

Fish farm size of a respondent referred to the total area of land on which he carried out the fish farming operation, the area being in terms of full benefit to him. The term refers to the fish farm area either owned by the respondent or culture fish on share-farming lease or taking from other including homestead pond. It was measured in hectares for each respondent using the following formula:

$FS = A + B + 1/2(C + D) + E$

Where, FS = Fish farm size

A= Homestead Pond

B= Own Pond under own cultivation

C= Pond taken from others as borga

D= Pond given to other as borga

E=Pond taken from others on lease

The data was first recorded in terms of local measurement unit i.e., decimal and then converted into a hectare. The total area, thus, obtained is considered as his fish farm size score by assigning a score of one for each hectare of land. This variable appears in item number three (3) in the interview schedule as presented in Appendix -A.

3.2.6 Communication exposure in fish firming

Communication exposure was measured as one's extent of contact to different information sources. Each respondent was asked to indicate his nature of contact for each of 14 selected media with five alternative responses. Following scores were assigned for each of 14 media.

Extent of exposure	Assigned Score
Never	0
Rarely	1
Occasionally	2
Often	3
Regularly	4

Logical frequency was assigned for each alternative response. Thus, the communication exposure scores of fish farmers could range from 0 to 56. Where 0 indicated no exposure and 56 indicated highest communication exposure. This variable appears in item six (6) in the interview schedule as presented in Appendix A.

3.2.7 Fisheries training received

Training of a respondent was measured by the total number of days for which a respondent attended in different training programs on fish farming. If a respondent receives training for 7 days, his training received score was given as seven (7). This variable appears in item number seven (7) in the interview schedule as presented in Appendix -A.

3.2.8 Usefulness of ICT in fish farming

Usefulness of ICT in fish farming was measured as one's extent use of agreement to different statements on usefulness of ICT in fish farming. Each respondent was asked to indicate the usefulness of using ICT with five alternative responses. Following scores were assigned for each of 5 statements:

Extent use of agreement	Assigned score
Strongly disagree	1
Disagree	2
Neither agree nor disagree	3
Agree	4
Strongly agree	5

Thus, the usefulness of ICT scores of fish farmers could range from 5 to 25. Where 5 indicated lowest usefulness of ICT and 25 indicated highest usefulness of ICT for fish farming. This variable appears in item no. eight (8) in the interview schedule as presented in Appendix A.

3.2.9 ICT self-efficacy

Self-efficacy is referred to the level of expertise of ICTs materials (7 utilities of ICTs materials) used by the farmers. It was expressed in score. The efficacy scoring system for each item was done in the following manner:

ICT self-efficacy	Assigned score
Not at all confident	0
Little confident	1
Fairly confident	2
Confident	3
Highly confident	4

The score for ICT using efficacy were determined by adding all the scores obtained from all the items. Thus, the ICT self-efficacy scores of fish farmers could range from 0 to 28 where 0 indicated no efficacy and 28 indicated highest efficacy. This variable appears in item no. nine (9) in the interview schedule as presented in Appendix A.

3.2.10 Use of mobile phone

Use of mobile phone was measured in frequency. Basically, the study considered the extent to which the user uses his/her mobile phone for commercial fish farming. Response was captured in a modified Likert scale ranging from 0 to 4 where 0 indicates no use at all and 4 indicates frequent use of ICT for commercial fish farming. The study did not consider any additional item for this construct but rather used it as a single-item measure. Since this is a frequency rather ordinal scale, a multiple regression analysis was used to test the hypothesis. This variable appears in item no. ten (10) in the interview schedule as presented in Appendix A.

Not at all use	•	•	•	•	•	**Frequently use**
	0	1	2	3	4	

3.3 Data Analysis

3.3.1 Editing

Raw data were properly reviewed for omitting errors. The researcher made careful scrutiny when she completed an interview so that all data were included to facilitate coding and tabulation.

3.3.2 Coding and tabulation

The researcher consulted with the research supervisor and co-supervisor, to make a detailed coding plan. All responses were given in the numerical score. The respondent responses were transferred to a spreadsheet of SPSS to facilitate tabulation. In accordance with the objectives of the research, all of the data were tabulated.

3.3.3 Categorization of data

Collected data were classified into various categories. These categories were developed for each of the variables. The procedures and categorization of a particular variable were discussed in Chapter 4 in detail.

3.3.4 Method of data analysis

Data were analyzed in accordance with the objectives of the research work. Statistical measures such as range, means, standard deviation, number and percentage distribution were used to describe the variables. The analysis of data was performed by using Statistical Package for Social Sciences (SPSS) computer program, version 25. In order to estimate the contribution of the selected factors that might influence fish farmers in the use of mobile phones in receiving farm related information, multiple regression analysis was used. Throughout the study, the 0.05 level of probability was used as the basis for rejecting or accepting a null hypothesis. If the computed value was equal to or greater than the designated significance level (p), the null hypothesis was rejected and it was concluded that the concerned variable significantly contributed to mobile phone use. Whenever the null hypothesis was accepted, it was concluded that there was no contribution of the concerned variables to mobile phone use for commercial fish farming.

CHAPTER IV

RESULT AND DISCUSSION

A consequential and detailed discussion on the findings of the scientific research study has been presented in this chapter. This chapter includes three sections. In the first section, independent variables, i.e., selected factors that influence mobile phone use, have been discussed. The second section dealt with the dependent variable, i.e., the extent of use of the mobile phone for commercial fish farming and finally, the contribution of the independent variables to dependent variable have been discussed in the third section.

4.1 Use of Mobile Phone

The observed score of use of mobile phones ranges from 0 to 4. The average and standard deviation were 2.54 and 1.56, respectively. The categories and distribution of the respondents according to their use of mobile phone for commercial fish farming are shown in Table 4.1.

Table 4.1 Distribution of farmers according to their use of mobile phone for commercial fish farming

Category	**No of farmers**	**Percent**	**Mean**	**SD**
Not use at all	18	18.0	2.54	1.56
Rarely use	9	9.0		
Occasionally use	19	19.0		
Often use	9	9.0		
Frequently use	45	45.0		
Total	**100**	**100.0**		

Table 4.1 shows that 45% of the farmers frequently used mobile phones for their fish farming practices while 18% had no use and the remaining 9%, 19% and 9% of them used mobile phone rarely, occasionally and often, respectively. Therefore, it can be concluded that mobile phone use for commercial farming could be increased at least among half of the respondents.

4.2 Selected Characteristics of the Farmers

Nine (9)characteristics of the farmers were selected to describe and determine their contribution to the use of mobile phones for commercial fish farming. These selected characteristics were age, education, farming experience, annual family income, fish farm size, communication exposure, fisheries training received, usefulness of ICT in

fish farming and ICT self-efficacy. Descriptive statistics of the selected characteristics of the farmers have been presented in Table 4.2.

Table 4.2 Descriptive statistics of the selected characteristics of the fish farming

Characteristics	**Min**	**Max**	**Mean**	**Standard Deviation**
Age	28	88	50.61	14.60
Education	0.0	18.0	8.56	4.61
Farming Experience	2	45	13.09	9.47
Annual family income	310	2000	920.84	363.85
Fish farm size	0.1	4.0	0.38	0.40
Communication exposure	11	56	42.18	12.32
Fisheries training received	0	30	7.87	7.59
Usefulness of using ICT	8	25	17.44	4.20
ICT self-efficacy	1	28	14.08	7.39

4.2.1 Age

Age of the sample farmers ranged from 28 to 88 years with an average of 50.61 and a standard deviation of 14.60. According to their age and based on the classification of Ministry of Youth and Sports, Peoples' Republic of Bangladesh, respondents were classified into three categories as shown in Table 4.3.

Table 4.3 Distribution of farmers according to their age

Categories	**No. of farmers**	**Percent**	**Mean**	**SD**
Young (18 - 35 years)	18	18.0	50.61	14.60
Middle aged (36 - 50 years)	37	37.0		
Old (above 50 years)	45	45.0		
Total	**100**	**100.0**		

Table 4.3 shows that 37% of the farmers using mobile phones for commercial fish farming were middle age while 45% were old and 18% were young. Therefore, majority of the fish farmers (82%) belongs to old to middle aged category. Fisheries farming requires more investment than crops and many are motivated in fish farming for higher profit return. Old and middle-aged farmers are mostly well off compared to the younger counterparts. Hence, the old and middle-aged farmers' involvement in fish farming is higher than young people.

4.2.2 Education

The range of education of the fish farmers was found between 0 to 16 and the average of education was 8.56 years with a standard deviation of 4.60. Fish farmers were classified into five categories based on their education: cannot read and write (0), can sign only (0.5), primary level (1-5), secondary level (6-10) and above secondary level (above 10). The categories and the distribution of the fish farmers according to their education are shown in Table 4.4.

Table 4.4 Distribution of farmers according to their education

Category	**No. of farmer**	**Percent**	**Mean**	**SD**
Can't Read and Write (0)	5	5.0	8.56	4.61
Can Sign Only (0.5)	7	7.0		
Primary Level (1-5)	16	16.0		
Secondary Level (6-10)	45	45.0		
Above Secondary	27	27.0		
Total	**100**	**100.0**		

Table 4.4 shows that 45% of the farmers fall under the secondary level of education category, while 27% above the secondary level, 16% at primary level, 7% can sign only and 5% cannot read and write.

4.2.3 Fish farming experience

Fish farming experience of the respondent farmers was ranged from 2 to 45 years. The average score was 13.09 years. Based on their fish farming experience, the respondent fish farmers were classified into three categories as shown in Table 4.5.

Table 4.5 Distribution of farmers according to their farming experience

Categories	**No. of farmers**	**Percent**	**Mean**	**SD**
Low experience (upto 10)	57	57.0	13.09	9.47
Medium experience (11-20)	29	29.0		
High experience (above 20)	14	14.0		
Total	**100**	**100.0**		

Table 4.5 shows that 29% of the fish farmers had medium fish farming experience, while 57% had lower experience and 14% had high experience in fish farming.

4.2.4 Annual family income

The range of fish farmers' annual family income was found between 105 to 2000 TK (in thousands of TK) and the average income was 920.84TK (in thousands of TK) with a standard deviation of 363.851. Fish farmers were classified into three categories based on their income both agricultural and non-agricultural income source: low income (up to 150 thousand of TK), medium income (151 to 300 thousand of TK) and high income (above 300 thousand TK). The fish farmers' categorization and distribution according to their income, both agricultural and non-agricultural income sources are shown in 4.6.

Table 4.6 Distribution of farmers according to their annual family income

Categories	**No. of farmers**	**Percent**	**Mean**	**SD**
Low income (up to 150)	2	2.0	920.84	363.85
Medium income (151-300)	5	5.0		
High income (above 300)	93	93.0		
Total	**100**	**100.0**		

Table 4.6 shows that 5.0% of the fish farmers had medium income while 93.0 % of the fish farmers had higher income and 2.0% had lower income. Among the different source of income, fisheries contribution is the most. The purpose of the fish farming is income generation and profit maximization. Therefore, the average income of the fish farming families is found to be higher than our national farm family income.

4.2.5 Fish farm size

The range of fish farm size of the farmers was found between 0.1 to 3 Hectare and the average size was 0.37 Hectare with a standard deviation of 0.40. Fish farmers were classified into four categories based on their fish farm size: marginal (upto 0.20 Hectare), small (0.21-1.00 Hectare), medium (1.01-3 Hectare) and large farm (above 3 Hectare). The categorization and the distribution of the fish farmers according to their fish farm size are shown in Table 4.7.

Table 4.7 Distribution of farmers according to their fish farm size

Categories	**No. of farmers**	**Percent**	**Mean**	**SD**
Marginal (upto 0.20)	43	43.0	0.37	0.40
Small (0.21-1.00)	51	51.0		
Medium (1.01-3)	4	4.0		
Large (above 3)	2	2.0		
Total	**100**	**100.0**		

Table 4.7 shows that 51.0% of the farmers had small fish farms while 43.0% had marginal, 4.0% medium and 2.0% had large fish farms.

4.2.6 Communication exposure

The respondents' observed communication exposure scores ranged from 11 to 56 against the possible range of 0-56. The average communication exposure score was 42.18 and the standard deviation was 12.32. Based on the possible range of extension media contact score (0 - 4). The categories and distribution of the farmers were shown in Table 4.8.

Table 4.8 Distribution of farmers according to their communication exposure

Category	**No. of farmers**	**Percent**	**Mean**	**SD**
Low communication exposure (upto 29)	17	17.0	42.18	12.32
Medium communication exposure (30-53)	65	65.0		
High communication exposure (above 53)	18	18.0		
Total	**100**	**100.0**		

Table 4.8 shows that 65% of the farmers had medium communication exposure while 18% had high communication exposure and 17% had low communication exposure for their fish farm management activities.

4.2.7 Fisheries training received

The training exposure score of the fish farmers ranged from 0 to 30 days. The average score was 7.87 days and the standard deviation was 7.59. According to the training exposure score, the fish farmers were classified into four categories such as, ‘no training (0 days), short duration training exposure (1-3 days), medium duration training exposure (4-7 days), and long duration training exposure (above 7 days) and presented in Table 4.9.

Table 4.9 Distribution of farmers according to their fisheries training received

Categories	**No. of farmers**	**Percent**
No training (0 days)	27	27.0
Short duration training exposure (1 -3 days)	13	13.0
Medium duration training exposure (4-7 days)	15	15.0
Long duration training exposure (above 7 days)	40	40.0
Total	**100**	**100.0**

Table 4.9 shows that 27.0% of farmers received no training, 13.0% received short duration training, 15.0% of respondents received medium duration training, while 40.0% received long duration training.

4.2.8 Usefulness of ICT in fish farming

The observed usefulness of ICT tools scores ranged from 8 to 25 against the possible range of 5-25. The average usefulness of ICT score was 17.44 and the standard deviation was 4.2. The categories and distribution of the respondents were shown in Table 4.10.

Table 4.10 Distribution of farmers according to their usefulness of ICT in commercial fish farming

Categories	No. of farmer	Percent	Mean	SD
Low (up to 13)	16	16.0	17.44	4.2
Medium (14-20)	58	58.0		
High (above 20)	26	26.0		
Total	**100**	**100.0**		

Table 4.10 shows that 58% of the farmers perceived mobile phones as moderately useful for their farming practice, while 26% perceived them as high and 16% perceived them as low useful for their farming practices.

4.2.9 ICT self-efficacy

The observed ICT self-efficacy scores of the respondents ranged from 1 to 28 against the possible range of 0-28. The average ICT self-efficacy score was 14.08 and the standard deviation was 7.39. Based on the possible range of ICT self-efficacy score (0-4), the categories and distribution of the respondents are shown in Table 4.11.

Table 4.11 Distribution of farmers according to their ICT self-efficacy

Category	No of farmer	Percent	Mean	SD
Low (up to 9)	31	31	14.08	7.39
Medium (10-18)	38	38		
High (Above 18)	31	31		
Total	**100**	**100**		

Table 4.11 shows that 38% of the farmers are moderately knowledgeable about how to use mobile phones while 31% have high competency and 31% are less confident about using mobile phones. Therefore, it is evident that two-thirds of the respondents (69%) had either low or moderate level of skills using mobile phone. Hence, there is an ample scope of improving this condition by offering training.

4.3 Contribution of Selected Factors of Fish Farmers to their Use of Mobile Phone for Commercial Fish Farming

Multiple regression revealed that among the nine variables, three variables, namely education, communication exposure and ICT self-efficacy, were found to be the significant positive contribution to mobile phone use for commercial fish farming. The remaining six variables, age, farming experience, annual family income, farm size, fisheries training received and usefulness of ICT was not significant at 5% as shown in Table 4.12

Table 4.12 Contribution of selected factors of fish farmers in the use of mobile phone for commercial fish farming

Dependent variable	Independent variables	β	P	R^2	Adj. R^2	F
Use of Mobile Phone	Age	0.166	0.090	0.702	0.672	23.50
	Education	0.385	0.000**			
	Farming experience	0.116	0.275			
	Annual family income	0.023	0.803			
	Fish farm size	0.130	0.082			
	Communication exposure	0.156	0.028*			
	Fisheries training received	0.056	0.425			
	Usefulness of ICT	0.008	0.925			
	ICT self-efficacy	0.461	0.000**			
Dependent Variable: Use of mobile phone ** Significant at p<0.01; *Significant at p<0.05						

These variables altogether contribute 67.2% of the variance of the extent of use of mobile phone (adj. R^2= 67.2%). The overall model was found significant (F=23.503*).

4.3.1 Contribution of education on the usage of mobile phones by the farmers

The contribution of education on mobile phone use was measured by testing the following null hypothesis; “there is no contribution of education on mobile phone usage behavior for commercial fish farming.”

The adjusted p value of the concerned variable was found 0.000. The contribution of education was significant at 5% level. So, the null hypothesis could be rejected.

From Table 4.12, unstandardized coefficients, beta was obtained 0.130 and standardized beta coefficient 0.385 which clearly represent the positive contribution to education on the mobile phone usage behavior of the farmers. The higher the education, the usage of mobile phone by the farmers is higher and lower the education, the lower the use of mobile phone.

Based on the above finding, it was concluded that a fish farmer with more education increased mobile phone usage. Education broadens the horizon and an educated person is more capable of judging adopting a technology. Therefore, they can make more consent decisions regarding technology adoption.

4.3.2 Contribution of communication exposure on the usage of mobile phone by the farmers for commercial fish farming

The contribution of communication exposure to the usage of mobile phones was measured by testing the following null hypothesis; "there is no contribution of communication exposure of the farmer to their use of mobile phone for commercial fish farming."

The p-value of the concerned variables was found 0.028. The following observations were made on the basis of the value of the concerned variable of the study under consideration. The contribution of communication exposure was significant at 5% level. So, the null hypothesis could be rejected.

From Table 4.12, unstandardized coefficients beta was obtained 0.020 and standardized beta coefficient 0.156 which clearly represents the positive contribution of communication exposure to the mobile phone usage behavior of the farmers. As higher the communication exposure, the usage of mobile phone by the farmers is higher and lower the communication exposure, lower the use of mobile phone by the farmers for commercial fish farming.

Based on the above finding, it was concluded that a respondent with more communication exposure increased mobile phone usage. Communication exposure broadens the horizon and the person is more capable of judging the pros and cons of adopting a technology. Therefore, they can make more consent decisions regarding technology adoption.

4.3.3 Contribution of ICT self-efficacy to the usage of mobile phones by the farmer for commercial fish farming

The contribution of ICT self-efficacy to the usage of mobile phones was measured by testing the following null hypothesis; “there is no contribution of ICT self-efficacy of the farmer to their use of mobile phone for commercial fish farming.”

The p-value of the concerned variables was found 0.000. The contribution of ICT self-efficacy was significance at 5% level. So, the null hypothesis could be rejected.

From Table 4.12, unstandardized coefficients, beta was obtained 0.097 and standardized beta coefficient was 0.461 which clearly represents the positive contribution of ICT self-efficacy to the mobile phone usage behavior of the farmers. The higher the ICT self-efficacy, the higher the use of mobile phones by the farmers and lower the ICT self-efficacy, lower the use of mobile phone for commercial fish farming.

Based on the above finding, it was concluded that a respondent with more ICT self-efficacy increased mobile phone usage. ICT self-efficacy broadens the horizon and the person is more capable of judging the pros and cons of adopting a technology. Therefore, they can make more consent decisions regarding technology adoption.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Major Findings

5.1.1 Selected factors that influence farmers use of mobile phone

Age

Highest proportion (45%) of the respondents was under old aged category compared to 37% middle and 18% young aged. The standard deviation was 10.87 and mean was 47.78.

Education

Almost all of the farmers had a different level of education. Among them, 45% of the respondents were comprised of secondary education, 16% had primary education,7% could sign only, 5% couldn't read and write, and the rest 27%, were above higher secondary education level.

Fish farming experience

Fish farming experience of the respondent fish farmers was ranged from 2 to 45 years. The highest proportion (57%) of the fish farmers had lowest fish farming experience, meaning they are culture fish up to 10 years. The medium experienced fish farmers 29% and 14% had high experience in fish farming. The average fish farming experience of the farmers in the studied area was 13.09 years. The majority, 86% of the respondents, had low to medium experience, indicating the young generation involved in fish farming.

Annual family income

The annual family income of the respondent ranged from 105 to 2000 (*000*) TK. The highest proportion (93%) of the fish farmers had highest annual family income, meaning they earned above 300 TK. The lower family income farmers, 2% and 5% had medium family income. As the average annual family income of the farmers in the studied area was 920.84TK. A high proportion of farmers are commercially involved with farming.

Fish farm size

Farm size of the respondent fish farmers was ranged from .1 to 4.0 Hectare. The highest proportion (51%) of the fish farmers had small fish farm ranged from 0.21 to 1 Hectare. While the marginal farms proportion was 43%, medium 4% and large farms 2%. As the average fish farm size in the studied area was 0.37 Hectare and standard deviation was 0.40.

Communication exposure

Communication exposure scores of the respondents ranged from 11 to 56. The average communication exposure score was 42.18 and the standard deviation was 12.32. Majority (83%) percent fish farmers had lower to highest communication exposure of use of mobile phone in commercial fish farming.

Fisheries training received

A majority (40%) of fish farmers received no training, while 13% of the fish farmers received short duration training, 15% received medium duration training, while 27% received no training.

Usefulness of ICT in fish farm management

The observed usefulness of ICT scores of the respondents ranged from 8-25. The average usefulness of using ICT score was 17.44 and the standard deviation was 4.20.

A majority of 58 % fish farmers had medium usefulness of ICT who think that they can receive information in time, can communicate easily with their business partner/dealers, save their time and can know weather and marketing information quickly by using mobile phone as an ICT communication media. 16% had lower usefulness of ICT while 26% agree with high usefulness of ICT.

ICT self-efficacy

The observed ICT self-efficacy scores of the respondents ranged from 1 to 28. The average ICT self-efficacy score was 14.08 and the standard deviation was 7.39. A majority (69%) percent of the fish farmers agreed that they could use mobile phones as a part of ICT self-efficacy, while 31% had lower ICT efficacy. It indicates that farmers can receive and call someone by using mobile phones. They can receive and send SMS, MMS to other people and complete tasks using mobile phones.

5.1.2 Use of mobile phone for commercial fish farming

The observed score of use of mobile phones ranges from 0 to 4. The average and standard deviation were 2.54 and 1.56 respectively. Most (45%) of the fish farmers reported using mobile phone frequently while 9%,19 % and 9% of them use it rarely, occasionally and often for commercial fish farming. The study also shows that 18% 0f the fish farmers do not use mobile phones for farming.

5.1.3 Contribution of the factors to farmers' use of mobile phone

Multiple regression analysis revealed that nine (9) selected factors altogether explained 70.5% (R^2 = .705) of the variance of farmers' use of mobile phones.

Among the factors, fish farmers' education, communication exposure, ICT self-efficacy were found to be positive and significantly contributed to the use of mobile phone while rest of the factors were found to be non-significant.

5.2 Conclusions

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

1. Forty-five (45%) percent of the fish farmers was the frequent users of mobile phone for commercial fish farming. Others were often, occasional, rare or not at all user of ICT for commercial fish farming.
2. Education significantly contributed to the fish farmers' use of mobile phone. Therefore, it may be concluded that education of the fish farmers had positively contribution to the extent of mobile phone use for commercial fish farming.
3. Communication exposure significantly contributed to the fish farmers use of mobile phones. Therefore, it may be concluded that communication exposure is one of the important predictors of mobile phone use. Higher communication exposure leads to higher use of mobile phones for receiving information for commercial fish farming.
4. ICT self-efficacy positively contributed mobile phone use, and it is no surprise that ICT literacy respondents find ICT to be a simple tool that contributes to higher levels of use than those who either have a low level of ICT literacy or seek support from others while using mobile phones.

5.3 Recommendations

5.3.1 Recommendation for policy formulation

On the basis of the findings revealed from the study, the following recommendations are put forward that might guide the policy formulation:

1. Forty-five (45%) percent of the fish farmers was the frequent user of mobile phone for commercial fish farming. Therefore, it may be recommended that necessary training and motivational campaigning should be provided to this fish farmers to increase their use of mobile phone for commercial fish farming.
2. Education had a significant contribution to the use of mobile phones. Therefore, it may be recommended to provide training on mobile phone usage to the fish farmers to increase their use of mobile phone for commercial fish farming.
3. Since ICT self-efficacy is very important for a user to access the ICT application, the Ministry of Youth and Sports and ICT Division of Government of the People's Republic of Bangladesh along with private sectors should promote ICT self-efficacy training to the rural clienteles. Therefore, rural farmers may upgrade their skills and enable them to minimize their economic loss and increase their income by commercial fish farming.
4. ICT self-efficacy had positive significant contribution to the use of mobile phones. Therefore, it may be recommended that ICT self-efficacy be increased by necessary training and motivational campaigning should be provided to this fish farmers to increase their use of mobile phone for commercial fish farming.

5.3.2 Recommendation for further study

1. The study was conducted Atwari and Boda upazila of Panchagarh District. Similar studies should be conducted in other parts of the country to get a clear picture of the whole country which will be helpful for effective policy formulation.
2. The present study was undertaken to explore the contribution of nine selected factors to farmers' use of mobile phones. Therefore, it could be recommended that further studies should be designed considering other agricultural and non-agricultural activities and including other characteristics of the farmers that might affect the use of mobile phones.

3. It is difficult to determine actual mobile phone usage behavior of the farmers. Measurement of the use of mobile phones by the farmers is not free from questions. Therefore, a more reliable measure of the concerned variable is necessary for further study.
4. Research should also be undertaken to identify other factors causing hindrances to the use of mobile phones.

REFERENCES

Abraham, R. (2006). Mobile Phones and Economic Development: Evidence from the fishing industry in India. *In 2006 International Conference on Information and Communication Technologies and Development.* , (pp. (pp. 48-56. IEEE)).

Achora, J. C., A. Mwiie., & E. Masabo., (2019). Use of Information Communication Technologies in Conservation Agriculture Knowledge Pathways among Smallholder Farmers in Machakos and Laikipia Countries, Kenya.

Ahmed, M., M. Mamun-ur-Rashid., & M. Mahmood., (2021). Determinants of Cellphone Usage among Sea Fisher's During Marine Fishing in Selected Coastal Villages of Bangladesh. *Journal of Development and Communication Studies, 8(1)*, 125-143.

Ahmed, S. (2012). Utilization and effectiveness of ICT for disseminating agricultural technologies among the farmers. *Ph.D thesis*. Bangabandhu Sheikh Mujibur Rahman Agricultural University.

Ajani, E. N. (2014). Promoting the Use of Information and Communication Technologies (ICT) for Agricultural Transformation in Sub-Saharan Africa: Implications for policy. *Journal of Agricultural & Food Information.*, 15(1),42-53.

Aker, J. C. (2008). Does Digital Divide or Provide? The Impact of Cell Phones on Grain Markets in Nigeria. BREAD Working Papers vol.

Aker, J. C. (2011). Dial "A" for Agriculture: a Review of Information and Communication Technologies for Agricultural Extension in Developing Countries. Agricultural Economics, 42(2),631-647.

Alam S.M.N. (2015). Use of Cell phone in Receiving Agricultural Information by the Farmers. Dhaka: MS (Ag. Ext.) thesis, Department of Agricultural Extension and Information System, Sher-e-Bangla Agricultural University.

Alam, M. Z., & Uddin, M. R. (2018). Use of Information and Connunication Technologies by the Farmers in Receiving Agricultural Information. Research in Agriculture, Livestock and Fisheries, 5(1),27-32.

Alkhadi, & A. N. (2016). Use of Mobile Banking in Saudi Arabia: An Empirical Evaluation Study. *International Journal of Managing Information Technology.*, 8(2),1-14.

Aminuzzaman, S. B. (2003). Talking back! Empowerment and Mobile Phones in Rural Bangladesh: A Study of the Village Phone Scheme of Grameen Bank. Contemporary South Asia. . 12(3): 327–348.

Anisuzzaman, A. S. (1995). Usefulness of Group Approach in Disseminating Farm Information to the Farmer. . Mymensingh.: M.S. (Ag. Ex. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, .

Bank, W. (2017). ICT in Agriculture: Connecting Smallholders to Knowledge, Networks, and Institutions. Updated Edition. Washington, DC: World Bank. doi:10.1596/978-1-4648-1002-2.

Baumüller, H. (2018). The Little We Know: An Exploratory Literature Review on the Utility of Mobile Phone-enabled Services for Smallholder Farmers. *Journal of International Development, 30(1)*, 134-154.

Bayes, A., von Braun, J., & Akhter, R. (1999). Village Pay Phones and Poverty Reduction: Insights from a Grameen Bank initiative in Bangladesh.

Burrel, J. (2008). Livelihoods and the Mobile Phone in Rural Uganda. Grameen Foundation USA.

Compeau, D. R., & Higgins, C. A. (1995). Compeau, D. R., & Higgins, C. A.Computer Self-Efficacy: Development of a Measure and Initial Test. MIS Quarterly, 19(2),189-211.

Davis, F. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, *13*, 319-340.

De Silva, H. &. (2010). ICT Policy for Agriculture Based on a Transaction Cost Approach: Some Lessons from Sri Lanka. *International Journal of ICT Research and Development in Africa (IJICTRDA)*, 1(1):51-64.

Duncombe, R. (2011). Researching Impact of Mobile Phones for Development: .

Duncombe, R. (2016). Mobile Phones for Agricultural and Rural Development: A Iterature Review and Suggestions for Future Research. *The European Journal of Development Research, 28(2)*, 213-235.

Farooq, U. (2020). Revolutionizing Pakistan Agriculture by Increasing the Use of Knowledge, Science and Technology and ICTs. *Retrieved from https://www.researchgate.net/profile/Umar-Farooq-34/publication/310794893*.

Goodman, J. (2005). Linking Mobile Phone Ownership and Use to Social Capital in Rural South Africa and Tanzania. Vodaphone Policies Paper Series, 2.

Hingorjo, A. A., & Memom, B. (2021). Hingorjo, A. A., & Memon, B. (2021). Use of Mobile Phone in Fisheries Profession: A Perspective of the Fishermen of the Indus Delta. *AMCAP Journal of Media and Communication Studies, 1(2)*, 101-119.

Horestone. (2012). Uses of Information and Communication Technologies (ICT) to Alleviate Poverty through Agricultural Development: ICT Initiatives in Agricultural Research and Extension system. ICT for Agricultural Research and Development. , pp. 67-77.

Islam, M. A. (2005).Use of Printed Materials by the Farmers in Receiving Agricultural Information. Mymensingh.: M.Sc. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University.

Jannat, S. (2015). Jannat, S.T. Impact of Using Information and Communication Technologies (ICT) by the Farmers of Sadar Upazila under Gazipur District. Dhaka: MS (Ag. Ext.) Thesis, Department of Agricultural Extension and Information System. Sher-e-Bangla Agricultural University.

Jensen, R. (2007). The Digital Provide: Information (Technology), Market Performance, and Welfare in the South Indian Fisheries Sector. *The Quarterly Journal of Economics*, 122(3):879 –924.

Kafura, R. (2015). Use of ICT as Extension Tool by the Farmers in Selected Areas of Gazipur District. MS Thesis. Bangabandhu Sheikh Mujibur Rahman Agricultural University.

Kafura, R. A. (2016). Use of ICT as an Extension Tool by the Farmers of Gazipur District in Bangladesh. I. Indian Research J. of Ext. Ed. 16 (2).

Karimi, A. a. (2011). Factors Influencing the Use of Information and Communication Technologies (ICT) by Iranian Vocational Agricultural Educators. J. Food Agric. Environ., 9(3-4): 1105-1108.

Kora. (2010). Domestic Price Stabilization Schemes in Developing Countries. Economic Development and Cultural Change. 38: 539-558. .

Lehr, D. (2007). Going Wireless: Dialing for Development (working paper).

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

M., S., M., H., & N. Mohammed., (2017). Effectiveness of Agricultural Information and Communication Centre in Technology Transfer to the Farmers in Bangladesh.

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

Mittal, S. G. (2010). Socio-economic Impact of Mobile Phone on Indian Agriculture. International Council for Research on Extension. , 123(4):134-139.

Mtega, W. P. (2013). Using Information and Communication Technologies for enhancing the accessibility of Agricultural Information for Improved agricultural production in Tanzania. . *Electronic Journal of Information Systems in Developing 56,(1)*, 1-14.

Munyua, H. (2007). ICTs and Small Scale Agriculture in Africa: a scoping study. *Ottawa:IDRC*.

Norberth, U. C. (2018). Utilisation of Agricultural Information Sources and Adoption of Animal and Crop Technologies among Farming Households in Imo State, Nigeria. *Journal of Agricultural Extension, 22(1)*, 143-155.

Nuruzzaman, M. (2003). Use and preference of Mass Media in Receiving Agricultural Information by the farmers. Mymensingh.: M.Sc. (Ag.Ext.Ed.)Thesis,

Department of Agricultural Extension Education, Bangladesh Agricultural University,.

Okello, J., O. Kirui., G. Njiraini., & Z. Gitonga., (2012). Okello, J.J., O.K. Kirui, O.K., G.W. Njiraini., and Z.M. Gitonga., Drivers of Use of Information and Communication Technologies by Farm Households: The Case of Smallholder Farmers in Kenya. J. of Agril. Sci,, 4(2):111-124.

Rahman, A. (2005). Freshwater Fishes of Bangladeh, 2nd eddition. Dhaka-1000: Department of Zoologuy, Dhaka University.

Rahman, M. (2003). Use of Television by the Farmers in Adopting Selected Technologies. Mymensingh: M.Sc. (Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, .

Sabu, M. &. (2018). Adopting of ICT Tools Among Small Scale Motorized Fishing Crafts in Northern Kerala, India. : . *Journal of Indian Fisheries Association. J. Indian Fish. Assoc., 44 (1)*, 47-59.

Salia, M., N.N. Nsowah-Nuamah., & W. Steel., (2011). M. Salia,. Effects of Mobile Phone Use on Artisanal Fishing Market Efficiency and Livelihoods in Ghana. *The Electronic Journal of Information Systems in Developing Countries, 47(1)*, 1-26.

Smale, M., & W. Tushemereiruwe,. (2007). Smale, M., & Tushemereiruwe, W. K. (Eds.) An Economic Assessment of Banana Genetic Improvement and Innovation in the Lake Victoria Region of Uganda and Tanzania. Research Report 155. Washington, DC:. International Food Policy Research Institute.

Uddin, M. (2015). Use of Information and Communication Technologies (ICT) by the Farmers in Receiving Agricultural Information. Dhaka: MS (Ag.), Sher-e-Bangla Agricultural University.

Valente, T. W., & E.M. Rogers,. (1995). Valente, T. W., & Rogers, E. M. The Origins and Development of the Diffusion of Innovations Paradigm as an Example of Scientific growth. Science communication, 16(3),242-273.

APPENDIX-A

ENGLISH VERSION OF THE INTERVIEW SCHEDULE

Department of Agricultural Extension & Information System

Sher-e-Bangla Agricultural University

Dhaka-1207

An interview Schedule for data collection for the research on

"Identification and Exploration of Mobile Phone Usage Behavior of Farmers for Commercial Fish Farming in Panchagarh District"

(This interview schedule is entitled to a research study, collected data will only be used for research purpose and will be published aggregately)

Serial No.:

Name of the respondent:	Father/Spouse name:
Village:	Union:
Upazila:	District:

Please answer the following questions

A. Personal information

1. Age: ……years

2. Education: Please mention your level of literacy

i. Can't read and write ( )
ii. Can sign only ( )
iii. I have passed class ……..

3. Farming experience: Please mention the following information about your fish farming experience.

How long have you been engaged in fish farming? …….. Years

4. Annual family income: Please mention your family income in taka from each of the following sources for last one year

Income from agricultural sector: (A)				
SL No.	**Sources**	**Total Taka**		
		Production	**Unit price**	**Income (*000*Tk)**
1.	Agriculture			
2.	Livestock			
3.	Fish			
Subtotal (A)				
Income from non-agricultural sector: (B)				
4.	Service			
5.	Business			
6.	Labor			
7.	Remittance			
8.	Others (Please specify……)			
Subtotal (B)				
Total (A+B):				

5. Fish farm size: Please mention here about your farm size

Sl. No.	**Use of land**	**Measuring unit**	
		Local unit	**Hectare**
1.	Homestead pond (A1)		
2.	Own pond under own farming (A2)		
3.	Pond given to others on borga (A3)		
4.	Pond taken to others on borga (A4)		
5.	Pond taken to others on lease (A5)		

Total farm size= A1 + A2 + ½ (A3 + A4) + A5

6. Communication Exposure: Please mention your extent of contact with following information sources.

Sl. No.	Sources of information	Extent of education				
		Regularly (4)	**Often (3)**	**Occasionally (2)**	**Rarely (1)**	**Never (0)**
Personal media						
1	Neighbor fish farmer/progressive farmers	7-8 times/month	5-6 times/month	3-4 times/month	1-2 times/month	0
2	Upazila Fisheries Officer	7-8 times/year	5-6 times/year	3-4 times/year	1-2 times/year	0
3	Fisheries Extension Officer	7-8 times/month	5-6 times/year	3-4 times/year	1-2 times/year	0
4	NGO worker(s)	4 times/month	3 times/year	2 times/month	1 time/month	0
5	Fish fry or Fingerlings/fish feed dealers	4 times/month	3 times/year	2 times/month	1 time/month	0
6	Local leader	7-8 times/month	5-6 times/month	3-4 times/month	1-2 times/month	0
Group media						
7	Participation in group discussion	7-8 times/year	5-6 times/year	3-4 times/year	1-2 times/year	0
8	Participation demonstration meeting	2 times/year	1 time/year	1 time/2year	1 time/3year	0
9	Participation in field day	4 times/year	3 times/year	2 times/year	1 time/year	0
10	Participation in training course	4-5 times/year	3 times/life	2 times/life	1 time/life	0
Mass media						
11	Listening fisheries program in Radio	Regularly	4-5 times/week	2-3 times/week	1 time/week	0
12	Watching fisheries program in TV	Regularly	4-5 times/week	2-3 times/week	1 time/week	0
13	Reading fisheries books/magazines/leaflets	7-8 times/year	5-6 times/year	3-4 times/year	1-2 times/year	0
14	Observing fisheries folksongs, fair etc.	7-8 times/year	5-6 times/year	3-4 times/year	1-2 times/year	0

7. Fisheries training received: Have you received any fisheries training till today? If yes, please mention the following particulars

Sl. No.	Subject matter of training	Year of receiving training	Name of the sponsoring organization	Duration of training (Days)
1				
2				
3				
4				

8. Usefulness of ICT in fish farming: Please give your opinion of the following:

Sl. No	Statements	Extent use of agreement				
		Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)
1	Information that I receive using my mobile phone is accurate.					
2	I can receive timely information regarding my farming using a mobile phone.					
3	Communication with my business partners/input dealers become easier using a mobile phone.					
4	I can save the time and cost that I used to spend before on needed farming information.					
5	Mobile phones help me to know weather and marketing information quickly.					

9. ICT self-efficacy: Please mention how confident you are to use the following ICTs.

Sl. No.	Items	Not at all confident	Little confident	Fairly confident	Confident	Highly confident
1	Receiving a mobile phone					
2	Calling someone using a mobile phone					
3	Receiving SMS					
4	Receiving MMS					
5	Sending MMS					
6	Watching video					
7	Complete a task using mobile phone					

10. Use of Mobile Phone: Please rate your use of mobile phone for commercial fish farming on the following scale.

Not at all use	• 0	• 1	• 2	• 3	• 4	**Frequently use**