USE OF CELL PHONE IN RECEIVING AGRICULTURAL INFORMATION BY THE FARMERS

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CERTIFICATE

This is to certify that the thesis enlighten, **"USE OF CELL PHONE IN RECEIVING AGRICULTURAL INFORMATION BY THE FARMERS"** submitted to the faculty of agriculture, Sher-e-Bangla Agricultural university, Dhaka in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE IN AGRICULTURAL EXTENSION,** embodies the result of a piece of bona fide research work conducted by **SK. MD. NUR-E-ALAM, Registration no. 08-02924** under my supervision and guidance. No part of this thesis has been submitted for any other degree or diploma.

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

Dated:
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Dedicated To

My Beloved Parents

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LIST OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

AICC	=	Agriculture Information and Communication Centers
AIS	=	Agricultural Information Service
BAU	=	Bangladesh Agricultural University
BBS	=	Bangladesh Bureau of Statistics
DAE	=	Department of Agricultural Extension
et al.	=	All others
etc.	=	et cetera, and the other
FAO	=	Food and Agriculture Organization
GOB	=	Government of Bangladesh
HYV	=	High Yielding Variety
ITU	=	International Telecommunication Union
MMS	=	Multimedia Message Service
MOA	=	Ministry of Agriculture
NGO	=	Non-Government Organization
SD	=	Standard Deviation
SMS	=	Short Message Service
SPSS	=	Statistical Package for Social Science
SAAO	=	Sub-Assistant Agriculture Officer
SAU	=	Sher-e-Bangla Agricultural University
UNDP	=	United Nations Development Programme

Use of Cell Phone in Receiving Agricultural Information by the Farmers

Sk. Md. Nur-E-Alam

ABSTRACT

Cell phone is an easy, fast and convenient device for communication. The main purpose of the study was to determine the extent of use of Cell Phone in receiving agricultural information and to explore the relationship between the selected characteristics of the farmers in using Cell Phone for receiving agricultural information. Data were obtained from 97 Cell Phone user farmers in selected village named Chorjamalpur of Boyra union under Singair upazila of Manikganj through face-to-face interview. Appropriate scales were developed in order to measure the concerned variables. Pearson Product Moment Correlation test was used to ascertain the relationship between each of the selected characteristics of the farmers with their use of Cell Phone for receiving agricultural information. The finding shows that 89.7 percent of the respondents had no use to low use of Cell Phone for receiving agricultural information and 10.3 percent of the respondents had medium use to high use of Cell Phone for receiving agricultural information. The finding clearly indicates the ignorance of the respondents about the use of Cell Phone for receiving agricultural information. Among 11 selected characteristics of the farmers, eight characteristics namely, education, land possession, effective farm size, annual family income, agricultural training exposure, organizational participation, innovativeness, cosmopoliteness showed significant and positive relationship with their use of Cell Phone. Problem confrontation of the farmers in using Cell Phone showed significant negative relationship with their use of Cell Phone for receiving agricultural information. But age of the farmers and farming experience of the farmers showed non significant relationship with the use of Cell Phone by the farmers.

CHAPTER 1

INTRODUCTION

1.1 General Background

Bangladesh being an agricultural country, the importance of the agriculture sector has long been recognized by the Government of Bangladesh (GoB). To make the agricultural sector as an engine for economic development the adoption of technology is a must. The dissemination of information communication technologies (ICTs) in developing countries provides much opportunity to transfer knowledge and information through private companies and government departments. During the last few years coverage by cell phone has spread fast in Bangladesh. According to Bangladesh Telecommunication Regulatory Commission (BTRC), the total number of Cell Phone subscriptions has reached 131.949 million at the end of April, 2016. Cell phones have provided new approach to farmers to make tentative decisions much more easily than before.

Nowadays Cell phones have been adopted by rural and urban populations in developing countries and getting a good benefit and latest information regarding weather, market and other related issue. Value addition in agriculture requires technological, institutional and price incentive changes designed to raise the productivity.

The popular uses in agricultural practices included getting to know the market prices of different crops, fertilizer and pesticide availability receiving instant solutions and so on.

Cell phones significantly reduced communication and information costs for the rural people of Bangladesh. This technology has provided new opportunities for rural farmers to obtain knowledge and information about agricultural issues, problems and its usage for increasing agricultural production. Majority of the people in Bangladesh depends on agriculture .Farmers can obtain information

(i.e. prices of agricultural commodities or the weather condition)that they can use cell phone to improve their farm income ,their lives leading to rural development.

Cell phone acts as an effective tool for enriching farm business through providing necessary business information.

Information-based, decision-making agricultural system (Precision Agriculture) is designed to maximize agricultural production and is often described as the next great evolution in agriculture. The combination of Global Positioning System (GPS) and mobile mapping are supposed to provide farmers with the information for implementation of decision-based Precision Agriculture (Michael, 2008).

Use of cell phones as a mode of providing agriculture related information would depend on how far the mobile phone network has been able to link the farmers to market information — timely and accurately. The impact on productivity can be directly measured in terms of increased returns to the farmers with a trickledown effect on the cropping pattern and potential yield of the sowed crop. Information on the price factors —prices of inputs and output, and non-price factors like information about availability of inputs, quality of seeds, modern techniques, etc. would play the primary role in improving farm productivity.

Broadly speaking, technology is the "relationship between inputs and outputs" (Foster and Rosenzweig 2010), or the set of hardware (physical) and software (techniques) tools that allow for a different mapping of inputs to outputs. In the context of agriculture, hardware refers to improved cultivars (seeds), fertilizers and pesticides, whereas software refers to practices such as inter-cropping, mulching, and integrated pest management. We can define adoption of technology as the "use of new tools or techniques that relate inputs to outputs and the allocation of inputs" (Foster and Rosenzweig 2010).

Different Government Organizations (GOs) and Non- Government Organizations (NGOs) are trying with diverse initiatives for strengthening the agriculture sector of Bangladesh. Though various efforts of improvement are in there, but the agriculture sector is facing a range of challenges for its development like over population, political instability, climate change, loss of agricultural land, infertile land, use of excessive pesticides, lack of inputs, improper irrigation etc. For providing agricultural information to the farmers GOs and NGOs has taken some time befitting initiatives. The Government of Bangladesh has established Agricultural Information Service (AIS) through which training guides, newsletters, radio & TV programs, films etc. are arranged for disseminating information. In 2010, AIS has developed SMS based information service with the help of a mobile operator Banglalink‟ and UNDP in the country. Since October 2008, an e-agriculture initiative known as "e-Krishok" has been using information and communication technologies to deliver information and advisory services to farmers in rural and remote locations at a lower cost.

In 2009 Ministry of Agriculture in Bangladesh with support from UNDP Bangladesh has initiated Agriculture Information and Communication Centers (AICC) in 20 areas. And agricultural information service has piloted 10 farmers community based Call Centers in those twenty areas (ebangladeshexpo, 2013).

Despite those initiatives, most of the farmers of Bangladesh are still in lack of information and modern agricultural knowledge. They need an easy access point to get and meet their information need. Information need has three basic elements: availability, access and utilization. But the GOs and NGOs initiatives are hard to reach and they lack ease of use by the farmers. Under the above circumstances, this study has tried to measure the contribution of cell phones in disseminating agricultural information in Bangladesh.

It has been claimed that through social networks, farmers can obtain information (e.g price of agricultural commodities of the weather), that they can use to

improve their farm income, and their lives, leading to rural development. It has been suggested that farmers in rural villages can use voice and data services over cell phone to benefit from such information. However it is also necessary to comprehend how the farmers make the best use of cell phone technology.

Farmers currently refer to a variety of sources for their information, (Table 1) which can be time consuming. Using mobile to collate information and advisory services focused on livestock and nutrition, market prices and weather forecasts would greatly streamline this process for farmers, at the same time as offering operators and service providers a chance to create social benefits for their users, enhancing customer loyalty. Secondly using mobile supply chain services can provide real time visibility of supplier networks and track and trace products in supply chain. Finally, mobile financial services for farmers, such as savings, credit products and micro insurance for crops can increase financial inclusion.

Table 1.1: Principal sources of agricultural information among farming population in Bangladesh, 2011

Type of information sought	Extension officer	Private sector	Peer group	Lead farmer	Television	Other
High-yielding crop/species	35%	22%	13%	7%	19%	4%
Cultivation techniques	21%	11%	19%	11%	25%	15%
Soil condition	35%	4%	10%	7%	14%	30%
Seed usage	20%	39%	21%	8%	4%	8%
Pesticide usage	14%	65%	5%	7%	3%	6%
Fertiliser usage	16%	56%	9%	8%	2%	10%
Irrigation methods	12%	12%	24%	14%	5%	33%
Market access	7%	20%	41%	15%	5%	12%
Weather forecast	3%	1%	4%	1%	62%	28%

Source: Orgquest, Katalyst

There is room for significant growth in operator involvement in reaching the 22 million agricultural workers that have mobile phones; in addition, by offering mobile agriculture services operators have the potential to attract 14 million new customers to their subscriber base by giving them a reason to connect that they may not have had previously. Robi, Banglalink and Grameenphone are currently offering mobile agricultural services, mainly providing market information, agricultural news and weather information via interactive voice response (IVR)

or native voice services in both Bangla and English. However, these services have not scaled yet; a study carried out by Katalyst and The Springfield Centre estimates that 200,000 farmers benefitted in 2012 from the two mAgri services offered by Banglalink and Grameenphone4. This is a significant number, but it represents only 1% of the total labor force in agriculture in Bangladesh. Offering voice-based services is an important step given the high rates of illiteracy among the target audience. However, we believe there is still a lack of awareness of these services and their value proposition (especially important for individuals with low disposable incomes). Operators and co-operatives can play a larger role in improving this, such as through rural distribution centre's and below the line advertising.

1.2 Significance of the study

Cell phone can serve as source of information. And can play a very useful role fulfilling the informational needs of farmers, particularly among marginal and small ones. The cell phone based agricultural information services are now rapidly getting popular. These services, through Voice call or SMS provide a variety of agriculture related information on crop cultivation, fertilizer use, plant-diseases , pesticides, market –prices, weather and important Government policy decisions.

In Bangladesh, 31.5 percent of its population is still living below the poverty line, agriculture contributes 17.2 percent to the total GDP, while industry and services sector contribute 28.9% and 53.9% respectively. Cell phone sector contributes 3 percent of GDP in Bangladesh. (GOB, 2013)

There are various modes – push and pull SMS, interactive voice response, mobile apps, and so on – through which mExtension services are provided either individually or in combination. While SMS and interactive voice response services are accessible from both conventional and smart phones, mobile apps require smart phones. Services can be free or subscription-based. Cost does not seem to affect popularity as shown by services such as IKSL (www.iksl.in) in

India, iCow (http://icow.co.ke) in Kenya, Kilimo Salama in Kenya and Rwanda, and e-Krishok in Bangladesh. Mobile-based advisory services are mostly targeted at farmers and the rural population but collaboration among stakeholders in agricultural innovation systems (AIS) for providing content is not unknown. The advisory services also vary from providing solely agricultural information (e.g. Gobi Sahana Sarana (http://www.agridept.gov.lk/index.php/1920-hotline) in Sri Lanka) to providing micro insurance to rural people (Kilimo Salama in Kenya and Rwanda), real time market information (e-soko (https://esoko.com/) active in 10 African countries), farmer-specific fertiliser recommendations NMRiceMobile in Bangladesh, China, India, Indonesia, Philippines and West Africa) or integrating agricultural and weather information along with entertainment to attract large numbers of rural people.

Cell phone is a success story of bridging the rural digital divide. Cell phones have facilitated greater communication and economic benefits and acted as agents of social mobilization. Hence, there seems to be a lot of potential in the use of cell phones for communication for the development of Bangladesh.

1.3 Statement of the Problem

Use of cell phone in agricultural extension is a challenging task. “Two way communication” is the strongest part of the cell phone use in receiving agricultural information. Using cell phone for accessing agricultural information is still not very popular .There is also another weakness technical illiteracy among clients and extensionists limits scope .To increase the extent of use of cell phone in receiving agricultural information , it is necessary to have a clear understanding about present status of use of cell phone by the farmers. It is also necessary to have an understanding of the constraints, which may create burden in the use of cell phone.

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

1. What were the selected characteristics of the farmers?
2. To what extent farmers use cell phone for receiving agricultural information?
3. Which characteristics of the farmers are related to their use of cell phone in receiving agricultural information?

1.4 Specific Objectives of the Study

The following specific objectives were formulated in order to give proper shape to the research work:

1. To describe the following selected characteristics of the farmer:
   i. Age
   ii. Education
   iii. Land Possession
   iv. Effective farm size
   v. Farming experience
   vi. Annual family income
   vii. Agricultural training exposure
   viii. Organizational participation
   ix. Innovativeness
   x. Cosmopoliteness
   xi. Problems confronted by in using cell phone for receiving agricultural information

2. To assess the extent of use of cell phone by the farmers for receiving agricultural information
3. To explore the relationship between each of the selected characteristics of the farmers and their use of Cell phone for receiving agricultural information

1.5 Assumption of the study

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

i. The respondents included in the sample of the study were able to provide their opinions and were competent enough to satisfy the queries.
ii. The information furnished by the farmers were reliable.
iii. The cell phone user farmers included in the sample were the representative of the population.
iv. The collected data were reliable because the researcher who acted as interviewer was well adjusted to the social environment of the study area.
v. The finding of the study will be useful for planning and execution of the extensive and more helpful effective use of cell phone for receiving agricultural information.

1.6 Limitations of the Study

In order to conduct the research in effective and manageable way , it becomes necessary to impose certain limitations as noted below:

i. The study was conducted in only Charjamalpur village of Boyra union of Singair upazilla of Manikganj district.
ii. Population of the study was limited to 106cell phone user farmers of the selected village only.

iii. Only eleven characteristics were selected for investigation in this study. But the characteristics of the farmers were many and varied.

iv. There are different type of mass media and interpersonal communication media for receiving agricultural information. But the present study was confined to cell phone study.

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

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

1.7 Definition of the Related Terms

Cell phone/ Mobile phone: A portable telephone that sends and receives radio signals through a network of short-range transmitters located in overlapping cells throughout a region, with a central station making connections to regular telephone lines. Also called *cellular telephone*, *mobile phone.*

A small telephone that people can take with them and use outside their homes called also mobile phone, (chiefly US) cellular phone, (US, informal) cell, (British) mobile. Cell phone is popular and powerful interpersonal communication media.

Technology : The branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science. The application of this knowledge for practical ends. Scientific or industrial process, invention, method, or the like. the sum of the ways in which social groups provide themselves with the material objects of their civilization.

The purposeful application of information in the design, production, and utilization of goods and services, and in the organization of human activities.

Age: The length of time during which a being or thing has existed; length of life or existence to the time spoken of or referred to. A period of human life, measured by years from birth.

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.
The act or process of imparting or acquiring particular knowledge or skills, as for a profession. The result produced by instruction, training, or study.

Land possession: In law, possession is the control a person intentionally exercises toward a thing. In all cases, to possess something, a person must have an intention to possess it. A person may be in possession of some property (although possession does not always imply ownership).

Effective farm size: Effective farm size refers to the actual quantity of farm size where respondent perform his/her agricultural activities last year.

Annual income: Total amount of income earned annually. Gross annual income represents the amount of money a person earns in one year from all sources before taxes.

Farming experience: Farming experience refers to how many years are engaged in agricultural farming.

Agricultural training exposure: It referred to the training gained by the farmers from different formal, non formal as well as informal sources.

Organizational participation: Organizational participation of a farmer referred to his taking part in different social organizations either as an ordinary member, executive committee member or an executive officer along with duration.

Innovativeness: Innovativeness is the degree to which an individual adopts an innovation relatively earlier than other members in a social system (Rogers, 1983).

Phone call: If you make a phone call, you dial someone's phone number and speak to them by phone

SMS: SMS means Short messaging system or short message service**.** A feature on a mobile phone that allows a user to send or receive written messages.

MMS: MMS means Messaging service: a method of transmitting graphics, video or sound files and short text messages over wireless networks, esp on mobile phones.

Video call: A call made via a mobile phone with a camera and a screen, allowing the participants to see each other as they talk.

Internet surfing: Alternatively referred to as web surfing, surfing describes the act of browsing the Internet by going from one page to another page using hyperlinks. The term was first used by Mark McCahill. Tip: When someone is surfing the Internet they can be referred to as a surfer or a net surfer.

CHAPTER 2

REVIEW OF LITERATURE

The researcher made an extensive search of available literature for the present research. Available literature was intensively reviewed to find out work in the world and almost in Bangladesh. This chapter is divided into four sections .First section deals with the history of cell phone .Second section deals with the findings on the use of cell phone in general and third section deals with the relationship between the farmers characteristics and their use of cell phone. The fourth section deals with the conceptual framework of the study.

2.1 History of Cell Phone

Cell phone technology is based on radio technology that was developed from the 1940's onward. For instance, the beginning of cell phones can be traced to the innovation in taxi cabs, police cars, and other service vehicles where two way radios allowed taxi drivers or police officers to communicate with one another or with a central base. Early cell phone communication technology can even be traced back to individuals with special radios that patch into a phone line via live operator to make a phone call.

The Swedish police used the first official mobile phone in 1946. The technology was connected to the telephone network and was distinctive of two way radio technology. The phone was not very practical as it could only make 6 phone calls before the car's battery was drained.

Modern cell phone technology started when D.H. Ring from Bell Labs created hexagonal cells for mobile phones in 1947. Later on, another engineer from Bell Labs came up with the idea of cell towers that would transmit and receive signals in three directions instead of two. However, although some technologies have been developed, electronics and other technologies take decades to mature. For

instance, the electronics that were used in the first cell phones were first developed in the 1960's.

By 1967, mobile phone technology was available. However, the user had to stay within one cell area. Cell areas that a base station serviced were unable to hand off cellular phone calls from one base station to another. While users could make a phone call, they were unable to continue the call after they reached a set range. In 1970, Amos Edward Joel, who also was an engineer at Bell Labs, developed the call handoff system. This technology facilitated phone calls from one area to another that would not be dropped.

While the technology had been developed, it was not until 1971 that AT&T submitted a request to the FCC for cellular service. It took more than 10 years for an approval and in 1982, the FCC allocated the frequencies of 824-894 MHZ Band to Advanced Mobile Phone Service (AMPS). From 1982 to 1990, AMPS was an analog service, Digital AMPS came along in 1990.

Throughout the decades, many technologies that made mobile phones available existed. Most of the time, these phones were installed in vehicles due to the large battery requirements. For instance, the MTA (Mobile Telephone System A) that Eriksson developed was available in Sweden in the 1950s. Unfortunately, it weighed over 80 pounds. Later versions weighed around 20 pounds, which is still ineffective in comparison to the portable devices that are used today. The final success of these systems is still to be determined (Tom, 2007)

2.1.1 First Generation Cell Phones

In 1983, Motorola unveiled the first truly portable cellular phone to the world. It was called the Motorola DynaTAC 8000X. The FCC approved it in the United States. Motorola developed the technology for cellular phones for decades and this particular phone took 15 years to come on the market at the cost of over 100 million dollars. The DynaTAC800X was extremely lightweight for its time and only weighed about 28 ounces. It was 13 inches x 1.75 inches x 3.5 inches and

was known as the Brick for its shape. It was largely developed with the help of Dr. Martin Cooper of Motorola.

From 1983 to the end of the 1980s, cell phones grew in popularity due to the innovations in cellular networks that were able to handle phone calls in either one area or hand them off to other areas. While most cell phones were not made to be carried in the hand, all phones were made for permanent installation in the car. For a while the term "car phone" was extremely popular. Besides car phones, there were a few models that came in tote bag configurations that easily hooked up to a car's battery via the DC outlet. There were also a few models that came as briefcases, to hold large batteries necessary to make phone calls.

2.1.2 Second Generation Cellular Phones

Cellular phones from the early 1990s are considered second generation (2G) and they were able to work on mobile phone systems such as GSM, IS-136 (TDMA), and IS-95 (CDMA). Digital mobile phone networks were in use in the United States in 1990 and in Europe by 1991. 2G mobile phones use digital circuit switched transmissions. This ultimately enabled quicker network signaling, lowering the amount of dropped calls and increasing call quality. As 2G digital networks were online most of the time, they replaced analog network frequencies, effectively making them obsolete.

Phones based on 2G technology were much smaller than the brick telephones of the mid to late 80s. Most 2G cellular phones were usually in the range of 100 to 200 grams, plus they were hand held devices that were truly portable and did not need a large battery. Advances in battery and computer chip technology also helped to make 2G cell phones much smaller than their predecessors. With these innovations, cell phone use soared.

2.1.3 Third Generation Cellular Phones

Third Generation cellular phones is the technology that is currently available and it is commonly referred to as 3G. While 3G came only a few years after 2G, mainly due to many innovations in technology and services, standards for 3G are usually different depending on the network.

It is usually stated that 3G is not necessarily a rigid standard, but is a set of requirements that most networks and cell phone providers follow. There are two main requirements: they include 2 Megabits of maximum data rate indoors and 384 kbits for outdoor use. 3G mobile phones usually include innovations to receive much more than phone calls. For instance, SMS text is available and some 3G phones also offer email and Internet access. Technologies are continuing to improve and new innovations such as streaming radio, TV, as well as Wifi are currently breaking into the market.

2.1.4 History of Cell Phone in Bangladesh

Bangladesh was the first South Asian country to adopt cellular technology back in 1993 by introducing Advanced Mobile Phone System (AMPS). In fact, the first mobile license was issued back in 1989 but it took several years to launch the services. The network coverage and number of subscribers had remained very limited due to exorbitantly high subscription cost and call tariff.

In 1996, the then government considering the monopolistic environment prevailing in the sector, awarded three GSM licenses aimed at breaking the monopoly and making the cellular technology affordable to the general masses. Since then, the country's cellular industry never looked back, now it has turned into the largest infrastructure provider during the last decade as sub sector within telecom sector. This sub-sector has created new opportunities by generating employment, facilitating education and health services for common people.

2.2 Literature related to Use of Cell Phone in General

De Silva & Ratnadiwakara (2010) who randomly sampled 300 farming households in Sri Lanka across four traded vegetable markets, and attempted to understand information search costs for core operations along the agricultural-farmer value chain. They found that 70 percent of all transaction costs related to information search costs (the transaction costs themselves were recorded as 15 percent of the total costs incurred). Costs were accounted for both in direct financial expenditure and the opportunity costs of time expended.

Similarly, Furuholt & Matotay (2011) view the mobile phone as a means whereby the high transaction costs associated with information market failures and inefficiencies in the business environment can be reduced, thus overcoming costs incurred in the coordination of economic activities related to: a) accessing inputs (infrastructure; production technology, knowledge, finance, materials, learning/training, etc) and, b) reaching output markets (either directly or through market intermediaries) as well as monitoring financial transactions and consulting with experts. Typically, the studies surveyed view search costs and the asymmetric relationships that govern price setting as the most significant informational impediments producers face (e.g., Islam & Gronlund, 2011; Martin & Abbott, 2011). Such high costs normally add to the market price of products and affect competitiveness in the market.

Campbell (2005) studied the impact of the cell phone on young peoples social life . he identified both positive and negative impacts of cell phone on young people . He observed that the cell phone has led to changed dynamics in the family with issues of safety. Campbell also identified along with other problems of which financial difficulties, non custodial parent access, as well as over reliance on the cell phone for safety issues and intrusion into young peoples lives were important

Kameswari et al (2011) surveyed 132 farmers across 8 villages in 4 districts of the Indian Himalayan region and found wide variations between districts (and

villages) in terms of crops grown, scale of production, water supply, types of soil, etc. This gives rise to diverse vulnerability contexts and differing needs for information-related services often between districts and settlements in quite close proximity, and which are more or less active in information seeking.

A similar perspective was taken by Masuki et al (2010) highlighting how differences in the cultural and social make up of different parishes within the same district of Uganda gave rise to different needs for information, as well capabilities to make use of information.

These livelihoods perspectives support the view that fostering sustainable rural production involves addressing a wide range of interconnected constraints which may be longstanding and entrenched within the realities of rural life, and reach into broad and diverse development concerns of environmental protection and conservation, gender imbalances, political participation, health and education (Feder, 1993).

Historically, the complex information needs of rural producers have been pursued through these personal and social networks, and mediated through face-to-face contact. Traditional networks of communication tend to be better aligned with the interests of rural dwellers and information sources may embody a certain level of trust (Molony, 13) increased speed of price transmission in maize markets – but no marked decrease in transaction costs in markets where exchanges were dominated by traders that lack literacy and rely heavily on visual inspection. Whilst 80 percent of traders and 48 percent of farmers surveyed used mobile phones to access information, traditional means of collecting and exchanging information had not changed (such as travelling to the market) but use of phones speeded up pre-existing processes.

For mobile users, this led to the trading of larger volumes, better prices and slightly larger margins – but only marginal increase in transaction costs (due to an increase in the net cost due to the costs of mobile ownership and use).

Similarly, Muto & Yamano (2009) from analysis of data collected between 2003 and 2005 in Uganda found that mobile network expansion (from 41 to 87 percent coverage) had positive effects on market participation. The effects were found to be more beneficial for farmers in remote areas and particularly for those producing perishable crops such as bananas.

Similarly, Aker (2008) investigated the impact of cell phones on grain markets in Niger identifying positive arbitrage (reduced grain price dispersion and variations across markets) resulting from a reduction in search costs and hence transaction costs, as well as lower grain prices (3.5% reduction from 2001 to 2006).

In common with Muto & Yamano, phone use was found to have greater impact when travel costs were higher – for markets that were more remotely located and unconnected by paved roads (Burrel & Matovu, 2008). Phones also caused traders to change their behavior – with a greater number of markets searched and more contacts and sales in more markets. These studies also identify a 'network effect' meaning that cell phones have higher impact (on price dispersion, for example) once more markets are covered by the network – with Aker (2008) suggesting diminishing returns over and above 75 percent network coverage.

Notable recent studies include that of Subervie (2011) evaluating the impact of SMS-based alerts for farmers via *Esoko* where econometric modeling of spatial arbitrage conditions found a significant effect on prices with a 10 percent increase amongst the treatment group of 500 farmers to whom mobile phones were distributed in the northern region of Ghana.

In contrast, Fafchamps & Minten (2011) gauged the benefits that Indian farmers derive from market and weather information delivered to their mobile phones via a commercial service called Reuters Market Light (RML). A robust estimation technique was used to generate findings for treatment and non-treatment groups comprising 933 farmers across 100 villages (20 in each of 5 villages) in the Maharashtra region. There was some evidence that use of RML positively

impacted upon spatial arbitrage and crop grading, although the effect was small. However, no significant effect was measured on the price received by farmers for the produce, nor on crop added value, crop losses resulting from bad weather or the likelihood of changing crop varieties and cultivation practices. In this case, better price information did not result in higher prices paid to farmers and this is explained due to the lack of alternative market destinations and the lack of opportunities for arbitraging by farmers. Overall, the study found a small number of clients for the service in aggregate across the study area and stagnation in take up of the service over the study period.

Also in India Mittal et al (2010) surveyed the use of IFFCO-IKSL, Fisher's Friend (and RML), each of which provide subscription-based messaging services for packaged information concerning weather, crop advisory tips, market prices, input availability and government schemes. Increasing numbers of subscriptions had brought some benefits to some famers, but constraints on these 'stand-alone' services included lack of awareness of their existence and what they can offer, lack of customisation and updating of content, concerns over timeliness and reliability of information and lack of use of local languages.

Nevin (2001) examined that in Bangladesh, 97 percent of all households and virtually all rural ones lack a telephone , making the nation on of the least wired in the world. This lack of connectivity has contributed to underdevelopment and the impoverishment of individual Bangladeshi. To address this problem Grameen Bank a micro finance institution, formed two entities :1) Grameen telecom(GT), a wholly owned non –profit organization to provide phone service in rural areas as an income generating activities for members of the Grameen Bank, and 2) Grameen phone Ltd.(In partnership with U.S. Norwegian , and Japanese companies) for profit entity that bid on and in1996 won a national GSM cellular license.

Despite the number of Market Information Prices Services using mobile phone for price information dissemination the market prices information remain often

not freely available so that prices are set locally and rather arbitrarily given the actual relative scarcity. More often than not, market prices are determined by the vagaries of weather, transport, monopolistic traders, and so forth (Gakuru, Kristen and Stepman, 2009).

The preceding studies demonstrate primary interest in impacts on farmers and the markets they trade into. Studies also highlight the impact of phone use on transactional relationships within value chains – and in particular the changing role of intermediaries or traders. Overå (2006) found that both producers and traders benefited considerably from the use of mobile phones after their introduction in 2001 in Ghana. Speed of communication allowed for more efficient information flows within the network of value chain actors, which in turn, saved time and reduced transportation costs. This led to better matching of supply and demand, and improved monitoring of compliance within the terms of trading contracts. One effect was that early adopters of mobile phones strengthened their existing trader relationships and networks, which were built on strong lineage-based social structures. New market entrants managed (through using mobile phones) to quickly cement good trading reputations and facilitate the building of more efficient trading networks. By contrast, existing traders and new entrants without phones were not able to attain these advantages, although it is not clear whether they were financially worse off as a result.

Mobile phones may also help with agricultural extension outreach. Lawal-Adebowale and Akeredolu-Ale (2010) collected data in southwest Nigeria to understand perceptions of ICT usage for agricultural development by three stakeholder groups – agricultural researchers, extension agents, and rural farmers. One finding was that the farmers had a high perception that the "linkages with the researchers and extension agents can be effectively achieved through the mobile phone if the device is owned by all" (Lawal-Adebowale & Akeredolu-Ale 2010). However, this study did not specify whether farmers thought they could link to researchers and extension agents through voice calls, SMS, or another mobile-based service.

A working paper by Mittal et al. (2010) found that the quality of information, its timeliness, and trustworthiness are the three important features that can enable farmers to use mobile-enabled agricultural information effectively. The Indian study found that while mobiles are currently being used in ways that contribute to farm productivity, they are not being used to their full potential. Infrastructure and farmers' capacity to use the information need to be improved in order to realize the full information dissemination potential of the mobile phone. This study sought to see if findings like Mitaal et al. (2010) also hold true in the Kenyan context. A flood of new development initiatives using SMS to send information to rural farmers has emerged in Kenya. This study hopes to better understand the use of SMS by Kenyan farmers in order to enhance such new emerging initiatives.

Some of the new agricultural SMS-based service providers include MFarm Ltd., which provides access to localized, current data on markets and weather as well as a network for buying and selling farming goods through SMS (MFarm Kenya 2011). The Kenya Agricultural Commodity Exchange (KACE) has an SMS-based information service, *SokoniSMS,* for farmers to receive market prices in Kenya (KACE Kenya 2011). GSMA recently announced its MFarmer Initiative Fund, supported by a grant from the Bill & Melinda Gates Foundation. The purpose of the Fund is to "encourage mobile communications service providers (in partnership with other public and private sector agriculture organizations) to use mobile communications to provide information and advisory services to smallholder farmers in developing countries who are living on under US$2 per day" (GSM 2011). WMO/Sony Ericsson/Airtel have partnered to start "Weather Info For All," an initiative that will send weather forecasts to farmers via SMS (World News Inc. 2011).

2.3 Relationship between farmers' Characteristics and Their Use of Cell Phone or other communication media

2.3.1 Age and use of cell phone or other communication media

Bhuyian (1988) found in his study that age of the farmers had significant negative correlation with the communication media.

Galindo (1994) found that the exposure to the communication media was closely related with the age of the farmers.

Sarker (1995) in his study concluded that age of the farmers had negative and insignificant effect on the use of communication media.

2.3.2 Education and use of cell phone or other communication media

Rahman (1974) found that the level of education of the respondents had significant influence on the use of communication media.

Ofuoku et al. (2000) found that educational attainment of the poultry farmers had significant relationships with the adoption of mobile phones.

Kashem and jones (1988) found in their study that education of the small farmers had significant positive correlation with their information sources.

2.3.3 Land possession and use of cell phone or other communication media

No literature was found related to land possession of the respondents with their use of cell phone or other communication media.

2.3.4 Effective farm size and use of cell phone or other communication media

Ofuoku et al. (2007) found that the farm size of the poultry farmers had significant relationships with the adoption of cell phone.

Bhuiyan (1988) in his study found that farm size of the farmers had positive and significant effect on the use of communication media.

Sarker (1995) in his study concluded that farm size of the respondents had a positive and significant relationship with their use of communication media.

Islam (1995) found that farm size of the farmers had a positive and significant relationship with their use of communication media.

2.3.5 Farming experience and use of cell phone or other communication media

Islam (1998) observed that the farming experience of the farmers had no significant relationship with their opinion on the effectiveness of the communication media.

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

2.3.6 Annual family income and use of cell phone or other communication media

Sawhney (1965) showed that income was positively related to use of different communication media.

Rahman (1974) showed that annual family income of the farmers and their use of communication media are significantly related.

Latif (1974) observed a significant positive relationship between income of the famers and communication media.

Ahmed (1977) found that income of the farmers had significant effect on the use of communication media in the adoption of plant protection measures.

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

Majority of the research findings indicated that the annual income of the farmers had significant relationship with their use of communication media.

2.3.7 Agricultural training exposure and use of cell phone or other communication media

No literature was found related to Agricultural training exposure of the respondents with their use of cell phone or other communication media.

2.3.8 Organizational Participation and use of cell phone or other communication media

Bhuiyan (1988) in a study found that organizational participation of the farmers had no significant effect on the use of communication media.

Islam(1995) in his study on wheat growers found that organizational participation of the farmers had positive and significant relationship with their use of communication media.

Rahim (1963) showed a significant and positive association ship between contact score and membership in organizational participation.

Sawhney (1969) found that the farmers who were more actively participating in formal organizations used for more cosmopolite media and less locality media than those who are participating less actively or not at all.

Haque (1972) found a high positive relationship between socioeconomic status of the farmers and use of communication media.

Sarkar (1995) found that the use of communication media by the small farmers had significant positive relationship with their organizational participation.

2.3.9 Innovativeness and use of cell phone or other communication media

Rahim (1963) concluded in his study that adoption improved farming practices agricultural technology by the farmers was positively related to their contact with communication media.

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

Kashem and Halim(1991) found in their study that innovativeness of the farmers had significant positive correlation with their (farmers) self confidence, use of communication media .

2.3.10 Cosmopoliteness and use of cell phone or other communication media

Latif (1974) found that the relationship between the cosmopoliteness and the communication media was positively significant.

Kadam and Sabale (1983) observed that cosmopoliteness of the farmers was significantly associated with the extent use of communication media.

Bhuiyan (1988) in a study observed that the relationship between cosmopoliteness and use of communication media was not significant.

2.3.11 Problems confronted by the farmers in using cell phone for receiving agricultural information and use of cell phone or other communication media

Buys et al. (2009) found that factors associated with higher costs namely, higher elevation, steeper slopes, and distance from a main road and major urban centers are negatively associated with mobile phone coverage.

Samuel et al.(2005) found that mobile phones were too expensive in terms of buying and running costs.

2.4 The conceptual framework of the study

In scientific research, selection and measurement of variables constitute an important task. Use of cell phone by the farmers for receiving agricultural information was the main focus of the study. Use of cell phone by the farmers might be depended on several factors of the farmers. In this study 11 selected factors (i.e. age, education, land possession, effective farm size, farming experience, annual family income, Agricultural training exposure, organizational participation, innovativeness, cosmopoliteness and problem confrontation by the farmers in using cell phone for receiving agricultural information) were considered which might have relationship with the use of cell phone. In the review process of past literatures, it was found that some characteristics of the farmers had relationship with communication media, but a very few literature were found which had relationship with cell phone use. Five selected services like phone call, sms, mms, video call and internet surfing were considered as cell phone use. Based on the above discussion a simple conceptual framework for the study is made on the basis of review of literature which is shown in figure 2.1.

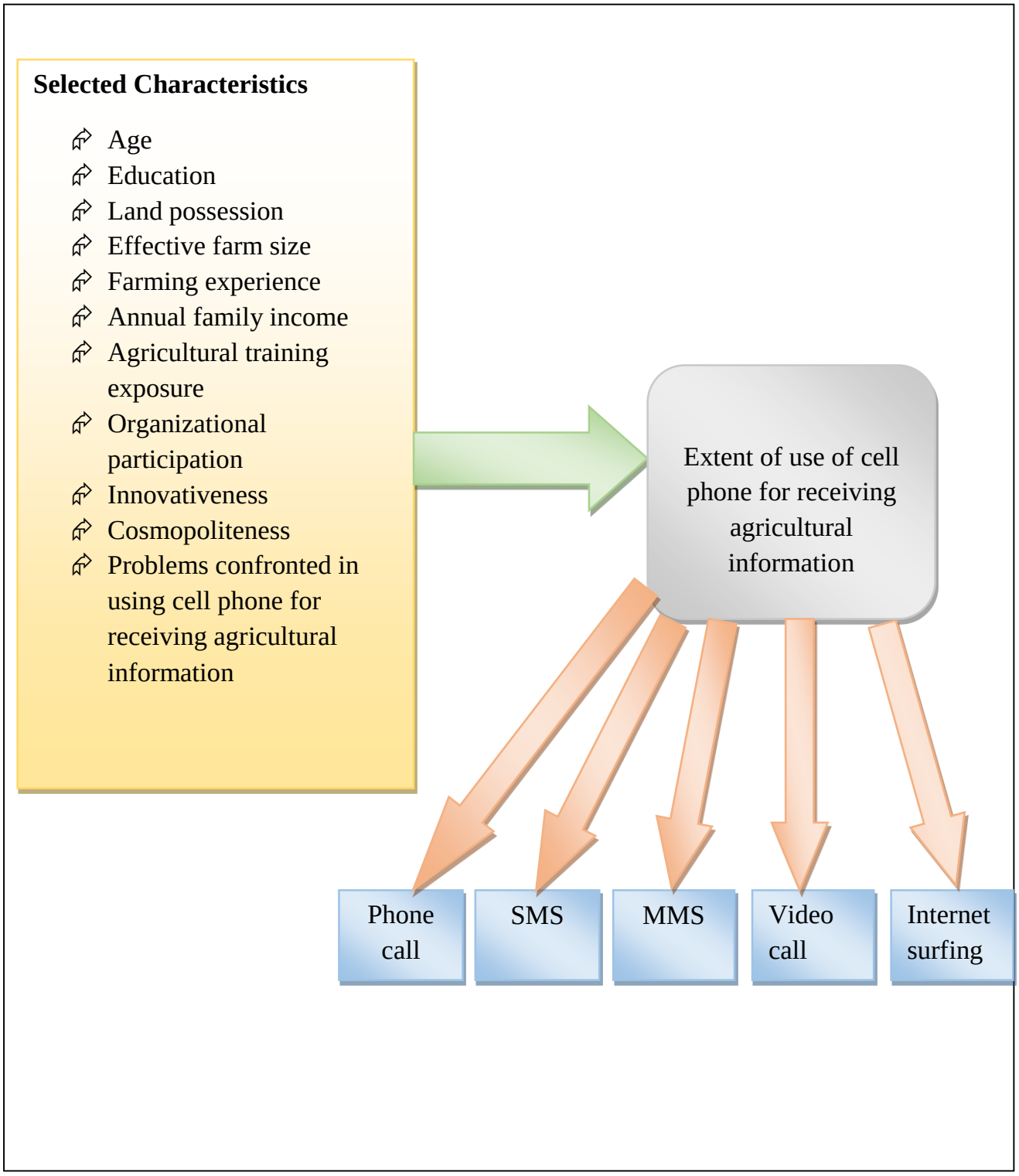

Fig 2.1 Conceptual framework of the study

CHAPTER 3

METHODOLOGY

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

3.1 Locale of the Study

The study was conducted in Singair upazilla of Manikganj district. The researcher selected cell phone user farmers of the Boyra union in this upazilla. Charjamalpur Village of Boyra union constituted the locale of the study. The physical, social and cultural heritages of the people of this area were similar in many cases with other central areas of the country. A map of Manikganj district showing the Singair upazilla and a map of Singair upazilla showing the study union are shown in figure 3.1 and 3.2 respectively.

3.2 Population and Sampling Design

All the cell phone user farmers of the Chorjamalpur village of Boyra union of Singair upazilla of Manikganj District constituted the population of the study. For this purpose, an up-to-date list of the cell phone user farmers was prepared with the help of the village elites and Sub-assistant Agricultural Officers of that union. The total number of the cell phone user's farmers in this village was 106. Attempt had been made to collect data from all the 106 cell phone user farmers of the village. But unfortunately, 9 farmers were not available at the time of data collection. Hence, the sample of the study become 97.

Figure 3.1 Map of Manikganj district showing Singair Upazilla

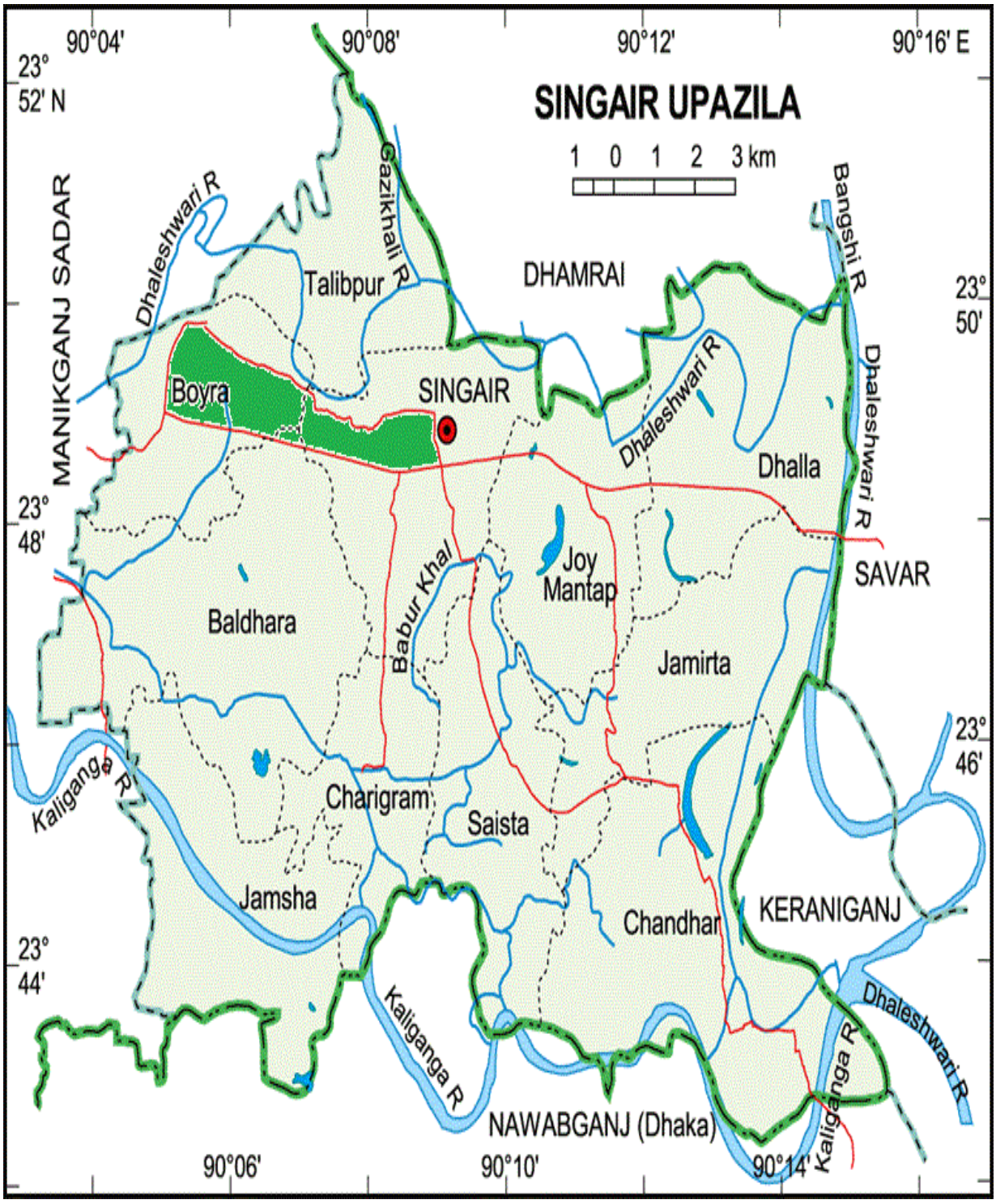

Figure 3.2 Map of Singair Upazillla showing the Boyra Union

3.3 Instrument for Collection of Data

In order to collect relevant information an interview schedule was carefully prepared and designed in keeping the objective of the study in view. The statements and questions were set with wide revision and they were made simple and easily understandable to the farmers. It contained both open and closed form questions. It contained eleven independent variables. The questions were arranged systematically. The interview schedule was pretested with 10 cell phone user farmers and then final shape was given to the interview schedule according to the experience of pre-test. The pre-test facilitated the researcher to examine the suitability of different questions and status of the instrument in general. An English version of interview schedule is enclosed in Appendix-A

3.4 Measurement of Variables

3.4.1 Age

Age of the farmer referred to the period of time from his/her birth to the time of interview. It was measured in terms of actual years on the basis of his response to the interview schedule (Appendix-A).

3.4.2 Education

Education was measured in terms of years of schooling completed by an individual in educational institution. If a respondent did not know how to read and write, his education score was taken as zero (0). The respondents got actual score of his every year of successful schooling i.e. 1 for one, 2 for class two and so on.

3.4.3 Land Possession

Land possession refers to the physical control over land provides one a possession of that thing. The land possession of the respondent was computed by using following formula:

Land Possession= A+B+1/2(C+D)+E

Where,

A= Homestead land

B=Own land under own cultivation

C=Land give to others on borga

D=land taken from others on borga

E=Land taken from others on lease

3.4.4 Effective Farm size

Effective farm size refers to the actual quantity of farm size where respondent perform his/her agricultural activities last year. It is measured in hectare.

3.4.5 Farming experience

Farming experience refers to how many years are engaged in agricultural farming. The farming experience of a farmer means the experience he/she gained directly by performing various farming activities and it was expressed in year.

3.4.6 Annual family income

Annual family income of a respondent was measured in thousand taka on the basis of his/her total yearly earnings from agriculture and other sources in which the respondent was involved. The income from all the crops in the preceding year was noted. The income from other enterprises (i.e. Livestock-cows, goats, poultry, fish etc.) was also added to the earnings. Earnings of each respondent from different sources (like service, business and labor) were also included in calculating the income. Yearly earnings from farming and other sources were

added together to obtain total income of a respondent. A score of one (1) was given for each one thousand taka income.

3.4.7 Agricultural training exposure

It was measured by the total number of days that a respondent has undertaken training on agriculture in his/her entire life time from different organizations. A score of one (1) was assigned for each day training received.

3.4.8 Organizational participation

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

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

Organizational participation (OP) score of a respondent of each organization was computed by using following formula:

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

Where,

OP= Organizational participation

P_{OM} =Participation as ordinary member

P_{EM} = Participation as executive committee member

P_{EO}= Participation as executive officer

Y=Duration of participation in year

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

3.4.9 Innovativeness

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

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

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

3.4.10 Cosmopoliteness

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

Please of visit	Nature of visit	Score
1. Visit to other villages	Regularly (≥ 5times/ month) Occasionally (3-4 times/month) Rarely (1-2 times/month) Not at all (0 time/month)	3 2 1 0
2. **Visit to other union**	Regularly (≥ 5 times/ month) Occasionally (3-4 times/month) Rarely (1-2 times/month) Not at all (0 time/month)	3 2 1 0
3. **Visit to own upazilla sadar**	Regularly (≥4 times/ month) Occasionally (2-3 times/month) Rarely (1 time/month) Not at all (0 time/month)	3 2 1 0
4. **Visit to other upazilla sadar**	Regularly (≥ 3 times/ year) Occasionally (2 times/year) Rarely (1time/year) Not at all (0 time/year)	3 2 1 0

Please of visit	Nature of visit	Score
5. Visit to own district town	Regularly (≥ 4times/ month) Occasionally (2-3 times/month) Rarely (1 time/month) Not at all (0 time/month)	3 2 1 0
6. **Visit to other district town**	Regularly (≥ 3 times/ month) Occasionally (3 times/month) Rarely (1 time/month) Not at all (0 time/month)	3 2 1 0
7. **Visit to Capital city (Dhaka)**	Regularly (≥ 3 times/ month) Occasionally (2 times/month) Rarely (1-time/month) Not at all (0 time/month)	3 2 1 0

Cosmopoliteness score of a respondent was obtained by adding his/her score for all the items. Therefore, the possible innovativeness score of the respondents could range from 0 to 21, 0 indicating no cosmopoliteness and 21 indicating very high cosmopoliteness.

3.4.11 Problems confronted by the farmers in using cell phone for receiving agricultural information

Problems confronted means unwanted situation generated during using cell phone like to make a call or to receive a call. For this purpose five point rating scale was used as follows:

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

Problem confrontation score of a respondent was obtained by adding his/her score for all the items. Therefore, the possible innovativeness score of the respondents could range from 0 to 24, 0 indicating no problem confrontation and 24 indicating very high problem confrontation in using cell phone for receiving agricultural information.

3.4.12 Use of Cell phone for Agricultural information

Extent of use of cell phone was measured by the number of successful use of five selected cell phone services in last three months. The services includes Phone call, SMS, MMS, Video call and internet surfing. The respondent farmers were asked to indicate the number s/he successfully used cell phone in each of the number of all the five selected services were added together to obtain the score for use of cell phone of the respondent farmers for agricultural information.

3.5 Hypotheses

3.5.1 Research hypotheses

The following research hypotheses were put forward to test the relationship of the selected characteristics of the farmers and their use of cell phone by the farmers for receiving agricultural information.

"*There is a relationship between each of the selected characteristics of the farmers and their use of cell phone for receiving agricultural information".* The selected characteristics include: age, education, land possession, effective farm size, farming experience, annual family income, agricultural training, organizational participation, innovativeness, cosmopoliteness and problems confronted by the farmers in using cell phone for receiving agricultural information.

3.5.2 Null hypotheses

For statistical test of the research hypotheses they were converted to null form. The null hypotheses were as follows:

"*There is no relationship between each of the selected characteristics of the farmers and their use of cell phone for receiving agricultural information.*"

3.6 Collection of Data

Data were collected by the researcher himself during 10 January to 12 February, 2016. To get valid and pertinent information, the researcher made all possible efforts to explain the purpose of the study to the respondents.

Interviews were executed with the respondents in their residents during their leisure period. While interviewing with any respondents, the researcher took all possible care to establish rapport with him/her so that he/she did not get feel awkward and unexpected situations to furnish proper responses to the questions and statements in the schedule. The questions were clearly explained wherever the respondents felt any unwanted situation or feelings.

3.7 Data Processing

3.7.1 Editing

The collected raw data were examined thoroughly to detect errors and omissions. As a matter of fact the researcher made a careful scrutiny of the completed interview schedule to make sure that necessary data 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.

3.7.2 Coding and tabulation

Having consulted with the research supervisor and co-supervisor, the investigator prepared a detailed coding plan. In case of qualitative data, suitable scoring techniques were followed by putting proper weight age against each of the traits to transform the data into quantitative forms. These were then tabulated in accordance with the objective of the study.

3.7.3 Categorization of data

Following coding operation, the collected raw data as well as the respondents were classified into various categories to facilitate the description of the independent and dependent variables. These categories were developed for each of the variables by considering the nature of distribution of the data and extensive literature review. The procedures for categorization have been discussed while describing the variables under consideration in chapter 4.

3.8 Statistical Analyses

The statistical measures such as range, percentage, mean, standard deviation were used for describing the variables. Tables were also used in presenting data for clarity of understanding. Pearson Product Moment correlation was run to determine the relationship between each of the selected characteristics of the farmers with their use of cell phone for receiving agricultural information. Five percent (0.05) level of probability was used as the basis for rejection of any null hypothesis throughout the study.

CHAPTER 4

RESULTS AND DISCUSSION

The findings of the study and interpretation of the results those faced by the Cell phone user farmers have been presented in this chapter. These are presented below according to the objective of the study. Necessary explanations and appropriate interpretations have also been made showing possible and logical basis of the findings.

4.1 Selected Characteristics of the Farmers

In this section the findings of the farmers' selected characteristics have been discussed. The selected characteristics are i) Age, ii) Education, iii) Land possession, iv) Effective farm size, v) Farming experience, vi) Annual family income, vii) Agricultural training exposure, viii) Organizational participation, ix) Innovativeness, x) Cosmopoliteness and xi) Problems confronted by the farmers in using cell phone for receiving agricultural information.

Measuring unit, range, mean, standard deviations of those characteristics of the farmers were described in this section. Table 4.1 provides a summary profile of the farmer’s characteristics.

Table 4.1: Salient features of the selected characteristics of Cell phone user farmer

Characteristics (measuring unit)	Possible score	Observed score	Mean	SD
Age(year)	-	16-75	42.53	11.55
Education (years of schooling)	-	0-16	5.83	3.71
Land possession (ha)	-	0.03-2.10	0.58	0.39
Effective farm size(ha)	-	0.04-2.02	0.173	0.33
Farming experience (years)	-	4-60	27.05	11.47
Annual family income (“000”Tk.)	-	60-390	138.35	74.10
Agricultural training exposure(Days)	-	0-21	1.07	3.00
Organizational participation(years)	-	0-7	1.86	1.80
Innovativeness(score)	0-60	11-38	24.17	4.91
Cosmopoliteness(score)	0-21	0-21	14.03	4.07
Problems in using cell phone for receiving agricultural information(score)	0-24	5-13	9.39	2.00

4.1.1. Age

Age of the farmers ranged from 16 to 75 years with the mean of 42.53 years and standard deviation of 11.55. However, based on their age the farmers were classified into three categories as young, middle-aged and old as shown in Table 4.2

Table 4.2 Distribution of the farmers according to their age

Categories	Farmers'	
	Number	Percent
Young (≤35)	26	26.8
Medium aged(36-50)	55	56.7
Old(>50)	16	16.5
Total	97	100.0

Table 4.2 revealed that majority (56.7 percent) of the farmers were middle aged, while 26.8 percent of the farmers were young and the rest 16.5 percent of the farmers were old. The findings again revealed that overwhelming majority (83.5 percent) of the farmers were young or middle age. Generally young and middle aged farmers are more likely to receive agricultural information by cell phone.

4.1.2 Education

The education of the respondents ranged from 0 to 16, the average being 5.83 with the standard deviation of 3.71. On the basis of their education score, the farmers were classified into four categories, namely "illiterate", "primary education", "secondary education" and "above secondary education". The distribution of the farmers according to their education is shown in Table 4.3.

Table 4.3 Distribution of the farmers according to their education

Category	Farmers'	
	Number	Percent
Illiterate (0)	8	8.2
Primary education (1-5)	37	38.2
Secondary education (6-10)	50	51.5
Higher Secondary (10-12)	2	2.1
Total	97	100

It was found that above half (51.5 percent) of the farmers had secondary education compared to 38.2 percent of the farmers had primary education, 2.1

percent of the farmers had higher education and 8.2 percent of the farmers were illiterate. From the finding it was also found that overwhelming majority of the farmers (91.8 percent) had literacy and 8.2 percent were illiterate. The educational status of the farmers due to the proximity of study area to the capital city Dhaka.

4.1.3 Land possession

The observed land possession scores of the farmers ranged from 0.03 hectares to 2.10 hectares. The average land possession was 0.58 hectare and the standard deviation was 0.39. The farmers were classified into the following three categories based on their land possession scores: “marginal farm size”, “small farm size” and “medium farm size. The distribution of the farmers according to their land possession is shown in Table 4.4.

Table 4.4 Distribution of the farmers according to their land possession

Category	Farmers’	
	Number	Percent
Marginal (up to 0.20 ha)	10	10.3
Small (0.21-1.00 ha)	77	79.4
Medium (1.01-2.5 ha)	10	10.3
Total	97	100

It was found that majority (79.4 percent) of the farmers land possession was small compared to 10.3 and 10.3 percent of them having marginal and medium land possession respectively.

4.1.4 Effective farm size

Effective farm size of the respondents ranged from 0.04 to 2.02 ha having an average of 0.57 ha and standard deviation 0.33 ha. The farmers were classified into following three categories based on their effective farm size scores: "marginal effective farm size", "small farm size", "medium farm size". The distribution of the farmers according to their land possession is shown in Table 4.5.

Table 4.5: Distribution of the farmers according to effective farm size

Category	Farmers'	
	Number	Percent
Marginal (up to 0.20 ha)	8	8.2
Small (0.21-1.00 ha)	80	82.5
Medium (1.01-2.5 ha)	9	9.3
Total	97	100

It was found that majority (82.5 percent) of the farmers possessed small farm size compared to 8.2 and 9.3 percent of them having marginal and medium effective farm size respectively.

4.1.5 Farming experience

The observed farming experience scores of the farmers ranged from 4 years to 60 years. The average farming experience was 27.05 years and the standard deviation was 11.47. The farmers were classified into the following three categories based on their farming experience scores: "Low", "medium", "High". The distribution of the farmers according to their farming experience is shown in the table 4.6.

Table 4.6: Distribution of the farmers according to their farming experience

Categories	Farmers'	
	Number	Percent
Low<(Mean - 0.5 sd, i.e. <21)	33	34
Medium (Mean ± 0.5 sd, i.e. 21-35)	47	48.5
High>(Mean + 0.5 sd, i.e.>35)	17	17.5
Total	97	100

It was found that 48.5 percent farmers possessed medium farming experience compared to 34 and 17.5 percent of them having low and high farming experience respectively.

4.1.6 Annual family income

The observed annual family income of the farmers ranged from 60-390 having an average of 138.35 with a standard deviation 74.10. Based on their annual income score, the farmers were classified into three categories: "low annual income", "medium annual income", "high annual income". The distribution of the farmers according to their annual family income is shown in Table 4.7.

Table 4.7: Distribution of the farmers according to annual family income

Category	Farmers'	
	Number	Percent
Low <(Mean - 0.5 sd, i.e. <101.3)	41	42.3
Medium (Mean ± 0.5 sd, i.e.101.3 to	33	34
High >(Mean + 0.5 sd, i.e.> 175.4)	23	23.7
Total	97	100

On the basis of annual family income, the respondents were categorized into three classes namely low, medium and high income respondents. The highest proportion of the respondents (42.3 percent) had low annual family income while 34 and 23.7 percent of them had medium and high annual family income respectively. Finding reveal that most (76.3 percent) of the respondents had low to medium annual family income indicating the present status of the farmers. Annual family income is an important character to realize the use of cell for receiving agricultural information. As the respondents were rural farmers and most of them had marginal and small farm size the researcher found that most of the beneficiaries had low to medium family annual income.

4.1.7 Agricultural training exposure

The observed Agricultural training exposure scores of the farmers ranged from 0 to 21.having an average of 1.07 and a standard deviation of 3.00.On the basis of their Agricultural training exposure scores. The farmers were classified into three categories: “no”, “low” and “medium”. The distribution of the farmers according to their Agricultural training exposure scores is shown in Table 4.8.

Table 4.8: Distribution of the farmers according to agricultural training exposure

Category	Farmers’	
	Number	Percent
No(0)	57	58.8
Low(1-2)	36	38.1
Medium (above 2)	4	3.1
Total	97	100

Finding reveals that majority (58.8 percent) of the respondents had no agricultural training. And 38.1 percent respondents had low Agricultural training exposure and 3.1 percent respondents had medium agricultural training. Finding

also reveal that majority of the farmers (96.9 percent) of the farmers had low to no agricultural training.

4.1.8 Organizational participation

The observed organizational participation scores of the farmers ranged from 0 to 7 with an average of 1.86 and a standard deviation 1.80. On the basis of their organizational participation scores, the farmers were classified into three categories: “no organizational participation”, “low organizational participation” and “medium organizational participation”. The distribution of the farmers according to their organizational participation is shown in Table 4.9.

Table 4.9: Distribution of farmers according to organizational participation

Category	Farmers	
	Number	Percent
No(0)	32	33
Low(1-3)	47	48.4
Medium (4-7)	18	18.6
Total	97	100

Finding shows that the majority (48.4 percent) of the farmers had low organizational participation compared to one third (33 percent) and few (18.6 percent) having no and medium organizational participation respectively. It was observed that most of the farmers (81.4 percent) of that area had no to low organizational participation.

4.1.9 Innovativeness

The observed innovativeness scores of the farmers ranged from 11 to 38 having an average of 24.17 and a standard deviation of 4.91 against the possible range of 0-60. On the basis of their innovativeness scores, the farmers were classified into three categories: “low innovativeness”, “medium innovativeness” and “high

innovativeness". The distribution of the farmers according to their innovativeness scores is shown in Table 4.10.

Table 4.10: Distribution of the farmers according to their innovativeness

Category	Farmers'	
	Number	Percent
Low< (Mean - 0.5 sd, i.e. <22)	29	29.9
Medium (Mean ± 0.5 sd, i.e.22 to 26)	38	39.2
High >(Mean + 0.5 sd, i.e.> 26)	30	30.9
Total	97	100

Finding reveals that 39.2 percent of the farmers had medium innovativeness compared to 29.9 percent and 30.9 percent having low innovativeness and high innovativeness respectively. Finding also reveals that majority (70.1 percent) of the farmers had high to medium innovativeness.

4.1.10 Cosmopoliteness

The observed cosmopoliteness scores of the farmers ranged from 0-21 against the possible range of 0 to 28 having an average of 14.03 with a standard deviation of 4.07. Based on the cosmopoliteness scores, the farmers were classified into four categories: "no", "low", "medium" and "high". The distribution of the farmers according to their cosmopoliteness scores is shown in Table 4.11.

Table 4.11: Distribution of the farmers according to their cosmopoliteness

Category	Farmers'	
	Number	Percent
No (0)	2	2.1
Low (1-7)	2	2
Medium (8-14)	47	48.5
High (15-21)	46	47.4
Total	97	100

The finding shows that the majority proportion (48.5 percent) of the farmers had medium cosmopoliteness. The second majority (47.4 percent) of the farmers had high cosmopoliteness as compared to 2.1 percent and 2 percent having no cosmopoliteness and low cosmopoliteness respectively. Thus, it can be revealed that most of the farmers (95.9 percent) of the farmers had high to medium cosmopoliteness.

4.1.11 Problems confronted by the farmers in using cell phone for receiving agricultural information

The observed problems confronted scores of the farmers ranged from 5-13 having an average of 9.39 and a standard deviation of 2.00 against the possible range of 0-24.On the basis of their problems confronted scores , the farmers were classified into three categories: "low", "medium", "high". The distribution of the farmers according to their problems confronted in using cell phone for receiving agricultural information is shown in Table 4.12.

Table 4.12: Distribution of the farmers according to their problems confronted in using cell phone for receiving agricultural information

Category	Farmers'	
	Number	Percent
Low < (Mean - 0.5 sd, i.e. <9)	33	34
Medium (Mean ± 0.5 sd, i.e.9 to 10)	31	32
High >(Mean + 0.5 sd, i.e.>10)	33	34
Total	97	100

The finding shows that 34 percent farmers were low problem facing and 32 percent of the farmers had medium problem faced. And 34 percent farmers had high type of problem faced during receiving agricultural information by using cell phone.

4.2 Use of cell phone for receiving agricultural information by the farmers

The computed cell phone using scores ranged from 0-8 with an average of 1.19 and a standard deviation of 1.71. Based on their cell phone using scores the respondents were classified into four categories as "no user", "low user", "medium user" and "high user". The distribution of the farmers according to use of cell phone is shown in Table 4.13.

Table: 4.13 Distribution of the farmers according to use of cell phone

Category	Farmers'		Mean	Standard Deviation
	Number	Percent		
No use (0)	45	46.4	1.19	1.71
Low use(1-3)	42	43.3		
Medium use (4-7)	8	8.2		
High (above 7)	2	2.1		
Total	97	100		

The finding shows that 89.7 percent of the respondents had no to low use of cell phone. And 8.2 percent of the respondents had medium use of cell phone for receiving agricultural information. 2.1 percent of the respondents had high use of cell phone for receiving agricultural information. The finding clearly indicates the ignorance of the respondents about the use of cell phone in receiving agricultural information. Lack of interest and awareness had found for using cell phone for receiving agricultural information. High use of cell phone was not found in respect of receiving agricultural information.

Most of the farmers preferred cell phone for communicating with their family members, neighbors and relatives. Therefore it is necessary to encourage the farmers in receiving agricultural information regarding availability, quality, market price and doses of different inputs like seeds, fertilizers, pesticides through cell phone.

Extent of use of different cell phone services

Attempt has been made to find out the extent of use of different cell phone services (i.e. Phone call, SMS, MMS, Video call, Internet surfing). The frequencies of different Cell Phone services are shown in a Table 4.13.

Table 4.14: Frequencies of different Phone Call Services used by the Farmers

Cell Phone Services	Frequencies	%
Phone Call	79	68.70
SMS	36	31.30
MMS	0	0
Video call	0	0
Internet Surfing	0	0

Farmers made 79 Phone call and 36 SMS in last three months. They do not made any MMS, Video call and Internet surfing.

4.3 Relationship between each of the Selected Characteristics of the Cell Phone User Farmers and their Use of Cell phone for Receiving Agricultural Information

The purpose of this section is to examine the relationships of each the eleven selected characteristics (as cited in the objectives) of the farmers with their use of cell phone in receiving agricultural information.

The null hypothesis formulated as "There is no significant relationship between each of the selected characteristics of the farmers and their use of cell phone in receiving agricultural information". The hypothesis regarding the concerned variables were examined through computing Pearson's Product Moment Correlation Coefficient (r) and findings have been shown in Table 4.14. Additionally, the correlation matrix of all the variables has been shown in Appendix B.

Table 4.15 Results of relationship between each of the selected characteristics of the cell phone user farmers and their use of cell phone for receiving agricultural information

N=97

	Selected characteristics of the farmers	Values of correlation coefficient("r")
Use of Cell Phone by the farmers	Age	-0.039^{NS}
	Education	0.236*
	Land Possession	0.523**
	Effective farm Size	0.509**
	Farming experience	-0.094^{NS}
	Annual family income	0.558**
	Agricultural training exposure	0.215*
	Organizational participation	0.268**
	Innovativeness	0.493**
	Cosmopoliteness	0.492**
	Problem confrontation of the farmers in using cell phone	-0.430**

^{NS}Non-significance

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

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

4.3.1 Age and use of cell phone

The correlation coefficients between age of the farmers and their use of cell phone (-0.039) was found smaller than the tabulated value at 5 percent level of probability (Table 4.14). So, the concerned null hypothesis was not rejected. Based on the computed "r" value, the relationship between the age and use of cell phone was not significant and followed a negative trend. Thus it was concluded that age of the farmers did not play significant role on their extent use of cell phone .This means that use of cell phone by the farmers was independent of their age.

4.3.2 Education and use of cell phone

The correlation coefficient between education an use of cell phone (0.236) was greater than the tabulated value at 5 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected. Based on the computed "r" value the relationship between the education and use of cell phone was significant and followed a positive trend. Rashid (2003) and Nuruzzaman (2003) found similar relationship between the education and use of cell phone in their respective study.

4.3.3 Land possession and use of cell phone

The correlation coefficient between land possession and use of cell phone (0.523) was greater than the tabulated value at 1 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected. Thus it may be concluded that there was significant and positive relationship between land possession and use of cell phone. Actually farmers who possess more land are more aware and knowledgeable about the use of cell phone for receiving agricultural information.

4.3.4 Effective farm size and use of cell phone

The correlation coefficient between the effective farm size and use of cell phone (0.509) was greater than the tabulated value at 1 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected .thus it may be concluded that there was significant and positive relationship between the effective farm size and use of cell phone.

4.3.5 Farming experience and use of cell phone

The correlation coefficient between the farming experience and use of cell phone (-0.094) was smaller than the tabulated value at 5 percent level of probability (Table 4.14). So the concerned null hypothesis was not rejected. Based on the computed "r" value the relationship between the farming experience and use of cell phone was not significant and followed a negative trend. Thus it was concluded that farming experience of the farmers did not play significant role on their extent of use of cell phone. This means that use of cell phone by the farmers was independent of their farming experience.

4.3.6 Annual family income and use of cell phone

The correlation co efficient between annual family income and use of cell phone (0.558) was greater than the tabulated value at 1 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected. Thus, it may be concluded that there was significant and positive relationship between annual family income and use of cell phone. Thus from the mandate of present Government of Bangladesh to make the country digitalize, the cell phone use is common phenomenon of the all levels of people of Bangladesh.

4.3.7 Agricultural training exposure and use of cell phone

The correlation coefficient between Agricultural training exposure and use of cell phone (0.215) was greater than the tabulated value at 5 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected. Based

on the computed "r" value the relationship between Agricultural training exposure and use of cell phone was significant and followed a positive trend.

4.3.8 Organizational participation and use of cell phone

The correlation coefficient between organizational participation and use of cell phone (0.268) was greater than tabulated value at 1 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected. Thus it may be concluded that there was significant and positive relationship between organizational participation and use of cell phone. Therefore, use of cell phone by the farmers was varied positively with the organizational participation.

4.3.9 Innovativeness and use of cell phone

The correlation coefficient between innovativeness and use of cell phone (0.493) was greater than the tabulated value at 1 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected. Thus, it may be concluded that there was significant and positive relationship between innovativeness and use of cell phone. This implies that with the increase of innovativeness of the farmers, their use of cell phone in receiving agricultural information was also increased.

4.3.10 Cosmopoliteness and use of cell phone

The correlation coefficient between cosmopoliteness and use of cell phone (0.492) was greater than the tabulated value at 1 percent level of probability (Table 4.14). So, the concerned null hypothesis was rejected. Thus, it may be concluded that there was significant and positive relationship between cosmopoliteness and use of cell phone. This implies that with the increase of cosmopoliteness of the farmers, the use of cell phone by them was also increased. Similar findings were found by Nuruzzaman (2003) in his respective study.

4.3.11 Problems confronted by the farmers in receiving agricultural information and use of cell phone

The correlation coefficient between problems confronted and use of cell phone (- 0.430) was found greater than the tabulated value at 1 percent level of probability (Table 4.14). Therefore, the null hypothesis was rejected. The relationship between the concerned variables was significant and showed a negative trend. It means that the increase of problems confronted faced by the farmers, their use of cell phone was decreased and vice-versa.

Chapter 5

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of the findings

The major findings of the study have been summarized in the following sections

5.1.1 Selected individual characteristics of the farmers

Age: Most of the farmers were middle aged (56.7 percent) while 26.8 percent and 16.5 percent respondents are in the young and old age category respectively.

Education: Most of the cell phone user farmers had secondary education (51.5 percent), 38.2 percent primary education, 2.1 percent above secondary education and 8 percent illiteracy.

Land Possession: Majority of the respondents (79.4 percent) had small land possession. And 10.3 percent had marginal land possession and 10.3 percent had medium land possession.

Effective Farm Size: Majority of the respondents (82.5 percent) effective farm size was small. And 8.2 percent respondents effective farm size was marginal and 9.3 percent respondents effective farm size was medium.

Farming Experience: Most of the respondents farming experience was medium (48.5 percent). About 34 percent of the respondents farming experience was low. And about 17.5 percent of the respondents farming experience was high.

Annual Family Income: About 42.3 percent of the respondents annual family income was low. About 34 percent of the respondent's annual family income was medium and about 23.7 percent of the respondents annual family income was high.

Agricultural training Exposure: About 58.8 percent of the respondents Agricultural training exposure was under no category. About 37.1 percent of the respondents Agricultural training exposure was low. And about 4.1 percent of the respondents Agricultural training exposure was medium.

Organizational Participation: 48.4 percent of the respondents organizational participation was low. About 33 percent of the respondents organizational participation was no organizational participation. And about 18.6 percent of the respondents organizational participation medium.

Innovativeness: About 39.2 percent of the respondents had medium innovativeness. About 29.9 percent of the respondents had low innovativeness. About 30.9 percent of the respondents had high innovativeness.

Cosmopoliteness: Most of the respondents (48.5 percent) of the respondents had medium cosmopoliteness. About 47.4 percent of the respondents had high cosmopoliteness. About 2 percent of the respondents had low cosmopoliteness. And 2.1 percent of the respondents had no cosmopoliteness.

Problems Confronted in Using Cell Phone for Receiving Agricultural Information: About 34 percent of the respondents problem confrontation was low in receiving agricultural information. About 32 percent faced medium problem confrontation in using cell phone for receiving agricultural information. About 34 percent of the respondents faced high problem confrontation during receiving agricultural information.

5.1.2 Use of cell phone for receiving agricultural information

About 46.4 percent of the respondents had no use of cell phone for receiving agricultural information. About 43 percent of the respondents had low use of cell phone for receiving agricultural information. About 8 percent of the respondents had medium use of cell phone for receiving agricultural information. And very negligible proportion (2 percent)of the respondents had high use of cell phone for receiving agricultural information. This was not a satisfactory scenario for using cell phone as a source of agricultural information.

5.1.3 Relationship between each of the selected characteristics of the farmers and their use of cell phone

Among 11 selected characteristics of the farmers, eight characteristics namely education, land possession, effective farm size, annual family income, Agricultural training exposure, organizational participation, innovativeness, cosmopoliteness showed significant and positive relationship with their use of cell phone. Problem confrontation of the farmers in using cell phone showed significant negative relationship with their use of Cell Phone. But age of the farmers and farming experience of the farmers showed non significant relationship with the use of cell phone by the farmers.

5.2 Conclusion

On the basis of the findings of the research and logical interpretations of their meaning in the light of other relevant facts, the researcher drew the following conclusions:

- The finding shows that 89.7 percent of the respondents had no to low use of Cell Phone and 10.3 percent of the respondents had medium to high use of Cell Phone for receiving agricultural information. Thus, it was revealed that use of cell phone by the farmers is still confined on other issues to communicate with their family members and relatives, not for receiving agricultural information.

- Land possession and effective farm size of the farmers had significant and positive relationship with their use of Cell Phone for receiving agricultural information. Therefore, it may be concluded that farmers having higher land possession and large effective farm size were the more user of cell phone.
- Annual family income, cosmopoliteness and organizational participation of the farmers had positive relationship with their use of cell phone. This implies that increase of annual family income, cosmopoliteness, and organizational participation increase their use of cell phone.
- Agricultural training exposure of the farmers had significant positive relationship with their use of Cell Phone for receiving agricultural information. Therefore it may be concluded that farmers having more agricultural training exposure were more user of cell phone service for receiving agricultural information.
- Innovativeness of the farmers had positive relationship with their use of cell phone for receiving agricultural information. So, it was concluded that with the increase of innovativeness, their use of cell phone was also increased.
- The relationship between the problem confrontation in receiving agricultural information and use of Cell Phone was significant and showed a negative trend. Therefore, it may be concluded that with the increase of problem confrontation of the farmers, their use of Cell Phone was decreased and vice-versa.

5.3 Recommendations

Based on the findings and conclusions of the stud, following recommendations for policy implications were put forward:

- The finding shows that 89.7 percent of the respondents had no to low use of Cell Phone and 10.3 percent of the respondents had medium to high use of Cell Phone for receiving agricultural information. This was not a satisfactory feature. As a result, policy should be taken for increasing extent of use of cell phone for agricultural purposes through creating awareness and interest among the farmers.

- Land possession and effective farm size of the farmers had significant and positive relationship with their use of Cell Phone for receiving agricultural information. Therefore, it may be recommended that attempts should be taken by the concerned authorities by motivational campaigning to use more cell phone by the small and medium farmers for receiving agricultural information.
- Agricultural training exposure of the farmers had significant positive relationship with their use of Cell Phone for receiving agricultural information. Therefore, it may be recommended that attempts should be taken by the agricultural extension service providers to arrange training for the farmers for increasing their use of Cell Phone for receiving agricultural information.
- The relationship between the problem confrontation in receiving agricultural information and use of Cell Phone was significant and showed a negative trend. Therefore, it may be recommended that attempts should be taken by the concerned authorities to solve the problems of the farmers in using cell phone for receiving agricultural information.

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5.3.1 Recommendation for further research

The researcher conducted a small piece of study which could not make available all information for the proper understanding of the use of cell phone by the farmers in receiving agricultural information. Therefore, the following recommendations are put forward for further research works:

- The present study was conducted in one villages of Boyra Union of Singair Upazilla under Manikganj district. Therefore, it is recommended that similar studies may be conducted in other parts of the country.

- The study was undertaken to explore the relationship of eleven selected characteristics of the farmers and their use of cell in receiving agricultural

information. Therefore, it could be conducted considering other characteristics in this regard.

- This study was conducted only one interpersonal communication media like cell phone. Similar study can be conducted involving other communication media.

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Appendix-A

Department of Agricultural Extension & Information System

Sher-e-Bangla Agricultural University

Sher-e-Bangla Nagar, Dhaka-1207

English Version of the Interview Schedule

On

"Use of Cell Phone in Receiving Agricultural Information by the Farmers"

Sl. No. ……..

Name Of Respondent: ……

Father's Name: ……

Village: …… Union: …….

Upazilla:…… . Zilla: …….

(Please answer the following questions)

1. **Age**
   What is your age? **.....** years
2. **Education**

   What is your level of education?

   a. can not read & write…..b. can sign only…….c. Have passed……class

3. Land Possession: Please mention the area of your land possession.

Sl. No.	Type of land	Land Area	
		Local Unit	Hectare
A	Homestead land		
B	Own land under own cultivation		
C	Land given to others on borga		
D	Land taken from others on borga		
E	Land taken from others on lease		
Total=A+B+1/2(C+D)+E			

4. Effective Farm Size: Mention your farm size on which you perform your agricultural activities last year.

	Local	Hectare
Area		

5. Farming Experience: How many years you are engaged in Agricultural farming? ..... Years

6. Annual family income: Please state your annual income from different sources

(A)Agriculture

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

(B)Non-Agriculture

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

Grand Total = A+B = …….. Tk

7. Agricultural training

Did you participate in any agricultural training program?

Yes ☐ No ☐

If yes, then please give the following information

Sl.No.	Name of the training courses	Duration of training(days)
Total		

8. Organizational Participation

Please mention the extent of participation in the following institutions:

Sl. No.	Name of the Institution	Extent of Participation (Years)			
		No Participation	Ordinary Member	Executive Committee Member	Executive Officer
1	Farmer's Co-operative Society				
2	NGO society				
3	Youth Club/Sports Club/Village Club/IPM club/ICM club				
4	Mosque/Temple/Madrasah/ School/ Union Parisad/Bazar Committee				

9. Innovativeness: Please indicate the level of frequency of using of the following technologies:

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

15	Use of balanced fertilizer					

10. Cosmopoliteness:

Please mention your frequency of visits to the following places:

Sl. No.	Place of visit	Frequency of visit			
		Regularly (3)	Occasionally (2)	Rarely (1)	Not at all (0)
1	Visit to other villages	≥5 times /month	3-4times/month	1-2times/month	0 time/month
2	Visit to other union	≥5 times /month	3-4times/month	1-2 times/month	0 time/month
3	Visit to own Upazilla Sadar	≥4 times /month	2-3 times/month	1 time/month	0 time/month
4	Visit to other Upazilla Sadar	≥3 times /year	2 times/year	1 time/year	0time/year
5	Visit to own District town	≥4 times /year	2-3 times/year	1 time/year	0time/year
6	Visit to other District town	≥3 times /year	2 times/year	1 time/year	0time/year
7	Visit to Capital city(Dhaka)	≥3 times /year	2 times /year	1 time/year	0time/year

11. Problems confronted by the farmers in using cell phone for receiving agricultural information:

Sl. No.	Problems	Extent of problem					Total
		Very High (4)	High (3)	Moderate (2)	Little (1)	Not at all (0)	
1	Lack of Knowledge						
2	High cost of Cell phone						
3	High call rate						
4	Inefficiency of Information service Provider						
5	Lack of cooperation from others						
6	Network Problem of Cell phone Operators						

12. Cell phone Use for Agricultural Information: Please mention your extent of use of cell phone for receiving agricultural information against following services:

Sl. No.	Name	Number of successful use in the last three month
1	Phone call	
3	SMS	
4	MMS	
5	Video call	
6	Internet surfing	
Total		

13. What type of Agricultural information you usually get by using cell phone?

14. What type of Agricultural information you want to get by using cell phone?

Thanking for your cooperation

…….

Signature of the interviewer & date

Appendix – B
Pearson Product Moment Correlation Matrix (N=97)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
X_1	-											
X_2	-0.092^{NS}	-										
X_3	0.138^{NS}	0.317**	-									
X_4	0.120^{NS}	0.300**	0.961**	-								
X_5	0.895**	-0.139^{NS}	0.158^{NS}	0.139^{NS}	-							
X_6	0.204*	0.290**	0.703**	0.663**	0.159^{NS}	-						
X_7	-0.075^{NS}	0.265**	0.309**	0.356**	-0.026^{NS}	0.263**	-					
X_8	0.183^{NS}	0.008^{NS}	0.087^{NS}	0.096^{NS}	0.069^{NS}	0.219*	-0.017^{NS}	-				
X_9	0.118^{NS}	0.280**	0.423**	0.374**	0.127^{NS}	0.571**	0.238*	0.317**	-			
X_{10}	0.072^{NS}	0.165^{NS}	0.336**	0.329**	0.100^{NS}	0.339**	0.121^{NS}	0.216*	0.388**	-		
X_{11}	-0.035^{NS}	-0.223*	-0.263**	-0.196^{NS}	-0.093^{NS}	-0.399**	-0.243*	-0.213*	-0.560**	-0.529**	-	
X_{12}	-0.039^{NS}	0.236*	0.523**	0.509**	-0.094^{NS}	0.558**	0.215*	0.268**	0.493**	0.492**	-0.430**	-

Spearman Rank Correlation Matrix (N=97)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
X_1	-											
X_2	-0.121^{NS}	-										
X_3	0.171^{NS}	0.393**	-									
X_4	0.141^{NS}	0.308**	0.895**	-								
X_5	0.883**	-0.141^{NS}	0.154^{NS}	0.128^{NS}	-							
X_6	0.201*	0.343**	0.665**	0.585**	0.146^{NS}	-						
X_7	-0.003^{NS}	0.276**	0.319**	0.322**	0.029^{NS}	0.212*	-					
X_8	0.209*	0.012^{NS}	0.209*	0.214*	0.122^{NS}	0.305**	0.240*	-				
X_9	0.196^{NS}	0.268**	0.442**	0.339**	0.191^{NS}	0.660**	0.138^{NS}	0.243*	-			
X_{10}	0.040^{NS}	0.166^{NS}	0.271**	0.193^{NS}	0.084^{NS}	0.397**	-0.017	0.151^{NS}	0.453**	-		
X_{11}	-0.014^{NS}	-0.226*	-0.305**	-0.197^{NS}	-0.064^{NS}	-0.446**	-0.180	-0.192^{NS}	-0.551**	-0.584**	-	
X_{12}	-0.030^{NS}	0.240*	0.474**	0.429**	-0.065^{NS}	0.469**	0.282**	0.263**	0.501**	0.386**	-0.477**	-

^{NS}Non-significance
**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).

X_1 = Age X_2 = Education X_3 = Land possession X_4 = Effective farm size X_5 = Farming experience X_6 = Annual family income X_7 = Agricultural training
X_8 = Organizational participation X_9 = Innovativeness X_{10} = Cosmopoliteness X_{11} = Problem confrontation X_{12} = Use of cell phone