EFFECTIVENESS OF KRISHOKER JANALA FOR DISSEMINATING AGRITULTURAL INFORMATION

MST. SHARMIN SULTANA

DEPARTMENT OF AGRICULTURAL EXTENSION &

INFORMATION SYSTEM

SHER-E-BANGLA AGRICULTURAL UNIVERSITY

DHAKA-1207

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MST. SHARMIN SULTANA

Reg. No. 12-04736

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APPROVED BY:

(Dr. Md. Sekender Ali)	**(Dr. Md. Rafiquel Islam)**
Supervisor	Co-Supervisor
Professor	Professor
Dept. of Agril. Ext. and Info. System	Dept. of Agril. Ext. and Info. System
Sher-e-Bangla Agricultural University	Sher-e-Bangla Agricultural University

(Md. Mahbubul Alam, PhD)
Professor & Chairman
Examination Committee
Dept. of Agricultural Extension and Information System
Sher-e-Bangla Agricultural University

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

CERTIFICATE

This is to certify that the thesis entitled **"EFFECTIVENESS OF KRISHOKER JANALA FOR DISSIMINATING AGRITULTURAL INFORMATION"** submitted to the department of Agricultural Extension and Information System, Faculty of Agriculture, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka in partial fulfillment of the requirements for the degree of Master of Science (M.S.) in Agricultural Extension, embodies the result of a piece of bona fide research work carried out by **MST. SHARMIN SULTANA, Registration No. 12-04736** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

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

Dated: December, 2017
Dhaka, Bangladesh

Prof. Dr. Md. Sekender Ali
Supervisor
Department of Agricultural Extension
and Information System
Sher-e-Bangla Agricultural University
Sher-e-Bangla Nagar, Dhaka-1207

DEDICATED

TO

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CHAPTER I

INTRODUCTION

1.1 General Background

Bangladesh is an agrarian country and its progress in the agriculture sector in last two decades is remarkable. In this development process, agricultural extension has played a momentous role. A number of Government Organizations (GOs) and Non-Government Organizations (NGOs) provide agricultural extension services to the farmers of Bangladesh. Among the services, providing agricultural advisory services to the farmer is a major one. A study of Katalyst (2011) revealed that from extension service provider, 80% of Bangladeshi farmers typically seek information on pest management and disease prevention. However, due to the existence of communication gap between the farmers and extension workers, problems are identified in wrong ways and in appropriate suggestions are provided to the farmers. Rothwell (2004) explained that this type of (communication) noise is caused mainly by the sender i.e., the encoder due to use of grammar or technical language or jargon that the receiver i.e. the decoder cannot understand. An electronic and device responsive pictorial database of plant's problem can be used to address all these issues effectively that minimizes the communication noises between farmer and extension worker.

The farmers of Bangladesh do not receive up-to-date and timely information on ways to identify and treat plant diseases, and their lack of formal education means they use crude and inaccurate terms to identify with plant diseases. These challenges have been addressed by **Krishoker Janala** (Farmer's Window), an inexpensive to build and inexpensive to operate, user centric indigenous innovation. Actually, **Krishoker Janala** is an important tool for agricultural knowledge management. Islam (2010) reported that effective knowledge management is achieved when the right knowledge and information is delivered to the right person at the right time in a user friendly and accessible

manner that helps the recipients to perform their jobs efficiently. The outcome of effective knowledge management includes improved productivity and performance of the agricultural sector. **Krishoker Janala** is an effective agricultural extension tool to ensure this. The initiative is also an effective means of disseminating agricultural information.

However, the success of this initiative is yet to be researched. Therefore, this study attempts to evaluate one of the agricultural advisory system projects '**Krishoker Janala', (**A 'Digital Completion and Standardization of Plants' Problem Identification System (DPPIS)**)'** which is a joint venture project of DAE, Access-to-Information (A2I) project, UNDP, USAID and Bangladesh Government.

'Krishoker Janala' is a mobile-based application. Users can download it in their mobile devices and use locally in offline form without the Internet. More than one thousands (1,000) problems of 120 crops are present in this mobile application. Generally field crops, vegetables, fruits and others plants diseases, pests, nutritional deficiencies alone with their images are present in this system. A farmer can easily identify his/her problem of crops by seeing the images in the system. The app has been proven as a time saving system, because they don't have to go to others. Farmers often seek help to SAAOs about their farming problems. However, it becomes often difficult to clearly identify any disease or problem without knowing proper signs and symptoms. This mobile application therefore assists users to identify the problem or disease by searching the images and symptoms. Since quick identification of disease is vital for crop cultivation this application could work as an important weapon for the farmers.

1.2 Statement of the Problems

The success of any technologies depend on its dissemination among the potential users, which ultimately measured by the level of effectiveness of that

technologies. It is anticipated that certain sustainable development can take place in Bangladesh if the relevant technologies can be transferred through right channels at the right time to the right people. In view of the foregoing discussion, the framework of this study stems from "effectiveness of Krishoker Janala" which is of great concern to national policy makers. The purpose of the study is to ascertain the mode, nature and extent of effectiveness of Krishoker Janala for disseminating agricultural in formation. The study is also aimed to have an understanding of the selected characteristics of the SAAOs and their contribution with the effectiveness of Krishoker Janala for disseminating agricultural information.

Therefore, farmers have to suffer economically from delayed receiving of information. Despite farmers dependent on other sources of information like input dealers or knowledgeable neighbors, it's been proven inadequate to meet the need of a demand-driven agriculture. Regarding this aspect, ICT-based solutions can provide an additional support to the traditional 'agent-based' agricultural advisory service and extend information directly to the farmers without any delay. This might on one hand assist farmers to directly receive farm related information and on the other hand help extension workers to upgrade their skills in delivering service. 'Krishoker Janala' is one of such prime initiatives by DAE, Bangladesh which is a repository of plants' diseases information with search option helps its users to find out problems of plants and suggest solutions. However, the success of such initiative is largely depends on how effectively it is serving its intended purposes to its users. Therefore, this study undertook an attempt to study the effectiveness of Krishoker Janala as an ICT-based agricultural advisory system in Bangladesh from its end-users viewpoints having the following questions in mind:

- ✓ To what extent Krishoker Janala as an effective tool for disseminating agricultural information?

- ✓ What were the factors those influence effectiveness of Krishoker Janala for disseminating agricultural information?
- ✓ What were the contribution of the factors (includes both personal and technological characterization of the SAAOs) to effectiveness of using Krishoker Janala for disseminating agricultural information?
- ✓ What problems were faced in using Krishoker Janala?
- ✓ What steps to be taken to improve the quality of Krishoker Janala?

1.3 Objectives of the Study

Considering the research questions stated above the following objectives were formulated for guiding the research:

- ✓ To determine some selected characteristics of the SAAOs
- ✓ To determine the effectiveness of Krishoker Janala for disseminating agricultural information
- ✓ To explore the contribution of the factors of the SAAOs on their effectiveness of Krishoker Janala
- ✓ To analyze problems faced by SAAOs in using Krishoker Janala
- ✓ To provide suggestion for improving the quality of Krishoker Janala

1.4 Scope and Limitations of the Study

The findings of the study will be particular applicable to the four Upazilas of Chuadanga district where the project of Krishoker Janala was first time launched. These findings may also be applicable in other areas of Bangladesh where the farmers and extension workers are informed about and have accessed to this initiative. The findings of the study will be beneficial for the extension personnel, farmers and particularly policy makers who are working towards digitalization of agricultural advisory system of Bangladesh.

The main purpose of the study was to assess the effectiveness of Krishoker Janala for disseminating agricultural information. It is expected that the findings obtained from this investigation will be generalized and applied to the other context however; in order to fulfill the research in purposeful and controllable way it becomes important to oblige certain limitations in regard to certain aspects of the study. Concerning the resources and time available to the researcher, the following limitations have been considered throughout the study.

- ✓ The study was conducted in four upazilas of Chuadanga district.
- ✓ There are numerous factors that might influence users effectiveness of 'Krishoker Janala', however among those factors only few personal and technological factors which deemed important were considered for this study.
- ✓ Data furnished by the respondent SAAOs were considered to be valid and reliable.
- ✓ Facts and figures collected by the investigator considering prevailing situation.

1.5 Assumptions of the Study

The following assumptions were made in conducting the study:

i. The respondents in the sample of the study were able to provide their opinions and were competent enough to satisfy the queries.

ii. The information provided by the respondents was reliable.

iii. The ICTs users included in the sample were the actual representative of the population.

iv. The researcher who acted as Interviewer was well adjusted to the social and cultural environment of the study area. Hence, the data collected by her from the respondents were free from bias.

v. The finding of the study will be useful for planning and execution of more ICT-based services facilitate its users for receiving agricultural information.

Study on the "effectiveness of Krishoker Janala for disseminating agricultural information" is conducted in very limited area of Bangladesh. A few studies in this regard have so far been conducted; therefore, the study will add new insights to the body of knowledge about the effectiveness in disseminating agricultural information to the rural clienteles.

1.6 Definition of the Terms

Age

Age of a respondent defined as the span of his/her life and is operationally measured by the number of years from his/her birth to the time of interviewing.

ICT Ownership

ICT ownership refers to as a respondent's possession of ICT devices ranging radio, TV, mobile phone and computer. It includes both self and shared access.

Ease of use

It refers to the extent to which a respondent perceives a system is easy to operate.

Extent of ICT use for work

It refers to the frequency of ICTs use by a user. Extent of ICT use for agricultural purpose refers to the extent of ICTs use by farmers for farm-related activities while the non-farm-related purpose is referred to as general purpose.

Internet

The Internet is a global system of interconnected computer networks that use the Internet protocol suit (TCP/IP) to link devices worldwide. It is a network of a computer networks that connects billion of web pages. The internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and peer-to-peer networks for file sharing.

Mobile Application

A mobile application, most commonly referred to as an app, is a type of application software designed run on a mobile device, such as a smart phone or tablet computer. Mobile applications frequently serve to provide users with similar services to those accessed on PCs.

Mobile Phone

An electronic telecommunication device, often refers to as a cellular phone or cell phone. Mobile phones connect to a wireless communication network through radio wave satellite transmission. Most mobile phones provide voice communications, Short Message Service (SMS), Multimedia Message Service (MMS), and newer smart phones may also provide Internet services such as web browsing and e-mail.

Feature Phone

Feature phones typically provides voice calling and text messaging and with a very few multimedia support.

Smart Phone

A smart phone is a mobile phone (also known as cell phones or cell mobiles) with an advance mobile operating system and having Internet browsing system.

SMS

SMS means Short Message Service. This is a feature on a mobile that allows a user to send or receive written message or any kind of information.

MMS

MMS means Multimedia Message Service. This is a method of transmitting graphics, video or sound files, etc.

CHAPTER II

REVIEW OF LITERATURE

Exploring the effectiveness of Krishoker Janala for disseminating agricultural information and its relationship with selected characteristics of the SAAOs were the main tasks of the study. This Chapter contains synthesis of selected literature those were related to the present study. The researcher made an elaborate search of available literature for this purpose. The researched topic is considerable newer and therefore very few studies were found that directly related to this study topic. However, this researcher made the best efforts to find relevant studies on the effectiveness of ICT-based applications used for disseminating agricultural information. This chapter is divided into four sections. First section deals with roles of SAAOs in agricultural extension and their job performance definition of SAAOs and their performance, the second section deals with concept of ICTs and their effectiveness, and the third section deals with the relationship between SAAOs characteristics and their effectiveness of Krishoker Janala and fourth section deals with the conceptual framework of the study.

2.1 Roles of SAAOs in Agricultural Extension and Their Job Performance

Professional leaders are the individuals who are assigned to a job and normally paid or receives remuneration for their tasks. They are responsible to carried out duties and responsibilities as assigned by their organization. Considering this definition, all the employees of agricultural extension service provider like SAAO, UAO, AEO are the professional leaders. Performance of professional leader refers to the degree to which an individual performs various duties and responsibilities assigned to them (Mahboob et al., 1978).

Employees' performance in an organizational context often synonymous to the job performance. A job can be defined as a collection of tasks assigned to a worker (Lanham, 1955 and Yulk, 1998) while performance implies how an individual actually performs in a given position, as distinct from how is expected to perform

(Davis, 1948). Performance often is the outcome of an individual's response to stimulus objects (Herman,1973). It may further defined as the manner and extent to which an employee performs different responsibilities of their job in a practical situation (Rizvi, 1967).

Employees' job performance is however is influenced by many factors. Both extrinsic and intrinsic factors might influence their performance. Environmental condition and organizational culture often influence individual's job performance yet employees' personal abilities and their motivation have been considered as the most influential factors for better performance (Lynch, 1971). Similarly, Lawler and Porter (1968) argued that performance depends on an individual's ability to perform the specific task as assigned to him. The ability is however largely determined by his characteristics. A number of personal characteristics of individual may affect the quality and quantity of his performance (Vinake, 1962).

2.2 Concept of ICTs and Their Effectiveness

ICTs as used in this paper refer to all information handling communication technologies digital, which are far more widespread, particularly in the rural areas of developing countries. Davenport and Prusak (1998) explained information handling technologies/ICTs to include digital ICTs (mostly referred to as "new ICT") but also encompass hard technologies such as radio, television and analogue telecommunication networks, and soft technologies based on information held as the written word such as used in books, manuals, and newspapers. The relevant ICT such as radio, TV, telephone and email provide information to the poor, who help them to improve on their productivity and income (Ssewanyana, 2007; Scott, et al., 2008) reported that mobile phone can often work well when integrated with more traditional means of communication in African rural setting.

Bertolini (2004) argued that innovative ways of combining ICT-based information sources (such as agricultural information systems) with traditional ones (such as radio broadcasting) should be considered when looking at the costs and benefits of ICT development.

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

Balaji et al. (2007) the use of ICTs radio, television and mobile phones in particular, can accelerate agricultural development by improving access to informational knowledge services. From the perspective of agricultural knowledge and information systems (AKIS), ICT can be seen as a useful tool in improving linkages between research, farmers and agricultural extension systems.

Sife et al. (2010) described ICTs as effective tools for the provision of information services as it allows a two way communication and can provide more than one service simultaneously.

Aker, Mbitiand Jensen, (2010) the use of ICT for development has attracted considerable attention in development policy and research.

De Janvry, Fafchamps, & Sadoulet, (1991) reported that farmers often respond to price signals in ways that differ from those predicted using standard micro-economic demand and supply analysis.

Schultz (1964) notes that given the constraints these farmers face and the environment in which these farmers operate, farmers are surprisingly efficient.

Singh, Squire, & Strauss (1986) subsequent work on agricultural household models that explicitly accounts for the dual role of farm households as both producers and consumers of often the same consumables and production factors has led to a

substantial literature that is able to explain smallholder behavior as a rational response to missing, incomplete or in efficient markets.

Foster and Rosenzweig (2010) model technology adoption through extension, and show how learning can reduce uncertainty about the profitability of a new technology. One can think of various ways in which ICTs can alter the above ex-ante risk management strategies available to households. ICTs may facilitate access to agricultural knowledge and best practice through call centers or information presented online.

Dercon (2002) access to price information in other markets, as well as contact information of traders and agro-processors, is likely to substantially reduce price risk. Weather forecasts will also affect the (perceived) riskiness of crops. ICTs may also make risk coping through sale of assets more effective. When common shocks occur, many households may decide to sell off assets at the same time, leading to a collapse of the market. This negative correlation between food prices and asset prices greatly reduces the effectiveness of savings as a risk management strategy.

There are a number of studies that investigate the effect of ICT on overall market efficiency and arbitrage. Jensen (2007) found that the introduction of cell phones in Indian fishing communities reduces price dispersion between markets and eliminates waste, consistent with increased spatial arbitrage.

Aker (2010) found that the introduction of mobile phones increases grain market integration in Niger, while Aker and Fafchamps (2015) found that producer price dispersion decreases after the introduction of mobile phones, but only for perishable crops.

There are also quite a number of studies on the effect of ICT use for price information provision on surplus sharing. Svensson and Yanagizawa (2009) found large effects of price information delivered through radio, resulting in a 15% increase in the price farmers receive.

Goyal (2010) looks at the provision of price information using Internet kiosks in the context of Indian soybean growers who sell to traders in wholesale markets. She found that price information translates to a 1–3% increase in farmer prices.

Fafchamps and Minten (2012) investigated the impact of an SMS-based price dissemination service in India and found no effect on the price reportedly received.

Courtois and Subervie (2015) found that price information disseminated though the well-known eSoko project resulted in a 10% increase in the price of maize and 8% increase in the price of groundnuts in Northern Ghana.

Futch and McIntosh (2009) did not find price effects resulting from the introduction of mobile phones in Rwanda. Another characteristic of smallholder farmers is the under-adoption of yield-increasing investments amid low and stagnating agricultural yields, despite the fact that these investments seem to be highly profitable (Duflo, Kremer, & Robinson, 2008).

Experts believe alack of knowledge about (improved) crops and farming techniques is an important constraint. It is argued that if this knowledge gap can be narrowed through agricultural extension, this may lead to significant improvements in rural welfare. We see different areas where ICTs may outperform traditional extension services. One of the main threats to sustainability of agricultural extension services is high recurrent costs (Quizon, Feder, & Murgai, 2001), and mobile technology provides a cost-effective way to transfer information to remote locations (Nakasone, Torero, and Minten, 2014).

Anderson and Feder (2004) mentioned that timeliness of information is also key to the success of extension systems. Again, ICTs may be particularly suited to disseminate reminders at particular points in time through, for example, SMSs. But also access to consumer markets is important for the sustainability of improved technology adopted through agricultural extension, as in better integrated markets, returns to increased output diminish less rapidly than in locally segmented markets characterized by more price inelastic demand (Gabre-Madhin, Barrett, & Dorosh, 2002).

The use of ICTs to obtain price information mentioned above may thus also affect technology adoption. There appears to be relatively less ICT-based initiatives that provide information on agricultural practices and inputs, compared to those that disseminate information on prices, weather forecasts, or buyer and seller information.

Aker (2011) suggests this may be because such information is more nuanced and difficult to convey. To our knowledge, there are no studies as yet that investigate the effect of extension information delivered through ICTs on agricultural knowledge, practices and outcomes.

Modern communication technologies like mobile phone or Internet is very much important for development communication and may foster socio-economic growth of a nation. Study conducted by Lucky (2012) showed the importance of ICT-based communication channels in the dissemination of agricultural information and thus in agricultural development. Farmers can directly communicate with extension agents, ask questions and get answers using ICTs without traveling to agricultural extension office or wasting too much time, particularly for urgent queries. Electronic media like Radio, television, the Internet can get information even to the remote areas where it is very hard to make direct contact.

The modern media of communication like radio, television, particularly the Internet are apparently accessible to urban individuals and elites (Samanta, 1986), however the

emergence of low-cost computing device like mobile phone create huge scope for rural people as well to continuously be updated with advisory service.

The utilization of new technologies in farming information transfer and investigated future points of view of new technologies as a power of progress in developing countries. They found that print media, electronic media, radio, television broadcasts are the vital wellsprings of disseminating information (Wate and Rivera, 1991).

ICTs were very efficient in terms of time, cost and distance, developing agricultural programs through assisting access to new technologies, production inputs and market information. He also observed that ICT had its direct and indirect effect for poverty alleviation. The main direct effect was higher profits from agricultural production through adoption new technologies and direct effect was employment generation through commercialization of agriculture. So with the acceptance of ICT based service farmers are able to get more information, the get more productivity of their crops (Kaini, 2007).

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

ICT enables the novel Ethiopian Commodity Exchange (ECX) to transmit commodity price information to farmers in real time – within two minutes of a deal being made at ECX from Addis Adaba. According to the World Bank (2011), market data feeds directly to the farmers via electronic display board in 31 centers spread across

Ethiopia as well as on the exchange's website. Market data is also provided via text messaging to the interested farmers those are the user of mobile phones.

Mobile phones can improve access to and use of information about agricultural technologies, potentially improving farmers' learning. Farmers require information on a variety of topics at each stage of the agricultural production process. In many developing countries, such information has traditionally been provided via personal exchanges, radio and perhaps landlines and newspapers. Compared with these mechanisms, mobile phones can significantly reduce the costs of obtaining agricultural information. Mobile phones are significantly less expensive than the equivalent per-search cost of personal travel or a newspaper, yet more expensive than landlines or radio. Nevertheless, landlines are not readily available in most regions of the country, and radio only provides price information for specific products and markets on a weekly basis. The reduction in search costs associated with mobile phones could increase farmers' access to information via their private sources, such as members of their social network (Bayes, et al., 2007).

ICT-based initiatives which cater for non-market information and extension services including financial, utilization of best agricultural practices, research, weather, climate, and distribution and supply chain management. Some of the initiatives include: KenCall Farmers Helpline, M-PESA etc. KenCall is a real-time call center service staffed by agricultural experts that provide agricultural information, advice and support to smallholder farmers over the phone, using voice and voice call-back to farmers (Payne et. al., 2010).

Five potential mechanisms through which mobile phones can provide economic benefits to consumers and producers in Sub-Saharan Africa (Aker, 2010). First, mobile phones can improve access to and use of information, thereby reducing search costs, improving coordination among agents and increasing market efficiency. Second, this increased communication should improve firms' productive efficiency by allowing them to better manage their supply chains. Third, mobile phones create new

jobs to address demand for mobile-related services, thereby providing income-generating opportunities in rural and urban areas. Fourth, mobile phones can facilitate communication among social networks in response to shocks, thereby reducing households' exposure to risk.

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

ICTs can play a significant role in rural development by empowering the rural farmers with new knowledge, up-to-date information and entrepreneurship skills. Parvyn-Wamahiu and Etta (2003) observed that telecenters have the potential to transform the lives and livelihoods of many in the developing world and especially those in remote locations. The work by Grameen Foundation in Uganda shows that use of mobile application has given farmers a broad range of information. The foundation works with a network of community knowledge workers (CKWs) who provide farming advice, market data, pest and diseases control training plus weather forecasts. The potential of Village Information Centres (VICES) as promoter of integrated information and communication technologies was demonstrated in 6 parishes of Rubaya sub-county in Kabale District, South Western Uganda over a period of six years since 2004. The goal was to improve the livelihoods of farmers through enhancing information access and use through improved flow of information between farmers, service providers, community members, and NGOs on NRM, agriculture and market.

A study in Tanzania, building on the utility of mobile phones as recording tools, listening devices, money-makers, and catalysts for dialogue, community radio stations are incorporating mobile technology into programming and it is being used for advisory services in agriculture (Gakuru et al. 2009). In Kenya and Malawi, mobile banking is another ICT-based service which has had a tremendous impact on the

socio-economic status of farmers. Through innovative schemes such as M-PESA in Kenya, farmers are able to send and receive money using their mobile phones (ITU, 2010).

The International Rice Research Institute (IRRI) launched a program called nutrient manager for rice mobile (NM Rice Mobile) to provide Philippine rice farmers with advice via their mobile phone on the optimal training, amount and type of fertilizer to apply to their rice crop to maximize production and profit, and reduce waste. The farmers and extension works are able to dial a toll-free number at which they can hear a voice instruction in their preferred local language which prompts them to use their keypad to answer 12 to 15 questions about their rice crop. After answering all the questions, the farmer receives a tailored fertilizer recommendation via text message (IRRI, 2011).

Modern agricultural system befitting the spirit of the age is a crying need to establish a balance between ever increasing demand and gradually decreasing farmland. Bangladesh Rice Knowledge Bank (BRKB) has been conducting research work from a very long time. This app will provide detailed information on modern technology of rice cultivation, beside disease management, seed production and crop marketing etc.

The Soil Resource Development Institute (SRDI) under the Ministry of Agriculture (MoA) has launched a digital fertilizer recommendation system for the farmers to help them get access to information on selecting precise dosage of different fertilizers for various crops through digital platforms.

The system has been developed with the technical cooperation of Katalyst, a Swiss based marketing development project, which innovated online fertilizer recommendation software incorporating the soil related data prepared by SRDI.

Experiences from Ghana show that how mobile phones can be used by cocoa farmers to obtain production and marketing information. A pilot program called Cocoalink,

launched by the Ghana Cocoa Board, provides cocoa farmers with useful information about improving farming practices, farm safety, crop disease prevention, post-harvest production, and crop marketing. In this program farmers receive information and specific answers to questions at no charge through voice and SMS messages in their local language or English (Martiz, 2011).

Overa (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.

A study of mobile phone users in South Asia also highlighted perceptions among users that the phones had increased the efficiency of daily activities due to greater contact ability and ability to obtain information (De Silva & Zainudeen, 2007). Looking at the use of mobile phones in agriculture more specifically, Furuholt and Matotay (2011) assessed how farmers took advantage of mobiles throughout the farming cycle, they found that mobile phones affected all stages of the cycle, including preparations, farming, harvesting and post-harvesting. Overall, farmers felt that mobile phones help to raise incomes by improving their ability to deal with risks and take advantage of income opportunities.

Jensen (2007) showed that fishermen using mobile phone to access to market information obtained higher prices. This also be effective to broadcast weather information. The Mozabique Agricultural Marketing Service (SIMA) collects and disseminates nation-wide and provincial data on market prices, processing of product and availability through a variety of media including text messages, e-mail, Internet, national and rural radios, television and newspapers. Therefore, ICTs, if properly

designed and implemented, could be an effective medium to strengthen agricultural advisory service along with the traditional way of technology dissemination.

Farmers had the real need to access about market information, land records and services, accounting and farm management information, management of pests and diseases, rural development programs and hence ICT could help accessing those services. ICTs help farmers to get timely information yet availability of ICTs is remained limited (Meera et al., 2004).

In Kenya, market information is provided through SMS so that smallholders have access to daily agricultural commodity prices, extension messages and opportunities to sell or bid through text messages and/or voicemail; there are other rural-based market information points which are linked through an electronic information system that allows farmers to link with buyers in different urban centers (Davis, 1948). Manobi, in Senegal provides access to price data on various crops, collected from different markets across the country. Manobi personnel use mobile phones to send the price data to the Manobi database using the wireless application protocol (WAP) (ITU, 2010).

2.3 Relation between the Selected characteristics of the respondents and the Effectiveness of Krishoker Janala as perceived by them

2.3.1 Age and perceived effectiveness of Krishoker Janala

No findings were noticed on this aspect to the researcher at the time of reviewing literature.

2.3.2 ICT ownership and perceived effectiveness of Krishoker Janala

Various studies have examined the role of ICT ownership in perceived effectiveness of ICTs. Several assessments concluded that mobile phones had reduced search times and costs (Bayes et al., 1999; Jagun et al., 2007; Overa, 2006). The growth of mobile phone coverage induces greater market participation of farmers who produce perishable crops in remote areas. While some evidences suggest that the use of mobile phones to obtain price information has induced producers to move to other markets (Jensen, 2007). Goodman (2005) studied the social impacts of mobile phones in Tanzania and South Africa and found that mobile phones were being used to maintain

social networks and provide access to information on socio-economic opportunities. Souter et al. (2005) also assessed the economic impact of telephones on rural livelihoods in Mozambique, Tanzania and India and reported that the impacts of telephones on peoples' livelihoods were more evident in emergencies, social networks, and saving costs and time.

2.3.3 Extent of ICT uses and perceived effectiveness of Krishoker Janala

Research conducted by Lio and Liu (2006) found strong correlation between the use of ICT and SAAOs productivity. They considered that use of ICTs can also increase farmers' bargaining power. With the access to information, small-scale farmers are better able to compete with the larger operators. They can even develop knowledge regarding crop choices, develop products for the niche markets and even can market the products directly to the consumers. Without the access to knowledge and communication capabilities the small farmers remain at the mercy of the global market forces.

While few studies suggest a significant positive contribution of ICT to development, others have been more cautious or even skeptical. Cullen (2003) argues that new technologies may co-exist with the old and often lead to digital divide. It also suggests that the opportunity cost of the resources engaged in bridging the digital divide may lead to the neglect the other development priorities.

Mutula (2005) argues that resources utilized to bridge the digital divide would have more impact if they were directed to meet the basic needs of the poor. He further questions about the outcome of the effective use of ICTs. Other researchers like Nikam, et al., (2004), Kirlidog and Aydemir (2005) expressed concerns regarding the appropriation of western born ICTs in the setting of developing societies. However, it has now been well documented that ICT can contribute positively to development if it is used appropriately (Heeks, 1999). Use of ICTs either for home- or farm-related purposes indicate acceptance of those systems by its users. In order words, the more the use of ICTs, the more its users' perceived it as effective. Therefore, it may be concluded that the more use of ICT positively lead to higher perceived effectiveness.

2.3.4 Use of Krishoker Janala and perceived effectiveness of Krishoker Janala

No findings were noticed on this aspect to the researcher at the time of reviewing literature.

2.3.5 Information quality and effectiveness of Krishoker Janala

No findings were noticed on this aspect to the researcher at the time of reviewing literature.

2.3.6 Problem faced in using Krishoker Janala perceived effectiveness of Krishoker Janala

No findings were noticed on this aspect to the researcher at the time of reviewing literature.

2.3.7 Job experience and perceived effectiveness of Krishoker Janala

No findings were noticed on this aspect to the researcher at the time of reviewing literature.

2.4 The Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. Effectiveness of Krishoker Janala for dissemination of agricultural information was the main focus of the study. In this study, seven selected factors like age, ICT ownership, extent of ICT use for work, the quality of information of Krishoker Janala as perceived by SAAOs, problem faced in using Krishoker Janala and job experience were considered which might positively contribute to farmers' perceived effectiveness of Krishoker Janala for disseminating agricultural information. The conceptual framework for this study is shown in Figure 2.1.

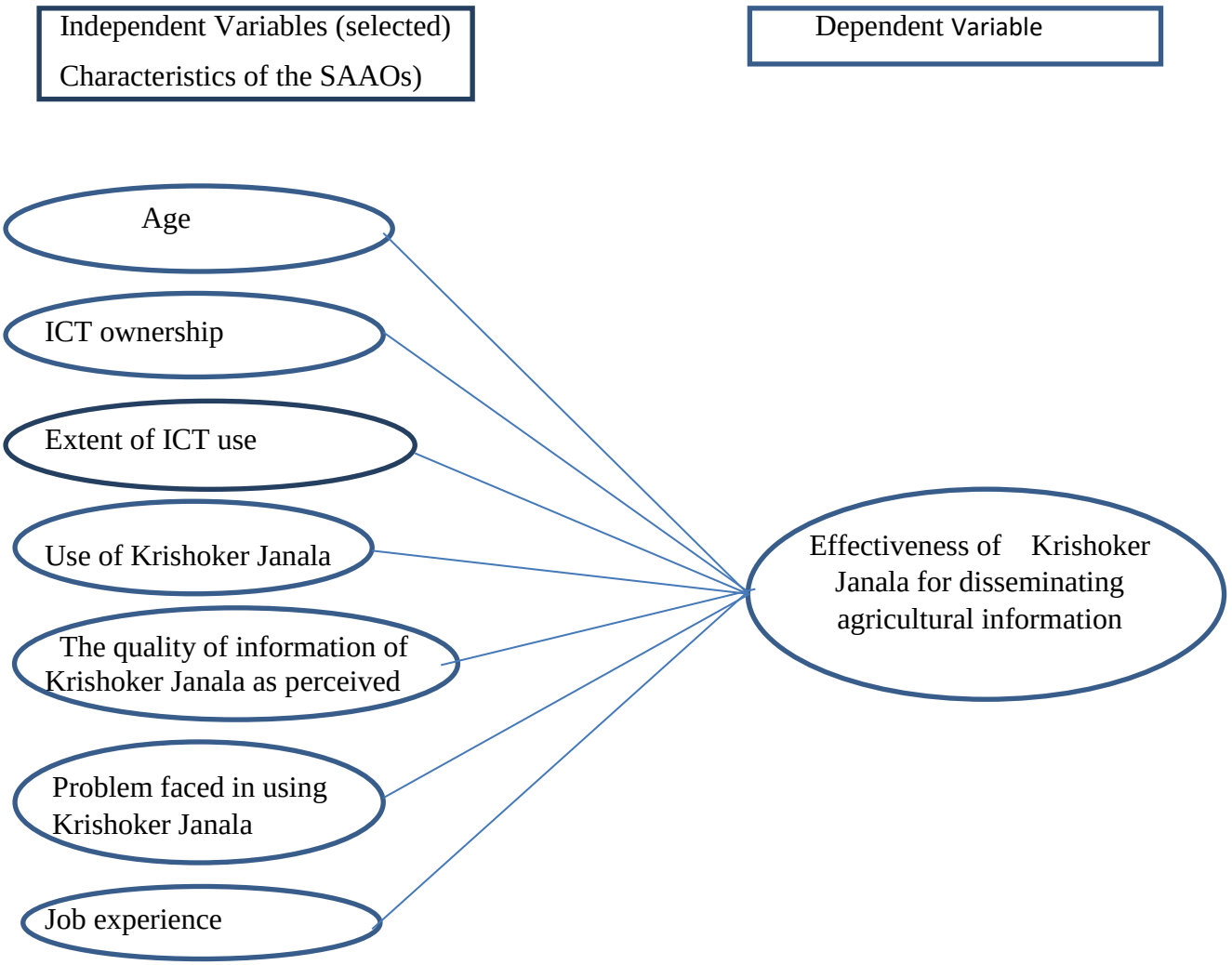

Figure 2.1 The Conceptual model of the study

CHAPTER III

METHODOLOGY

Methodology deserves a very careful consideration in conducting scientific research. Importance of methodology in conducting any research cannot be undermined. Methodology enables the researcher to collect valid and reliable information and to analyze them properly to arrive at correct decisions. Keeping this point in view, the researcher took utmost care for using proper methods in all the aspects of this piece of research work. Methods and procedures followed in conducting this study has been described in this chapter.

3.1 The Locale of the Study

Chuadanga sadar, Alamdanga, Damurhuda and Jibannagar Upazilla under Chuadanga district was purposefully selected due to easy communication as well as easy contact with the SAAOs who use Krishoker Janala for disseminating agricultural information. Since the selected case of ICT-based advisory system 'Krishoker Janala' was first time piloted in those upazilas. The study area consists of 40 blocks and all the blocks were considered as the locale of the study. A map of four upazilas of Chuadanga district showing the locale of the study have been presented in Figure 3.1.

3.2 Populations and Sampling Design

The SAAOs of the selected upazilas were the population of the study. Four separated lists of the selected SAAOs were prepared with the help of Upazila Agricultural Officers of four Upazilas in Chuadanga district. The total numbers of SAAOs in these four Upazilas were 106. The whole populations were selected as the sample of the study.

Figure 3.1 A map of Chuadanga district showing study area

3.3 Instrument for Data Collection

In order to collect reliable and valid Information from the SAAOs, an interview schedule was prepared carefully keeping the objectives of the study in mind. The interview schedule contained both open and closed form questions. Appropriate schedule was also developed to operationalize the selected characteristics of the SAAOs. Pre-test with the draft interview schedule with 5 SAAOs was accomplished. Data was collected by face to face interviewing of the respondents. The duration for this imposes was from 20 June to 20 July, 2018. Based on the pre-test result, necessary corrections, modifications, addition, alternation were made in the interview schedule and then finalized it. This pre-test facilitated the researcher to examine the suitability of different questions and statements in general. The interview schedule may be seen at Appendix-A.

3.4 Measurement of Variables

A variable is any characteristic, which can assume varying, or different values in successive individual cases. An organized research usually contains at least two important variables, viz. an independent and a dependent variable. An independent variable is that factor which is maintained by the researcher in his attempt to ascertain its relationship to an observed phenomenon. A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variable (Parvyn, 2003). According to the relevant research area, the researcher selected seven (7) characteristics of the SAAOs as the independent variable and perceived effectiveness of Krishoker Janala was dependent variables of the study.

3.5 Measurement of independent variables

The independent variables of the study were seven (7) selected characteristics of the SAAOs. These were age, ICT ownership, extent of ICT use for work, use of Krishoker Janala, the quality of information of Krishokr Janala as perceived, by the SAAOs problem faced in using Krishoker Janala and job experience . The procedures followed in measuring the independent variables are briefly discussed below:

3.5.1 Age

The age of an individual is one of the important factors pertaining to his personality make up (Foster, 2010) which can play an important role in his/her adoption behavior. Age of the respondents was measured in terms of actual years from their birth to the time of interview.This variable appears in item number 1 in the interview schedule as presented in Appendix-A.

3.5.2 ICT ownership

ICT ownership of the respondents was measured on the basis of nature of access of four selected ICT devices or communication media. ICT ownership score was computed in the following manner of each ICT device.

Nature of Access	**Score Assigned**
Self	2
Shared	1
No Access	0

Thus the ICT ownership of a respondent could range from 0 to 8, where '0' indicates no ownership and '8'indicates highest ownership of ICT devices or communication media.

3.5.3 Extent of ICT use

Extent of ICT Use (agricultural Purpose) means the frequency of using ICTs devices for farm-related purpose. Five point rating scale was used for this purpose as follows:

Items	Nature of use	Scores
Mobile Phone (voice call, SMS, MMS, Video, etc.)	Frequently (4-6 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/week)	2
	Rarely (1-3 times/week)	1
	Not at all (No use)	0
Internet	Frequently (4-6 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/week)	2
	Rarely (1-3 times/week)	1
	Not at all (No use)	0
Computer/laptop/tab	Frequently (4-6 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/week)	2
	Rarely (1-3 times/week)	1
	Not at all (No use)	0
Agricultural Information Service (AIS)	Frequently (4-6 times/day)	4
	Often (1-3 times/day)	3
	Occasionally (5-6 times/week)	2
	Rarely (1-3 times/week)	1
	Not at all (No use)	0

Farmers' extent of use of ICTs for agriculture was captured by four items. Therefore, the score could range from 0 to 16, where '0' means no use of ICTs for agriculture and '16' mean highest use of ICTs for agriculture purpose.

3.5.4 Use of Krishoker Janala

Use of Krishoker Janala was measured by the number of times used in last one month. This variable appears in item number 4 in the interview schedule as presented in Appendix-A.

3.5.5 Quality of information of Krishoker Janala as perceived

Quality of information of Krishoker Janala as perceived by the SAAOs were measured by three-point modified Likert Scale. Three-point rating scale was used for this purpose as follows:

Quality of Krishoker Janala	Score Assigned
Good	3
Moderate	2
Low	1

Quality of information of Krishoker Janala as perceived by the SAAOs were computed by the three items. Therefore, the score could range from 3 to 9, where‘3’ means low quality of information of Krishoker Janala as perceived by you and ‘9’ means highest quality of information of Krishoker Janala as perceived by the SAAOs.

3.5.6 Problem faced in using in Krishoker Janala

It was measured by using a four point rating scale. A list of 5 probable problems that SAAOs could face in different aspects were listed and asked to indicate the extent of their problem confrontation. For each problem score of 3, 2, 1 and 0 were assigned to indicate extent of problems as high, moderate, low and not at all respectively. The problem confrontation score was computed for each respondent by adding his /her scores for all the 5 problems. The possible range of problem scores thus could be 0 and 15. A total score of 15 indicated highest problem in respect of use of Krishoker Janala while a score of 0 indicated no problems.

To ascertain the comparison among the problems a Problem Faced Index (PF1) was computed using the following formula:

$PFI=P_hX\ 3 + P_m\ X\ 2 + P_l\ X\ 1 + P_n\ X\ 0$

Where,

PFI = Problem Faced Index

P_h = Number of SAAOs faced high problem

P_m=Number of SAAOs faced moderate problem

P_l = Number of SAAOs faced low problem

P_n = Number of SAAOs faced problem at all problems.

Thus, PFI of an item could range from 0 to 318, where '0' indicated no problem at all and '318' indicated high problem faced by the SAAOs in using Krishoker Janala.

3.5.7 Job experience

Job experience was operationalized by counting the number of years a respondent actively involved in job. For each year, the score of the respondent was assigned by 1 and so on.

3.6 Measurement of dependent variable

Perceived effectiveness of Krishoker Janal was the dependent variable of this study. Perceived effectiveness of 'Krishoker Janala' was measured on the basis of opinion provided by the respondents regarding the extent of effectiveness of Krishoker Janala for disseminating agricultural information. Five point scales namely "highly effective", "effective", "low effective", and "not at all effective" were used to measure the extent of effectiveness of Krishoker Janala for disseminating agricultural information perceived by the respondent SAAOs.

Extent of effectiveness	**Score**
Highly effective	3
Effective	2
Low effective	1
Not at all effective	0

The effectiveness score of a respondent was obtained by adding the scores from all selected items and it could range from 0 to 27, where '0' indicates no perceived effectiveness of Krishoker Janala for disseminating agricultural information and '27' indicates highest effectiveness of Krishoker Janala for disseminating agricultural information as perceived by the SAAOs.

3.7 Statement of Hypothesis

A set of hypothesis was formulated for empirical testing. The following null hypothesis was formulated to test the contribution of 7 independent variables with effectiveness of Krishoker Janala for disseminating agricultural information.

"There is no contribution of each of the independent variables to the effectiveness of Krishoker Janala for disseminating of agricultural information as perceived by the SAAOs."

3.8 Data Processing

3.8.1 Editing

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

3.8.2 Coding and tabulation

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

3.8.3 Categorization of data

The collected data were classified into various categories based on the nature of the data. These categories were developed for each of the variables. The procedures for categorization of variables are further discussed in the Chapter iv in detail.

3.9 Statistical Analysis

Data were analyzed accordingly to the research objectives such as range, mean, and standard deviation were used for describing the variables. Multiple regression analysis was run to determine the contribution of the selected factors to effectiveness of Krishoker Janala for disseminating agricultural information. The analysis of data was performed using statistical treatment with SPSS (Statistical Package for Social Sciences) v.23. Throughout the study 5% level of significance were used to test the significance level of each hypothesis. If the computed value of 'β' was equal to or greater than the designated level of significance, than the hypothesis was rejected and it was concluded that there was a significant contribution of the independent variables to the dependent variable. If the computed value of 'β' was smaller than the designated level of significance than the hypothesis was accepted and it was concluded that there was no contribution of the independent variables to the dependent variable.

CHAPTER IV

RESULTS AND DISCUSSION

The findings of the study and their interpretation have been presented in this chapter. Procedures of using these data for the measurement needed some discussion for clear understanding. Necessary explanation has also been made showing possible and logical basis of the findings whenever necessary. This chapter is presented in five sections according to the objectives of the study. The first section deals with the selected characteristics of the SAAOs. The second section deals with the extent of the effectiveness of Krishoker Janala for disseminating agricultural information. The third section describes the contribution of the factors (selected characteristics of SAAOs) to the effectiveness of Krishoker Janala. The fourth sections deals with the problem faced by the SAAOs in using Krishoker Janala and the fifth sections deals with the suggestions for improving the quality of Krishoker Janala.

4.1 Socio-economic profile of SAAOs

Seven (07) characteristics of the respondents were selected for the study which are:

- Age,
- ICT ownership,
- Extent of ICT use for work,
- Use of Krishoker Janala,
- The quality of information of Krishoker Janala as perceived by SAAO officers,
- Problem faced in using Krishoker Janala,
- Job experience.

These characteristics of the SAAOs are described in this section which focused the as respondents socio-economic profile. The salient features of the characteristics of the respondents were shown in Table 4.1.

Table 4.1 Salient features of the selected characteristics of respondents

Characteristics	Unit of measurement	Possible range	Observed range	Mean	S D
Age	Years	unknown	25-58	38.52	7.10
ICT ownership	Scores	0-8	5-8	6.29	0.894
Extent of ICT use for work	Scores	0-16	6-14	10.68	2.15
Use of Krishoker Janala	Scores	unknown	4-21	11.52	3.79
Quality of information of Krishoker Janala as perceived	Scores	3-9	5-9	6.20	0.90
Problem faced in using Krishoker Janala	Scores	0-15	6-15	3.65	2.46
Job experience	Years	unknown	2-34	16.21	5.88

4.1.1 Age

The observed age of the respondents ranged from 25 to 58 years, the average being 38.52 and the standard deviation was 7.10. On the basis of their age, the respondents were classified into three categories considering National Youth Policy: “young” (up to 35 years), “middle aged” (36 - 50 years) and “old” (above 50 years). The distribution of the respondents according to their age was shown in Table 4.2.

Table 4.2 Distribution of respondents according to their age

Categories (Years)	Number	Percent	Mean	SD
Young aged (up to 35)	37	34.9	38.52	7.10
Middle aged (36-50)	61	57.6		
Old aged (above 50)	8	7.5		
Total	**106**	**100**		

It was found that 34.9 percent of the respondents were young aged, 57.6 percent were middle aged and the rest 7.5 percent were old aged. Data revealed that most of the respondents in the study area were middle aged. It might be due to the middle aged respondents comparatively give more preference to agricultural activities than the young and old aged respondents.

4.1.2 ICT ownership

The observed ICT ownership scores of the respondents ranged from 5 to 8 against the possible range of 0-8. The average ICT ownership was 6.29 and the standard deviation was 0.894. The respondents were classified into three categories such as low, moderate and high. Based on their ICT ownership status, the categories along with number and percentage are presented in Table 4.3.

Table 4.3 Distribution of respondents according to their ICT ownership

Categories (Scores)	Number	Percent	Mean	SD
Low (up to 5)	23	21.7	6.29	0.894
Moderate (6-7)	75	70.8		
High (above 7)	8	7.5		
Total	106	100		

Data in the Table 4.3 reveals that 70.8 percent of the total respondent had moderate ICT ownership where, 21.7 percent had low and 7.5 percent respondents had high ICT ownership. So, it can be said that overwhelming majority (92.5%) of the respondents were low to moderate categories of the ICT ownership regarding ICT ownership.

4.1.3 Extent of ICT use

The observed extent of ICT use for work scores of the respondents ranged from 6 to 14 against the possible range 0-16. The average extent of ICT use for work was 10.68 and the standard deviation was 2.15. The respondents were classified into three categories based on their extent of ICT use for work as shown in Table 4.4.

Table 4.4 Distribution of respondents according to their extent of ICT use

Categories (Scores)	Number	Percent	Mean	SD
Low (up to 8)	17	16.0	10.68	2.15
Medium (9-12)	59	55.7		
High (above 12)	30	28.3		
Total	106	100		

Data in Table 4.4 reveals that ICT use is medium by most of the respondents (55.7 percent) while 28.3 percent of the respondents used ICTs highly for various purposes. Around 16.0 percent of the respondent had medium use of ICTs.

4.1.4 Use of Krishoker Janala

The observed use of Krishoker Janala scores of the respondents ranged from 4 to 21. The average use of Krishoker Janala was 11.52 and the standard deviation was 3.79. The respondents were classified into following three categories based on their use of Krishoker Janala as shown in Table 4.5.

Table 4.5 Distribution of respondents according to their use of Krishoker Janala

Categories (Scores)	Number	Percent	Mean	SD
Low (up to 8)	29	27.4	11.52	3.79
Medium (9-14)	49	46.2		
High (above 14)	28	26.4		
Total	106	100		

Data in Table 4.5 reveals that use of Krishoker Janala was medium by most of the respondents (46.2 percent) while 26.4 percent of the respondents were the high user of of Krishoker Janala and 27.4 percent of the respondents' was the user of Krishoker Janala. It means that majority (73.6%) of the respondents' belonged medium to low level use of Krishoker Janala.

4.1.5 Quality of information of Krishoker Janala as perceived by the SAAOs

The observed the quality of information of Krishoker Janala as perceived scores of the respondents ranged from 5 to 9 against the possible scores 3-9. The average of the quality of information of Krishoker Janala as perceived was 6.20 and the standard deviation was 0.90. The respondents were classified into three categories based on their perceived quality of information of Krishoker Janala as shown in Table 4.6.

Table 4.6 Distribution of respondents according to their quality of information of Krishoker Janala as perceived

Categories (Scores)	Number	Percent	Mean	SD
Low (up to 5)	24	22.6	6.20	0.90
Medium (6-7)	73	69.0		
High (above 7)	9	8.4		
Total	106	100		

Data in Table 4.6 reveals that the quality of information of Krishoker Janala was medium as perceived by most of the respondents (69.0 percent), while 8.4 percent of the respondents perceived the quality of information of Krishoker Janala having high and 22.6 percent of the respondents' perceived as low quality of information of Krishoker Janala. It means that majority (91.6%) of the respondents' belonged low to medium quality of Krishoker Janala.

4.1.6 Problems faced in Krishoker Janala

The problems faced in Krishoker Janala score of the respondents ranged from 6 to 15 against the possible range 0-15. The mean score was 10.75 with the standard deviation 1.60. On the basis of problems faced in using Krishoker Janala, the respondents were classified into three categories namely 'low problems', 'medium problems' and 'high problems', as shown in Table 4.7.

Table 4.7 Distribution of the respondents according to their problems in using Krishoker Janala

Categories (Scores)	Respondents SAAO		Mean	SD
	Number	Percent		
Low (up to 9)	19	17.9	10.75	1.60
Medium (10-11)	58	54.7		
High (above 11)	29	27.6		
Total	106	100		

Data contained in the Table 4.7 revealed that the majority (54.7%) of the respondents faced medium problems in using Krishoker Janala as compared to 27.6% and 17.9% high and low problems in using Krishoker Janala respectively.

4.1.7 Job Experience

The job experience score of the respondents ranged from 2 to 39. The mean score was 12.63 with the standard deviation 6.88. On the basis of job experience, the respondents were classified into three categories namely, ‘low experience’, ‘medium experience’ and ‘high experience’ as shown in Table 4.8.

Table 4.8 Distribution of the respondents according to their experience

Categories (Scores)	Respondents SAAO		Mean	SD
	Number	Percent		
Low (up to 6)	15	14.2	12.63	6.88
Medium (7-18)	72	67.9		
High (above 18)	19	17.9		
Total	106	100		

Data contained in the Table 4.8 revealed that the majority (67.9%) of the respondents had medium job experience as compared to 14.2% and 17.9% having low and high job experience respectively.

4.2 Effectiveness of Krishoker Janala for Disseminating of Agricultural Information

The observed effectiveness of Krishoker Janala scores of the respondents ranged from 15 to 24 against the possible range 0-27. The average perceived effectiveness of Krishoker Janala was 21.01and the standard deviation was 2.14. The respondents were classified into three categories based on their perceived effectiveness of Krishoker Janala shown in Table 4.9.

Table 4.9 Distribution of the respondents according to their perceived effectiveness of Krishoker Janala

Categories (Scores)	**Respondents SAAO**		**Mean**	**S D**
	Number	**Percent**		
Less effective (up to 19)	26	24.5	21.01	2.14
Medium effective (20-23)	68	64.2		
High effective (above 23)	12	11.3		
Total	**106**	**100**		

Data in Table 4.9 reveals that majority (64.2 percent) of the respondents reported ‘Krishoker Janala’ was moderately effective while 11.3 percent and 24.5 percent of them respectively perceived it as high and less effective as a medium for disseminating agricultural information.

4.3 The Contribution of the selected characteristics of the respondents to their perceived Effectiveness of Krishoker Janala for Disseminating of Agricultural Information

In order to estimate the contribution of the selected characteristics of the SAAOs to their perception on the effectiveness of Krishoker Janala for disseminating of agricultural information, the multiple regression analysis was used as shown in the Table 4.10**.**

Table 4.10 Multiple regression coefficients of the contributing variables related to effectiveness of Krishoker Janala for disseminating of agricultural information

Dependent variable	Independent Variable (Selected characteristics of the SAAOs)	β	P	R^2	Adj. R^2	F
Effectiveness of Krishoker Janala for Disseminating of Agricultural Information as perceived by the SAAOs	Age	.039	0.813	0.432	0.392	10.65
	ICT ownership	0.058	0.544			
	Extent of ICT use	0.475	0.000**			
	Use of Krishoker Janala	0.183	0.044*			
	Quality of information of Krishoker Janala	0.267	0.001**			
	Problem faced in using Krishoker Janala	-0.017	0.833			
	Job experience	0.189	0.259			

** Significant at $p < 0.01$; * Significant at $p < 0.05$

Among the seven hypothesized variables, three (3) variables namely extent of ICT use, use of Krishoker Janala and quality of information of Krishoker Janala had significant contribution to effectiveness of Krishoker Janala for disseminating of agricultural information (Table 4.10) while rest of the variables had no significant contribution. All the factors jointly contribute 43.2% of the variance of the adoption

(R^2 = 0.432). Each predictor may explain some of the variance in respondents' perceived effectiveness of Krishoker Janala for disseminating of agricultural information simply by chance. The adjusted R^2 value (0.392) penalizes the addition of extraneous predictors in the model, but values of 0.392 still show that the variance in respondents' perceived effectiveness of Krishoker Janala for disseminating of agricultural information can be attributed to the predictor variables rather than by chance, and that both are suitable model (Table 4.10). In summary, the model suggests that the respective authority should consider the respondents extent of ICT use, use of Krishoker Janala and the quality of information of Krishoker Janala.

4.3.1 Contribution of extent of ICT use to effectiveness of Krishoker Janala for disseminating of agricultural information

The contribution of extent of ICT use of the SAAOs to their perceived effectiveness of Krishoker Janala for disseminating of agricultural information was determined by testing the following null hypothesis "There is no contribution of extent of ICT use for work to their effectiveness of Krishoker Janala for disseminating of agricultural information".

The following observations were made on the basis of the value of 'b' the concerned variable of the study under consideration:

a. The contribution of the extent of ICT use (b=0.475) was significance at 1% level.
b. So, the null hypothesis could be rejected.

Extent of ICT use had positive contribution on effectiveness of Krishoker Janala for disseminating of agricultural information. It had the most significant (significant at $p<0.000$) contribution on effectiveness of Krishoker Janala for disseminating of agricultural information. From the analysis it can be said that higher the use of ICT, higher the effectiveness of Krishoker Janala.

4.3.2 Contribution of the quality of information of Krishoker Janala on effectiveness of Krishoker Janala for disseminating of agricultural information

The contribution of the quality of information of Krishoker Janala on effectiveness of Krishoker Janala for disseminating of agricultural information was determined by testing the following null hypothesis: "There is no contribution of the quality of information of Krishoker Janala as perceived by SAAOs to their effectiveness of Krishoker Janala for disseminating of agricultural information

The following observations were made on the basis of the value of 'b' was of the concerned variable of the study under consideration.

a. The contribution of the quality of information of Krishoker Janala on effectiveness of Krishoker Janala for disseminating of agricultural information (b=0.267) was significance at 1% level.

b. So, the null hypothesis could be rejected.

Based on the above finding, it can be summarized that a SAAOs had perceived more the quality of information of Krishoker Janala had perceived more effectiveness of Krishoker Janala for disseminating agricultural information.

4.3.3 Contribution of use of Krishoker Janala to the effectiveness of Krishoker Janala for disseminating of agricultural information

From the multiple regression, it was concluded that the contribution of use of Krishoker Janala to the effectiveness of Krishoker Janala for disseminating of agricultural information was measured by the testing the following null hypothesis: "There is no contribution of use of Krishoker Janala on their effectiveness of Krishoker Janala for disseminating of agricultural information".

The following observations were made on the basis of the value of 'b' was of the concerned variable of the study under consideration.

a. The contribution of the use of Krishoker Janala (b=0.183) was significant at 5% level (0.044).

b. So, the null hypothesis could be reject

c. So, it can be stated that if the use of Krishoker Janala to their is increased by 0.183 unit, use of effectiveness of Krishoker Janala for disseminating of agricultural information increased by one (1) unit, considering the effects of all other predictors are held constant.

Based on the above finding, it can be said that more use of Krishoker Janala increased the effectiveness of Krishoker Janala for disseminating of agricultural information.

4.4 Comparative severity among the problems faced by the respondents in using of Krishoker Janala for disseminating of agricultural information

The observed Problem Faced Index of the problems ranged from 155 to 271 against the possible range of 0-318. Problem Faced Index (PFI) of the selected problems is shown in Table 4.11.

On the basis of PFI, it was observed that "lack of information of all crops" ranked first followed by "lack of valid information", "availability of internet", "availability of ICT tools" and "lack of technical knowledge".

Table 4.11 Problem Faced Index (PFI) with Rank Order

Problems	Numbers of farmers				PFI	Rank order
	High problem	Moderate problem	Low problem	Problem not at all		
Lack of information of all crops	62	41	3	0	271	1
Lack of valid information	64	35	4	3	266	2
Availability of internet	29	71	5	1	234	3
Availability of ICT tools	27	53	26	0	213	4
Lack of technical knowledge	15	32	46	13	155	5

4.5 Suggestion for improving the quality of Krishoker Janala

After getting information regarding problems faced by the SAAOs, attempts had been made to seek suggestions from them to improve the quality of Krishoker Janala. SAAOs were asked to indicate three important suggestions against each problems. Based on descending order of citation number, suggestions against each problems are presented with the rank order in Table 4.12.

Table 4.12 suggestion Index (SI) with Rank Order

Problems	Suggestions	Citation number of suggestions	Rank order of suggestions
Lack of information of all crops	Information of all important crops should be included.	74	1
	2). Latest innovations should be updated regularly.	62	2
	3). Pest control measure should be clear.	55	3
Lack of valid information	1). Information should be validated by relevant experts.	71	1
	2). Pictures of pest attack should be clear.	59	2
	3). Validation of information should be continued.	54	3
Availability of internet	1). Internet should be available in every place of Bangladesh.	66	1
	2). Internet speed should be increased.	59	2
	3). Internet use cost should be reduced.	55	3
Availability of ICT tools	Cell phone with GPRS should be supplied to the SAAOs.	67	1
	2). Cell phone with GPRS should be supplied to each FIAC and AICC.	62	2
	3). Price of cell phone having GPRS should be reduced.	54	3
Lack of technical knowledge	1). Training should be provided to the SAAOs to increase their knowledge on using Krishoker Janala and other ICT.	63	1
	2).Training should be provided to the farmers of FIAC and AICC to increase their knowledge on using Krishoker Janala and other ICT.	61	2
	3). Motivational campaigning should be arranged to increase the use of Krishoker Janala and other ICT tools.	54	3

CHAPTERV

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

5.1.1 Selected characteristics of the respondents

Age:

Highest proportion (57.6 percent) of the respondents was under middle aged category compared to 34.9% young and 7.5% old aged.

ICT ownership:

ICT ownership score of the respondents ranged from 5 to 8 with the average of 6.29 And the standard deviation was 0.89. Highest proportion (70.8 percent) of the respondents was under moderate ICT ownership compared to 21.7% low and 7.5% high ICT ownership.

Extent of ICT use:

Extent of ICT use score of the respondents ranged from 6 to 14 with the average of 10.68 and the standard deviation was 2.15. Highest proportion (55.7 percent) of the respondents was under medium Extent of ICT use.

Use of Krishoker Janala:

The observed use of Krishoker Janala scores of the respondents ranged from 4 to 21. The average use of Krishoker Janala was 11.52 and the standard deviation was 3.79.The majority of the respondents fell into medium (46.2 percent) category while 27.4 percent of the respondents had low use of Krishoker Janala.

Quality of information of Krishoker Janala as perceived:

Quality of information of Krishoker Janala as perceived had medium most of the respondents (69.0 percent), while 8.4 percent of the respondents the quality of information of Krishoker Janala as perceived having high and 22.6 percent of the respondents had low quality of information of Krishoker Janala as perceived.

Problems faced in Krishoker Janala:

The majority (54.7%) of the respondents had medium problems faced in Krishoker Janala as compared to (27.6%) and (17.9%) having high and low problems faced in Krishoker Janala respectively.

Job Experience:

The majority (67.9%) of the respondents had medium job experience as compared to (14.2%) and (17.9%) having low and high job experience respectively.

5.1.2 Effectiveness of Krishoker Janala for Disseminating of Agricultural Information

The observed effectiveness of Krishoker Janala scores of the respondents ranged from 15 to 24. The average perceived effectiveness of ICT-based service was 21.01and the standard deviation was 2.14.The majority (64.2%) of the respondents reported 'Krishoker Janala' was moderately effective while 11.3 percent and 24.5 percent of them respectively found it as highly and less effective as a medium for disseminating agricultural information.

5.1.3 Contribution of the selected characteristics of the respondents to their perceived effectiveness of Krishoker Janala for disseminating of agricultural information

Extent of ICT use, use of Krishoker Janala and quality of information of Krishoker Janala had significant contribution to effectiveness of Krishoker Janala for disseminating of agricultural information, while rest of the variables showed no significant contribution.

5.1.4 Problems Faced Index (PFI) for using Krishoker Janala

On the basis of PFI, it was observed that "Lack of information of all crops" ranked first problem followed by "Lack of valid information", "Availability of internet", "Availability of ICT tools" and "Lack of technical knowledge".

5.1.5 Suggestion for improving the quality of Krishoker Janala

- ✓ "Information of all important crops should be included in Krishoker Janala" was ranked first suggestion against the problem "Lack of information of all crops" followed by "Latest innovations should be update regularly" and "Pest control should be clear."

- ✓ "Information should be validated by relevant experts in Krishoker Janala" was ranked first suggestion against the problem "Lack of valid information" followed by "Picture of pest attack should be clear" and "Validation of information should be continued."

- ✓ "Internet should be in every place of Bangladesh in Krishoker Janala" was ranked first suggestion against the problem of "Availability of internet" followed by "Internet speed should increase" and "Internet use cost should be reduced."

- ✓ "Cell phone with GPRS should be supplied to the SAAOs in Krishoker Janala" was ranked first suggestion against the problem of "Availability of ICT tools" followed by "Cell phone with GPRS should be supplied to each FIAC and AICC" and "Price of cell phone having GPRS should be reduced."

- ✓ "Training should be provided to the SAAOs to increase their knowledge on using Krishoker Janala and other ICT in Krishoker Janala" was ranked first suggestion against the problem "Lack of technical knowledge" followed by "Training should be provided to farmers of FIAC and AICC to increase their knowledge on using Krishoker Janala and other ICT in Krishoke Janala" and "Motivational campaigning should arrange to increase the use of Krishoker Janala and other ICT tools."

5.2 Conclusions

Conclusions drawn on the basis of the findings of this study and their logical interpretation in the light of the other relevant factors are furnished below:

- ✓ Majority (64.2 percent) of the respondents reported 'Krishoker Janala' was moderately effective, while 11.3 percent and 24.5 percent of them respectively found it as highly and less effective as a medium for disseminating agricultural information. Therefore, it may be concluded that effectiveness of Krishoker Janala for disseminating agricultural information was moderate in this area.

- ✓ Majority (73.6%) of the respondents belonged low to medium level of use of Krishoker Janala. There was a possitive significant contribution of the use of Krishoker Janala to the effectiveness of Krishoker Janala for disseminating agricultural information. Therefore, it may be concluded that, SAAOs having more use of Krishoker Janala perceived more effectiveness of Krishoker Janala for disseminating more agricultural information.

- ✓ Overwhelming majority (91.6 percent) of the SAAOs perceived low to medium quality of information of Krishoker Janala. There was a positive significant contribution of quality of information of Krishoker Janala to the effectiveness of Krishoker Janala for disseminating of agricultural information. Therefore, it may be concluded that, SAAOs having higher perception on the quality of information of Krishoker Janala perceived more effectiveness of Krishoker Janala for disseminating more agricultural information.

- ✓ Majority (71.7%) of the SAAOs belonged to low to medium use of ICT. Extent of ICT use of the SAAOs had significant positive contribution with their effectiveness of Krishoker Janala for disseminating of agricultural information. Therefore, it may be concluded that, SAAOs having more use of ICT perceived more effectiveness of Krishoker Janala for disseminating more agricultural information.

- ✓ “Lack of information of all crops” was the main problem of Krishoker Janala. Most of the respondent SAAOs suggested for including information of all important crops in Krishoker Janala. Other problems may be solved as per suggestions made by the respondent SAAOs.

- ✓ To mitigated the first problem “Lack of information of all crops”, SAAOs suggested that information of all important crops should be included in Krishoker Janala. For the second problem “Lack of valid information” SAAOs suggested that information should be validated by relevant experts. For the third problem “Availability of internet” SAAOs suggested that internet should be available in every place of Bangladesh and for the fourth problem “Availability of ICT tools” they suggested that cell phone with GPRS should be supplied to the SAAOs. For the fifth problem “Lack of technical knowledge” SAAOs suggested that training should be provided to the SAAOs to increase their knowledge on using Krishoker Janala and other ICT.

5.3 Recommendations

5.3.1 Recommendations for policy

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

- ✓ Most of the respondents perceived moderate effectiveness of Krishoker Janala for disseminating agricultural information. Therefore, attempts should be taken by the concerned authorities to increase the effectiveness of Krishoker Janala for disseminating of agricultural information by increasing its quality and use.

- ✓ The extent of ICT use had a significant contribution on perceived effectiveness of Krishoker Janala for disseminating of agricultural information. Therefore, it may be recommended that attempts should be taken by the concerned authorities to increase the use of ICT by providing motivational campaigns and trainings.

- ✓ Use of Krishoker Janala had a significant contribution on perceived effectiveness of Krishoker Janala for disseminating of agricultural information. Therefore, it may be recommended that attempts should be taken by arranging motivational campaigning to increase the use of Krishoker Janala for dissemination agricultural information quickly.

- ✓ The quality of information of Krishoker Janala had a significant contribution on perceived effectiveness of Krishoker Janala for disseminating of agricultural information. Therefore, It may be recommended that the quality of information of Krishoker Janala should be improved with valid and reliable information of all important crops for disseminating agricultural information.

- ✓ "Lack of information of all crops" was the main problem of Krishoker Janala. Most of the respondent SAAOs suggested to include information of all important crops in Krishoker Janala. Other problems may be solved as per suggestions made by the respondent SAAOs. Therefore, it may be recommended that the problems of Krishoker Janala should be reduced by improving the information of all crops and those information should be validated by relevant experts, internet should be available in every place of Bangladesh, cell phone with GPRS should be supplied to the SAAOs, training should be provided to the SAAOs to increase their knowledge on using krishoker Janala and other ICT tools.

5.3.2 Recommendations for further study

This study investigated perceived effectiveness of Krishoker Janala for disseminating of agricultural information. A small and limited research has been conducted in the present study cannot provide much information related to this aspect. Further studies should be undertaken to cover more information in the relevant matters. So, the following recommendations were put forward for further research:

- It is difficult to perceived effectiveness of Krishoker Janala for disseminating of agricultural information. Measurement of effectiveness of Krishoker Janala for disseminating of agricultural information was measured by the perception of the SAAOs in this study. More reliable measurement of concerned variables may be used for further study.

- The present study was conducted only in four upazilas of Chuadanga district. Findings of the study need further verification through similar research in other parts of the country.

- The study investigated the contribution of seven characteristics of the SAAOs to their perceived effectiveness of Krishoker Janala for disseminating of agricultural information. So, it is recommended that further study would be conducted with other characteristics of the SAAOs.

- Research should be undertaken to measure the effectiveness of Krishoker Janala for disseminating of agricultural information by using the perception of farmers.

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APPENDIX –A

English Version of the Interview Schedule

Department of Agricultural Extension and Information System

Sher-e-Bangla Agricultural University, Dhaka-1207

Interview Schedule for data collection for the Research on

EFFECTIVENESS OF KRISHOKER JANALA FOR DISSEMINATING AGRICULTURAL INFORMATION

(This Interview Schedule is entitled for a research study)

Serial no.: ……..

Name of the respondent: …….

Cell Phone Number:……

Village/Mohallah: …… Block: ……...…….....

Ward No.: …… Thana: ……

District: …….

1. **Age**
   How old are you?
   Ans: ……..years

2. **ICT Ownership**
   (Please mention your possession and access to the following ICTs)

Items	**Possession status**		
	Self	**Shared Access**	**No access**
Featured cell phone			
Smart cell phone			
Internet			
Computer/ laptop/ tab			

3. Extent of ICT use for work

(Please mention your frequency of using the following ICTs for receiving farm related information e.g., talking to input dealers or marketers or extension support staffs in seek of agricultural information.)

Items	**Not at all**	**Rarely**	**Occasionally**	**Often**	**Frequently**
Mobile Phone (voice call, SMS, MMS, Video, etc.)	No use	1-3 times/Week	5-6 times/Week	1-3 times/day	4-6 times/day
Internet	No use	1-3 times/Week	5-6 times/Week	1-3 times/day	4-6 times/day
Computer/laptop/tab	No use	1-3 times/Week	5-6 times/Week	1-3 times/day	4-6 times/day
Agricultural Information Service (AIS)	No use	1-3 times/Week	5-6 times/Week	1-3 times/day	4-6 times/day

4. **Use of Krishoker Janala**

How many times have you used Krishoker Janala in last one month?)

Ans: (……)

5. The quality of information of Krishoker Janala as perceived by you

(Please mention)

Items	**Good**	**Moderate**	**Low**
Clarity of information			
Compleness of information			
Understandability of information			

6. Problem faced in using Krishoker Janala

(Please indicate the extent of Problem faced by you in using Krishoker Janala.)

Problems	High Problem	Medium Problem	Low Problem	No Problem
Lack of valid information				
Lack of information of all crops				
Availability of internet				
Availability of ICT tools				
Lack of technical knowledge				

7. Job Experience

(How many years you are engaged with the job?)

Ans:

8.Suggestions to improve the quality of Krishoker Janala

Please mention their important suggestions to improve the quality of information of Krishoker Janala against each of the 5 selected problems.

Problems	Suggestions
Lack of information of all crops	1. 2. 3.
Lack of valid information	1. 2. 3.
Availability of internet	1. 2. 3.
Availability of ICT tools	1. 2. 3.
Lack of technical knowledge	1. 2. 3.

9. Perceived Effectiveness of Krishoker Janala

(Please mention the extent of effectiveness of Krishoker Janala for disseminating Agricultural information perceived by you)

Items	Highly effective	effective	Low effective	Not at all effective
Quick Apps to get agricultural related information				
Helpful for agricultural work				
Farmers can be updated with the agricultural information by Krishoker Janala				
Easy to handling for everyone				
Popular to the agricultural stackholders				
Easy to understand and application				
Helpful to increase production rate				
Farmers get instant solution(s) from Krishoker Janala				
All the information in Krishoker Janala are useful				

Thank you for your kind co-operation

……

Signature of the Interviewer