

USE OF ICT AND TRADITIONAL AGRICULTURE INFORMATION SOURCES BY BANGLADESHI FARMERS

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ABSTRACT

This study investigated the use of online information resources by the farmers in Bangladesh. The research was conducted in two districts—Tangail and Munshiganj. To explore the access and use of information by the farmers, this study has taken Roger’s “Diffusion of innovation” model as a theoretical framework. Both quantitative and qualitative data collection methods were used in the research. For quantitative data, a survey questionnaire was used to gather information from the respondents. For qualitative data, interviews were carried out among the farmers. Some agriculture extension officers (service providers) were also interviewed to assess the patterns of their service to farmers. This study found that most of the farmers are not familiar with the online agricultural information sources due to lack of technological facilities, such as a computer and Internet connection. Farmers are not concerned about using ICTs or online information sources, rather, they are worried about the low prices of their products and high prices of seeds, fertilizers, pesticides, fuel and transportation. Their primary sources of information are television, radio, newspaper, fellow farmers and agriculture extension service providers.

Keywords: E-agriculture, ICT adaption, Digital Bangladesh, Web portals, Diffusion of innovation.

INTRODUCTION

Agriculture is an important sector in most developing countries and the majority of the rural population of the world depends on it (Stienen, Bruinsma, & Neuman, 2007). The contribution of agriculture to rural development is highly dependent on the generation and delivery of new agricultural technologies and most of these new technologies can be described as information intensive (Tripp, 2001). Information has become a critical factor of the agricultural production (Rao, 2006). Information and communication technologies (ICT) have touched almost every field of human activity, and agriculture is not an exception to that (Winrock, 2003).

Since Bangladesh is a developing country, agriculture is an important sector and nearly 80% of the total population are involved in agriculture and related activities (Rahman, 2009). This sector is currently under everyone’s attention to meet the growing demand for food as the country’s population continues to increase. However, agricultural production of Bangladesh is very low because the lands are cultivated in traditional ways, farmers’ practices are unscientific, and there is insufficient knowledge and use of ICT in the agricultural activities (Zaman, 1987).

Farms in Bangladesh are extremely small and land capable of cultivation is divided into smaller plots, due to the rapid increase in population. Cultivation is dependent on the uncertainties of variable rainfall and average output is generally low. Value addition in agriculture requires technological, institutional and price incentive changes designed to raise the productivity of the small farms (Todaro, 2000).

Previous research has shown that most of the time Bangladeshi farmers do not get correct and timely information on seeds, fertilizers, insecticides and weather. Every year a major portion of small and middle class farmers face losses due to low prices for their products. The conditions of Bangladeshi farmers are degrading gradually and a large number of farmers are losing interest in cultivating the land.

A major problem for farmers in Bangladesh is a lack of necessary information. Kizilaslan (2006) argues that proper dissemination of information for agricultural and rural communities is a crucial tool in the fight against poverty. Information helps the poor to take advantage of opportunities and also reduces their vulnerability. Kiplangat (1999) claims that dissemination of relevant information to farming communities can facilitate the effective adoption of agricultural inputs, decision making on markets and adoption of scientific methods. Lack of dissemination of information across the agricultural supply chain is a major concern in the developing world as well as in Bangladesh.

The use of ICT in agriculture among rural farmers of Bangladesh is limited because of lack of proper education, poor social and economic conditions and a scarcity of information and technological infrastructure. The government of Bangladesh has stepped into a new era of a digital world with a spectacular vision for making a Digital Bangladesh as outlined by its current Prime Minister Sheikh Hasina.

The term "Digital Bangladesh" was first used by Bangladesh Awami League political group immediately before the 2008 national election. It was used at that time as a nice-sounding political slogan. Making Digital Bangladesh means all the government's activities, such as commerce, education and agriculture, will be powered by computers and the Internet (Sarma, 2009). As a part of digitalizing agricultural information many online-based information portals have been launched in the country. The online based sources include different types of portals.

One of the biggest Web trends is the portal (O'Leary, 2000). Online web portals are a central system which disseminates information via the Internet. A portal aggregates information and they are designed to be a one stop shop (Browning, 2003). A network service brings together content from diverse, distributed resources using technologies, such as cross searching, harvesting, and alerting. The information is then collated into an amalgamated form for presentation to the user. This presentation is usually via a web browser, though other means are also possible. For users, a portal is a single point of access where searching can be carried out across one or more than one resource and the amalgamated results viewed (Asensio, 2003). There are different types of portals, such as vertical, horizontal, enterprise, knowledge, corporate and markets space portals (Eid, 2008).

At present, the Internet is playing important role in bringing positive changes for many individuals. Additionally, poor and developing countries can change their fate by allowing their citizens to use the Internet in their everyday lives. Bhuiyan (2004) stated that a developing country should consider providing access to some enhanced services such as the Internet. Providing access to the Internet not only will check the gap between the information haves and have-nots in terms of new media access but also will facilitate the achievement of universal access goals.

How people benefit from information and communication technology depends on the information dissemination processes that are used. Thus, how farmers receive information and implement it in their fields hinges on the method that agriculture extension officers, who serve as information disseminators, use in sending the messages. The aim and objectives the communication will never be fulfilled unless the senders receive feedback from the receivers (Singh, 1999).

At the time of information dissemination, agriculture extension officers play the role of senders and farmers play role as receivers. How

E-agriculture in Bangladesh

E-agriculture involves the initiatives of agricultural informatics, agricultural development and entrepreneurship towards building a hunger-free, efficient and resourceful Bangladesh. These e-agricultural initiatives are part of Digital Bangladesh that the government hopes to achieve by 2021 (Islam, 2009). The Government of Bangladesh recognizes ICT as an indispensable tool in the fight against poverty. It is also understood that ICT can enhance the contributions of agriculture to rural development tremendously. E-agriculture or e.Krishi promotes a multi-stakeholder, people-centric, cross-sectoral platform that will bring together all stakeholders, especially farmers. It will enable them to access timely and relevant information, exchange opinions, experiences, good practices and resources related to agriculture.

E.Krishi focuses on leveraging easy access of ICTs including cell phones, radio, television, etc., for information dissemination. With the aim of improving communication and learning processes between various actors, e.Krishi promotes the integration of technology with multimedia, knowledge and culture. (e-Krishi vision 2025, Bangladesh). The information disseminated by e-Agriculture initiatives includes weather information, price information, information on production and cultivation techniques, plant nutrients, water usage, education and health information, information of government and non-government facilities, demands and current stock information, plant diseases, and insect information.

Objectives of the Study

The main aim of this study is to investigate the usage of online agricultural information sources by farmers in Bangladesh. To judge the use of the information portals by the farmers a survey was conducted among 110 farmers in the Tangail and Munshiganj districts of Bangladesh. Additional objectives included investigating and describing the uses of different online portals by

farmers. As well as identifying factors affecting the use of information portals by farmers in agriculture.

Research Questions

This research, with an aim to understand the use of online agricultural information sources by farmers, explored the following research questions:

1. To what extent do farmers use the online information sources?
2. For what purposes do they use them?
3. What are the other sources used by the farmers for agricultural information?
4. To what extent do the farmers rely on different information sources?

LITERATURE REVIEW

ICT in Agriculture

New information and communication technologies are increasingly important for the extension of agriculture (Shabanali, Falaki, Irvani, & Mohammadi, 2009). Research conducted by Lio and Liu (2006) investigated whether there is a strong correlation between the use of ICT and farmers' productivity. They found that a microwave-radio telephone system installed in the remote region of Tumaca, Columbia, along with community access points resulted in better trade and market opportunities for the farmers. However, rural populations still face problems accessing necessary information that could help them in making timely and accurate decisions (Anandaraja, Rathakrishnan, & Philip, 2006).

ICT use in some developed countries started well before the advent of the Internet in the 1990s but they are now spreading to developing countries. Some of the key benefits of ICT applications in agriculture include reduction of transaction costs, online input procurement, electronic data interchange (EDI), better inventor control systems, improved supply chain coordination and market access, and transparency among others (Rao, 2006).

Allahyari and Chizari (2010) identified the potential of new information and communications technologies (ICTs) in agricultural and rural sector. They also found some drawbacks in getting information, such as the delivery of irrelevant information, a lack of coverage, a lack of avenues to improve performance, and a lack of accountability. Among farmers in developing countries there is a great dissatisfaction with prices and market information. For example, Islam and Gronlund (2007) found that 80 percent of farmers would go to some other market to sell their products if prices were better there.

ICT Adaption

Adoption of ICT is strongly associated with the education level of the farmer, farm size and negative effect of age of the farmers. Additionally, past research indicates that there is disparity in adoption between different sizes and types of farms (Warren, 2002). It is important to understand farmers' reasons for non-adoption first and then try to help the farmers address their questions to make them more confident adopting the technologies.

Gelb, et al, (2008) identified some reasons which hinder the process of adoption. They include, “lack of leadership and/or agents of change, the need to support effective and successful traditions concurrent with adoption of innovations, lack of end user and community involvement, lack of political will, conflicting interests, fragmented coordination among donors and failure to adopt participatory measures, uncoordinated strategy and policies, lack of funding, resources and start-up support and more (p-8)”.

However, Gelb, Maru, Brodgen, Dodsworth, Samii, and Pesce (2008) argued that sometimes too much innovation can be an obstacle by blocking the use of older technologies that can often be more effective. Gelb and Bonati (1998) revealed that access to the Internet is very useful for present day agriculture. However, farmers are skeptical about the Internet and e-marketplaces (Cloete & Doens, 2008).

Diffusion Model and Bangladeshi Farmers

Farmers in Bangladesh live in the countryside where dissemination of agricultural information has been a major challenge due to lack of proper channels and means. To understand the access and use of information by the farmers this study has taken Roger’s Diffusion of innovation (DoI) model as a theoretical framework. Diffusion of innovation is a field of research that investigates how new ideas spread within a population. It is the process by which an innovation is communicated through certain channels over time among members of a social system (Rogers, 1995).

The theory has been used to study instructional technology (Surry & Farquhar, 1997), information technology (Clarke, 1997) and diffusion of agricultural innovations (Rogers, 1995). The theory emerged in the mid-20th century from studies in several disciplines, including foundation studies on the adoption of agricultural production (Ryan & Gross, 1943).

The theory has been widely used to investigate diffusion of agricultural innovations (for example, Rogers, 1995; Kiplang'at, 2005). Thus the application of the theory to information and communication technology, and agriculture made it the most appropriate theoretical framework for this study. The theory tells us about the nature of the innovation, the communication channels, the characteristics of the social group, institutions and organizations (Lewis, 1997; Kiplang'at, 2005).

The process of information delivery and reception needs media literacy or education among the farmers. Infrastructure developments, such as reliable electricity, media access, better road and transportation systems, and links with the urban business district, are all primary underpinnings of information dissemination.

Diffusion research is focused on how the major elements of dissemination or dispersion relate to, facilitate, or hinder embracing of new products or practices among a social system of adopters. It provides a framework that may help information professionals and development experts understand the variation in the acceptance and use of agriculture related information and

innovations. It also provides opportunities to predict and account for factors that affect the dissemination of innovations.

In terms of applying this model to Bangladeshi farmers, it is important to remember that the country's economy is based mainly on agriculture. About 62 percent of the population is engaged in agriculture (BBS, 2006). Since agriculture is the top priority, the government has taken many initiatives to promote this sector. To reach the agricultural information in a feasible way the government created many online web portals. This study investigates how the diffusion of innovation theory or model is applicable for the farmers of Bangladesh.

The Bangladesh government, non-governmental organizations (NGOs) and many international organizations are partners in promoting the agriculture sector of the country. For that reason many agricultural implements are made for farmers and updated information is provided via a variety of online web portals. In spite of these efforts the condition of Bangladeshi farmers is yet to be changed. From the discussion of the diffusion of innovation model it is possible that a failure to adopt Internet based information sources may be the reason that the condition of Bangladeshi farmers has not improved. Thus, the current investigation attempts to determine where the farmers get their information, and the impact of e-information.

METHODS

Survey and in-depth interview data collection methods were used in this research. For quantitative data, a survey questionnaire was used to gather information from the respondents (farmers). An interview was carried out with some of the farmers and some agriculture extension officers (service providers) were also interviewed to assess their service patterns to the farmers. The survey was conducted to ascertain the farmers' present condition, especially their demographics and media usage, whereas interviews were conducted to assess the use of online information portals among Bangladeshi farmers.

Survey Questionnaire

The survey questionnaire attempted to determine the farmers' demographic and media usage. It was administered face to-face and was conducted in the Bangladesh districts of Munsiganj and Tangail. A total of 110 respondents participated in the surveys, 55 in each of the districts. The study used purposive sampling, where the researcher went to two districts and requested that farmers participate in the interview. The study purposely chose farmers of high, medium and low income, as well as high, medium and low education levels. All the respondents were male farmers.

The survey instrument asked farmers what type of mass media they use, the programs they watch on television, the way they find information about seeds, fertilizers, insecticide and market prices, and which medium they depend on for agricultural information. They were also asked questions concerning their use of online information portals.

Survey setting. The survey data was collected from different locations in the Bangladesh districts of Tangail and Munshiganj. Tangail is 100 kilometers away from Dhaka city and Munshiganj is 30 kilometers away from Dhaka. As the purpose of this study is to assess the

usage of online information portals by the farmers of Bangladesh, this research attempted to collect data from different areas of the districts. Farmers were selected from the two Tangail district thanas of Sadar upaziala and Nagarpur upazila as well as the Sreenagar thana from Munshiganj district.

Survey sample/participants. The respondents of the survey were all male, since the culture is such that questioning females would have been deemed inappropriate. The respondents' age, educational qualifications and economic conditions varied. Participant ages ranged between 20 and 60. The respondents were divided into the educational categories of educated, literate and illiterate. At the same time they were categorized into the age categories of young, adult and old. Additionally, their personal wealth was categorized as rich, middle class and poor.

As the majority of the respondents in the rural areas were lower educated or illiterate, the researcher needed to probe and verbally explain the questions. Of the 110 respondents 55 were from Tangail and 55 were from Munshiganj. Also, in each district 18 were educated, 18 were literate and 19 were illiterate. The questionnaires were printed, allowing literate respondents to check their answer. For illiterate respondents the researcher read the questionnaire aloud and recorded the respondent's answer.

When approaching the respondents the researcher explained the importance of the survey and requested that they spend around ten minutes to cooperate with the work. If they agreed, a questionnaire was given to the respondent, who responded immediately. Colleagues of the researcher who lived in the two districts assisted in recruiting and administering the survey. No incentives were given to the farmers to encourage their participation.

In-depth Interviews

The study used in-depth interviewing as one of the main methods of data collection. The central concern of the qualitative research is to understand human experiences at a holistic level. This method of research can produce very precise and specific answers about an individual's experiences, opinions and motives, which quantitative methods have a more difficult time assessing.

For in-depth interview 25 farmers were purposely chosen, with 10 from Munshiganj and 15 from Tangail. The interviewees included farmers who were educated, literate and illiterate. As the survey questionnaire failed to get in-depth information regarding use of digital information sources, the researcher decided to conduct in-depth interviews with selected farmers. Upazila agriculture officers helped to locate farmers to represent the different categories, especially some who have made use of the Internet. For the in-depth interviews the researcher stayed seven days in Tangail and five days Munshiganj.

Farmers were asked how and from where they derive updated agricultural information, the way of cultivating their lands, and if their information sources were traditional or modern information technology? This study inquired whether the farmers have access to the Internet and what are the possible barriers for adopting Internet information sources. This research also investigated farmers' views about digital Bangladesh and e-agriculture, as well as the types of services

provided by the agriculture service providers. They were also asked about the sufficiency of the services. The farmers were also asked about their basic problems and what they actually need. The interviewer took notes and the interviews were recorded with audio tape for additional analysis.

RESULTS

This section discusses the first part of the findings of the research: the farmers' information sources. The section also examines the media farmers use to derive their desired information, the role of the agriculture service providers in disseminating information among the farmers, and barriers to dissemination they face.

E-information Service Center

In line with the government's plan to build digital Bangladesh as charted out in the vision 2021 program, Prime Minister Sheikh Hasina launched Union Information Service Center (UISC) in November 2010. The USICs were developed in all 4,501 unions across the country under UNDP-funded A2I Program designed to give Internet connectivity access to rural Bangladeshis.

UISCs services include over 50 government forms, circulars, gazettes, birth registration, voter ID registration, agricultural information, social safety net information, public examination results, employment information, among others. Sirajul Islam, secretary of Atpara Union Parishad (UP) in Sreenagar, Munshiganj, who oversees the newly added 'E-information Service Center' in the UP office premises, said "November 17, 2010 Prime Minister Sheikh Hasina inaugurated the 'E-information Service Center at a time across the country." However, the Center did not get a computer and Internet modem for six months. Then they were instructed to hire two employees for the Center, but because the Center did not receive the funds to pay them regularly, the two left.

Though the service has been re-started, the use of the service has been very low. Some people come for birth certificates, inheritance certificates, visa related tasks and some for agricultural information. When asked why people do not come in for the services, he said, "People are yet to be informed about the service, it is just started and more campaigns need to carry on to make aware the village people including farmers about the matter."

Rashedul Hasan Badhon, computer operator of the Atpara Union Parishad (UP) E-information Service Center, said that he joined Center three months earlier. He also noted that few people come to the Center for service and most of the ones that do are farmers. They want to know about the good seeds, weather, and other agricultural information.

Types of Services Provided by Agricultural Officers

Agriculture extension officers provide different agriculture related information to the farmers. They practically show the farmers how to make an ideal seed bed, destroy insects, make compost fertilizers, recognize adulterate seeds, and how to derive modern information and technology in agricultural activities. Agriculture service providers reported providing all the updated

information on modern technologies to the farmers. Their prime task is to motivate the farmers for agricultural activities providing accurate information as well as possible technological support.

Agriculture Officer of Nagarpur upazila, Tangail, Anowar Hossain, said that they arrange visual training programs for the farmers. “We invite farmers to take part in our monthly or bi-monthly program, but all farmers do not respond our call. The farmers who come to our training program we teach them how to use ICT for agricultural information such as high yielding crops, how to cultivate land in proper way, making ideal seedbeds, how to control pest attack and use of technology in agriculture.”

“In last 2 years we trained at least 5000 farmers in different programs in Nagarpur. Through our different workshops and meetings we motivated and inspired farmers to use new information and technology. Thus we brought a positive change in agriculture,” he added. Services are the same across the villages both in Tangail and Munshiganaj. In Sreenagar Upazila of Munshiganaj district an agriculture officer Makbul Hossain said, “We are working for the betterment of farmers. I myself regularly go to the fields, talk with the farmers, observe their activities and give necessary directives to them.”

Awareness about E-information Service Center at Union Level

The E-Information Service Center (Tottho Seba Kendro) has started information dissemination among farmers at Union level. All 12 Unions in the Nagarpur Upazila in Tangail have E-Information Service Centers and a few unions of Sreenagar in Munshiganaj opened their Centers. The Center’s co-coordinator said that due to lack of logistical support the process is yet to start in full swing. In Tangail, it was found that some people go to the Center to talk to their expatriate husbands, sons, fathers or other relatives with Skype or Yahoo messenger with cheaper call rates. But the objective of the Center is to provide agricultural information to the farmers.

Awareness and Knowledge about Agricultural Portal and Digital Bangladesh

The service providers reported that the use of the national portal is yet to be started in the district and Upazilla level. Using the website of Agriculture Information Service (AIS), Agriculture Ministry (MOU), and Department of Agriculture Extension (DIA) they provide agriculture related information to farmers. As the process of digitizing agriculture has only recently begun, e-agriculture is still at the conceptual level. As one official mentioned “Frankly speaking, I, myself, did not know anything about the National Web Portal. Besides, we are not being told anything about the portal from the Agriculture Department or Ministry.”

Training Related to ICT and Internet and its Impacts

Shaikat Hassan, a Sub-Assistant Agriculture Officer (AASO) in Sreenagar Upazila of Munshiganaj has been working as an AASO in Valpara area in the Upazila for five years. Among a total of 30 AASOs in the Upazila, Shaikat is one of the three who know how to provide Internet based information to farmers. He took part in a 21-day ‘Computer Literacy and English

Language Course’ organized by RPATC (Regular Public Administration Training Centers) in 2011.

Shaikat said he learned many things about modern agriculture from the training program, such as how to derive online information, how to disseminate that information to farmers, use of modern technology, and how to get optimum output from the fields. “Before taking part in the RPATC’s training I merely know about e-agriculture and use of ICT in agriculture. But now, I know more than the past. I know the name of various websites which provide updated agricultural information to the farmers like Agriculture Information Service (AIS), Department of Agriculture Extension (DAE) and Ministry of Agriculture (MOA).”

Access to and use of Information

This study revealed that most of the farmers who participated in the study did not know about the online agricultural web portals due to lack of technological facilities, such as a computer and internet access, still they use other information sources.

Media Exposure

The survey found that 80 percent of farmers use mass media for agricultural information and entertainment. Among them 65 percent use television to get agricultural and other necessary information, 15 percent read newspapers, 12 percent listen to radio, 2 percent use the Internet and 6 percent use other media. Educated farmers use newspapers as well as television and radio as their sources of agricultural information, while illiterate farmers depend on television and radio for agricultural information.

The survey also found that farmers use television as a prime medium of gathering information, such as current market prices of various crops, seeds, fertilizers, insecticides and new innovations in agriculture. Farmers reported that they use radio, especially for weather updates and market prices.

In the in-depth interviews of the 25 respondents, 18 farmers said that they watch the agricultural program of Shykh Seraj (a popular agricultural program producer and presenter) on television. Additionally, the survey results found his program *Mati-O-Manush* was said to be very popular among the farmers. Farmers said that they can learn many new things from the Shykh Seraj program on BTV and Channel i. They said they learned the practical use of agricultural technology from those programs. Farmers from Sreenagar said a few months back Shykh Seraj came here and practically showed them the proper way of making seedbeds, planting seedlings, the way of harvesting and preserving seeds. This information helped the local farmers to be more attentive in their agricultural activities. Farmers reported that Shykh Seraj program inspired them to use ICT in their agricultural activities.

Farmers said that they get information about the market condition from their fellow farmers, (educated and experienced farmers) dealers, agriculture service providers, and local opinion leaders. Sometimes they visit the local market to know the market price.

Knowledge of ICT

This study found that the majority of the farmers do not have adequate knowledge about modern technology in agriculture. In most of the cases, the farmers perform all their agricultural activities in traditional ways. Some of the farmers want to apply new technology in their fields, but due to a lack of financial support they cannot afford to do so.

Harun-or-Rashid, 48, a middle class farmer possessing two acres of land of Khoiyagaon village under Sreenagar Upazila of Munshiganj, has been cultivating land for the last 15 years. He said, “I feel the necessity of information technology. But it is not available for us. As for example, if I wish to get a computer it is not possible for me. How can it be possible for me to buy a computer spending 20,00tk (\$270)?”

This research found that some farmers of Munshiganj do not think that ICT is necessary for agriculture. Farmers reported that it does not bring extra production for them. However, in some villages of Tangail they have set up ICM and IPM clubs where farmers collect updated information using the Internet. But the farmers don't have direct access to the Internet. In this case local educated youths help them to acquire the information.

Arun Kumar Saha, 50, native of Shologhar of Sreenagar, said, “In the past cultivating my 10 acres of lands in traditional way I produced utmost 300 maunds of IRRI paddy but now using ICT I can produce more than 1200 maunds of paddy in the same amount of lands. In previous time I was not aware about how to properly cultivate the land and do not pay heed the suggestions given by the service providers.”

Use of Internet

Most of the farmers do not have any idea about the Internet. Recently with the support of Agriculture service providers, Internet based information dissemination processes have been started among a very limited number of farmers in Tangail. But farmers are yet to get the facility with direct access to Internet, as most of the rural farmers do not have institutional education and technical knowledge.

Most of the farmers mentioned they have no concept or idea about the Internet. Recently, they have been informed by the agriculture service providers about the Internet. Farmers reported that extension workers told them about the Internet. They said that using Internet would enable them to get all kinds of updated agricultural information. A few of the educated farmers are familiar with the Internet, but they have no direct access to it.

A sexagenarian farmer of Tangail mentioned, “Earlier we got agri-information from the service providers. At present we get it from the Internet. Though I do not know how to browse the Internet but one of my sons helps me to get it. When I get any new information I disseminate it to my fellow farmers by the multimedia. At the end of the month we arrange a meeting of ICM (Intensive Crops Management) club members.” Farmers reported they do not get service providers when they are needed. If farmers learn to use the Internet then the dependency on service providers will be reduced.

Problems of the Farmers

The price of paddy and other agricultural products are very low but there is a high cost for seeds, fertilizer, insecticides and oil. To buy a sack of fertilizer farmers have to sell two maunds of paddy. Those problems and lack of capital are some of the problems that farmers face regularly. Most farmers cannot cultivate their land on time due to lack of capital. They do not get loans when they need them and when farmers do receive loans they have to pay high interest rates. Additionally, agricultural loans are not available for poor and middle class farmers. Bank loans are only available for the farmers with the largest amount of land.

Tarapoda Das, a farmer of Shologhar in Sreenagar, said, “In our land, we can produce crops only one time in a year. But many parts of the country produce three crops in a year. Agriculture department should have eyes on this matter. We do not need information. We want to know the tactics of cultivating our land at least two times in a year”

Khalilur Rahman, a farmer of Nagarpur said “I am not being benefited by cultivating or producing crops because I have to count losses every year. I cultivate my land just from the passion.”

Demands of the Farmers

Farmers demanded rapid dissemination of agricultural information. They reported that service providers should be more skilled. Some agricultural service providers do not have updated information and technology. They cannot provide information when it is needed. Abdul Hakim, a farmer of Shologhar in Sreenagar, said in some cases their anticipation and suggestions are aborted as a result. He argued that if farmers can turn to the Internet for information, their many problems would be solved. However, most of the farmers cannot afford to buy a computer. They demanded that the government provide them a free computer and Internet connection so that they could benefit from the digital agricultural information.

A disappointed farmer, Harun-or-Rashid, 40, of Khaiyagong of Sreenagar, said, “We do not need the information or technology. We need available fertilizer in cheap rate, insecticide and fair price of crops, especially paddy. This is the time to rein the monopoly fertilizer business of dealers and abolition of middlemen.”

Internet Changes their Lives:

While Internet service is not available in some of the villages, some educated and trained farmers are starting to use the Internet and have changed their agricultural activities. Shahidul Islam, 36, a farmer of the village of Kathuri under Nagarpur Upazila, said that from the Internet they come to know about the various diseases of paddy, their prevention and remedy. As a result, the production of crops has been increased and became financially beneficial. He has no direct access to the Internet but with the support of local educated youth he tries to access updated agricultural news, such as market condition, price of seeds and any new crop innovations.

Abdur Rahuman, 66, of Kathuri village, said, “Earlier I got the agricultural information from the service providers. At present I get it from the Internet. One of my sons helps me to get it. When I get any new information I disseminate it to my fellow farmers.”

Saiful Islam, 62, a share cropper said, earlier he derived agricultural information from the service providers. But for the last four months he is getting information from the Internet. Though the government of Bangladesh has created many online portals for the farmers, they still have no direct access on those portals. They use other information sources, such as television, radio, newspaper, fellow farmers, and agriculture service providers.

CONCLUSION

Formal education and training are important for the farmers to adopt ICT in agriculture (Ballantyne, Maru, & Porcari, 2010). The uses of online information sources depend on farmers’ education, financial condition and size of land. The farmers who are rich and produce a large amount of crops are more conscious about applying ICTs in their agricultural activities. Age and education are also major factors of using online information in agricultural activities. This study found that comparatively young and educated farmers are interested in using new information and technology in their fields for agricultural production. Also, most older farmers are nonchalant about using ICT in agricultural activities. They feel more comfortable cultivating their land, planting saplings, harvesting crops and preserving crops in their traditional way.

An important finding of this study is that farmers are not concerned about using ICT or online information sources. Instead, they are worried about the high price of seeds, fertilizers, insecticides, fuel and transportation. Farmers said they do not need information. They need availability and fair prices of seeds, fertilizers as well as on time irrigation. Farmers are anxious about the incessant increase of fertilizer and fuel prices. There appears to be little understanding that information may help to reduce costs and increase production.

Farmers are not getting a fair price for their products. Selling two sacks of paddy will not allow the farmer to buy one sack of fertilizer. They are disgruntled about the monopoly of seed and fertilizer markets, as these markets are manipulated to keep prices high. As markets are monopolized by a few people, farmers don’t have any bargaining power. Farmers have to buy the agricultural products at prices fixed by the traders. The price of fuel is increasing sharply, and that is throwing farmers into darkness. Without financial solvency, farmers have to till their land by hiring a tractor and if the price of oil increased then tractor costs are also increased.

Farming in Bangladesh is at the mercy of nature. Every year various natural calamities hit across the country causing farmers lose their crops and capital. The situation is worse for rural Bangladesh, where illiteracy and lack of access to communications are a big problem that hinders farmers. Additionally, villagers are yet to receive consistent electrical service and the literacy rate is not high. With these logistical problems, the use of modern information and technology is simple rhetoric for most Bangladeshi farmers.

The use of ICT among Bangladeshi farmers is yet to be expanded, though the government and many NGOs have been trying to provide ICT support to farmers for promoting their agricultural

activities. However, because of the many problems mentioned earlier, the use of ICT in agriculture has yet to be adopted. The diffusion of innovation model helped this study to investigate why innovation did not properly diffuse to the farmers in spite of government and different stakeholders' efforts. Poor farmers usually do not have access to new information and technology.

Rural populations still face problems accessing necessary information that could help them in making timely and accurate decisions (Anandaraja, Rathakrishnan, & Philip, 2006). To access online information farmers need computers and Internet connections, but most of the farmers cannot afford to buy a computer. Moreover, broadband Internet connection in rural Bangladesh is limited. Buying a computer along with Internet modem and paying the associated charges is beyond the means of most farmers. As a result, in spite of the desire to use ICT in agriculture, farmers cannot afford it.

Farmers reported that main sources of their agricultural information are radio, television, agricultural extension officers, local markets, local opinion leaders and their fellow farmers. Among 25 respondents of in-depth interview of the two districts nobody was found who has direct access to the Internet. In Tangail, some farmers set up ICM (Incentive Crops Management) and IPM (Incentive Pest Management) clubs where farmers get updated agricultural information via the Internet accessed by some local, educated youths.

The research found that the farmers cannot use agricultural messages given to them by the agriculture service providers due to a lack of education, which hinders the development of agricultural practices. The farmers are reluctant to adopt any new technology or information until they are able to determine its benefit. This is one of the major barriers to adoption of innovation by the farmers.

RECOMMENDATIONS

To insure the use of information sources by the farmers some rigorous initiatives should be taken, such as helping them to analyze their problems and identify opportunities, illustrating the significance of using online information, and supporting group formation and facilitating collective action. As a large number of farmers are illiterate, the government should develop a large-scale program of education for them should be undertaken to provide them with reading skills that would enable them to access agricultural information on the Internet.

The basic equipment needed for gathering online information are a computer and Internet connection. To operate the computer reliable electricity service is necessary. But most of the villages are yet to receive electricity facilities. Besides, a major portion of farmers are poor and are unable to afford a computer and Internet modem with a broadband connection. Thus, the government should undertake initiatives to provide computers with Internet access in all villages.

The main problem of the village farmers is getting a fair price for their products and reasonable costs for seeds, fertilizers, insecticides and oil. Farmers will be more likely to adopt new ICT in farming practices if costs and prices are favorable. Additionally, it is important for farmers to see

how adopting this new information can help them to reduce costs, increase profits and increase crop production rates.

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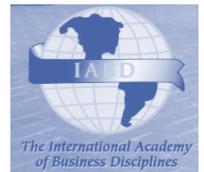
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