

STRATEGIES OF EXTENSION SERVICE PROVIDERS TO MEET THE INFORMATION NEEDS OF THE FARMERS

S. Das^{1*}, M.N. Munshi² and W. Kabir³

¹Agricultural Information Centre, Bangladesh Agricultural Research Council
Farmgate, Dhaka, Bangladesh

²Department of Information Science and Library Management, University of Dhaka

³Former Executive Chairman, Bangladesh Agricultural Research Council
Farmgate, Dhaka, Bangladesh

ABSTRACT

The role of Information Communication and Technology (ICT) is yet to be fully realized to receive its full potential benefits in agricultural information dissemination services. The present study is undertaken to enhance agricultural knowledge and minimize the information gaps between farmers' needs and new technologies. It reviews recent ICT initiatives in agriculture and farmers access to agricultural information services in Bangladesh. The role of ICT on farmers enhanced agricultural production is also discussed in the paper. The current research proves that agriculture information is not only for libraries, research stations, and national and international agricultural database. Agriculture information services are to be provided by the Government, NGO, private organizations, agricultural research organizations, and advisory centers. The data were collected from questionnaire and interviews and they were coded, decoded, and interpreted in descriptive statistics through tables, graphs, and chart. The findings were arranged in separate sections with respective manners. This study contributes to the field of agricultural information dissemination systems of Bangladesh. It significantly elicits strong relationship between the use of ICT and farmers' enhanced production led income. It was concluded with recommendations for the information providers, researchers, policy makers, and stakeholders for making extension services more effective.

Keywords: Agricultural Information, Information providers, Dissemination system.

* Corresponding author: susmitabarc@gmail.com

INTRODUCTION

Bangladesh is blessed with positive agro-economic conditions of agriculture for growing a number of crops. However, the cultivation, the processing and the marketing of agricultural products are hampered to some extent due to the non-availability of right information at the right time to the farmers from a reliable source at the community level. Once upon a time, agriculture information was confined to libraries, research stations, and national and international agricultural database. Therefore, it is noticed that farmers' access to getting proper information on agriculture, packaging and dissemination of knowledge generated by the researchers and lastly farmers' affordability of receiving that information are main obstacles to booster agricultural productivity in Bangladesh. The major objective of the present study is to examine the strategies of extension service providers to meet information needs of the farmers at all levels in Bangladesh.

Warren (2002) coined the acronym ICT (Information and Communication Technologies) and meant those technologies for the multitude of stand including telephone, television, video, voice information systems, and fax. Information Communication and Technology (ICT) is presently being used in developing agricultural programs. ICTs have the potential strategies to reduce the gap of information availability, irretrievability communication among the farmers. The current study was undertaken with a view that ICTs could play a significant role in establishing the strategies of extension policy as well as enhancing the agricultural production and by connecting with the available and verifiable authentic sources of data, information and knowledge. The prosperous farming system can be well established through using data. Realizing the potential of ICT, the study results would show that ICT can trace the agricultural knowledge delivery systems and farmers' information needs in Bangladesh and identify the gaps to minimize the information gap between farmers' needs and new technologies.

The agricultural information service agents of Bangladesh are apparently involved in introducing agricultural information services based on farmers' specific needs. The Government, NGOs, private organizations, agricultural research organizations and advisory centers comprise these information service providers. Some government bodies like Department of Agricultural Extension (DAE), Department of Livestock Service (DLS), Department of Fisheries (DoF), Agricultural Information Service (AIS), National Agricultural Research System (NARS), concerned ministries and also some other non-government organizations have been providing agricultural information the farmers of Bangladesh in various modes both in print and electronic ways.

Agricultural information delivery services are accelerated by use of different ICT tools. Some studies related to those services are reviewed here for identifying the effective benefits of ICTs in agricultural information services. Agricultural information matters much in agricultural knowledge being interacted with farmers

and it influences agricultural productivity in various ways. Farmers are much benefitted by agricultural information in taking right decision about land, labour, seed variety, fertilizer, capital and farm management and many other things. Demiryurek et al. (2008) illustrates that agricultural productivity can be arguably improved by relevant, reliable and useful information and knowledge. Relevant evidence shows that ICTs have easier access to agricultural development to the standard of the livelihood of the farmers. Computers, internet, mobile phone, traditional media such as radio and TV comprise the study of the ICTs.

In the study conducted by Islam and Islam (2008), it is evident that the use of ICT has become increasingly an integrated and important part of farmers' information needs all over the world. In developing countries, Information and Communication Technologies are the data transferring media of agricultural information. Rao (2007) points out that these developing countries are connected with the developed countries and are getting the latest information and technologies in the fields of weather, natural resources and other related information. Mannan and Bose (1998) remark that ICTs have a key role in agro-food sectors to render a fast information and knowledge about agriculture in the world. Ekbia and Evans, 2009; Ommani and Chizari (2008) rightly utter that different ICT tools such as mobile phone, radio, television, and internet have the facilities to transfer related and rightly information that helps a farmer take right decisions to use resources in the most productive and profitable way. ICTs have played a very effective role in agricultural development and in decision making of farmer communities in different countries (Cash, 2001; Galloway and Mochrie, 2005; Opara, 2008; Taragola and Van Lierde, 2010). Herselman (2003) is in the opinion that technologies are the real source of information and knowledge for farmers and thus these reduce the distance among different communities of the world. Birkhaeuser, Evenson, and Feder (1991) have opined that ICTs have brought significant changes in agricultural development and transferring information and knowledge through various technologies among farmers.

MATERIALS AND METHODS

To collect the data, few instruments like questionnaire, interviews and field visit were conducted in the study. For secondary data, the researchers searched literature such as journal publications, books, reports, online papers and dissertations on the use of ICT addressing the farmers' information needs in respect of agricultural production. The main instrument was questionnaire. The research employed two different sets of questionnaires-one set for the farmers involved in using ICT tools in farming and other set for the farmers involved in farming with traditional instruments. The study also used formal and informal interviews for data collection. Random sampling was used in the study. Selected villages representing different agro-ecological zones of the country were chosen for the study. All villages included in the survey were absolutely farm based livelihood.

The surveyed areas comprise of two distinct types of locations based on department sponsored ICT initiatives and other without any such initiative. The first type consists of Agricultural Information and Communication Centers (AICC), Farmers Information Advisory Centers (FIAC), audio programs, television programs, mobile services. Other surveyed area comprises of traditional farmers who are not involved within service area with ICT based initiatives. The ICT service area covers 58.8% whereas non-ICT 41.2% of the data. The study area comprises of two category respondents. Farmers of ICT based service areas use ICT tools like radio, television, mobile phone, e-mail etc. These sorts of respondents were introduced as ICT oriented farmers. The other type of respondents is the farmers who not involved in activities of those services.

RESULTS AND DISCUSSION

The data of the present study were analyzed with traditional statistical means. The interpreted data showed how the uses of ICT tools would influence the extension activities through applying ICT tools in delivering information delivery services. The cumulated results indicated meeting the importance the farmers' information needs for generating proper extension strategies. The formal analysis was performed to investigate respondents' proper access to and utilization of agricultural information for the purpose of increasing various agricultural products. Farmers' category in accordance of their land possession was illustrated in another part.

The study further showed how many farmers use ICT tools such as radio, television, mobile phone and computers. The purpose of using such devices in retrieving farming related information was measured in the analysis description portion. A list of farmers' sources of information media for agricultural programs was analyzed. The farmers were interviewed why they kept mobile radios. The results of the collected data distinguished the annual income of the two types of respondents- ICT based farmers and non-ICT based farmers. The popularity and effective usefulness of agricultural technologies were calculated in the last part of the analysis.

ICT tools such as radio, television, mobile, computer and internet are thought to be the best means of communication. These tools play a vital role in making agriculture more efficient and effective. These tools are highly related to e-agriculture and proper application of these tools can make the way to delivering best information for the marginal farmers. Radio, television, mobile, computer and internet are mostly used in the ICT service areas. Television is a common ICT tool available in almost every house of all farmers. Computer is the information source to be used by the digital farmers. Now mobile phone is the easy and the quickest means of ICT tools. Radio is one of the commonest ICT tools used in agriculture information. All the four tools are equally used everywhere by the farmers in the same areas. The use and holding of ICT tools differ from area to area.

The farm category of ICT using farmers is different from that of ICT not using farmers. The large farm category in ICT service area is little more than that of non-ICT service area. The five farm categories are traced in both groups of farmers.

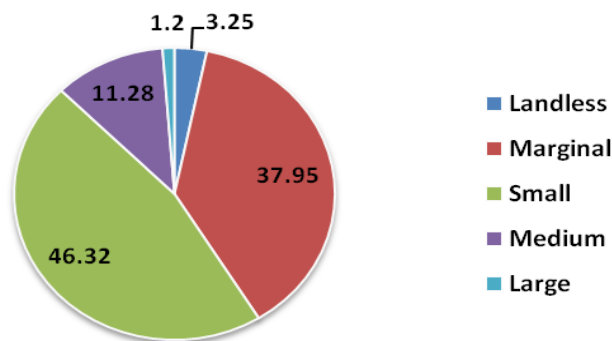


Figure 1. Farm category of respondents

The survey result indicates that in ICT service area, small farmers represent 46.32% of the total respondents. The number of landless farmers is proportionately less (3.25%) in ICT service area. The marginal category of farm is more (37.95%) in the ICT service area. The aggregation of farmers of small and marginal farm category is 84.27%. So, it is notice that this category dominates all other categories in the service area.

Table 1. Frequency distribution of ICT tools by service area

Assets		Service Area					
		ICT		Non-ICT		Total	
		No.	%	No.	%	No.	%
Radio	No	620	47.00	655	20.00	1275	64.07
	Yes	550	53.00	165	80.00	715	35.93
Mobile	No	35	3.00	205	25.00	240	12.06
	Yes	1135	97.00	615	75.00	1750	87.94
Television	No	468	40.00	492	40.00	960	48.24
	Yes	702	60.00	328	60.00	1030	51.76
Computer	No	770	65.81	730	89.02	1500	75.38
	Yes	400	34.19	90	10.98	490	24.62

The table (1) shows the frequency and the percent of ICT tools used by the farmer respondents in the two service areas. 93.22% farmers have at least one set of mobile phone. Of the total respondents, 61.46% farmers belong to ICT and 38.54% farmers

to non-ICT service areas. 97% farmers of the ICT service areas hold mobile phone. Television occupies the second position and 60% farmers of ICT and non-ICT service areas have at least one set of television. It is notice that the number of computer and radio using farmers is less than the farmers who watch television and use mobile phone. However, the computer using farmers are less than radio listening farmers. Out of the total farmers, 35.93% farmers have radio sets and they listen to the tool for current information and 24.62% have access to computers to watch video documentary. The researcher got an important message from the survey that more farmers from the ICT service areas use these four ICT tools. This section describes the sources of information from different ICT tools. It analyses access to television, and farmers' favorite television programs with channels. Its different subtitles describe different technologies, access to mobile phone, purpose of using mobile phone, access to radio, radio listener with their station and programs along with weather forecast, crop variety selection.

Different ICT based information services have emerged to all farmers in many ways. The farmers skilled with ICT tools learnt many technologies from those centers practically. Institutional learning and knowledge inherent in them were blended into some resultant technologies that the farmers can use in cultivation. Of them, method of different natural manure was found the most learnt technology.

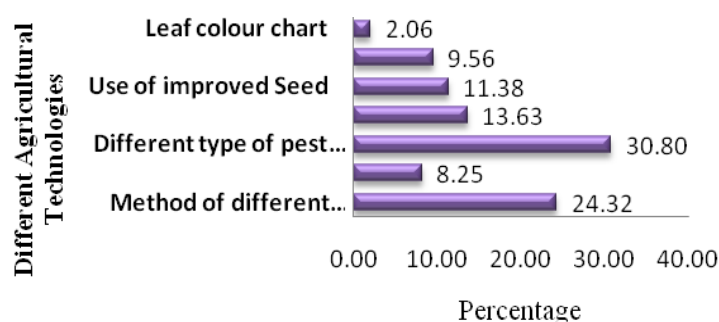


Figure 2. Technologies learnt from ICT based services

The figure 2 shows that method of making different organic fertilizer is the technology (30.8%) that the farmers have learnt from the ICT based service centers. The less-learnt technology 2.06% is using the leaf colour chart (This relates plant leaf colour into plant nutrient status). It is noticed that about 24.32% of the ICT based farmers learnt the different types of pest management like IPM and ICM from ICT based service centers. They have learnt about the uses of agricultural machinery. There are some other technologies that the farmers learnt proportionately such as making improved seed bed 11.38%, managing proper fertilizer 13.63%.

Table 2. Frequency distribution of television programs by service area

Television Program	Service Area					
	ICT		Non-ICT		Total	
	No.	%	No.	%	No.	%
News	870	74.36	580	70.73	1450	72.86
Movies	80	6.84	135	16.46	215	10.80
Agricultural Programs	200	17.09	75	9.15	275	13.82
Others	20	1.71	30	3.66	50	2.52
Total	1170	100.00	820	100.00	1990	100.00

$\chi^2=71.54$, Sig=0.00

Table 2 shows that about 70.73% of non- ICT farmers listen to news whereas 74.36% respondents of the ICT area do the same. Agricultural programs are watched by about 17% ICT farmers and 9.15% non-ICT farmers. It is proved that ICT farmers are more conscious in watching agricultural programs than non-ICT based farmers. Movies are watched by 16.46% non-ICT farmers and 6.84% ICT farmers. Farmers watch TV for other purposes too. Service area also affects watching TV. ICT farmers watch agricultural programs on TV regularly more than those of non-ICT service area.

In the past, radio was the only common source of entertainment for the rural people when TV set was very expensive for them. In the early twentieth century TV occupied its place. However, very recently Band radios with FM, community and Krishi radios have become more popular among the farmer society. Mobile radio is another addition to easy and cheap access to information and entertainment world.

Farmers' radio listening period varies from one service area to another. Farmers of some area listen to radio for longer and some for shorter. Listening time is divided into three periods 1–10-year, 10-20 year and 20-30 year. Here the ICT farmers are regarded as long-time radio listener.

Table 3. Frequency distribution of radio listening by service area

Listening Period	Service Area					
	ICT		Non-ICT		Total	
	No.	%	No.	%	No.	%
01-10 years	273	66.59	137	33.41	410	100
10-20 years	251	89.96	28	10.04	279	100
20-30 years	26	100.00	0	0.00	26	100
Total	550	76.92	165	23.08	715	100

$\chi^2 = 59.21$, Sig. = 0.000

Table 3 shows the relationship between farmers' listening period (radio) and the service area. 36% of the total respondents listen to radios whereas 28% of the ICT based farmers do the same. 66.58% of the ICT and 34% of the non-ICT based farmers listen to radio programs for one to ten years. 38.18% ICT based farmers of the total respondents (listening radio) listen to radio for this period. This is the highest percentage of radio listening farmers. For 10 to 20 years, radio is listened to by 90% of the ICT and 10% of the non-ICT based farmers. This group is the second highest radio listening group of respondents. However, 30 to 40 years of listening radio is done by 5% of only ICT based farmers.

It is also shown in the table that the ICT based farmers are more alert and thus their listening period is longer than any other age group. Here the relationship between farmers' period of listening radio program and the service area is highly significant as Chi-square is 59.21 ($P < 0.05$).

Farmers of two groups listen to different radio at different degrees of times. Bangladesh Betar, FM Radio, Regional Radios and Community Radios are listened to by the farmers for amusement, recreation and agricultural activities. Among these stations, they prefer Bangladesh Betar for the reason that the station is available to them and its frequency is smooth and after all, they are habituated to listening Bangladesh Beter.

ICT centers cater different services to farmers. The centers provide the farmers with many up-to-date services. The services are assessed by the farmers. Some farmers are satisfied with the services but some are not at all. They are up to the satisfaction level as those services have been able to meet the farmers' agricultural problems. In addition, those who are up to the mark of satisfaction with the services think that there is a fault either in their assessment or the centers are weak enough to cater them with their expected services with adequate content, timely flow of information etc.

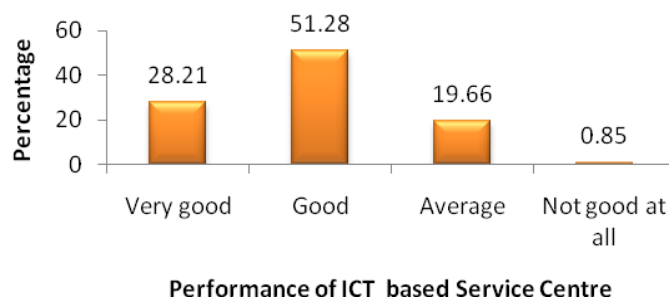


Figure 3. Evaluation of different ICT services

The figure justifies the evaluation of different ICT based services determined by the farmers. About 51% of the respondent farmers within ICT based service area pointed out that these services rendered by the ICT based initiatives are good, 28% expressed

that those services are very good to them and only one percent farmers did not feel good about the services. But the farmers who thought the services are neither good nor bad are made of about 20% of the total respondents. The result is bended forward more than half of the total respondents who think the ICT based services are really good.

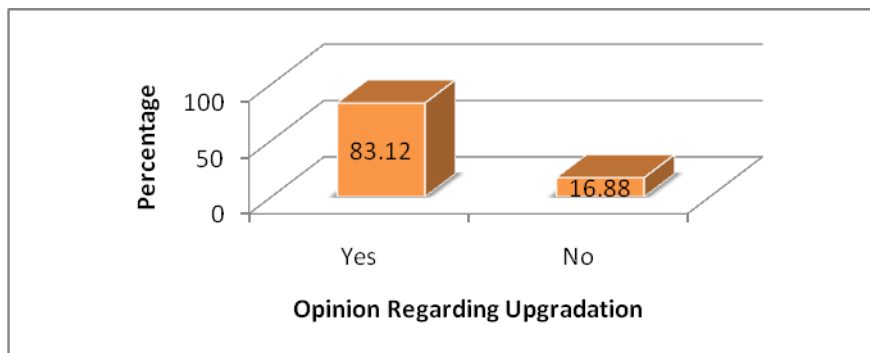


Figure 4. Reasons of upgrading ICT service centers

For the reasons of upgrading ICT service centers shown in the figure 4 above, the respondents conspicuously expressed some opinions. The ICT centers are thought to be upgraded for the ICT tools need to be modern. The slow speed internet and infrastructure development are main barriers behind this reason of up-gradation. About 83.12% of the farmers think that the centers should be upgraded by the authority but about 16.88% of the respondents are not feel interested in upgrading the ICT centers. The result indicates that the real picture of maximum dissatisfaction about the modernization of the ICT based service centers. It means that maximum farmers are in the opinion for up grading the centers.

CONCLUSION

The study investigated the effective uses of ICT tools in agricultural extension delivery services. The survey indicates different uses of ICT tools in different service areas. The results proves that effective extension activities are important to ensure demand driven services. Farmers' positive attitude indicated more utilization of digital tools. The comparative study clarifies that effective use of ICT tools can help farmers get extension services more quickly than the traditional sources. The study results focus on the spread and development of technology supported by ICT tools for solving farming constraints. The experiences of ICT services through establishing ICT based centers show better benefit to the farmers. The appropriate extension policy should be in place to appreciate the strength of ICT. The agriculture ministry needs to equip extension workers with ICT tools to provide services to farmers' doorsteps. Finally, development agencies including research need to develop location

specific farming practices for achieving the sustainable development goals and zero hunger.

REFERENCES

- Birkhaeuser, D., Evenson, R.E. and Feder, G. (1991). The economic impact of agricultural extension: A review. *Economic Development and Cultural Change*, 39: 607-650.
- Cash, D.W. (2001). In order to aid in diffusing useful and practical information: Agricultural extension and boundary organizations. *Science Technology and Human Values*, 26: 431-453.
- Demiryurek, K., Erdem, H., Ceyhan, V., Atasever, S., and Uysal, O. (2008). Agricultural Information Systems and Communication networks: The case of dairy farmers in the Samsun Province of Turkey. *Information Research*, 13(2): 343.
- Ekbia, H.R. and Evans, T.P. (2009). Regimes of information: Land use, management, and policy. *The Information Society*, 25(5): 328-343.
- Galloway, L. and Mochrie, R. (2005). The use of ICT in rural firms: A policy orientated literature review. *The Journal of Policy, Regulation and Strategy for Telecommunications*, 7: 33-46.
- Herselman, M. (2003). ICT in rural areas in South Africa: Various case studies. *In Proceedings of Informing Science + Information Technology Education Joint Conference*. Pp. 945-955.
- Islam, A. and Islam, M. (2008). Community information services in Bangladesh: A case study on community information Centre (Cic). *Library Herald, Journal of The Delhi Library Association*, 46(4): 225-280.
- Mannan, S.M. and Bose, M.L. (1998). Resource sharing and information networking of libraries in Bangladesh: a study on user satisfaction. *Malaysian Journal of Library and Information Science*, 3(2): 67-86.
- Ommani, A.R. and Chizari, M. (2008). Information dissemination system (IDS) based e-learning in agricultural of Iran (perception of Iranian extension agents. *World Academy of Science, Engineering and Technology*, 38: 468-472.
- Opara, UN. (2008). Agricultural information sources used by farmers in Imo State Nigeria. *Information Development*, 24(4): 289-295.
- Rao, N.H. (2007). A framework for implementing information and communication technologies in agricultural development in India. *Technological Forecasting and Social Change*, 74(4): 491-518.
- Taragola, N.M. and Van Lierde, D.F. (2010). Factors affecting the internet behavior of horticultural growers in Flanders, Belgium. *Computers and Electronics in Agriculture*, 70: 369-379.
- Warren, M.F. (2002). Adoption of ICT in agricultural management in the United Kingdom: The inter-rural digital divide. *Agricultural Economics*, 48(1): 1-8.