

Farmers' Use of ICT Based Media in Receiving Agricultural Information: A Farm Level Study

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Abstract

The main purpose of the study was to determine the extent of use of ICT based media by the farmers in receiving agricultural information. Six types of ICT media and facilities were considered for the study. Data were obtained from a random sample of 150 farmers in three selected villages of Mymensingh, Tangail and Sherpur districts during September 2014 to February 2015. A pre-tested interview schedule was used for collection of data. Appropriate scales were developed and used in order to measure the concerned variables. Correlation test was used to ascertain the relationships between the concerned variables. More than one third (37.3 percent) of the farmers were found to use mobile phones for receiving agricultural information, while 21.3 percent used internet facilities provided by Agricultural Information and Communication Centers (AICC), a community based ICT hub established by the Ministry of Agriculture. Only 2 percent farmers were found having use of smart phone. Farmers' characteristics such as education, training received on ICT, knowledge on ICT had a significant positive relationship with the extent of use of ICT based media by the farmers, while age and constraints in using ICT had a negative relationship with their extent of ICT based media use.

Keywords: Farmers' use of ICT, AICC, AIS, cell phone, smart phone

Introduction

Information and Communication Technologies (ICT) has become an integral part of all spheres of life in today's world. ICT is an umbrella term that includes any communication device or application, encompassing cellular phones, computer and network including hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as video conferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, agriculture, healthcare, or libraries. ICTs are now being used in agriculture for receiving various information such as market price of products, various improved technologies, and solution of various problems faces in

agriculture production. ICT tools can be used to find, explore, analyse, exchange and present information responsibly and without discrimination. ICT can be employed to give users quick access to ideas and experiences from a wide range of people, communities and cultures. Globally, the development of ICT has proven its potentials for enhancing development efforts, but also virtually reduced the distance and turned the world into a global village (O'Farrell, 2003). Worldwide, ICTs is playing a vital crosscutting enabler role to address many problems. In countless ways ICTs leveraged as a tool for e-governance. It is necessary for ensuring government accountability, decentralization and providing effective service delivery.

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Additionally, bidirectional information flow between citizens and government can provide the power of consensus building within a society. Mr. Ban Ki Moon, UN Secretary General, stated that: *"...Let us use all our energy and innovation to harness ICT to our work towards the Millennium Development Goals. Let us turn the digital divide into digital opportunity. Let us promote new business models, public policies and technology solutions in the global approach to development. The United Nations family is a willing and able partner in that process."*

While the huge march of the ICT revolution is going ahead in many countries, Bangladesh also puts considerable efforts to be a part of that revolution and improve livelihoods of its citizens by utilizing its potentials. Bangladesh government's official development strategy of Vision 2021 essentially encompasses the goal of 'Digital Bangladesh by 2021' that proposes to mainstream ICTs as a pro-poor tool to eradicate poverty, establish good governance, ensure social equity through education, health care and law enforcement for all, and prepare the people for challenges like climate change. Given that Bangladesh is an agrarian economy with almost 33% of the population still employed in the agriculture sector (BBS, 2013) and that the country has set a course for self-sufficiency in food production in coming years, this sector naturally gets the highest emphasis on the Digital Bangladesh e-services strategy. Some areas of focus are: (i) strengthening the existing information channels and developing new ones to provide farmers with real time information related to integrated crop management, input availability and dosage, irrigation, soil quality, etc. at the community level; (ii) building capacity of farmers and extension workers through

distance learning and by using locally relevant multimedia content; (iii) fostering market access with necessary information and training to promote, support and enhance; (iv) supporting rural farm and non-farm enterprises locally and internationally; (v) mobilizing finance (including in-banking) for rural farmers who are underserved by the commercial banking system and/or the country's microfinance NGOs; and (vi) organizing/uniting farmers nationally to enable exchange of knowledge, information and to ensure their collective voice and participation in policy formulation.

In Bangladesh, approximately 33% of its labour force derives their livelihood from the agricultural sector (BBS, 2013). Today's farmers are not only waiting for three-time food for their families from their hard sweat, but also surplus food production, which can be sold in the market to get sufficient money to fulfil their other daily needs. Also, private sector initiatives like contract farming have commercialized the agricultural sector of Bangladesh. It has also seen many new concepts and theories substituting the traditional methods. ICT is one of them, which enables the dissemination of requisite information at the right time. This revolution in information technology has made access to the information easy and cost-effective (Kashem et al., 2010).

Application of ICT in agriculture of Bangladesh was initiated only in 1979. A major ICT initiative was taken during 1979-1985 to computerize the reconnaissance soil survey information generated through a UNDP/FAO funded project. As follow up on this, several ICT initiatives/programmes were undertaken and the outputs of these were used for agricultural research, development and extension and disaster management. Services are being provided to

the Ministry of Agriculture and other Ministries, various NARS institutes, various extension agencies, universities, international organizations, and GOs and NGOs by catering to their needs (Islam, 2013). At 2003, Support for ICT task force programme was launched by the Ministry of Agriculture (MoA). At the same time, private sector operators have become the main providers of services related to ICTs (mobile phones, computers, and internet). The government also formulates and implements ICT policy for supporting all stakeholders of the sector (Islam, 2013). Current ICT related initiatives are establishing Agriculture Information and Communication Centre (AICC); Fisheries Information and Communication Centre (FIAC); web-based price information dissemination by Department of Agricultural Marketing; web-based Information Repository by Department of Agricultural Extension; web-based soil testing database by Soil Resources Development Institute; Bangladesh Rice Knowledge Bank by BRRI; mobile accessible agriculture helpline run by private mobile operators. The Access to Information (A2i) project supported Union Digital Centres (UDC) in each Union Parishad premise, is also a huge step towards digitization of community services for rural people.

The majority of Bangladeshi and international NGOs working with ICT are now developing community information centres in the country to facilitate information transmittal to the rural people.

Some NGO initiatives, many of which are partner with international organizations, private organizations or local government, include- Gonokendras of BRAC, Pallitathaya Kendra of D-NET, Communication Information Center of Grameen Phone, Agricultural Extension Support Activity Project of Dhaka Ahsania Mission (DAM), RTC of Practical Action, Amader Gram of BEFS, e-Krishok of BIID etc.

It could be easily understood from the above facts and discussions that ICT is going to play a vital role in the agricultural development of Bangladesh. It is also necessary to make a proper understanding of actual field level situation of ICT use as well as pertinent issues like prospects and challenges of using it by farmers in receiving agricultural information. To increase the extent of use of ICT based media in receiving agricultural information, it is necessary to have a clear understanding about present status of use of ICT based media by the farmers and its associated challenges. There is a dearth of research based information in this much needed field.

The present paper focuses on the following specific objectives: (i) determining the nature and extent of use of different ICT based media by the farmers for receiving agricultural information; (ii) describing socio-economic characteristics of the internet and mobile phone user farmers; and (iii) identifying factors affecting effective utilization of ICT based media by the farmers and associated challenges.

Methodology

Study area, population and sample: The study was conducted in three selected upazilas under three districts in greater Mymensingh region. The upazilas were to

be selected on the basis of availability of active AICC (Agricultural Information and Communication Centre) at village level. In consultation with the concerned officers

(Upazila Agriculture Officer and Sub-Assistant Agriculture Officers), Muktagachha Upazila under Mymensingh, Nakla Upazila under Sherpur and Dhanbari Upazila under Tangail district were finally selected.

The population of the study included the farmers of the selected villages who were users of ICTs and members of ICM clubs that were hosting AICCs. Therefore, three ICM clubs (one from each Upazila) were selected for data collection. All members of the concerned ICM club and their neighbouring farmers were the target population of the study. An update list of farmers who were active members of different AICCs in the selected villages of the study area was prepared with the help of the secretaries of the AICCs. As there were 50 members in an AICC, the list of farmers comprised of 150 farmers. At the same time, list of 150 neighbouring farmers were also prepared and these farmers were not among AICC members, but active user of mobile phones and other ICT devices. Therefore, sample size was determined from a list of 300 farmers. Fifty percent farmers from the list were selected as the sample of the study. Therefore, the sample size for data collection stood to 150 farmers.

The Research Instrument: Four methods were used in the process of finalizing data collection instruments. These were face-to-face interview by using personal interview schedule (questionnaire), Focus Group Discussion (FGD), key-informant interview (KII) and consultation with experts. A structured questionnaire (personal interview schedule) was prepared on the basis of information gained from the FGD, KII and consultations. Two FGDs were conducted with two groups of AICC members in Nakla and Muktagachha, while KIIs were conducted with the concerned SAOs and

UAOs. Expert consultations were made with the concerned AIS officers responsible for maintaining AICCs. The questionnaire was prepared in accordance with the objectives of the study. Necessary scales have been developed to determine different variables. The questionnaire was pre-tested with 20 farmers in the study area and necessary modifications were done before its finalization.

Variables of the study: The focus variable of the study was the extent of use of ICT based media by the farmers. This issue was understood by the extent farmers were using ICT based media in receiving farming information. At the same time, nature of use was also identified. For this purpose, six ICT based media and internet facilities were considered. The selected media were: mobile phone (for talking and small messaging), smart phone, internet in AICC facilities, internet in personal computer, internet through private service providers, and free internet facilities from other sources. The ICT based media use score was computed by the unit of 'hours per week'.

Nine socio-economic characteristics of the farmers were selected as the factors for use of ICTs. These were: age, education, farm size, annual family income, training received on ICT, knowledge on ICT, social mobility, extension contact and access to use ICT facilities. Conventional procedures were used to measure these characteristics. A brief understanding of the measurement of the variables could be achieved from Table 3.

Data collection, processing and analysis:

Data were collected by a trained enumerator from the selected farmers. The interviews were conducted with the respondents individually in their respective houses or farms. No serious difficulty was faced by the interviewer during collecting of data.

Data were collected from 1st September 2014 to 28th February, 2015.

At the end of data collection from the respondents, the collected data were coded, compiled, tabulated and analysed. Data were analysed in accordance with objectives of the study. SPSS (Statistical Package for Social Sciences) computer programme was used to perform the data analysis. Various

statistical measures such as range, mean, number, percentage, standard deviations and rank order were used to describe the study focus and selected factors/characteristics of the respondents. In order to find out the relationship between the concerned variables, Pearson's Product Moment Correlation Co-efficient (r) was computed.

Results and Discussion

Status of using ICT based media by the farmers in receiving information:

Farmers' status of using different ICT based media was expressed in terms of nature of ICT based media use by the farmers in the study area.

Six ICT based media and facilities were selected for the study and it was supposed that through the use of these media farmers were able to receive agricultural information. However, only three media were found to be used by the farmers for the farming purposes. The scenario regarding present use of ICT based media by the farmers in receiving agricultural information have been presented in Table 1.

Data presented in Table 1 clearly show that only few farmers in the rural areas use ICT based media to for receiving farm related information. Out of six types of ICT based media, farmers were found using only three media for receiving farm related information.

Use of AICCs: Few farmers were found searching information in AICCs for their farm related issues. However, it was observed that in AICCs farmers looked for a wide ranges of information on different farm aspects. Availability of trained

manpower in AICCs plays a vital role in farmers' interest on the centres. Therefore, it could be concluded that if the AICCs are actively maintained, farmers will have opportunities to get farm related information from different websites.

Use of Cell Phones: It is interesting to note that 34 percent farmers use cell phone in getting marketing related information. However, a considerable number of farmers were found using cell phones in receiving information on cultural practices as well as insect pest management. It was observed that farmers usually contact with key informants like UAOs and SAAOs for their necessary information. Moreover, Veterinary Surgeons (or ULOs) are also regularly contacted by the rural people. On the other hand, no information was received on farmers' contact with UFOs.

Use of Smart Phones: Although smart phones have becoming increasingly popular in rural areas, only few cases were found where farmers used the device for receiving farm related information.

Extent of use of ICT based media and facilities was measured in terms of hours per week. The related data are presented in Table 2.

Table 1 Nature of farmers' use of ICT based media in receiving farming information

ICT based media	Nature of use	Frequency (N=150)	Percent
Agricultural Information and Communication Centre (AICC)	Watching various documentaries on farming	29	19.3
	Insect pest management	25	16.7
	Cultural practices or operations in farming	21	14.0
	Surfing websites for farming related information	19	12.7
	New varieties of crops and technologies	13	8.6
	Fertilizer use and application	13	8.6
	Plant disease management	11	7.3
	Fruit cultivation related practices	9	6.0
	Storage and post-harvest management	9	6.0
	Weather information	2	1.3
Cell Phone (calling and small text messaging)	Marketing information	51	34.0
	Cultural practices or operations	22	14.7
	Insect pest management	19	12.7
	Seed related information	3	2.0
Smart Phone (website browsing)	Cultural operations	7	4.7
	New varieties and technologies	4	2.7

Data presented in the table clearly show that extent of use of ICT by the farmers in receiving farming information is considerably low in the study area. Relatively good proportions (37.3%) of the farmers were found using mobile phone for information. This was mainly due to the fact that mobile phone now-a-days is easily available and its 'user friendly' nature. Many farmers inform that they found it convenient to use mobile phone for getting information from SAAOs, input dealers and UAOs. As the data were collected from AICC members and many of them received training on ICT use, it was not unusual to observe that 21.3% of them were using AICC facilities to get farm related

information. On the other hand, only few farmers were found using smart phones for receiving farming information. However, many of them informed that they use the user friendly device (smart phone) for recreational purposes (seeing movie, drama, song and other videos). No farmers were found using other remaining sources of ICT and it is a testimony that the farmers of Bangladesh still need to take long time to use ICTs for receiving farming related information unless the facilities are provided and challenges are met.

Characteristics of the Farmers: Salient features of the respondent farmers' selected characteristics have been presented in the Table 3.

Table 2 Extent of use of different ICT based media by the farmers in receiving information

Sl. No.	ICT based media	Percentage of farmers using (N = 150)	Mean Use (hours/week)
1	Use of cell phones for calling and small text messaging	37.3	0.16
2	Use of internet in AICC	21.3	2.65
3	Use of internet in smart phones	2.0	0.03
4	Use of internet in private service provider (cyber cafe/ private shops)	0	0
5	Use of internet in friends and family	0	0
6	Use of internet in personal computer (desktop or laptop)	0	0

Table 3 Salient features of the individual characteristics of the respondents

Characteristics	Scoring system	Observed score range (possible range)	Categories of the respondents with score range	Respondents' percentage (N=150)	Mean and standard deviation*
Age	Years	22-65	Young (up to 30)	10	42.12 (9.59)
			Middle aged (31-50)	72	
			Old (above 50)	18	
Education	Years of schooling	0-13	Illiterate (0)	9	6.59 (3.61)
			Primary (1-5)	40	
			Secondary (6-10)	40	
			Above secondary or above (>10)	11	
Farm size	Hectare	0.13-2.89	Marginal (up to 0.2)	8	0.77 (0.64)
			Small (0.21-1.0)	70	
			Medium (1.01-3.0)	22	
Annual family income	'000' Tk.	48.38-403.50	Low (up to 120)	73	98.19 (67.02)
			Medium (121-240)	20	
			High (above 240)	7	
Training received on ICT	Days	0-7	No training (0)	87	0.43 (1.12)
			Low training (1-5)	10	
			Medium training (above 5)	3	
Knowledge on ICT	Scale score	1-16 (0-20)	Low knowledge (up to 6)	82	4.1 (3.34)
			Medium knowledge (7 to 12)	14	
			High knowledge (above 12)	3	
Social mobility	Scale score	7-17 (0-21)	Low mobility (up to 7)	12	13.83 (1.56)
			Medium mobility (8-14)	60	
			High mobility (above 14)	38	
Extension contact	Scale score	9-24 (0-30)	Low contact (up to 10)	36	15.38 (2.05)
			Medium contact (11-20)	48	
			High contact (above 20)	16	
Access to ICT facilities	Scale score	3-10 (0-18)	Low access (up to 6)	88	5.62 (1.74)
			Medium access (7-12)	12	
			High access (above 12)	0	

*Standard deviation in parentheses

Farmers' selected characteristics and their relationship with use of ICT based media:

The relationship between nine selected characteristics of the respondent farmers and their extent of use of ICT based

media in receiving agricultural information was measured by conducting correlation test. The concerned Correlation Coefficients (r) are shown in Table 4.

Table 4 Relationship between the selected characteristics of the farmers and their use of ICT based media in receiving agricultural information

Focus variable	Selected characteristics	Correlation coefficient ("r") with d.f.=148
Use of ICT based media by the farmers	Age	-.360**
	Education	.411**
	Farm size	.199
	Annual family income	.124
	Training received on ICT	.294*
	Knowledge on ICT	.624**
	Social mobility	.157
	Extension contact	.204
	Access to ICT facilities	.386**

** Correlation is significant at 1% level of probability

* Correlation is significant at 5% level of probability

Data presented in Table 4 indicate that farmers' education, training on ICT, knowledge on ICT and access to ICT facilities had significant and positive relationship with their use of ICT in receiving agricultural information. That means, the higher the educational qualification, the more training received on ICT, the higher knowledge of the farmers on ICT and the higher access to ICT facilities, the higher was the use of ICT by the farmers in receiving information. On the other hand, age of the farmers was

negatively correlated with their use of ICT and it implied that relatively younger people are more relevant to ICT related activities in the study area. The other characteristics of the farmers viz. farm size, social mobility, extension contact, and annual income did not show any significant relationship with their use of ICT in receiving agricultural information. Therefore, education, training on ICT, knowledge on ICT and access to ICT facilities are the major positive factors, while age is a negative factor for use of ICT based media for farmers.

Conclusion

The findings of the research revealed that out of six selected ICT-based information media, farmers used only three types of media, namely cell phone, internet through AICC and internet through smart phone. Interesting information is the farmers were not using any other forms of

ICT based services and facilities. It is therefore concluded that appropriate programmes should be undertaken by the appropriate authorities (DAE, DLS, DoF and AIS) to inform farmers about availability of ICT based sources and popularize them. Secondly, it was

revealed that good prospects are available for make the farmers using ICT based media. At the same time, situational and policy factors like the government's Digital Bangladesh Vision 2021, growing infrastructure for internet related services, message credibility, demand driven information, availability of electricity and cost effectiveness should be properly addressed by both the government and mainstream extension agencies of the country. Moreover, more training and awareness building programmes should be undertaken by the extension agencies to make farmers using ICT based media in

receiving information. Availability of ICT facilities is crucial for achieving the purpose. Therefore, more policy support along with infrastructure facilities should be created for promotion of ICTs for the farming communities of the country. The major challenges of using ICT based media were willingness to pay for use ICTs, technical know-how of the farmers, bandwidth speed, uninterrupted supply of electricity, and farmers awareness on availability of services. Appropriate steps should be taken to meet these challenges widening the scope of use of ICTs by the farmers of the country.

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