

## Use of ICT as Management Tool for Agricultural Extension Services

K S Rahman<sup>1</sup>, S Nasrin<sup>2</sup> and S. Kundu<sup>3</sup>

### Abstract

Bangladeshi farmers have traditional agricultural knowledge and skills from generations. Such experience and historic knowledge are now inadequate to meet the challenges in agriculture compared to the rapid population growth and recent food crisis. Agriculture today must meet the demands of modernization. This article focuses on the innovations and developments in ICT sector in agriculture. Various web based programmers, websites and links and their provided services have been discussed in the paper. The challenges and measures have also been discussed.

**Key words:** *ICT, agriculture, innovations*

### Introduction

Bangladesh is a developing country. Agriculture, being one of the major driving forces is contributing great to the GDP and the growing economy. Almost 80% of the total workforce directly connected to agriculture (Kashem *et al.*, 2010)). For the rapid growth of population the demand of food has increased. Thus the conventional method of cultivation is to be changed. Though the agricultural sector is also developing but in the most part it's not up to the mark due to lack of up to date knowledge. Usually the farmers counter difficulties in obtaining the proper information as they collect information from conventional & traditional sources like extension fellow farmers. From season to season there is high demand of up to date information for new cultivation processing techniques, pest and diseases control, marketing and consumer demand, crops transport etc.

Timely and accurate information can assist farmers to protect from potential seasonal losses. Up to date knowledge helps them to make optimum use of limited resources.

Bangladesh has stepped into new era of digital world with a spectacular vision for making Digital Bangladesh. This vision would be saddled by e-agriculture involving multi disciplinary initiatives of agricultural information, agricultural development and entre premiership towards building a hunger free, efficient and resourceful Bangladesh. The history of ICT use in Bangladesh Agriculture is not so rich. ICT taskforce program launched in 2003 by the ministry of Agriculture perhaps would be the first initiative to set up on Agricultural Information system. Recently a dedicated division (ASICT) has been established in BARI for providing the agricultural Information services digitally.

### Methodology

To harness ICT in agriculture and rural livelihood a conceptual model of e-agriculture has been formulated. e-

agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information

---

<sup>1</sup>Scientific Officer, ASICT Division, BARI, Joydebpur, Gazipur-1701, <sup>2</sup>Ex M.Sc. Student, Rajshahi University, Rajshahi and <sup>3</sup>Scientific Officer, Planning and Evaluation Division, BARI, Joydebpur, Gazipur-1701

and communication processes. It involves the conceptualization, design, development, evaluation and application of innovative ways to use the rural domain, with a primary focus on agriculture.

The information disseminated by e-agriculture can be divided into several major areas, which is called as services of e-agriculture (Dash and Kumar, 2006). These are-

1. Weather information
2. Price information
3. Production and cultivation techniques
4. Plant Nutrients and water usage
5. Education and health information
6. Govt. & Non govt. facilities
7. Demand and current stock information
8. Diseases and Insect information

For the above services there are at least three criteria which to be meet

- a) **Cost effectiveness:** The goal will be to increase in the access to the greatest amount of information at the least possible cost.
- b) **User Friendliness:** The farmers who will be the principal users of these technologies are not to be specialists in ICTs, but rather functional users of these technologies. The use of the Bangla language and high levels of illiteracy are to be considered as well.
- c) **Adaptation to local conditions:** Availability of electricity, the danger of power surges, and the need of phone, computer, modem and internet connectivity should be considered.

#### **Assess to Agricultural Information & Service delivery**

##### **a) Broadcasting System**

Along with the print media, radio and TV have the most significant role in delivering agricultural information.

Radio & TV are mass communication tools those are being used all over the country. BTV provides agricultural information throughout many agricultural programs & news. Other private channels have their individual programs regarding this aspect. Channel I (a private TV channel) is the pioneer with prominent, regular agricultural programs like Ridoye mati o manush & Agricultural news ([www.channel-i-tv.com](http://www.channel-i-tv.com)). The popularity of urban, private FM radio stations, is on rise, especially among the youth but all the radio channels are not accessible all over the country. The good news is that almost all the channels broadcast agricultural programs and news.

##### **b) Mobile Phones**

Almost 98% of the population uses mobile phone now a days ([www.btrc.gov.bd](http://www.btrc.gov.bd)). Mobile phones are acting as an important tool for farmers. It can play significant role in linking farmers and service providers and key stages of the agricultural value chains. Among all the features voice call & SMS are mostly & widely used by the farmers. The mobile phone operator has brought a numerous programs & features for farmers. Like Jigyasha 7676 helpline by Banglalink. Similar features are also available in other operators like Grameen phone, Rabi, Citycell etc. These Programs have added a new dimension in access to information in Agricultural sector. Besides Mobile banking, b-kash, Mobi-cash, e-ticketing by mobile etc. have made the financial and marketing jobs easy for the formers.

Moreover mobile phones now a days have radio features. This combination of mobile phone and radio has become an important tool in information exchange and communication exchange. Combination of TV & mobile along with internet facility

(3G & 4G) has become the optimistic opportunity for the users to access in formations; though these combined & aneroid phones are rarely used by the farmers for their high price.

**c) Internet Infrastructures and Access:**

Internet usage in Bangladesh is on rise. According to the Bangladesh telecommunication regulatory commission (BTRC) total internet usage of 2013 reached 33.3 million and this done mainly through mobile based internet access. Though broadband connections are still rare outside of major urban areas but the mobile operators provide high speed internet packages now a days like 3G. In rural areas

there are some physical information centers which can provide internet services to the farmers. These are like UISC, AICC, Private sector initiatives operated either by NGOs or entrepreneurs.

The recent revolution in the ICT industry, due to massive penetration of mobile phone and digital Bangladesh initiatives contributed significantly to trigger the changes in extension service. Telecom operators contributed in taking the connectivity issue forward. NGOs also play an important role to explore innovative ideas to introduce ICT enabled services. The Bangla typing software which has been recently introduced, in mobile, created a big way in texting & SMS communications.

Table 1 Key players for ICT in Bangladesh in the agriculture sector

Name and contact information	Brief Description
Ministry of Agriculture (MoA) Minister Phone: 880-2-7169277 Email: <a href="mailto:minister@moa.gov.bd">minister@moa.gov.bd</a> <a href="http://www.moa.gov.bd">www.moa.gov.bd</a>	Within the MoA, extension related work is carried out by the Department of Agricultural Extension (DAE), Agricultural Information Service (AIS), and Department of Agricultural Marketing (DAM).
Department of Agricultural Extension (DAE) Director General Phone: 880-2-9140857 Email: <a href="mailto:dgdae@dae.gov.bd">dgdae@dae.gov.bd</a> <a href="http://www.dae.gov.bd">www.dae.gov.bd</a>	The DAE staff should be able to use facilities at the Farmers Information and Advisory Centres (FIAC) being established in each Union Parishad. So far, staff link with farmers through many different initiatives, but do not tend to use ICTs in their work. A challenge is that of linking with rural women involved in agriculture as only 7% of the extension staff is female.

Name and contact information	Brief Description
<p>Agricultural Information Service (AIS)  Phone: 880-2-9112260  Email: dirais@dekko.net.bd  www.ais.gov.bd</p>	<p>The website has a large number of resources of use to farmers and extension workers, and all is published in the Bangla language.</p> <p>AIS provides material for the agricultural programs on state TV and radio at the national and regional basis. AIS is also responsible for providing agricultural content for the new community radio stations. Production of local programming in regional dialects is now being encouraged.</p> <p>Agricultural radio programs have been produced since 1939. In radio they now have a total of 12 hours per day. The most popular is the daily “<i>Desh Amar Mati Amar</i>”. AIS produces a 30-minute program for national TV that is broadcast 6 days per week. AIS has also worked on a number of short multi-media products, a total of now 150 clips. Every three months AIS has a meeting to decide on subjects to be covered in future programs.</p>
<p>Department of Agricultural Marketing (DAM)  Chief (Research &amp; Devt)  Phone: 02-9114093  Email: chief@dam.gov.bd  www.dam.gov.bd</p>	<p>DAM, which is part of the MoA, has undertaken an e-government initiative to utilize the power of ICT to develop and disseminate critical agricultural market information to farmers, traders, government, policy makers, development agencies and other stakeholders. The daily price information is available for use in many ways including from the DAM website.</p>
<p>Bangladesh Agricultural Research Council (BARC)  Executive Chairman  Phone: 9135587, 9014975  Email: ec-barc@barc.gov.bd  www.barc.gov.bd</p>	<p>BARC is the official National Agricultural Research centre for Bangladesh with an emphasis on research for improving agriculture. BARC maintains large databases of both spatial and non-spatial information.</p> <p>Goals of the organization are to generate client-oriented or demand-driven appropriate technology, document and disseminate research outputs to stakeholders.</p>
<p>Bangladesh Agricultural Research Institute (BARI)  Director General  Phone: 88-02-9261415  Email: dg.bari@bari.gov.bd  www.bari.gov.bd</p>	<p>BARI (Bangladesh Agricultural Research Institute) is the largest multi-crop research institute conducting research on a wide variety of crops, such as cereals, tubers, pulses, oilseeds, vegetables, fruits, spices, flowers, etc. Besides variety development, this institute carries out research on such areas as soil and crop management, disease and insect management, water management and irrigation, development of farm machinery, improvement of cropping and farming system management, post-harvest handling and processing, and socio-economic studies related to production, processing, marketing and consumption.</p>

Name and contact information	Brief Description
Bangladesh Rice Research Institute (BRRI) Director General: Phone: 880-2-9252736 Email: dg@brrri.gov.bd www.brrri.gov.bd	In terms of digital platforms, BRRI is responsible for the Bangladesh Rice Knowledge Bank. Farmer feed-back is actively solicited to further improve the BRRI produced materials.
Soil Resources Development Institute (SRDI) www.srdi.gov.bd Phone: 880-2-9113363 Email: director@srdi.gov.bd	SRDI developed the Fertilizer Recommendation Software in partnership with Katalyst and IFDC to assist farmers with the accurate information for different crops based on location and soil type. This links very quickly to a soil and land use database to give the correct information to the farmer. Most of the time farmers use either the Grameenphone Community Information Centres or the Banglalink short code 7676 to reach the service. Farmers can get the information they require within three minutes. It is a potentially very valuable service which is underused at present and would probably benefit from more intensive publicity and marketing efforts.
Department of Livestock Services (DLS) Director General Phone: 88-02-8112983 Email: ashrafdls@yahoo.com www.dls.gov.bd	DLS employs around 2,400 extension staff throughout the country. They are responsible for disease surveillance and advice on animal husbandry.
Department of Fisheries (DOF) www.fisheries.gov.bd	The DOF promoting ICT enabled services as a part of the ongoing Digital Bangladesh initiative of the government. It is making strides to link with Digital Bangladesh and e-Extension systems.
National Agricultural Technology Project (NATP) www.worldbank.org.bd	Since 2008 the MoA has been implementing the World Bank funded NATP. NATP will be contribute to the national objective of increasing income and reducing extreme poverty and hunger by improving agricultural productivity and performance of the national agricultural technology system.
Access to Information (a2i), UNDP www.a2i.pmo.gov.bd	A2i is the flagship initiative of the United Nations Development Program in Bangladesh. Under this project, the UNDP is facilitating the implementation of the Digital Bangladesh vision of the government. A2i is hosted by the Prime Minister's Office. Its mandate is to make policy interventions and initiate e-governance related activities at different level of the government. A2i is supporting the establishment of shared access point setup under public-private partnerships, namely the Union Digital Centre (UDC).

Name and contact information	Brief Description
Rural Development Academy (RDA), Bogra Phone: 880-51-51001 Email: dgrda.bogra@yahoo.com www.rda.gov.bd	RDA has produced practical training videos on rice seed sorting and storage. Women to women extension. Worked with women's NGO – TMSS
Bangladesh Institute of ICT in Development (BIID) Phone: +8801819243935 Email: shahid.akbar@biid.org.bd www.biid.org.bd	BIID is a distinct inclusive business initiative to support development and promotion of ICT based services. The inclusive approach ensures serving the poor in a sustainable way through market led approach. The distinction of BIID lies in clear identification of ICT as a cross cutting development tools and create opportunities through continuous knowledge management, innovation and development.
BIID e-Krishok www.ekrishok.com	BIID's agricultural service is branded as e-Krishok, an initiative which is aimed at farmers with the desired goal of providing services from which farmers will benefit both in terms of their farming activities and opening up opportunities in new avenues which will ultimately translate into increased income for farmers. Farmers with any problem or query or issue which is related to agriculture can go to nearby ICT enabled Information Centre /Telecentres and receive the information that they are seeking. The information usually provided to them in a timely and quick manner, so that the farmers can get on with their activities. With such timely and appropriate information, farmers will be able to maximize their economic gain; enabling them to achieve income growth through agricultural activities. e-Krishok is now in a process of transforming into a transactional service through introducing short code 16250. Under this short code, SMS and voice based information and advisory services will be offered.
Katalyst	Katalyst supported a no. of private sector led ICT based initiatives in Bangladesh, partners include major telecom operators (GP, Banglalink for call centre), BIID for e-Krishok, Win Incorporate for 7676 and government institutes like AIS, SRDI (For Fertilizer Recommendation Software), etc.
Win Incorporate CEO www.ruralinfobd.com	Win Incorporate is a private company with focus on agriculture related projects. Win Incorporate offers ICT enabled (web and mobile) based content services to Grameen Phone and Banglalink. Initially, Katalyst supported the launching of these services.

Name and contact information	Brief Description
<p>Grameen Phone (GP) and Community Information Centers (CIC) <a href="http://www.gpcic.org">www.gpcic.org</a> Phone: 01711505613 Email: <a href="mailto:reaz@grameenphone.com">reaz@grameenphone.com</a></p>	<p>GP is a private, leading mobile service provider with 40.02 million (Source: <a href="http://www.btrc.gov.bd">www.btrc.gov.bd</a>) customer base covering 41% of market share.</p> <p>The pilot project started with 16 Community Information Centres (CICs) in February 2006, and has by now become a massive operation with over 500 CICs running in around 450 upazilas. The immediate term plan of this initiative is to establish CICs in all the 462 upazilas. In the long run GP plans to increase the number of CICs substantially so that every CIC can support the information needs of four adjacent villages. GP's CICs are designed to be run independently as small businesses by local entrepreneurs. The entrepreneurs are trained and are provided with continuous support by GP. To help the entrepreneurs earn more, CIC also provide local people with other GP services, such as payphones (again using GP's mobile network) and electronic recharges (Flexi load) for pre-paid and post-paid mobile accounts.</p> <p>This initiative by GP is part of its long term commitment to the community including: Bridging the digital divide by providing information access to rural people, alleviating poverty, educating the underserved and underprivileged on information-based services, create employment for unemployed youth.</p> <p>BIID offers its e-Krishok services to farmers through 350 of the GP CICs.</p>
<p>Banglalink 7676 <a href="http://www.banglalinkgsm.com">www.banglalinkgsm.com</a></p>	<p>Banglalink is the 2nd largest mobile service provider with 25.83 million (Source: <a href="http://www.btrc.gov.bd">www.btrc.gov.bd</a>) customer base covering 27% of market share.</p> <p>In 2008 Banglalink introduced a service called "<i>krishijigyasha 7676</i>". By dialing the short code 7676, a Banglalink customer reaches a call centre, where staff provide answers and suggestions to queries related to agriculture, vegetable and fruit farming, poultry, livestock, fisheries, etc. To use this service a just needs to dial 7676, talk and get expert's advice on the problem. Banglalink was the pioneer in launching such a service in Bangladesh.</p>
<p>Channel-I, Private TV Channel Chairperson <a href="http://www.channel-i-tv.com">www.channel-i-tv.com</a> Phone: +88-02-8891160-65</p>	<p>Channel I's agricultural program is called "<i>Ridoye Mati O Manush</i>" and has been broadcast weekly program every Sunday since 2003. The channels also provides a daily agricultural news bulletin at 5 pm each day.</p>
<p>Cell Bazaar <a href="http://www.cellbazaar.com">www.cellbazaar.com</a></p>	<p>An online platform to facilitate buy and sale of wide range of products of the GP subscribers only. The service is also available in mobile phone. Agriculture produces are also available in this platform.</p>

## Discussion

The challenges can be categorized in roughly three categories: technology, human capacity, and content.

- a) **Technology:** Technology is not an actual challenges but the tool that involves may be considered in some perspective. It may create some difficulties when our demands exceed its ability to deliver services. Internet and/cellular coverage is not up to expected level in many rural areas. Moreover where there is coverage, the cost these services remains a barrier regardless of the innovations available. Despite the widely reported rapid growth of mobile network coverage the cost of a handy & well featured handset and its utility is a thing of great concern.

- b) **Human Capacity:** Illiteracy is a great problem among the rural peoples. ICT may make tools and information available but farmers must know that they exist and be capable to use them. Due to the illiteracy success of ICT innovation is greatly hampered.
- c) **Content:** If ICT are to provide real decision tools it is necessary for an “ecosystem” of relevant information and data to exist. This short of information is under development in most of the cases. Information should be made and developed according to the need of end users (farmers) and provided in native language (Bangla), in simple interactive form. It must be up to date, relevant and supplied in a timely manner.

## Conclusion

ICT is a tool for information generation and dissemination. ICT projects provide linkages enhance market access, develop business process and product diversity for the farmers. To monitor the impact of this tool we need to look into the most effective and successful ways to reach the farmers with timely and related information. more over there should be a better co-ordination among ASICT. BARI, MOA and other national bodies related to agriculture. There must be multi focused approach by initiatives & innovations to meet the existing

challenges and to cover up the needs of the end users (farmers). A comprehensive model is needed to address the limitations of existing methods and the feedback (from farmers) system to be developed to analysis the overall process.

ICT infrastructure thus can play the key role for the sustainable economic growth and can bring betterment to the agriculture & the rural life as well.

## Reference

Dash, P. and C. Kumar. 2006. Prospects of e-agriculture in Bangladesh, e-Gov Asia, 2006.