

ADVISORY SERVICES ON ORGANIC FARMING USING ICT'S IN BANGLADESH

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Introduction

Bangladesh is one of the most densely populated countries in the world with more than 160 million people with a very small territory of 147,570 square kilometers (BBS, 2011). To ensure food production for the huge population, the term 'green revolution' was appeared in 1960s with the concept of 'grow more food'. For this, introduction of High Yielding Varieties (HYV), as well as chemical fertilizers, pesticides and ground water extraction were undertaken. As a result, food self sufficiency have achieved within a very short time. At the same time, soil fertility as well as soil health maintenance totally been ignored. The use of chemical fertilizers and pesticides is increasing over the years in Bangladesh (Table 1). BARC (2001) showed that soil organic matter is decreasing in some agro-ecological zones of Bangladesh (Fig.1). Subsequently, the average organic matter content of top soils have gone down, from about 2% to 1% over the last 40 years (BARC, 2001). In these aspects, the term Information and Communication Technology (ICT) has come in the sight to the advisory services of farmers safeguarding the environment in a cost effective way. ICT means information and communication technology which is an umbrella that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on. Over the past few years, there has been a remarkable progress in the use of ICT's in Bangladesh agriculture, especially in the area of farmers' access to agro-services delivery. Various projects have been developed that integrate ICTs into the dissemination of agricultural information to farmers.

This paper discusses few innovative technologies using ICTs to deliver information to farmers, focusing its analysis largely on mobile telephony, which has become more widespread recently as a means of disseminating agricultural information to farmers and offers various means of providing agricultural entrepreneurships.

Advancement of ICT's in Farmers Advisory Services

In the recent times, there are many ICT technologies are operating worldwide including Bangladesh. The technologies were agro-meteorology for managing climate risk in Mali, appsforfarming (Mobile Apps for farming) in Netherlands, Banglalink Krishi Jigyasha (Agricultural questions and queries) 7676 in Bangladesh, *Mrittika* (Soil)- a soil nutrient analysis and recommendation tool in Bangladesh, Collecting and Exchange Local Agriculture Content (CELAC) in Uganda, Digital Green in India, Extension Initiative in US, ECAMIC project in Ghana, Fertilizer Recommendation Solution (FRS) in Bangladesh, FruTIC in Argentina, Green Seeker in US, IFFCO Kisan Sanchar (IKSL) in India. Kenyan Agriculture Commodity Exchange (KACE) in Kenya, One farm in India, Progis in Germany, Nano Ganesh in India, Kilimo Salama

(Safe Agriculture) in Kenya, Database for soil carbon sequestration developed by the World Bank, Solar phone charger in Ghana, Nutrient Manager for Rice Mobile (NMRICE Mobile) in Philippines, OPPAZ organic certification using Smartphone's in Zambia (The World Bank, 2012). Among them, *Mrittika*-soil test based fertilizer recommendation tools, Banglalink Krishi Jigyasha, Fertilizer Recommendation Solution (FRS), Nutrient Manager for Rice Mobile –a rice based tools developed by International Rice Research Institute (IRRI), Organic Producers and Processors Association of Zambia (OPPAZ) organic certification using Smartphone's are discussing here briefly.

Mrittikka is a joint venture between Grameen Intel Social Business Ltd. And eKutir Social Business, a social enterprise based on Orissa, India. It is a soil nutrient analysis and recommendation tool that enables farmers to receive tailored input requirements for their yields. Based on the type of crop, soils, land condition, cropping season, *Mrittikka* recommends specific fertilizers and its application amounts. *Mrittikka* also tells farmers where they can purchase the required fertilizers, the cost per kilo, and the total cost for the amount of fertilizer recommended. Soil analysis report includes information on the soil pH, organic carbon, and other key chemical levels, as well as the fertilizer requirements for their plot split out by fertilizer type and quantity. FRS *e-Krishok* was developed in Bangladesh by Soil Resource Development Institute (SRDI), with support from Katalyst (Market development project) and promoted by Bangladesh Institute of ICT in Development (BIID) as a service of the *e-Krishok* program (New Agriculturist, 2012). The FRS system is a web based solution to guide the farmers on correct doses and types of fertilizer for the specific location and crop. *Banglalink Krishi Jigyasha 7676* was launched by *Katalyst* and *Banglalink*, the second largest mobile phone operator in Bangladesh. The service is a SME helpline that provides information and advisory services across 67 sub-topics to farmers. The fertilizer market team under the Industry and Rural Sector Group (IRSG) of *Katalyst*, in partnership with SRDI, developed a software that can be used to provide fertilizer recommendation for specific soil types. This software was developed based on a manual called 'upazilla shaar niedeshika' (Upazila Fertilizer Manual) developed by SRDI (Katalyst, 2012).

Table 1. Trends of Fertilizers and Pesticide Consumptions in Bangladesh

Year	Chemical Fertilizer Consumptions	Pesticides Consumptions
	Metric tons	
1978-79	-	3336.00
1984-85	1260221	-
1988-89	-	5050.76
1989-90	2043176	-
1992-93	2316184	7441.57
1994-95	2640620	7858.72
1995-96	3022690	11224.89
1996-97	3036563	11367.20
2000-01	3046590	15632.24
2006-07	-	31522.00
2007-08	3064263	48690.19
2010-11	3645600	44423.43

(Source: BBS, 1978-2011)

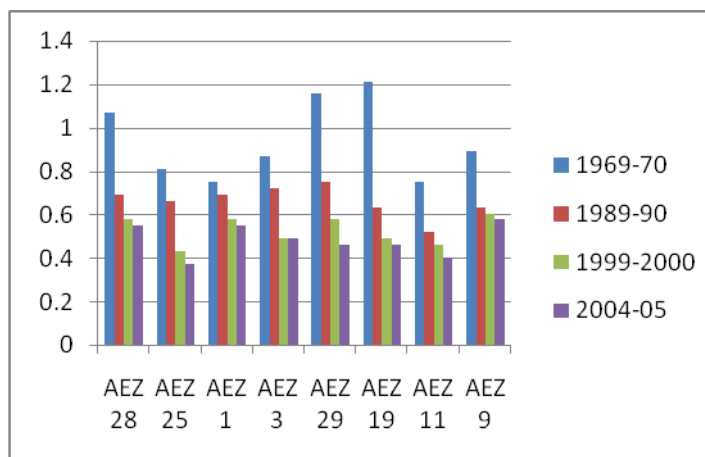


Fig 1. Trends of Evolution of Soil Organic Matter in Some AEZs of Bangladesh (Source: BARC, 2001)

A model of fertilizer recommendation processes by *Mrittika* were shown below (Fig. 2) where rural entrepreneurs offer soil testing services to the farmers and use *Mrittika* to analyze the results to recommend fertilizer to the farmers for achieving cost effective and optimum productivity.

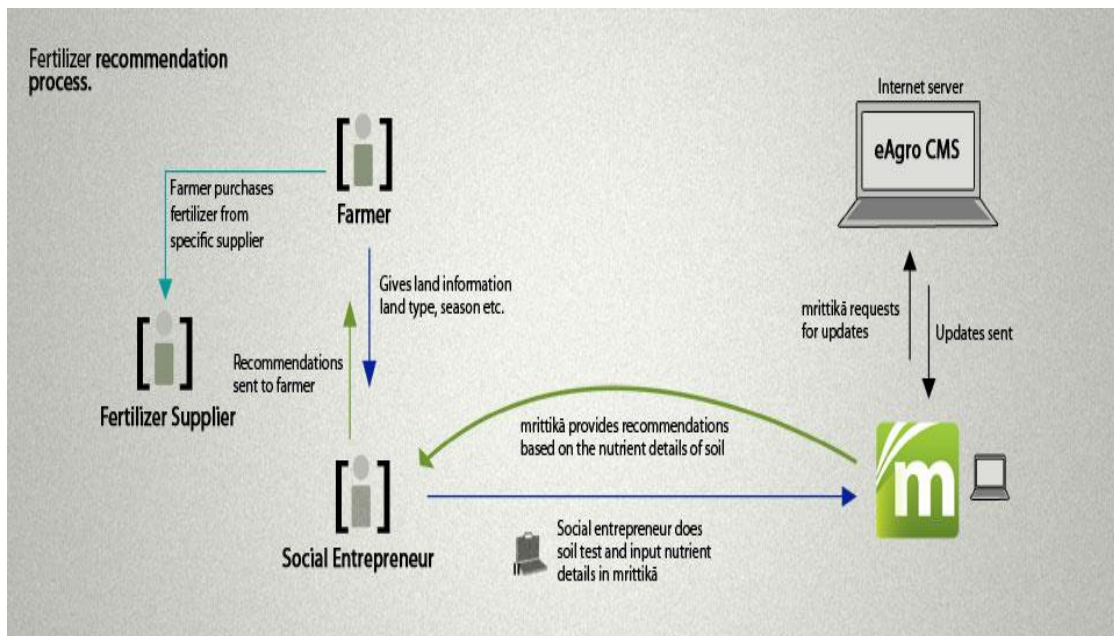


Fig.2. Fertilizer recommendation processes by *Mrittika*.

Nutrient Manager for Rice (NMR) developed by IRRI is a set of country specific internet and mobile phone applications for extension workers, crop advisors, and rice farmers in Asia and Africa. It is known as site specific nutrient management. It enables small scale rice farmers to increase their income through the use of 'precision farming' practices adapted to their rice field. Nutrient manager for Rice uses the internet or mobile phones to collect information from a rice farmer, which is then used to calculate a customized fertilizer and crop management guidelines for the farmers. This guideline is transmitted to the farmer via mobile phone and internet. Nutrient manager for Rice tutorial provides an introduction to the suite of Nutrient Manager for Rice Decision Support Tools. It enables a users to receive fertilizer guidelines for the specific conditions of his/her field. The tools ask questions that can be answered quickly and easily by extension workers, crop advisors, and farmers. After the questions are answered, a location specific fertilizer guideline is provided.

A salient example of ICT based organic farming may be referenced here. Organic Producers and Processors Association of Zambia (OPPAZ) is a national organic movement operating in Zambia in the Southern African Region. OPPAZ was established in 1999 by a group of farmers keen to promote and expand the ideas and opportunities of organic agriculture (Green Africa Directory, 2011). Its aim is to provide technical and specialist services so that accessible local and export routes are established to create an opportunity for income generating for the Zambian farmer through organic and fair trade agricultural production and processing. In the recent time, they have successfully introduced ICT's to increase efficiency of organic certification processes using smart phones. Thus the introduction of ICT has resulted in 30% decrease in costs and time of

national and international certification for participating producers. It has also resulted a 20% increase in membership of new producers, now able to finance the certification processes and gained access to premium prices in the market for organic products.

In Bangladesh, the above ICT based organic farming possible to replicate by establishing farmers association or organization at grass root level. This can extended by organizing an organic day/ fair. The following points are sorted out primarily from the on-going ICTs regarding farmer's advisory services in Bangladesh:

- i) Service delivery processes of different ICT channels are very smooth. They can provide advisory services to the farmers at quickest time.
- ii) Service delivery channels are versatile from where people get different types of contemporary services. Fertilizer recommendation services could be extended with a vision to help the rural farmers, entrepreneurs and general people to access relevant and required information.
- iii) Service delivery channels and their effectiveness are outstanding.

Conclusion

ICT based advisory services for farmers are becoming popularity worldwide including Bangladesh. As organic sector and movement is very much preliminary stages in Bangladesh which requires a comprehensive approach to motivate and make awareness to the all stakeholders such as policy-makers, consumers, and growers. So, it is expecting that the ICT based approach can boost up and enhance particularly the organic growers for its sustainability and long term benefits.

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