New ICT in Agriculture: Opportunities and Challenges

R.S.Parmar[1], D.R.Kathiriya[2] and G.J.Kamani[3]

1 Associate Professor (Computer Science), College of AIT, AAU, Anand - 388110
2 Professor (Computer Science), College of AIT, AAU, Anand - 388110
3 Assistant Professor (Computer Science), College of AIT, AAU, Anand - 388110
Email : rsparmar@aau.in

ABSTRACT

New ICT have had an enormous impact on society. The role of Information and Communication Technology to develop agriculture and quality of life in rural area is well established. New ICT can help a farmer to get relevant information regarding agro-inputs, crop production technologies, agro processing, market support, agro-finance and management of farm Agri-business. Agriculture sector faces major challenges of enhancing production in a situation of falling natural resources necessary for production. The growing demand for agriculture products, however, also offers opportunities for farmers to sustain and improve their livelihood. New ICTs have a major role in addressing these challenges and uplifting the livelihood of the farming community. This paper attempts to review the significance of New ICT in agriculture, discuss their opportunities in agriculture and examine their challenges as well.

Keywords: *New ICT*

INTRODUCTION

The Information and Communication Technology (ICT) in this era of globalization has accentuated new modes of knowledge transformation and communication patterns. ICT has opened up uncommon opportunities for developing countries in terms of providing low cost access to information. This is the fastest growing tool of communication ever with the number of users growing from 150 million in 1998 to more than 700 million in 2001 (Brown, 2002). India has 70% of its population, which is dependent on Agriculture for its livelihood. Considering this, use of ICT in Agriculture is of strategic importance in a country like India. ICT have tremendous potential in timely collection of data and distributing it to the potential users even in developing countries, thus, providing low cost access to information.

While the term 'ICT' comprises many technologies for capturing, interpreting, storing and transmitting information (Jonathan, 2010), 'New ICT' is used to denote "the use of computers and the communication systems between computers (Anon, 1999). New ICT, however have the potential of getting vast amount of information for rural populations in a more timely, comprehensive and cost effective manner. The new ICT are becoming more accessible and users can obtain information from various sources, one computer could meet the needs of a large community. These modern technologies offer new and multiple perspectives, such as faster and better-focused access to information. Email is the most commonly used new ICT that has brought a cultural revolution in the way individuals and organizations interact, in terms of time, cost and distance. Another most significant use of ICT is the computer networks, the World Wide Web, email and search engines, which enable us to receive information and communicate or exchange information with millions of computers (Jonathan, 2010).

METHODOLOGY

New ICT has been implemented as a layered structure having three layers viz., User Interface layer (UIL), Application layer (APL) and Database layer (DBL). Each layer has its own specific functions. Applications are usually broken into logical chunks called "tiers", where every tier is assigned a role. Traditional applications consist only of 1 tier, which resides on the client machine, but web applications lend themselves to an n-tiered approach by nature. Though many variations are possible, the most common structure is the three-tiered application. In its most common form, the three tiers are called presentation, application and storage, in this order. A web browser is the first tier (presentation), an engine using some dynamic Web content technology (such as ASP, ASP.NET, CGI, ColdFusion, JSP/Java, PHP, Perl, Python, Ruby on Rails or Struts2) is the middle tier

(application logic), and a database is the third tier (storage). The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface. The basic structure of a 3-tier web-based application is presented in Fig. 1.
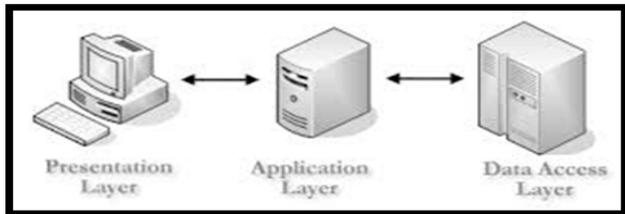

Fig. 1 : Basic structure of 3-tier Architecture
(http://www.engr.uconn.edu)

Application of New ICT'S in Agriculture

New Information and Communication Technologies are indispensable catalysts of agricultural development. It helps scientists to provide quick solutions to farmers, agriculture extension department to disseminate various information to farmers and government to create awareness amongst farmers. Some ICT enabled projects for rural areas are as follows:

DVAR (Direct Video Assisted Redressal) Project

DVAR is designed to be used by farmers who does not know computers, Internet, e-mail, chat and does not possess reading/writing skills. It is also designed to be a bandwidth aware, so it can be used on very low bandwidth connection without sacrificing the audio/video quality. The only different between low bandwidth and high bandwidth setup is response time between farmer and scientists. Lower bandwidth DVAR setup will have longer response time compare to high bandwidth setup. DVAR technology is comprises of various technologies like:

✓ VOD Video on Demand

✓ OLVM Off line video messaging

✓ CMS Content Management System

✓ VC Video conferencing

✓ RDBMS Relational Database Management System

It is an integration of all above technologies in a way that, farmer or scientist does not need to learn computer in order to communicate in an efficient and timely manner.

Farmer will interact with push of a button and scientist will interact with click of a mouse (Parmar *et al*., 2012). Both will interact with each other without the time bound so farmer can concentrate on how to get most out of his farm and scientist can concentrate on his research. DVAR technology is not about only being a farmer to scientist interaction medium; it can be effectively used by government, agriculture extension to create awareness amongst rural population.

✓ It can help farmers to solve their day to day problems with push of a button

✓ It can also help various government departments to interact with farmers, through awareness videos or one-on-one off-line messaging

✓ It can particularly help agriculture extension department to disseminate agriculture related awareness information to farmers without spending much budget on travelling

✓ It can further help government to create awareness amongst farmers to make them active participant in development process resulting effective nation building exercise

✓ It can be used by private companies to reach specific audience for targeted marketing

Gyandoot Project

Gyandoot is an ICT based Government to Citizen Service delivery portal commissioned in Dhar district of Madhya Pradesh in January 2000. The Dhar district in central India has a population of 1.7 million; 60 percent live below the poverty line. The goal of the Gyandoot project has been establish community-owned, technologically innovative and sustainable information kiosks in a poverty-stricken, tribal dominated rural area of Madhya Pradesh (Mansuri, 2009). It is a low cost user-charge-based-service and the expense of running it is being borne by panchayats and the communities. Gyandoot creates a cost-effective, replicable, economically self reliant and financially viable model for taking the benefits of Information and Communication Technology (ICT) to the rural masses. Gyandoot is managed by a society called 'Gyandoot Samiti' registered under Madhya Pradesh Societies Registration Act with District Collector as the President of the Samiti. The services offered by Gyandoot encompass a wide range of government departments and can be accessed from any Gyandoot kiosk (soochanalaya) by any citizen. The services offered by Gyandoot are:

- ✓ Agriculture Produce Auction Centers Rates

- ✓ Copies of Land Records

- ✓ On-line Registration of Applications

- ✓ On-line Public Grievance Redress

- ✓ Village auction site

TARAhaat Project

TARAhaat is an e-business created to bring the benefits of the Internet to rural India. It is a Delhi based non-profit organization launched in Tikamgarh district of Madhya Pradesh. The Taradhabas or public kiosks unlike PCOs are run by independent local franchisees. This organization is operational in Bundelkhand in Jhansi and Bhatinda district in Punjab. TARAhaat delivers education, information services and market opportunities to rural consumers via the Internet and its Kendra outposts (http://www.tarahaat.com).

MeraKisan.com

It is an online digital tool to help consumers in India who value fresh food and goods sourced from local farmers. This portal has been developed keeping in mind the needs and requirements of consumers in search of quality farmers and also to create visibility of those farmers who are producing quality Agro Products (http://www.merakisan.com).

Greenstar Project

This is a new consortium of companies from India and the United States which launched its first solar powered internet community centre in Parvatpur village, 150 kms from Hyderabad, providing e- commerce services and offering agricultural information through fax, e-mail and voice mail (http://www.greenstar.org).

KISAN.com

It is a website conceptualized and developed by Nagarjuna group which offers weather forecasts, commodity news, product availability, online loan facilities, chat rooms and discussion forums. It enables the farmers to communicate with other farmers, suppliers and consumers across the world. It intends to bring Decision Makers and Opinion Leaders in Agriculture on a common platform. It is an unbiased, open, uninfluenced platform for everybody to use to their own extent (http://www.kisan.com).

Farmerbazzar.com

It allows farmers to sell their produce through auctioning. The biggest advantage of this site is that farmer knows the best price before clinching a deal (http://www. farmerbazzar.com).

Aquachoupal.com

It provides shrimp farmers information on world shrimp prices and technological information on shrimp farming technology (http://www. aquachoupal.com).

Challenges ahead

New ICT is not only a technology but an innovative concept which requires good planning and on-going support. In order to make the New ICT implementation successful, all the stake holders must be working together in order to get the full potential of the technology. Once farmers starting to use New ICT and getting satisfactory solutions for their problems, they will use again and again for their day to day problems. End result of the New ICT implementation could very well be motivated and well informed famers.

Farmers

He must be motivated to use New ICT, and it will only be possible if he gets the problem solving answers in a reasonable amount of time.

Scientist

They need to be active providing descriptive answers in the local language so they can build a trust worthy relationship with farmers through interactive questions and answers. The whole idea of interactive video based question answer technology is to build trust between farmers and scientists, so any new farming advised by scientists would be implemented by farmers with a good acceptance, trust and confidence.

IT department

It will manage the collaborative database, take backup, maintain recording setup and help scientist to easily access and study framers' questions through internet/intranet/extranet.

Extension Department

Their primary responsibility could be providing various training and informative material in form of the

audio/visual aids.

Government or Private Agencies

To prepare, provide or upload awareness videos for farmers based on governments guide lines and policies. They can also work with private companies to collect paid advertisements for targeted audience.

It is true that in spite of all the efforts made by the various agriculture and technology scientists, there is still a long way for an average farmer to enjoy the fruits of Information and Communication Technology (ICT) and relish its ultimate use. Some of the challenges associated with the use of new ICT for farmers are listed below:

✓ Policy considerations

✓ High telecommunication costs

✓ Infrastructure

✓ Lack of local content and language barrier

✓ High rate of Illiteracy

✓ Inadequate human resources

✓ Gender differences

CONCLUSION

✓ New ICT is a technological innovation to promote ONE FARMER AT A TIME concept, each farmer will get personalized attention, and solutions to their problems.

✓ New ICTs have a major role to play in the life of farmers as they provide them with latest know-how on agriculture, on line selling and buying, daily weather forecasts, information on cropping patterns, soil conservation, and government schemes.

✓ India would benefit from approaching the issue by using ICT in Agriculture by focusing on providing broadband connectivity and a centric development approach.

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