



“E-Agriculture” Introduction and Figuration of its Application

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Abstract-In India, Agriculture is considered to be a primary occupation for a most segment of population. We aim to focus on key factors discovered for effective utilization of Information Communication Technology for agricultural boost up, at least on the surface, with supportive of evidence herein. E-Agriculture is a rising field focusing on the improvement of rural and agricultural development through advanced information and communication processes. Some exciting issues discussed with agriculture and rural development. The development of agriculture has been on under development for the past few years due to lack of Agriculture knowledge and environmental changes. The main aim of this paper is to reach farmers for their awareness, usage and perception in e-Agriculture. E-Agriculture is a platform for supporting marketing of agricultural products.

Keywords- E-Agriculture, ICT, Agricultural Products, E-commerce.

I. INTRODUCTION

“E-Agriculture” is an emerging field in the intersection of agricultural informatics, agricultural development and entrepreneurship, referring to agricultural services, technology dissemination, and information delivered or enhanced through the Internet and related technologies. More specifically, it involves the conceptualization, design, development, evaluation and application of new (innovative) ways to use existing or emerging information and communication technologies (ICTs). E-Agriculture goes beyond technology, to promote the integration of technology with multimedia, knowledge and culture, with the aim of improving communication and learning processes between various actors in agriculture locally, regionally and worldwide. Facilitation, support of standards and norms, technical support, capacity building, education, and extension are all key components to e-Agriculture. There are several types of activity related to e-agriculture applications that are widely recognized around the world today. The delivery of agricultural information and knowledge services (i.e. market prices, extension services, etc) using the Internet and related technologies falls under the definition of e-Agriculture. More advanced applications of e agriculture in farming exist in the use of sophisticated ICTs such as satellite systems, Global Positioning Systems (GPS), advanced computers and electronic systems to improve the quantity and quality of production.[2]

In India agriculture is a major occupation for most part of population. Most rural population depends upon agriculture as their important occupation. Techno legal ICT and cyber law specialist of India and the managing member of ‘Association for people of India’ (AFPOI), the agriculture development characteristics are analyzed keeping in mind the advent of E-agriculture in India.

A. Current scenario of agriculture sector

The occupational structure of India is dominated by the “agricultural sector” and the “manufacturing sector” and the “service sector” is lagging far behind in this context. This shows that India is predominantly an agricultural economy and hence it requires strongest protection and development of its “agricultural resources”. India is facing certain “Agricultural Challenges” that must be resolved as soon as possible. The major challenges to “Agriculture Sector in India” are:

- 1) Insufficient agricultural infrastructure and support facilities,
- 2) Insufficient institutional capacity to deliver farmers specific services,
- 3) Lack of awareness regarding suitable agricultural methods among the farmers,
- 4) Agricultural content development and its up gradations,
- 5) Ownership issues of the public and government generated data,
- 6) Inadequate use of Public-Private Partnerships in India,
- 7) Lack of “Common Platforms” for the farmers in India,
- 8) Absence of an “Agricultural Think-Tank” in India,
- 9) Insufficient use of ICT for agricultural purposes, etc.

II. E-AGRICULTURE IN BRIEF

E-Agriculture Community is made up of individual stakeholders such as information and communication specialists, researchers, farmers, students, policy makers, business people, development practitioners, and others. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative

ways to use information and communication technologies (ICT) in the rural domain, with a primary focus on agriculture. e-agriculture is the Internet platform of this global initiative aimed at promoting sustainable agricultural development and food security by improving the use of information, communication, and associated technologies in the sector. In short e-Agriculture will connect all concerned persons starting from farmers to researchers together. Farmers can get the desired information at any instant of time from any part of world and they can also get the help from experts viewing their problem immediately by without moving anywhere^[1].

E-agriculture is a rising field for enhancing existing agriculture and food security through enhanced processes for knowledge access and switch using information and communication technologies. The World Summit on the Information Society (WSIS) Plan of Action comprises e-Agriculture as a region of function of information and communication technologies (ICTs).

A. Goal of the platform

E-agriculture is a relatively recent term in the field of agriculture and rural development practices. An emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. To enable Community members to exchange opinions, experiences, good practices and resources related to e-Agriculture, and to ensure that the knowledge created is effectively shared and used worldwide.

B. Architecture

For improving agricultural productivity an expert agricultural advice is given to the farmers both in a timely and personalized situations. Here, in this system agricultural experts generate the advice by using the modern agriculture which is highly knowledge intensive which also requires timely, reliable and accurate information on natural resource endowments and their usage patterns at present and future technology available for their utilization and other information about markets, weather, insurance, subsidy, etc. The Architecture of the modern system is as follows:

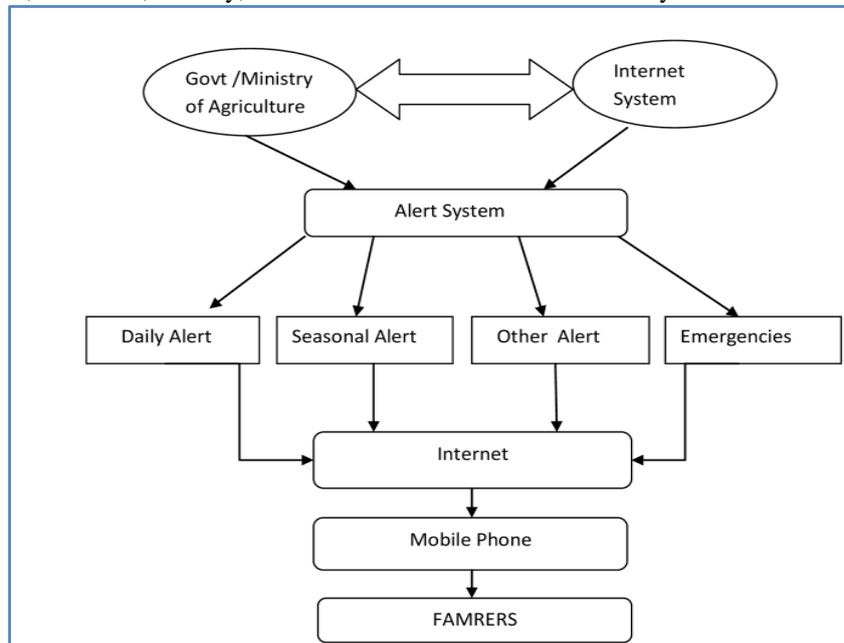


Fig. 1 Architecture of Modern system

The news releases from the government reach the farmers in time and it is also sub categories by the alert system, therefore an alert system is being built for daily releases and for seasonal releases.

III. GLOBAL TRENDS IN E-AGRICULTURE

A. Technology-based Solutions

Applications of e-Agriculture in intensive agricultural systems in developed countries are gearing towards using sophisticated technologies to improve the quantity and quality of production, in order to maximize profits. This is the case in precision agriculture in which farmers are harnessing computer and satellite technologies to cut costs, improve yields and protect the environment; and e-commerce (or e-marketing) in which the marketing and sale of agricultural products is conducted over electronic networks such as the Internet and extranets. On the other hand in many developing countries farmers' access to information is improved through grass root level initiatives of using ICTs as well as distance education modalities to enhance the knowledge base among service providers.

B. Precision Agriculture

In precision agriculture or site-specific farming, farmers are using ICTs and other technologies to obtain more precise information about agricultural resources which allow them to identify, analyze, and manage the spatial and temporal variability of soil and plants for optimum profitability, sustainability, and protection of the environment [3].

Precision agriculture is described as: "A system to manage farm resources better. Precision farming is an information technology based management system now possible because of several technologies currently available to agriculture. These include global positioning systems, geographic information systems, yield monitoring devices, soil, plant and pest sensors, remote sensing, and variable rate technologies for application of inputs." [4]. Precision agriculture is an advanced e-agriculture application. It makes use of five major components of technology: 1) Geographical Information Systems (GIS) for analysis and management of spatial data and mapping; 2) Remote Sensing (RS) to identify and 3) Global Positioning Systems (GPS) to locate and define spatial features or activities that contribute to the quality of site-specific practices; 4) Variable Rate Technology (VRT) allowing targeted, site-specific input applications; and 5) Yield monitoring for recording crop productivity as an historical database for crop management [5].

C. E-Commerce in Agriculture

Improved productions and high yields result in the need to look for profitable markets beyond local communities, and electronic markets are providing an opportunity to farmers to market and sell their produce to buyers at the global level. Electronic commerce (ecommerce), simply defined as the general exchange of goods and services via the Internet, is already having a significant impact on agriculture. Farms had already bought or sold agricultural products on the Internet [6] and Goldman Sachs had estimated that 12% of all agricultural sales in the U.S. would be conducted over the Internet in 2004, compared to only 4% in 1999 [7]. Further, a study conducted by Rockwood Research on Internet use by commercial farmers in the US found that farmers were primarily using the Internet to access information on commodity prices, weather, farm chemicals, and machinery. The study also showed that farmers were migrating quickly toward Web-based transactions such as purchasing seed, crop chemicals, and farm equipment on the Internet [8].

IV. ROLE OF ICT IN E-AGRICULTURE

ICT is an umbrella term that includes any communication device or application, encompassing: radio, television, mobile and fixed phones, computer and network hardware and software, satellite systems and so on, (as well as the various services and applications associated with them, such as videoconferencing, distance learning, etc) necessary for the delivery of information in the form of audio, data, video, image, etc from Point A to Point B. ICT consists of all technical means used to handle information and aid communication. Several reports underscore just how significant and extraordinary ICT productivity gains are not only for individuals and businesses, but for a nation.

A new concept about Agricultural informatics that has arisen following the rapid development in information and communication technologies (ICTs) and of the internet. Referred to as e-agriculture, agricultural informatics is an emerging field which combines the advances in agricultural informatics, agricultural development and entrepreneurship to provide better agricultural services, enhanced technology dissemination, and information delivery through the advances in ICT and the internet. The dissemination of information to farmers has become increasingly integrated into ICTs. Rural telecentres provide information on education, agricultural and health issues and equip rural citizens with skills on how to use computers and provide basic literacy. Also Radio and TV programmers feature agricultural information. Many of the organizations like government, private, cooperatives, and public have also attempted to facilitate technology transfer in the agricultural sector. Information and Communication Technologies (ICTs) are crucial in facilitating communication and access to information for agricultural and rural development. Information and communication technologies are making tremendous impact on the rural economy due to its wide application and appeal. It may seem paradoxical that modern lets associated with developed country markets and capital intensive methods of production, has any relevance for country like India where many millions of people lack in basic needs. Nevertheless, there are many efforts in India and other developing countries to demonstrate the concrete benefits of ICT for rural population and to carry out the same in a manner that makes economic sense [10].

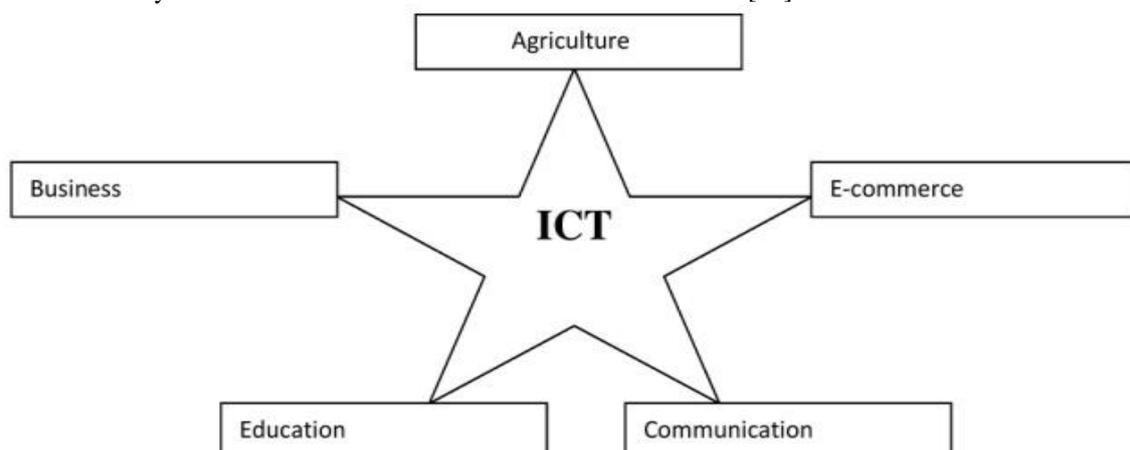


Fig.2 Application of ICT

A. Advantages of ICT in E-agriculture

1) It can initiate new agricultural and rural business such as e-commerce, real estate business for satellite offices, rural tourism, and virtual corporation of small-scale farms.

- 2) It can support policy-making and evaluation on optimal farm production, disaster management, agro-environmental resource management etc., using tools such as geographic information systems (GIS).
- 3) It can improve farm management and farming technologies by efficient farm management, risk management, effective information or knowledge transfer etc., realizing competitive and sustainable farming with safe products. For example, farmer has to make critical decisions such as what to plant? When to plant? how to manage pests?, while considering off-farm factors such as environmental impacts, market access, and industry standards. IT-based decision support system (DSS) can surely help their decisions.
- 4) It can provide systems and tools to secure food traceability and reliability that has been an emerging issue concerning farm products since serious contamination such as chicken flu was detected.
- 5) It can facilitate rural activities and provide more comfortable and safe rural life with equivalent services to those in the urban areas, such as provision of distance education, telemedicine, remote public services, remote entertainment etc.
- 6) Empowerment of Stakeholders (Government Officials, Research, Education & Extension Scientists, farmers and other service providers such as Community Information centers.
- 7) Development of Knowledge Management, Decision Support and Advisory Systems to strengthen Extension services and also used for Farmers Redressal system
- 8) Efficient management (Development, Conservation, allocation and utilization) of resources .
- 9) Improved productivity and profitability of farmers through better advisory systems.

V. FUTURE SCOPE

- 1) E-agriculture is very helpful for the young farmer and provide them useful information's regarding the plantations that they have grown.
- 2) E-agriculture scheme using the data mining technique namely birch clustering has been used for clustering the large datasets of farmers details .The present work on E-agriculture conveys the information regarding agricultural details to farmers in SMS via SMS gateway. The details such as daily alert, seasonal alert and other additional details can be sent to farmers. The daily alert can be sent to all farmers in the database. Seasonal alert can be sent to farmers only for selected farmers based on clustering result. Finally the other or additional detail which is announced by agriculture can be sent to all farmers. Experimental result shows better result when compare with the existing work
- 3) This paper has examined efforts taken by major developed countries in order to sketch the wide canvas of ICT for agricultural developments. This is then thought in the lines for the potential benefit of Indian agricultural developments in particular and rural developments in general.
- 4) Majority of farmers in the state or country are aware that mobile phones can be used to conduct businesses and receive information. Mobile phone costs should be lowered to enable majority of farmers for having access to the current information about agribusiness within the state or country.
- 5) The government should also conduct sensitization to create awareness for the farmers on how best they can use information technologies to conduct agribusiness.

VI. CONCLUSION

The present work on E-agriculture conveys the information regarding agricultural details to farmers in SMS via SMS gateway and hereby propose to switch over E-agriculture. The details such as daily alert, seasonal alert and other additional details can be sent to farmers. The daily alert can be sent to all farmers in the database. Seasonal alert can be sent to farmers only for selected farmers based on clustering result. Finally the other or additional detail which is announced by agriculture can be sent to all farmers. Experimental result shows better result when compare with the existing work. This paper also talks about Pros and cons of E-agriculture.

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