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Research Article

IMPACT OF INFORMATION TECHNOLOGY IN AGRICULTURE SECTOR

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ABSTRACT
There are many ways in which Information Technology can be used to exchange the information rather effective communication like information kiosks which provide not only the basic services like email, helps in education, health services, Agriculture and Irrigation, online trading, community services etc., expert systems which helps in determining marketing alternatives and optimal strategies for producers, integrated crop management systems for different crops, Farm-level Intelligent Decision Support system developed to assist in determining optimal machinery management practices for farm-level system. Information technology helps to predicts the results related to the agriculture specially plant physiology. Leaf protein study is an important study which helps to solve protein deficiency and malnutrition. Present study deals with role of IT in Agriculture.

Keywords: *Information Technology, Agriculture, Leaf Protein*

INTRODUCTION
Agriculture is one of the most important sectors in India, and could benefit tremendously with the applications of ICTs especially in bringing changes to socio-economic conditions of poor in backward areas. Agriculture constitutes a major livelihoods sector and most of the rural poor depend on rain-fed agriculture and fragile forests for their livelihoods. Farmers in rural areas have to deal with failed crops and animal illness frequently and due to limited communication facilities, solutions to their problems remain out of reach (World Bank, 2009). The service role of ICTs can enhance rural communities' opportunities by improving their access to market information and lower transaction costs for poor farmers and traders. Though India has a strong and fast
Growing IT industry, access to ICTs remains very low.particularly in rural areas. The present indicators of IT penetration in Indian society are far from satisfactory.
The National Policy for Farmers emphasizes the use of Information and Communication Technology (ICT) at village level for reaching out to the farmers with the correct advisories and requisite informationWith this background information, the paper is devoted to outline the level of attitudes of the farmers on ICT application in agriculture, impact of ICT application in agriculture activities and problems in accessing the ICT application.

Information Technology
Information Technology is the buzz technology now-a-days. It is the technology that is helping to exchange the information in fast and easier way. Due to this technology the distance between or the difference between the nations is reduced and now world is becoming a global village This technology provides an opportunity to the developing nations and under developed nations so that can build up their strategies and compete with the developed nations.
In any sector information is the key for its development. Agriculture is not exception to it. If the relevant and right information in right time is provided it can help agriculture a lot. It helps to take timely action, prepare strategies for next season or year, speculate the market changes, and avoid unfavorable circumstances. So the development of agriculture may depend on how fast and relevant information is provided to the end users. There are other traditional methods to provide the information to the end users. Mostly they are inoculated, untimed and also communication is one way only. It will take long time provide the information and get feedback from the end users.

So now it's time to look at the new technologies and methodologies, which will benefit developing nation like India, which can help it to become the super power. There are many ways in which Information Technology can be used to exchange the information rather effective communication like information kiosks which provide not only the basic services like email, helps in education, health services, Agriculture and Irrigation, online trading, community services etc., expert systems which helps in determining marketing alternatives and optimal strategies for producers, integrated crop management systems for different crops, Farm-level Intelligent Decision Support system developed to assist in determining optimal machinery management practices for farm-level system (Narendrasinh, 2010)

Many organizations and Institutes are utilizing the information technology to provide solutions to the problems faced by the agriculture sector in a cost effective manner with proper business models.

A cross disciplinary group working on research issues in increasing access to internet and communication technologies to rural and small town India. The lab is involved in various projects funded by Media Lab Asia, Ministry of Communications and IT (GoI), Development Gateway Foundation (GoI, World Bank) and Pan Asia Networking (UNDP, IDRC, APDIP, ISOC, APNIC and Microsoft). The areas under investigation include design and evaluations of devices and interfaces for computer, handheld and mobile users, cross-lingual information retrieval and translation, improving information dissemination protocols over the internet catering for low bandwidth and small devices, ethnographic studies emphasizing the study of social and cultural factors influencing interaction design of applications for e-learning and use of computers in education. The laboratory is formed around several core projects, each involving academic, industrial and village community partners (Bheenick, 1998).

Their role is to facilitate the invention, refinement, and dissemination of innovations that benefit the needy masses. We work with industry, NGOs, and governments, to bring these innovations to rural and small town India.

Impact of ICT Application in Agriculture

It is to be mentioned that the ICT offers a variety ofprograms both for the social development and the economic development. An assessment of the impact was felt essential so as to determine whether there is any significant change on the part of the farmers before and after their ICT application in Agriculture. It is to be noted that a change which a farmers does not possess before ICT application in Agriculture may take place in the farmers after his ICT Application in Agriculture (Banerjee, 2011).

The researcher, through his observations and interaction with the farmers, has identified eight economic and social traits which the farmers may or may not posses before their ICT application inAgriculture. As such, the economic and social traits for the purpose of the study include productivity improved, avoiding buying on credit, comfortable life, reduction in poverty, house modified, liberal spending, change in the life style and maintenance of children improved (Venkatesh *et al.*, 2012)

Role of IT in Agriculture

In the context of agriculture, the potential of information technology (IT) can beassessed broadly under two heads: (a) as a tool for direct contribution to agricultural productivity and (b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted. Precision farming, popular in developed countries, extensively uses IT to make direct contribution to agricultural productivity. The techniques of remote sensing using satellite technologies, geographical information systems, agronomy and soil sciences are used to increase the agricultural output (Arundhathi and Subbiah, 2007). This approach is capital intensive and useful where large tracts of land are involved. Consequently it is more suitable for farming taken up on corporate lines.

The indirect benefits of IT in empowering Indian farmer are significant and remain to be exploited. The Indian farmer urgently requires timely and reliable sources of information inputs for taking decisions. At present, the farmer depends on trickling down of decision inputs from conventional sources which are slow and unreliable. The changing environment faced by Indian farmers makes information not merely useful, but necessary to remain competitive (Jacobsen, 1987).

Research Article

Role of IT in Plant Physiology

Plants react to their environment and to management interventions by adjusting physiological functions and structure. Functional–structural plant models (FSPM), combine the representation of three-dimensional (3D) plant structure with selected physiological functions (Ansari and Iliyas, 2011) and (Iliyas and Ansari, 2013) An FSPM consists of an architectural part (plant structure) and a process part (plant functioning). The first deals with (i) the types of organs that are initiated and the way these are connected (topology), (ii) co-ordination in organ expansion dynamics, and (iii) geometrical variables (e.g. leaf angles, leaf curvature and Microbial Biotechnology). Green crop fractionation includes Deproteinised Leaf juice as a medium for fungal growth and for production of Protease (Josephin and Sayyed, 2005); Study Of LPC and PCR Prepared From Radish (*Raphanus Sativus* Linn.) (Sayyed, 2011). Effect of additives on chlorophyll content in wet LPC prepared from juice of Medicago sativa Linn. (Sayyed, 2010). Changes in chlorophyll content of lucerne leaf juice during storage (Sayyed and Mungikar, 2003). Use of Deproteinised Leaf Juice (DPJ) in Microbial Biotechnology (Sayyed and Mungikar, 2005). Production of amylase of DPJ of four different plants (Sayyed, 2013). The process part may include any physiological or physical process that affects plant growth and development. Leaf protein is Good Source of Cyanocobalamine (B12), Ascorbic Acid (Vitamin C) and Folic Acid (Vitamin B9) (Iliyas and Badar, 2010) and also of Thiamine, Riboflavin and Pyridoxine from LPC of Some Plants (Iliyas and Badar, 2010) (e.g. photosynthesis, carbon allocation). This paper addresses the following questions: (i) how are FSPM constructed, and (ii) for what purposes are they useful? Static, architectural models are distinguished from dynamic models. Static models are useful in order to study the significance of plant structure, such as light distribution in the canopy, gas exchange, remote sensing, pesticide spraying studies, and interactions between plants and biotic agents. Dynamic models serve quantitatively to integrate knowledge on plant functions and morphology as modulated by environment. Applications are in the domain of plant sciences, (Shaikh and Sayyed, 2014) for example the study of plant plasticity as related to changes in the red:far red ratio of light in the canopy. With increasing availability of genetic information, FSPM will play a role in the assessment of the significance towards plant performance of variation in genetic traits across environments. In many crops, growers actively manipulate plant structure. FSPM is a promising tool to explore divergent management strategies.

Introduction of Precision Agriculture through Informatization of Cultivation and Animal Breeding Technology

Networking of agricultural production facilities. Greenhouse environment measurement and control network. Target crops: cucumber, tomato. Real-time remote environmental monitoring and alarm system. Remote management of grain storage facility for high quality of agricultural products. Remote environmental monitoring system via the Internet. Real-time monitoring and analysis of temperature variation in the storage facility. Livestock individual information database and analysis system. Dairy cattle individual information database and individual recognition system. Establishment of agricultural facility automation. Yield forecasting system using agricultural facility environment database. Remote control and measurement system for agricultural facility. Greenhouse environment control system using mobile communication technology. Collection and distribution of crop growth stage information and pest information using GPS (Global Positioning System). Develop a device for portable information service. Automation of post harvest management for improving quality of agricultural products. Environment management system for horticultural products. Optimal environment maintenance and automatic management system. Introduction of precision agriculture using newly developed high technology. Chloroplast analysis technique for diagnosis of plant nutrient status, optimal fertilization recommendation. Productivity management of cultivation lot with GPS. Site-specific crop productivity management system

IT and Indian Agriculture in The Future

Technologically it is possible to develop suitable systems, as outlined in the previous sections, to cater to the information needs of Indian farmer. User friendly systems, particularly with content in local languages, can generate interest in the farmers and othersworking at the grassroots. It is possible to create

dedicated networks or harness the power ofInternet to make these services is available to all parts of the country.

The task of creating application packages and databases to cater to complete spectrum of Indian agriculture is a giant task. The Long Term Agriculture Policy provides an exhaustive list of all the areas that are to be covered. This can be taken as a guiding list to evolve design and develop suitable systems catering to each of the specified areas. Our country has theadvantage of having a large number of specialized institutions in place catering to variousaspects of Indian agriculture. These institutions can play a crucial role in designing the necessary applications and databases and services. This will facilitate modularization of the task, better control and help in achieving quick results. As it is, several institutions have already developed systems related to their area of specialization (Suresh, 2003)

For quick results, it may be useful to get the applications outsourced to software companies in India. This will facilitate quick deployment of applications and provide boost to the software industry in India. In order to avoid duplication of efforts, it may be useful to considerpromoting a coordinating agency which will have an advisory role to play in evolving standardinterface for users, broad design and monitoring of the progress (Attaluri *et al.*, 2011).

In the post WTO regime, it is suggested that it is useful to focus more on some agricultural products to maintain an unquestionable competitive advantage for exports. This will call for urgent measures to introduce state of the art technologies such as remote sensing, geographical information systems (GIS), bio-engineering, etc. India has made rapid strides in satellite technologies. It is possible to effectively monitor agricultural performance using remote sensing and GIS applications (Singh, 2004). This will not only help in planning, advising and monitoring the status of the crops but also will help in responding quickly to crop stress conditions and natural calamities. Challenges of crop stress, soil problems, and natural disasters can be tackled effectively through these technologies. A beginning in precision farming can be encouraged in larger tracts of land in which export potential can be tilted in our country's favor.

While developing these systems it is necessary to appreciate that major audience that is targeted is not comfortable with computers. This places premium on user friendliness andit may be useful to consider touch screen technologies to improve user comfort levels. It is oftenobserved that touch screen kiosks, with their intuitive approach, provide a means for quicklearning and higher participation. It is also necessary to provide as much content as possible in local languages (Klepsc and Absher, 1997).

Once the required application packages and databases are in place, a major challenge is with respect to dissemination of the information. The Krishi Vigyan Kendras, NGOs and cooperative societies may be used to set up information kiosks. Private enterprise is alsorequired to be drawn into these activities. These kiosks should provide information on other areasof interest such as education, information for which people have to travel distances such as thoserelated to the government, courts, etc. Facilities for email, raising queries to experts, uploadingdigital clips to draw the attention of experts to location specific problems can be envisaged.

Conclusion

The Indian farmer and those who are working for their welfare need to be e-powered to face the emerging scenario of complete or partial deregulation and reduction in government protection, opening up of agricultural markets, fluctuations in agricultural environment and to exploit possible opportunities for exports. The quality of rural life can also be improved by quality information inputs which provide better decision making abilities. IT canplay a major role in facilitating the process of transformation of rural India to meet thesechallenges and to remove the fast growing digital divides.By this study, the authors concludes that the Indian Govt. is being made a remarkable achievements especially in the area of agriculture by giving various facilities to the farmers in which the ICT services is one among which is helping the farmers to understand the modern cultivation methods, availability of agriculture inputs, irrigational sources, availability of pesticide and fertilizers for increasing the production and productivity of crops.

The rapid changes in the field of information technology make it possible to develop and disseminate required electronic services to rural India. The existing bottlenecks in undertaking the tasks need to be

addressed immediately. A national strategy needs to be drawn for spearheading IT penetration to rural India. A national coordinating agency with an advisoryrole can act as a catalyst in the process. No single institution or organization alone can succeed in the task of e-power in farmers and rural India. At the same time, scattered and half hearted attempts cannot be successful in meeting the objective. Industries with major stake in villages, such as fertilizer sector, should come together to provide the initial impetus.
The success of any IT based service to rural India hinges on evolving a proper revenue model for the dissemination points. The 'clicks and mortar' rural kiosks should beintegrated with the 'bricks and mortar' industry to make them sustainable ventures by makingthem a business gateway to rural India. The information kiosks can draw revenue from the industry by providing and disseminating required services. Once these dissemination pointsprove to be economically viable, the IT revolution in rural India will require no crusaders.

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