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Status of ICT Application in Agriculture –an Overview

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ABSTRACT

Information and communication is very important in agriculture. Ever since people have grown crops, raised livestock, and caught fish, they have sought information from one another. Where can I buy the improved seed or feed this year? Who is paying the highest price at the market? How can I participate in the government's credit program? Producers rarely find it easy to obtain answers to such questions, Updated information allows the farmers to cope with and even benefit from these changes. Providing such knowledge can be challenging, however, because the highly localized nature of agriculture means that information must be tailored specifically to distinct conditions. In which ICT can play a major role, that's why in this paper mainly focus on the different ICT project like Fisher Friend project, Fisher Friend project, Helpline hello Uttam, Expert system, Kisan Call Center, ICT based Kisan Mobile Sandesh, e – choupal, MSSRF, Agrisnet , e- arik , etc which help to farmer to get right information at right time. The continued increase in globalization and integration of food markets has intensified competition and efficacy in the agriculture sector, and has brought unique opportunities to include more smallholders into supply chains. Yet in the same vein, agriculture faces a range of modern and serious challenges, particularly in developing countries different ICT project help to cope up the problems.

India holds 2nd position among the countries with high population in the world with approximate 1.2 billion. Among these, 70 per cent reside in rural area and their main occupation is agriculture. About 127 million of farmers have limited access to information about modern agriculture techniques due to lack of access of extension worker support (one extension worker looks after 1000 farmers). The main phases of the agriculture industry are crop cultivation, water management, fertilizer application, fertigation, pest management, harvesting, post harvest handling, transporting of food products, packaging, food preservation, food processing, value addition, food quality management, food safety, food storage and food marketing. Recent development in ICT has created new opportunity to ensure that farmers can get the information that they need. That is the reason to emerge in ICT Mass media plays an important role in information distribution and in political market and public policy making.

Information and Communication Technology (ICT) is a term which focuses on the use and integration of communication technologies in information technology (IT). ICT refers to any device or product which enables the "capturing, storing, transmitting and displaying data and information electronically." This includes the Internet and all computer hardware and software together with radio, digital television, wireless networks, cellular phones and satellite systems.

The use of information and communication technologies provides greater access to information and enables people from around the world to communicate in real-time via services like instant messaging, video and conference calls, voice over IP (VoIP), email and social networks. ICT also helps businesses, governments and different organizations to store, process and share information among each other with one click. It enables the rural community to get recommendation & other assistance from various organizations more faster and also provide opportunity for 2-way communication. It helps in bottom up approach of development need & perception

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It also help by providing decision making services, advisory services, market outlook, creating employment opportunity, maintenance of land holding records, provide technical support to farming community and also Triggering knowledge revolution and make farmers more competent in decision making.

Review on best practices of ICT for agriculture extension:

e- arik - Access to appropriate agricultural information is a difficult task for the rural tribal farmers of North-East India. The number of successful e-Agriculture initiatives in rural India not replicated among the rural tribal farmers. There is no note worthy village level ICT initiatives in the tribal population dominated eight states of North-East India, where large proportion of population live below the poverty line. Further, low and uncertain agricultural productivity, frequent natural calamities add the problem of the North- East India. The region's geographical remoteness, difficult terrain and inadequate man power in the rural developmental departments make the information access of rural farmers become distant reality and hinder the socio-economic development of the region. Considering grim scenario in the region, a research project entitled "e-Arik" ("Arik" means "Agriculture" in the Adi tribal dialect of Arunachal Pradesh State) has been implemented by the College of Horticulture and Forestry, Central Agricultural University. This two year research project sponsored by the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India, examines the application of ICTs in providing agricultural extension services and its socio-economic impact among rural tribal farming community in the "Yagrung" and near by villages of East Siang district of Arunachal Pradesh State. The project experiments single window system for the improved agricultural information and technology delivery by using computer, internet, phone, radio and television. Project provides all time expert consultation on agriculture production, protection and marketing aspects through ICTs. The e-Arik research project staff regularly undertakes field visits to observe crop condition, diagnosis the pest, diseases, and nutrient deficiency, physiological problems, and then field crop condition digitally documented. To solve complex crop pest, diseases, nutrient deficiency and physiological problems, digital photographs is transmitted through e-mail from e-Arik-village knowledge centre to the farm scientists of Central Agricultural University and recommendations passed on to the farmers. Further, farm scientists undertake need based field visits and provide expert advice to the farmers. Further, farmers training and demonstrations were conducted by the project staff and or extension personnel from the developmental departments. Project portal provides information on crop cultivation, agriculture and rural developmental departments and their schemes, day to day market information and weather conditions, which is also displayed in the village knowledge centre notice board. Further, information on health, education, governance and other information for tribal farmers are available in the project portal. The village agricultural library at the e-Arik-village knowledge centre is having the collection of farm publications, multimedia CDs and daily news papers for the ready reference of the farmers and others. Farm input display unit at e-Arik-village knowledge centre exhibits bio-fertilizers, organic pesticides and fungicide samples for the familiarization among the farmers. The ICT awareness lectures, regular trainings were conducted for the benefit of village children, students, village school teachers and villagers. The village advisory committee regularly reviews the progress of the project.

Digital green- Digital Green borrows concepts and experiences from the Digital Study Hall (DSH) system. Launched in September 2006 by Microsoft Research India's Technology for Emerging Markets team, a live deployment of a prototype is currently in development with the GREEN Foundation in villages near the Karnataka and Tamil Nadu-state borders in India. Digital Green combines technology and social organization to improve the cost-effectiveness and broaden the community participation of existing agricultural extension systems by building on existing social linkages and using technology, Digital Green seeks to amplify the impact of agriculture extension workers who help farmers become more productive. Digital green records live demonstrations of agricultural practices by experts, transmits them to a large database and distributes them on DVDs to local organizations for dissemination among small and marginal farmers.

Digital Green (DG) is a research project that seeks to disseminate targeted agricultural information to small and marginal farmers in India through digital video. The Digital Green system sustains relevancy in a community by developing a framework for participatory learning. The system includes a digital video database, which is produced by farmers and experts. The content within this repository is of various types, and sequencing enables farmers to progressively become better farmers. Content is produced and distributed over a hub and spokes-based architecture in which farmers are motivated and trained by the recorded experiences of local peers and extension

staff. In contrast to traditional extension systems, we follow two important principles: (1) cost realism, essential if we are to scale the system up to a significant number of villages and farmers. (2) building systems that solve end-to-end agricultural issues with interactivity that develops relationships between people and content. The DG system provides structure to a traditional, informally-trained vocation. The system improves the efficiency of extension programs by delivering targeted content to a wider audience and enabling farmers to better manage their farming operations with the reduced field support.

VASAT- Virtual Academy for the Semi-Arid Tropics (VASAT) is a partnership coalition that aims to mobilize communities and rural service providers in the dry tropics by sharing information, knowledge and skills related to climate literacy, drought preparedness, best practices in dry land agriculture, and other relevant issues. This is achieved through the innovative interface of **ICT** and **Distance learning**. The VASAT approach is premised on creating a viable blend of three different trends in development International and national agricultural research that leads to the creation and validation of useful knowledge in all areas relating to drought mitigation and management (this includes validated information on indigenous practices as well) Applications of modern information and communication technologies in rural development (ICT4D) which is fast emerging as a key trend in development research. The Open Distance Learning paradigm that aims at education of masses, VASAT is a platform established by ICRISAT primarily to foster drought preparedness among the rural farmers using a blend of innovative methodologies involving a triple-helix model. This model consists of curation of agricultural information, innovation ICT4D delivery mechanisms and Open Distance Learning (ODL)Knowledge sharing is an indispensable component of cooperation for development. ICRISAT's innovation in knowledge sharing follows a multi-dimensional strategy to channel the spill-over from the south for the benefit of the south. The VASAT's triple helix model is a strategic coalition for information, communication and capacity building. It operates to enhance the livelihoods of the small-holder farmers in South Asia and West and Central Africa in partnership with the Desert Margins Program (DMP). VASAT links and mobilizes stakeholders through drought preparedness programs to lessen the impact of drought on small-holder farmers in the semi-arid tropics. It is an innovative and cost-effective medium to educate and support a critical mass of rural women and men spread across vast geographical areas by informing them about the oncoming drought and desertification through information and communication technologies. A number of private sector initiatives that use information technology for rural development are active partners in South Asia, and corporate foundations are partners in West and Central Africa. Extension Education to suit users' requirement. The key lesson from the VASAT experience revolves around the importance of identifying the best partner for realizing the project objective and the circumstances with which the project has been conceptualized. The VASAT's experience shows that women are the key managers on the domain of knowledge sharing and can overcome communication barriers. A successful extension activity needs the involvement of credible individuals such as Village Network Assistants (VNA's) from the locality as facilitators or intermediaries. Local capacities have to be developed with respect to the essentials of practical agriculture espousing an open and distance learning paradigm that blends with ICT-based communication, which was one of the guide posts in the conceptualization and implementation of VASAT.

AGRISNET

Agriculture Resources Information System Network (AGRISNET) is a mission mode project funded by the Ministry of Agriculture, Government of India to develop a comprehensive online knowledge portal to disseminate relevant information to farmers. Under this scheme most of the State Governments are established information rich agricultural websites. For example, Sikkim AGRISNET (http://www.sikkimagrisnet.org), Andhra Pradesh agri- portal, http://www.apagrisnet.gov.in, Uttar Pradesh (UP) Agrisnet Knowledge Portal (http://agriculture.up.nic.in), Tamil Nadu- www.tnagrisnet.tn.gov.in, AGRISNET– Himachal Pradesh (http://203.193.179.168/default.aspx) - Expert Advisory Services (http://www.hp.gov.in/expertadvisory)

Village knowledge center:

MSSRF- Village knowledge center

The information village project, implemented by M.S. Swaminathan Research Foundation started in Pondicherry, a Hub & Spoke Model Network of Village Knowledge Centre (VKC) and Village Resource Centers (VRC) Focus on Fisheries, Agriculture & Horticulture Mainly in Value addition. Project maintains update and disseminate information on entitlements to rural families using a blend modern and existing channels of communication and also trained rural youth in the organization and maintenance of a system that generates locally relevant information from generic information. The project objective is to assess the impact of ICT in fostering

transition to sustainable agriculture and rural development and document their role in promoting the process of knowledge empowerment of rural family. A value addition center in the Pondicherry region in south India. A value addition center has been established at Villianur and is functional since February 1998. It acts as hub of communication network in the project.

Village Resource Centres (VRCs) –Indian Space Research Organisation (ISRO)

473 VRCs have been set up in 22 States/Union Territories in India. The VRCs are connected to Knowledge/Expert Centres (ECs) like Agricultural Universities and Skill Development Institutes (SDI). Over 6500 programmes have been conducted by the VRCs in the areas of agriculture/ horticulture, fisheries, live stock, water resources, tele- health care, awareness programmes, women empowerment, supplementary education, computer literacy, Micro credit, micro finance, skill development/ vocational training for livelihood support etc. So far, over 500000 people have availed VRC services(www.isro.org/scripts villageresourcecentres.aspx)

ICT for market information and agribusiness:

e – choupal

ITC Limited has now provided computers and Internet access in rural areas across several agricultural regions of the country, where the farmers can directly negotiate the sale of their produce with ITC Limited. Traditionally, commodities were procured in mandis (major agricultural marketing centers in rural areas of India), where the middleman used to make most of the profit. These middlemen used unscientific and sometimes outright unfair means to judge the quality of the product to set the price. The difference in price between good quality and inferior quality was little, and therefore there was no incentive for the farmers to invest and produce good quality output. With e-Choupal, the farmers have a choice and the exploitative power of the middleman is neutralized.

This online access enables farmers to obtain information on mandi prices, and good farming practices, and to place orders for agricultural inputs like seeds and fertilizers. This helps farmers improve the quality of their products, and helps in obtaining a better price. Each ITC Limited kiosk having Internet access is run by a sanchalak — a trained farmer. The computer is housed in the sanchalak's house and is linked to the Internet via phone lines or by a VSAT connection. Each installation serves an average of 600 farmers in the surrounding ten villages within about a 5 km radius. The sanchalak bears some operating cost but in return earns a service fee for the e-transactions done through his e-Choupal. The warehouse hub is managed by the same traditional middle-men, now called samyojaks, but with no exploitative power due to the reorganization.

Telephone Mobile technology:

ICT based Kisan Mobile Sandesh an innovative approach

In the Kisan Mobile Sandesh short message services is being provided by the SMS of KVK's. M.P has population of about 6 crores, out of which 90 lakhs are mobile phone users. In Zone VII of Zonal Project Directorate, ICAR, at present out of 93 KVKs, total 63 KVKs are used mobile for information dissemination. This technology is adopted by all the ICAR Zones. Zonal Project Directorate VII and J.N.K.V.V are also using this technology. Main features of Kisan Mobile Sandesh are multi language support (16 languages), long SMS facility (160 characters) and sending of 2 SMS in a week i.e. on Tuesday and Friday, issued in various agriculture subjects like Agronomy, Horticulture, Plant Protection, etc. (besides some messages are also being sent by the KVKs as per the urgent needs).

Kisan Call Center: Bridging the information gap

The Department of Agriculture & cooperation, Ministry of Agriculture, Govt. of India launched farmer call centres on January 21,2004 across the country. KCC enables farmers to have direct discussions with the subject matter experts who are able to analyze the problem effectively and provide the solution directly. A central call centre has been established which takes queries of farmers and answers in their language, seven days a week and provided solution in local lenguage. KCC was transformed into a control room providing preventive solutions to reduce crop damage. So far, more than It is a very impressive and powerful telecom network for both sector private as well as government sector, more than 4 lakh village have the facility of public telephone in the country, the networks directly connect to the Indian farmers who have several problems regarding their farming, now any single farmer can call to the kisan call centre at any time of clock, the main moto of kisan call centre to solve their farming problems over telephonic talk Toll Free Number: 1551. the farmer call centre consist of 3 levels – namely, level –I(Agriculture graduates) , level-II (subject matter specialists) and level III (Management group)

In case of Fertilizer and Chemical:

Expert system - Expert system can be defined as a tool for information generation from knowledge. Information is either found in various forms or generated

from data or knowledge. Text, images, video, audio are forms of media on which information can be found, and the role of information technology is to invent, and devise tools to store and retrieve this information. Statistical information is a good example of information generated from data while advises generated by an expert system is a good example of information generated from knowledge. The need of expert systems for technical information transfer in agriculture can be identified by recognizing the problems in using the traditional system for technical information transfer, and by proving that expert systems can help to overcome the problems addressed, and are feasible to be developed. Expert systems can be integrated with other information sources such as images bases and/or textual bases to make use of these sources. For example, images can be used for describing symptoms as it is very difficult and very confusing to describe them in words. Images can also be used for confirming the diagnosis of the cause of a certain disorder. Expert systems can also be integrated with textual data bases that may be the extension documents related to the specialty and/or commodity handled by an expert system. This textual data base can be used for explanation purposes of basic terms and operations. It can also be used to confirm the reached conclusion in some situations.

Value added

Helpline hello Uttam

Chambal's Uttam Bandhan, a trend setting agriculture and community welfare initiative is laying a key role in protecting and renewing arable land by educating farmers to practice sustainable agriculture. Chambal uses a mix of both new- age as well as conventional media for providing customized information and technical know-how to the farmers. Under this initiative, farmers are using various contact points to access information on scientific farming practices, latest high quality agri - inputs and prevailing market prices. It is also helps them to locate authorized dealers, know about latest local weather forecast and non-farm business options. Most significantly, it is empowering farmers to cope with problems like nutrient-deficient soils, low water tables and indiscriminate use of fertilizers and pesticides. The interface between Chambal and the farmers are Uttam Krishi Salhakars (UKSs). The UKS is usually a local youth having entrepreneurial skills and agricultural knowledge. He is responsible for collecting soil and water samples for analysis, distribution of quarterly magazine "Chambal ki Chitthi", organizing animal health camps, arranging farmers meetings, crop seminars and product demonstration.

Fisher Friend project

The Fisher Friend project of the M.S. Swaminathan Research Foundation (MSSRF) in Tamil Nadu and Pondicherry leverages mobile technology to provide vital livelihood information to fisher folk. MSSRF partnered with Qualcomm, Tata Teleservices and Astute Technology Systems for developing the Fisher Friend Mobile Application. The tool was designed after a thorough needs assessment of the fisher communities and incorporation of feedback from central stakeholders. Upon sending a single-button-click request from an icon-based software module on mobile, fishermen gain access to vital updates on wave height, wind speed and direction, potential fishing zones, news, government schemes and market prices. All content is displayed in the local language - Tamil.This unique application is helping fisher folk make better choices and avoid hazardous situations. Technology up gradation would empower communities. It would also fit the long-term goals of post-tsunami rehabilitation by expanding the concept of village knowledge centers. It is enabling them to conduct their livelihood operations in a safe and profitable manner. By pressing the button of this mobile phone, fishermen can gain access to information on wave height, weather, potential fishing zones, news flashes, government schemes and latest market price.

CONCLUSION

In India, during the last one and half decade, hundreds of Grassroots ICT projects are implemented invariably, agriculture becomes one of the indispensable parts of the project service menu. However, we yet to get substantial results in increase of agricultural production because of deployment of ICTs. ICT in developing countries has grown rapidly, a development enabled by changes in technologies, policies, and markets. Increased access has unleashed the transformative potential of ICT, affecting the ways in which people, governments, and businesses interact. The changes in those interactions, and ICT itself, promise to enhance economic opportunities for the poor, improve delivery of services to the underserved, enhance government efficiency and transparency, and accelerate social change. Together, the private sector investments and public sector reforms have helped to narrow the gap in access to mobile telephony between developing and developed countries (reaching a penetration of 68 percent for developing countries in 2010). Use of the Internet, although also growing rapidly, is lagging behind the explosive growth of mobile telephony.

All agricultural extension and farmer-outreach programs face three major challenges viz. ensuring cost-effective outreach, designing solutions tailored to needs of individual farmers and cultivating an image that is farmer-friendly. Large sections of the farming community, particularly the rural folk, do not have access to the huge knowledge base acquired by agricultural universities, extension centers and businesses, Most of projects are implemented in smaller geographical area and covering few hundred farmers and hence, drawing generalizations may not appropriate. Much hyped ICT projects are yet to make any break through in agricultural information dissemination. Even though, ICTs are promising to make difference and also accelerating information access by some farmers, but, most of the ICT projects were taken as pilots projects, institutionalizing of ICTs need to be given more emphasis. ICTs for agricultural extension projects need to be compared and evaluated objectively. Low cost ICT tools such as mobile phones having lot of promise for agricultural extension. At the same time, experiences are indicating that ICT are going to play greater role in private sector agribusiness, market information and market intelligence. Further, certain type of farm information (e.g. informing government schemes) and online monitoring of the progress of the governmental schemes are proved successful. Hence, it is high time to find out appropriate information to provide through ICTs. As indicated earlier, formulating National and State level e-Agriculture policy, human resource development, strengthening ICT infrastructure, localization and customization of appropriate content are to be taken-up to harvest the benefits of ICTs for agricultural extension services provision and agricultural development. Over the past decade.

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