

## ICT in Indian Agriculture : Learnings and A Way Ahead

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### ABSTRACT

*Market liberalization and globalization are putting pressure on farmers to adjust their production portfolio and production practices to the emerging trends in food consumerism in domestic as well as global markets, to compete in the market place, farmers need to diversify their production whilst improving the quality of the output. The demand for fast access to accurate information on crop choices, technology, inputs, production practices, services and market is increasing at a rapid pace from farmers end. Application of ICT models in India, with a few initiatives from public and private sector has helped the farmers to obtain the required and accurate information. Its use has reduced the transaction cost for the farmer leading him to save money and time. In this light, taking up appropriate technology, institution and policy measures would lead to efficient management of ICT for maximizing its impact on agriculture.*

**Key words :** Information and Communication Technologies (ICT); e-Chaupal; I-Kisan Helpline; Constraints

Information and Communication Technologies (ICT) including telephone, facsimile, computer, internet, radio and television are considered as important tools for fast dissemination of diversified information and in a cost-effective manner. The NSSO 59th round survey indicates that about 13 and 9 per cent of the households respectively access information through radio and television (GOI, 2005). Balit et al. (1996) considered information and knowledge as the least expensive input in rural development and the introduction of ICT services in rural areas is considered to have far reaching impacts almost on every facet of life, stimulating social and economic development. Torero and von Braun (2006) indicated that by use of ICT in rural education programs, rural families can have access to quality education with previously unimagined opportunities. Role of ICT in management of natural disasters and environmental hazards is beyond doubt. It can provide access to timely information and facilitate link with government agencies for effective governance and can improve livelihood and security of rural communities. In China, Torea and von Braun (2006) reported a significant positive relationship between household income growth and telephone subscriptions. The ICT expand the scope of providing demand driven, interactive, client specific information thereby improving communication efficiency, enhance productivity, encourage competitiveness and accelerate growth in various business and social sectors (Helpman, 1998).

### Growth of ICT

ICT sector in India is growing fast with its application in various fields using different ICT tools like television, radio, telephone, and others. Growth in Indian information technology (IT) in the world market is primarily dominated by IT software and services, including system integration, IT consulting, application management, custom applications,

infrastructure management, software testing and web development. Between 2009 and 2012 tele-density has increased more than doubled. Such a tremendous increase in tele-density was driven by mobile cellular services, the density of which increased from 6.9 percent to more than 63 per cent in 2011. In India mobile subscribes base touches 952 million in 2011 while the overall wireless teledensity reached 76 per cent. In 2012. During this period, there has also been significant increase in the internet users from 4.6 per cent in 2009 to 41.0 per cent in 2011. India has overtaken China in terms of mobile growth rates. India has growth rates of 91 per cent per annum since 2001. With just total mobile penetration rates of over 14 per cent potential for growth is enormous.

### Applications of ICT in agriculture - Learnings

The fastest growth of ICT sector is influencing its application in several sectors including agriculture and rural development. In recent years, both public and private sector organizations have taken initiatives for application of ICT in the field of agriculture to improve efficiency and to accelerate growth. The empirical research on direct and indirect impacts of ICT on agriculture and rural development is limited. This study discusses on issues and salient benefits of ICT in agriculture based on a quick study on selected ICT-based initiatives. The paper throws light on broad issues concerning mainstreaming ICT in Indian agriculture.

### METHODOLOGY

One of the important dimensions of the study was to quantify costs and benefits of application of ICT from the end users perspectives. For the purpose, a survey was conducted with 120 randomly selected farmers associated with ICT dissemination models as described above. The sample includes forty farmers from each initiative i.e. 'e-chaupal' in Dhar district of

Madhya Pradesh, 'Help-line' initiative of Chandra Shekhar Azad University of Agriculture & Technology, Kanpur district of Uttar Pradesh and I-kisan initiative from Kanchipuram district of Tamil Nadu. Information on activities and approaches followed in each model was documented through discussions with project staff. Information on the costs, benefits and constraints were obtained from selected farmers. Though it is difficult to delineate the effect of use of ICT excluding other factors, we tried to measure some tangible costs and benefits 'with and without' framework. Some important indicators included for measuring cost effectiveness include transaction costs, distance travelled for information acquisition, time saved, and opportunity costs for labour.

#### **e-Choupal :**

e-Choupal, is widely acclaimed and successful application of ICT in Indian agriculture. e-Choupal was started in 2000 by the ITC (Indian Tobacco Company) primarily to improve its procurement efficiency of soybean in Madhya Pradesh. At present, it has become the largest initiative among all Internet-based interventions by private sector in rural India covering over 4 million farmers growing a range of crops - soyabean, coffee, wheat, rice, pulses, shrimp - in over 40,000 villages through 6500 kiosks across ten states (Madhya Pradesh, Haryana, Uttarakhand, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan, Maharashtra, Kerala and Tamil Nadu). Over 1200 e-Choupals are in Madhya Pradesh. These Choupals have been provided with internet connectivity with solar panel battery back-up and VSAT equipment. Although, the primary objective of the e-Choupal is to empower producers with information on market prices of agricultural products, it also gives latest information on weather and farming practices to help them in decision-making. The e-Choupal acts as a direct marketing channel, and eliminates market intermediaries and reduces price spread. It thus helps producers reduce transaction costs of information search and transportation. Also the farmers realize better returns with increase in sale value for their soya produce by around two per cent. Besides, e-Choupal helps providing high quality inputs to producers by tying up with input manufacturing companies.

#### **I-kisan limited :**

I-kisan limited is an initiative of the Nagarjuna Group of Companies, started in 2000 in Andhra Pradesh to help farmers improve agricultural productivity by providing information on best practices through its information kiosks at block/ village level. Farmers were provided access to the internet portal free of cost. It provides information in regional languages (Tamil, Telugu, Kannada, Marathi and Punjabi). The portal contains information on agricultural practices,

agricultural news, animal husbandry, agricultural machinery, aromatic and medicinal plants, agricultural credit, insurance and prices of inputs. It also provides information on marketing and weather. I-kisan maintains 21 kiosks, 14 in Andhra Pradesh and 7 in Tamil Nadu. These kiosks had facilities like computer, internet connection and other infrastructure. A facilitator is also available at each kiosk for disseminating information and providing services of I-kisan. A 'member registration' system had been evolved for I-kisan at the village level with the twin aims of developing a rapport between the farmers and I-kisan. These services are complemented by the farm advisory service unit of the group.

#### **Help-line service :**

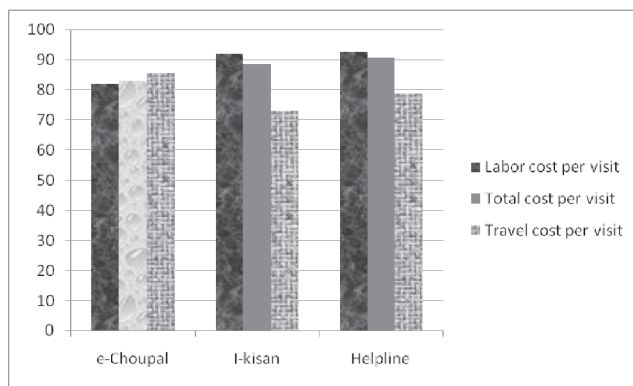
Started by the Chandra Shekar Azad University of Agriculture and Technology (CSAUAT), Kanpur, Uttar Pradesh in 2002. Help-line service operates through a toll-free telephone service and offers farmers direct solutions of their agriculture related problems. A panel of scientists from various disciplines of agriculture attends farmers' calls and interacts with farmers during specified hours on all working days. On an average about 10 queries are received by the panel every day. Mostly, the farmers queries are related to variety of seeds available with regard to various crops and plant protection measures.

## **RESULTS AND DISCUSSION**

In absence of ICT situation, due to travel constraints, farmers sought the suggestions from private agro-input dealers while purchasing agro-inputs, instead of going to nearby office of department of agriculture. But, it was product oriented advice rather than farmer/farm oriented advice which alone could not help in increasing overall productivity of one's farm. Even at all India level, the quality of information as 'good' was expressed by only 50.50 per cent of farm households for input dealers whereas 59 per cent and 55.50 per cent had expressed for TV and Radio respectively (NSSO, 2005). But the study results indicate that in the case of private ICT-based initiatives like e-choupal, I-kisan, and Helpline, the farmers could get more authentic technical advice by visiting information kiosks/phone booths located in the village or nearby village which had reduced transaction cost to the level of 80-90 per cent. The substantial reduction in the transaction cost in the three ICT dissemination models is depicted in Figure 1.

#### **Figure 1: Reduction in transaction cost for information acquisition (%)**

Conventionally, farmers spend considerable time and money for price discovery for procurement of inputs and sale of produce. Application of ICT in



**Fig. 1 : Reduction in transaction cost for information acquisition (%)**

information acquisition and facilitating transactions in input and output markets by ICT-based initiatives have helped farmers in reducing transaction cost on these activities. As per ITC’s own estimates, by using e-choupal in the case of soybean, the farmers could save 68 per cent of the transaction costs due to information led decision making on when and where to sell their farm produce. Also, the farmers had expressed that they had realized increase in sale value for their soybean produce by around two per cent due to premium price offered by e-choupal for their quality farm produce (Adhiguru and Mruthyunjaya, 2004). Helpline service has reduced transaction costs for seeking information by about 90 per cent and has helped farmers in taking correct decisions on farm-inputs and adoption of technologies in agriculture and allied areas.

constraints experienced by end users are presented in Table 2. For instance, among the various constraints reported by the users in different initiatives, subject matter inadequacy and lack of content in local language were found to be prominent constraints.

**Enhancing use of ICT tools**

Application of ICT’s has promoted massive Learning Management Systems (LMSs) and learning resources. In the past few years, for purpose of learning through internet various electronic texts, images, movies and other learning resources have been developed. Later, other applications to create synchronous and asynchronous learning management systems are developed. Mobile phones are also utilized in knowledge transfer through SMS, podcasts, video and audio netcasts, etc. Using ICT applications the search, categorization, arrangement and exchange of information, facts and data have become a frequent situation. Using of horizontal and vertical portals, knowledge management platforms are developed under e-extension can improve the farmer-scientist relationship by means of user friendly content delivery ICTs.

Multi-pronged strategy in deploying ICT is required if it is to make a real dent in the upliftment of the poor.

- i. Content development has to be optimized blend of both generic and indigenous knowledge.
- ii. Unified dissemination of technical information by evolving institutional synergy among research and

**Table 1: Constraints experienced by farmers** (Percentage of farmers)

Sr. No.	Constraints	Organization		
		e-Choupal	IKisan	Helpline
1.	Insufficient regional specific information	25	55	15
2.	Inadequate subject matter	25	10	38
3.	Not suitable to all kinds of information	20	15	30
4.	Inadequate support from facilitator	10	35	NE
5.	Inadequate facilitator’s knowledge	53	30	NE
6.	Facilitator is not available	NE	NE	50
7.	Lack of infrastructure facility	NE	63	10
8.	Inadequate internet/phone connectivity	NE	50	50

NE: Not expressed

**Constraints in availing ICT-enabled services**

Importantly, there is poor domestic demand for ICT as it remains outward looking. In India, ICT initiatives in agriculture are in the takeoff stage and obviously they are facing many field problems while translating any ICT model into reality. At macro level, some hurdles in takeoff of ICT include, uneven regional development leading to greater inequality between states and also greater rich-poor, urban-rural inequalities; and lack of absorptive capacity standing in the way of knowledge filtering to other sectors of the economy. At micro level the fine tune of ICT still continue to be a matter for concern. Some selected

- development institutes.
- iii. Capacity development programs to upgrade regional/intermediary institutions to be abreast with innovative application of ICT tools.
- iv. Bridging the digital divide by strategic deploying ICT with regard to dividers viz. age, gender, land holding, geography.
- v. Emphasis on gender equity by providing women-oriented content, easy access and capacity building.

## CONCLUSION

Changing agricultural scenario has enhanced information needs of various stakeholders in agriculture especially farmers. The information revolution taking place through ICT is a great coincidence to meet those information needs. In this context, various organizations have ventured into ICT initiatives in agriculture. The lessons drawn from them had provided insights into positive impact of ICT

mainly on cost reduction also constraints in content, facilitation, connectivity and institutional support. In these lights, taking up appropriate technology, institution, integration of information, products and services along with policy measures would lead to efficient management of ICT for maximizing its impact on agriculture.

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