Proceedings

National Workshop on USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN INDIAN AGRICULTURE

International Food Policy Research Institute (IFPRI)

&

Centre for Research on Innovation and Science Policy (CRISP)

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CONTEXT

This workshop was jointly organized by IFPRI and CRISP to take stock of the current developments in use of Information and Communication Technologies (ICTs) in Agriculture in India. The workshop brought together experts and practitioners working on ICTs in Agriculture) and they deliberated on the achievements, constraints and way forward for effective use of ICTs in agriculture.

INAUGURAL SESSION

Welcome

Devesh Roy (IFPRI, South Asia) while welcoming the participants highlighted the importance of information and how it is emerging as an important variable that determines the productivity and profitability of agriculture.

Workshop: Background and Objectives

Rasheed Sulaiman V (CRISP) presented the background to the workshop. He started with the information from the National Sample Survey Organisation (NSSO, 2014) data that shows that only 41% of the people (less than half) have access to information on agriculture, though India has several ICT initiatives (audio, visual, print and video) implemented by the public, private and NGO sectors. There is a need to better understand how these ICT applications are supporting the achievement of food security with focus on not only food production but the complete value chain including processing, etc. He emphasized on the need to undertake research to better understand how ICTs can better contribute to food security and sustainable development goals and see what is working and what is not.

The three main objectives of the workshop were as follows:

1. Recognize the large number of ICT solutions deployed in agriculture in India
2. Understand how the ICT applications are supporting the achievement of food security with focus on not only food production but the complete value chain including processing, etc.
3. Identify the research gaps that can better provide policy level insights on using ICTs to achieve food security

The workshop brought together several experts and practitioners and served as a platform to share the achievements and constraints and reflect on way forward for ICT in agriculture.

Inaugural Address

D Rama Rao (NAARM, Hyderabad) delivered the inaugural address. He stated that the use of ICTs has transformed drastically in the last 2 to 3 years. However, the usage of the technology is much lower than the ownership. Also the technological advances are also happening very rapidly. He also expressed that the ownership of technology is much higher than the usage of technology, be it mobile, radio or even newspaper. Why is it so? He urged the participants of the conference to focus on how we can enable greater use of ICTs in agriculture.

Keynote Address

Saravanan Raj (CAU, Shillong) pointed to the large number of ICT solutions available for the farmers in the form of mobile-SMS, web portals, call centres, digital videos and mobile apps. However, most of these are used for the delivery of information only. The potential of using ICTs for other purposes such as capacity development are yet to be fully realized. He also pointed to the promising cases of social media applications such as Facebook and WhatsApp which are now connecting large number of farmers on the same platform and enable them to share their learnings and experiences with each other. He also shared with the group the challenges in promoting use of ICT in Agriculture such as lack of relevant content, limited access to ICTs and lack of convergence among different stakeholders to develop and promote more appropriate and sustainable solutions for the farmers. He suggested several ways forward to address these issues which include, development of location specific content and integration of different efforts by various stakeholders.

Food Security Portal (FSP) Initiative

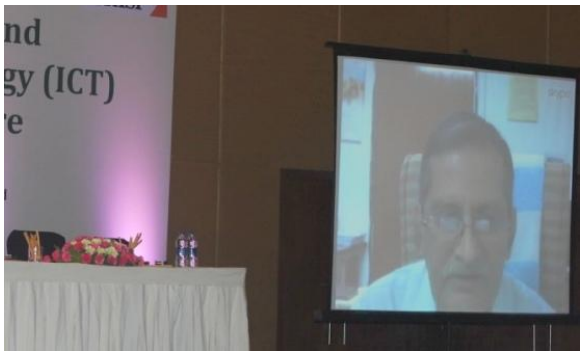
Jaspreet Kaur (IFPRI, South Asia) presented the features of the Food Security Portal (www.foodsecurityportal.org). The portal provides information on six different aspects related to food security. The weekly blogs published in each category are open to everyone. The portal shows an interactive map view of the world depicting the areas with the different level of drought, temperature, rainfall, etc. The portal also gives us an idea of the projected price of the different commodities based on the historical data and modelling.

TECHNICAL SESSION I: ICT IN AGRICULTURE-NATIONAL LEVEL INITIATIVES

m-Kisan-SMS Based Farm Advisory

R K Tripathi (DAC, MoA, Government of India) began his presentation by mentioning that there are a large number of websites/web portals on agriculture that are existing today but many are not being accessed by the farmers for the following reasons:
* Lack of a single website that can solve information needs.
* Lack of information in vernacular languages (most of the sites are in English language).

Realisation of these reasons has led to the development of an integrated portal which is now called as the farmers' portal. The portal provides information related to the complete value chain, crop management, postharvest, risk management, exports and imports. It also provides information on crop diseases and symptoms, veterinary centres, diagnostic laboratories, livestock census etc. Although the data is available at the national, state and district levels, there are plans underway to provide more location-specific information (block level and below) to farmers. Besides, the portal supports multiple languages.



As many farmers are still not using the information provided through the portals, the government realized the need to have some kind of facilitation to help farmers access the information. We need an organization/entity that can understand their problems, reach out to the right knowledge source, translate it in the farmers' language and deliver in an understandable format for the farmers. With this view, farmer call centres were launched in 2004. A Kisan Call Centre (KCC) is accessible to everyone on a nationwide toll free number – 1800 180 1551. The KCCs have a well-connected group of professional and experts. Initially, the KCCs lacked in both the infrastructure and the human resources. But in the year 2012 the system was completely restructured with the advancements in technology and internet facilities. Highly trained team of professional and supervisory teams are currently working with the kisan call centres and are responsible for providing high quality information to the farmers.

Through the new initiative *mKisan*, a farmer can get a preferred advisory on his mobile through SMS. Experts can register and send advisory messages to farmers at www.mkisan.gov.in . The messages are sent in the local language.

Kisan Call Centres (KCC)

Sudhakar Reddy (PJTSAU, Hyderabad) began his presentation by mentioning that undivided Andhra Pradesh is a pioneer of KCC. Technical support for KCC is provided by PJTSAU in Telangana through three levels. At level I, agriculture/horticulture graduates responsible for

answering the farmers' calls capture the questions and the data. At level II, subject matter specialists housed at the response center provides advice on farmer queries. At level III, senior officers at the nodal institutions provide advice on questions that remain unresolved at level II. He also mentioned that apart from PJTSAU, various other organizations like DRR, AH Dept, Dept of Horticulture, Doordarshan, etc are actively contributing to the successful functioning of the KCC.

Information related to plant protection, weather forecasts and processing of livestock products are the top three categories where information is being sought. Apart from answering calls of the farmers, KCC is also responsible for providing training to different line departments. KCC organizes a monthly training program where they educate the KCC staff on one crop and also about the probable questions they might receive. He also stated that KCC is helping the university in getting easy feedback from the farmers and is acting like a source for easy information dissemination, to help formulate research projects, plan extension strategies and formulate government policies.

Farm Advisory through Mobiles- Green SIM

G C Shrotriya (IKSL, Delhi) discussed about the gap that exists between the information needs of a smallholder farmer and the current means to satisfy him/her. He described the various challenges in addressing this and emphasized the use of mobile phones as the solution to bridge this gap. He explained the features of IKSL services, which deliver up to four free voice messages on areas of interest, and has a helpline services managed by experts and organize phone-in programmes and mobile-based quizzes. The importance of mobile phones and its various uses for information dissemination and communication were highlighted.

IKSL is covering 19 states and 108 zones in those states and have a subscriber base of 11 lakh. IKSL provides messages through both push- and pull-based approach. The messages are delivered daily in regional languages and have content in 16 different categories which includes Agriculture, Horticulture, Animal Husbandry, Floriculture, Poultry, Irrigation, Fertilizers, Insurance, Banking, Rural Health, Government Schemes, Market Prices, Sericulture, Employment Opportunities, Human Health and Co-Operatives. A message mix for every day is determined and weekly message calendar is prepared. IKSL carries out a content audit to assure actionable, authentic, adequate, clear information to be delivered to its users. To increase the access of information, IKSL have an online portal (voice, text and images) which can be accessed by anyone anytime and even on a mobile app. Users can customize the app as per their needs and receive information in the preferred language.

i-Kisan

Vijay Yesudasan gave an overview of the Nagarjuna group (which is a pioneer in the field of ICT in agriculture) and the Ikisan, Agri-Informatics and Services which is a part. He narrated the evolution of the different initiatives by different players and discussed about the expected shape of future initiatives which are going to be largely driven not by technological changes but by the changing "business" environment of agriculture. The future initiatives are oriented towards enabling the larger agricultural innovation system rather than the formal agricultural research and development system. He noted that sustainability, scalability and replicability are the three factors that need to be factored in any project.

While designing a solution the wants of rural villagers should be kept in mind. The intervention of iKisan with partners like ICAR-CRIDA has an information kiosk, display announcement package, interactive voice response system, knowledge share centers, market linkages etc. iKisan has developed a device called irrigation controllers which enable farmers to regulate irrigation supply according to weather condition and electricity availability. The irrigation system can be switched on or off remotely through a simple SMS or blank call. These devices are launched in the districts of Nalgonda and Mahbubnagar.

TECHNICAL SESSION II: ICTS IN INFORMATION DISSEMINATION-ICT TOOLS

eSagu IT Based Personalized Agro Advisory System

P Krishna Reddy, (IIIT-H, Hyderabad) narrated the experiences with e-Sagu, a web-based personalized agro-advisory system which uses Information Technology (digital photo based) to help farmers adopt better/scientific management practices in agriculture. Though several ICT based solutions for agriculture sector are evolving, we haven't been able to build scalable and location specific solutions that cater to the entire farming community. Some of his ICT based projects in pipeline such as e-Agro-met, crop specific virtual labs and crop planner/scheduler were discussed.

He emphasized the importance of timely actionable knowledge at every farm. Most of the existing ICT solutions are generalized and are text based which is a major challenge, considering the high rate of illiteracy among farmers. Most of the ICT solutions are designed based on a top-down approach. He explained how the e-Sagu system was customized to cater to the need of the not only the elite and literate groups of farmers but also the illiterate farmers as well. In this approach, the advisory issued by the expert scientists were printed and posted on the village notice board. Some revolutionary research is needed to find holistic solutions for building an effective extension system which will integrate all aspects that are required at the farm level.

Facebook for Farmers and Extension Workers

Joshy P M (Government of Kerala) highlighted how the social media platform such as Facebook is being effectively used in Kerala for reaching out to farmers and extension workers. Based on the success of using Facebook by the Vattamkulam Krishi Bhavan (Malappuram District, Kerala), the Government of Kerala has decided to officially include Facebook as an important tool to strengthen the extension activities of the Department of Agriculture. The state agriculture department has urged all the officials under it to extend the activities of the department through the social media to enhance the productivity and profitability of farming. All the farmers registered with the department will have to maintain a social media account to be in touch with the local Krishi Bhavan. The plan is to equip 300 e-panchayats for farming in the initial stage. The government has mandated that all agricultural officers should have active Facebook accounts.

SasyaSree - a One Stop Telugu portal for Information Dissemination

Devi Prasad Juvvadi (AMRG, Centre for Good Governance, Hyderabad) highlighted the importance of locally relevant content in regional language. He spoke about the ICT-mediated project, "SasyaSree - a One Stop Telugu portal for Information Dissemination", which was initiated based on the identified need of having locally specific, demand driven knowledge solutions in local language through a web portal. The project caters to eight districts in Andhra Pradesh by documenting the best crop management practices, information related to Government schemes, market price and other information needs of the farming community in local language by means of video, audio, photographs etc. The project also tries to integrate with other public extension initiatives and provide information on other allied sectors such as animal husbandry, poultry etc.

TECHNICAL SESSION III: ICT IN FOOD SECURITY

Framework for Implementing ICTs in Agricultural Development in India

N H Rao (NAARM, Hyderabad) emphasized on the integration of several ICT initiatives in India with the larger national wide initiative which has been underway for over 8 years in the name of "Digital India". He tried to lay down the framework for integrating ICT's into a national

framework which has been envisaged particularly with reference to the agricultural knowledge services. He also highlighted the core issue involved such as the following:

- Strategic challenges of food security and business environment for farmer
- Agricultural Knowledge System in India
- Digital India – infrastructure to connect farmers with agricultural knowledge services
- Integrating agricultural knowledge services with digital India infrastructure
- Implications for policy and investments

The demand and the production systems needs to be linked with various stakeholders as even small and timely information about market prices can increase the farmer level profits from 5-20 %. The significant knowledge challenges in terms of the technology and the technological challenges to meet the rise in demand for food security were highlighted. Greater knowledge intensive technologies are required keeping in view the sustainability and climate smart agriculture.

The Key issues:

- Connect people with information
- Enable conversion of information to knowledge
- Connect people with other knowledgeable people
- Encapsulate knowledge, to make it easier to transfer
- Customize and disseminate knowledge
- Scale

Some key points from the Digital India initiative were highlighted. These include, provision of connectivity at the Gram Panchayat (GP) level with Optical Fiber Network (OFN) in place up to the block level in 2011. BBNL (Bharat Broadband Network Limited) has been formed to extend Broadband connectivity up to GP level. The need for convergence of data to information to knowledge pathways at Gram Panchayat level was also highlighted. How the Geographical Information Systems (GIS) can provide the framework for agricultural knowledge services through Digital India Platforms was explained.

The implications for policy and action were also highlighted; such as ensuring authenticated knowledge link with NARS / KVK; Trained personnel at GP to interface with farmers; investments in skill building in managing knowledge services at GP; integration with markets and logistics network; eventual links with sensor based data from farms, sensor data, archival data and other data to provide base for big data analytics based knowledge discovery and decisions.

Knowledge Management using Web Portal- RKMP

Shaik N Meera (IIRR, Hyderabad) highlighted the approach to Knowledge Management using Web Portal through discussing the case of "Rice Knowledge Management Portal (RKMP)".

There have been some 3,500 ICT initiatives in India in the last two decade and a shift is clearly visible in terms of using the ICT for Knowledge management strategies very specific to agriculture development. The issue of bridging the digital divide in terms of providing the knowledge and content continues to be a major challenge. He talked mainly on the depth required for knowledge management initiative in agriculture, including knowledge generation, storage retrieval and sharing. RKMP currently has more than 16000 pages of validate, contextualized and localized information in local language related to rice. Development of this portal was possible only through the direct involvement of more than 60 rice scientists and more than 250 rice stakeholder organizations across the country. The importance of scaling up such initiatives and the danger of leaving them in the project mode were discussed.

ICTs and Farmers Decision-Making across the Agricultural Supply Chain

Jabir Ali (IIM-Lucknow) discussed about the relationship between agricultural decision making among users or non-users, the quality of information delivery from public and private sources and the factors that are likely to affect ICT adoption and its implications. He shared the results of a research study on "Information and Communication Technologies (ICTs) and Farmers' Decision-making across the Agricultural Supply Chain". The study found that the use of information in agriculture has increasingly become important for effective decision-making by the farming community. Availability of information and knowledge makes a significant impact on the quality of decision making across the agriculture supply chain. He also mentioned that the finding from the study also provides guidance to public and private extension systems for designing ICT-based information system to better serve the farming communities based on their needs.

TECHNICAL SESSION IV: ROLE OF PRIVATE SECTOR IN ICT AND AGRICULTURE

Participatory Video Based Extension

Pritam Nanda, (Digital Green, Hyderabad) highlighted the participatory video based extension approach which is the core of the Digital Green and how this approach is supplementing the existing extension systems in India. He illustrated the processes adopted by Digital Green that include, video recording, editing, production, dissemination and monitoring of adoption practices. Rather than creating a parallel system of extension, Digital Green works with the existing systems to supplement their efforts.

mKrishi– Mobile Agro Advisory System - Sampath Selvan, TCS

Sampath Selvan (TCS, Bangalore) talked about mKrishi mobile agro advisory system of TCS which uses a combination of mobile, web, IVR and USSDD services. He also talked about their initiatives that are focused around engaging with the Farmer Producer Organization (FPOs) at large and subscription and module based services to individual farmer stating from preparation of crop planner, agro advisory, cultivation practices and marketing.

Life Line Agriculture Program - BijoyBasant Patro

Bijoy Basant Patro discussed about the “Life Line Agriculture” which uses an innovative, yet simple mix of telephony and the internet – to serve vital information and knowledge needs at grassroots and to enable concurrent co-creation of a contextual knowledge base on agriculture and allied subjects. This service allows farmer to call the toll free number, 1800-11-2500, to register their query in local language, which is further processed by the knowledge workers through the database or else forwarded to experts and the query is answered within 24 hrs.The initiative is now moving forward with Mobile based app.

CLOSING REMARKS

Rasheed Sulaiman V (CRISP, Hyderabad) made the final remarks. He shared some of the major lessons and learning from the workshop, which were as follows:

India has at least two decade long experience of using ICT in Agriculture. ICTs have gone through different stages and many of these will continue to evolve in response to changing technology and business environment in agriculture as well as in response to emerging challenges in agriculture.

Lot of evolution has happened in this sector, the costs of accessing information through ICTs have come down, access have generally improved and many initiatives are combining text, images, audio and video. There is an increasing shift from stand-alone ICT initiatives to much more integrated ICT initiative that basically works across the value chain.

ICT can play critical role in strengthening the capacities of not only farmers but also for the field level functionaries and intermediaries. Developing the right or relevant content at the appropriate level has always been a challenge and more efforts are needed in this direction. Content development is not a one-time process and it needs a continuous approach. We need to explore the possibility of mandating district level organizations like Krishi Vigyan Kendras (KVKs) in developing locally relevant content.

Another interesting area to look at is on leveraging the potential of investments in Digital India, where the government is investing considerable resources in establishing the hardware and connectivity in place.

From individual personalized advisory services, there is an increasing recognition on the importance of linking ICT initiatives to groups like farmer groups, farmer producer organizations etc. Efforts to undertake audience segmentation are happening currently. ICTs are adding value in knowledge management as several players are looking for the same information. While most of the initiatives are independently funded and managed currently, there is a lot of scope for convergence. Institutionalization of successful ICT initiatives would depend largely on the policy level support and there is a need to bridge the gap between practice and policy.

Policy relevant research is needed to bridge this gap between practice and policy, including evaluation of impact of ICTs in agriculture. Lot of data is available with the different players, including the private sector which everyone is using to carry out their own independent research. As there is no platform to share this data and analysis on a continuous basis, these are not available for analysts and policy makers to make informed decisions. We need to design a platform where all the players in the ICT in agriculture sector are willing to share and use data

and experience, so that we collectively learn while the initiatives are in progress and continuously innovate.

Finally, Jaspreet Kaur (IFPRI, South Asia) proposed a very hearty vote of thanks to all the speakers and participants who spared their valuable time and shared their insights in this workshop.

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