ICT Programmes and Policies for Agricultural Extension in India: A Review on Karnataka

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Abstract

An information and communication technology (ICT) in agriculture is an emerging field focusing on the enhancement of agricultural sector in India. It involves application of innovative ways to use ICT in the rural domain. It can provide with accurate information necessary for the farmers which facilitates better Agricultural output. In recent year farmers attitude to access to agricultural information have been changed because of very fast networking of information and communication technology. Farmers can get the information regarding fertilizers, pesticides, crop patterns and weather forecasting and other information through zero affordable cost or low cost. Many of the organizations like government, private, co-operatives and public have also attempted to facilitate the information technology transfer in the agriculture sector. ICT is crucial in facilitating communication and access to information for agriculture and rural development. With this perspective present study is going to find out the relevant ICT applications for agricultural extension in India with respect to Karnataka government initiative policies and programmes perspective.

Keywords: *ICT (Information and Communication Technology), Agriculture, Farmers, Policy and programmes.*

Introduction

Agriculture sector is predominant sector in Indian economy. Most of the families are depending on agriculture sector; nearly 60 % of the Indian populations are engaged in agriculture sector in India. Agriculture sector contribution is 16% of total GDP in India. The performance of agriculture basically means the performance of small holder farming. It is only by empowering small and marginal farmers to overcome their handicaps that, they can

become instruments of evergreen revolution and growth in agriculture sector. ICT in agricultural extension will provide much needed impetus to agricultural sector and ICT can complement the traditional extension system for "Knowledge Resource" delivery to the millions of the farmers. Present study deals with the Karnataka's agriculture profile and performance of ICT tools in Karnataka with respect to agriculture sector. Study also reviews on successful ICT programmes in agriculture and allied activities.

Information and Communication Technology (ICT) consists of three main technologies. They are: Computer Technology, Communication Technology and Information Management Technology. These technologies are applied for processing, exchanging and managing data, information and knowledge.

Any system applied for getting information and knowledge for making decisions in any industry should deliver accurate, complete, concise information in time or on time. The information provided by the system must be in user-friendly form, easy to access, cost-effective and well protected from unauthorized accesses. ICT can play a significant role in maintaining the above mentioned properties of information as it consists of three main technologies. ICT is the integration of technologies and the processes to distribute and communicate the desired information to the target audience and making the target audience more participative in nature.

Special Features of Information and Communication Technology

Some of special features are can be summarized as follows;

- Speed is one of the special features of ICT; the tremendous progress of telecommunication has killed the vast distance in between, and turned the world to a global village.
- It is an astounding store-house of information which enhances the knowledge of people for new innovation and ability to access them for free.
- Saves time and opens up new vistas in various agricultural activities.
- Unifying and magnifying features of digital technology. The technology of virtual reality is helping areas of research in certain disciplines.
- The information is available instantaneously from any point on the globe round the year and twenty four hours a day

- Here communication is interactive as it also involves the farmers
- The communication is dynamic and ever growing.

Improving Information Availability and Delivery of Services for sustainable agricultural growth and livelihood are the main aims of providing ICT services to the farming community. The well accessed information by the ICT results in increasing productivity thereby increasing sustainability of agriculture. The importance of ICTs application is summarized on the following accounts;

- Improved information access and delivery of services to the farming community.
- Improved productivity and profitability of farmers through better advisory systems.
- Efficient and Increased utilization of information by stakeholders for their decision making.
- Faster and efficient redressal of farmers' grievances.
- Better monitoring of government schemes, which directly impact the farmers.
- Improved transparency and accountability.
- Direct feedback from farming community to the decision makers in the state.
- Efficient management (Development, Conservation, allocation and utilization) of resources

Reasons for Delay in Agricultural Information in India:

The main purpose of extension is to transfer the agricultural advanced technology and research to the farmer, and feedback of field problems to the research system. Latest information and knowledge on the subject play a major role to full fill this purpose. There is an information delay between farmers and agriculture researcher in India because:

- Media, Information Management and ICT are not properly used
- Lack of adequate extension workers
- Lack of Agricultural information literacy in India

- Lack of updated agriculture information with the farmers and most of the extension workers
- Poor technological knowledge of farmers and village level extension personnel
- Economic problems of rural people
- The top-down approach is adapted for extension activity. So the linkages between research- extension and farmer remained weak etc.

Significance of the Present Study

The present study forms part of agricultural economics by emplacing on the primary sector growth and development. Services and facilities those are available for farmers to become efficient and smart to enhance their agriculture production particularly. Information and Communication Technology is of utmost importance which determines the effectiveness and utilization of services and facilities to improve farmer. In particularly the agricultural production of the nations and farmers cultivation method and knowledge depends on innovation technology as well as information technology. Thereby, Information and Communication Technology is very important variable in determining agricultural production and farmers' efficiency in farming activities. So present study focuses on how ICT programmes and policies are emphasized in agriculture sector and awareness to the farmers in Karnataka.

Literature Review

Rabindra Kumar M (2012) in the work entitled, "Role of Information in Agricultural Development of Odisha", aims to discuss areas of information needs for various stakeholders in agricultural sector in the developing state of Odisha. Access to right information and its proper utilization for the farming community is the order of the day which needs to be practiced in the state. Author suggested that extension professionals should carry publicity materials and distribute success stories in agriculture so that it may make great impact upon farmers with needed information. Hence, extension professionals working in agricultural sector should develop better visioning and empower the farmers with latest technology and farming practices.

R.Saravanan (2012) worked on "ICT for agricultural extension in India: Policy implications for developing countries", This article was concise reviewed ICT projects implemented since 1990's in India, elaborating best practices and its ingredients for success

and also draws policy implications for the effective ICT based agricultural advisory services in developing countries. Study revealed the national policies with respect to ICT in agricultural extension services in India. It also found the impact of information and communication technology on agricultural sector with the view of the successful implemented programs.

Jenny C. Aker (2011) in the article entitled "Dial "A" for agriculture: a Review of information and communication technologies for agricultural extension in developing countries", outlines the potential mechanisms through which ICT could facilitate agricultural adoption and the provision of extension services in developing countries. Public sector programs have attempted to overcome information-related barriers to technological adoption by providing agricultural extension services. They reviewed existing programs using ICT for agriculture, categorized by the mechanism and the type of services provided. According to author identifying potential constraints to such programs in terms of design and implementation is important. It concluded with some recommendations for implementing field-based research on the impact of these programs on farmers' knowledge, technological adoption, and welfare.

Claire J.et.al (2010) in their work entitled, "Review of Agricultural Extension in India" ascertain why farmers are not accessing information and where information gaps exist, despite the variety of extension approaches in India. They focused on some of the major agricultural extension programs in India by considering their ability to provide information and facilitate information sharing and use in farming communities. Author examines the challenges and constraints of each agricultural extension approach as it attempts to provide farmers with access to information that is relevant to their farm enterprises. They concluded that there is an increasing need to work in partnership and to share knowledge and skills in order to provide locally relevant services that meet the information needs of marginal and smallholder farmers in India.

Objectives of the Study

To review the various Government policies and programmes in promoting ICT in agriculture sector in Karnataka.

Methodology

The present study is based on the secondary source of information

Secondary sources were collected from various government reports, i.e., Ministry of Agriculture and Allied activities of both Central and State governments. Karnataka State agricultural policies, which are Karnataka Agriculture Policy 2006, Integrated Agribusiness Policy 2011, Karnataka Agriculture Market Policy 2013 and Karnataka Agribusiness & Food Processing Policy 2015.

Karnataka Agriculture Sector

Agriculture plays a vital role in economy of Karnataka. Karnataka is heavily dependent on the agricultural sector. About 1.8 m ha (million hectare) area of the state is under irrigation which constitutes about 16 percent of the gross cropped area. Karnataka with its diversified agro climatic conditions is home for the production of variety of agriculture crops such as Sunflower, Maize, Tur, Jowar, Sugarcane, Bengal gram, Soybean, Groundnut, Green gram, Black gram, Sunflower, Paddy, Cotton etc. The State also grows variety of small and minor millets such as Foxtail Millet (Navane), Little Millet (Sawe), Finger Millet (Ragi), Bajra (Sajje), Haraka etc.

Karnataka State Agricultural Policies Review

Karnataka agricultural policies reviewed here are with respect to importance of ICT applications for agricultural development in Karnataka.

Karnataka Agriculture Policy 2006

The Policy stated a "Farmers Centric" approach, which means policy, would have concern on farmers, how to empower the farmers and how to enhance the production capacity with available resources and mainly on eradicating or address the impediments of agricultural sector.

The philosophy of the 2006 agricultural policy lies in the concept of 'Pancha Sutra'. The five components of sutra's are: 1) to protect and improve soil health. 2) Conservation of natural resources, with special emphasis on water and micro irrigation 3) Timely availability of credit and other inputs to the farmers, 4) Integrated post-harvest processing with the production process, and 5) Reducing the distance between "Lab to Land" in transfer of technology.

With these five components policy has given the more importance for ICT to enrich the knowledge of farmers on farm cultivation, input supply, pre and post harvesting of the agriculture and allied activities etc. IT being a 'farmer centric' policy, the focuses of the

policy has to generate an honorable level of growth in the net income of the farmer through value addition and agro-processing. ICT has taken a prominent role in this policy to provide accurate and adequate information and to make skilled agricultural laborer. Policy has recommended a scheme of Raitha Mithra Pusthaka (RMP) it has information about the farmers and many other agricultural related information has Consisted .Another step of the policy was to strengthen the Bhoomi project which is one of the ICT based project, this project has the information about the computerized land records from the information kiosks in this direction farmers can easily get land records. Another major program is Soil Health Card, it has consisted the information regarding soil health Nutrition, it would help to farmers to maintain the soil health. Therefore ICT play a prominent role in the Agriculture Sector.

Integrated Agribusiness development Policy 2011

The Karnataka government has taken a lead initiative in developing sustainable agriculture or agribusiness enabled through an 'Integrated Agribusiness Development policy', covering agriculture and allied activities (like horticulture, animal husbandry, fisheries, sericulture and food processing) both in infrastructure and industrial segments on an end to end concept. In this view policy aims to create an enabling institutional structure for addressing the aforesaid thrust areas, facilitates flow of information, technologies, skill sets and modern management practices. In order to facilitate agribusiness in Karnataka and to keep abreast of latest technology and information in the sector, central product information, cultivation knowledge support cell and market intelligence cell shall be established. This *knowledge support cell* would cover creation of agri- portal, university-farmer interaction ,knowledge dissemination, corporate knowledge and farmer FAQ, technologies, guidance solution support, schemes and services of GoK and GoI, key events, e-extension, distribution of literature, soil and water testing services, single window delivery system for technology products, diagnostic services and information through hub and spoken model, creating awareness of improved agricultural technologies among the farmers ,promotion of IT in agriculture.

Karnataka Agricultural Marketing Policy 2013

The Policy stated that Information Technology contribution is very high in providing better market practices. Harnessing information technology for marketing extension will receive

high point in the policy agenda. Effectively use of modern ICT, it would be promote the transparency and avoided the malpractices in marketing activities. Extensive use of information technology will be promoted for communication between farmers and stakeholders. Online marketing system is one of the effective programme for generating the price competition and in encourage the use of effective modern technology and also make use to get good price, accurate weighting and timely accessibility of the payment etc. Farmers easily can get the information on agricultural commodities through the well-known ICT programmes of *KrishiMarataVahini*, *online marketing*, *e-tendering* etc. In order to this role of ICT in agriculture market, policy initiative has been concern on regulated marketing, increasing competition and empowering farmers and so on.

Karnataka Agribusiness & Food Processing Policy 2015

The Agribusiness and Food Processing sector in the State requires a special focus and thrust. There is a need to have an exclusive Agribusiness and Food Processing Policy to give focused attention for the overall development of Agribusiness and Food Processing sector to give value addition to farm produce for the benefit of farmers.

Vision of the Policy, 'to position Karnataka in a sustained growth path in the field of agricultural and allied sectors through global technologies and innovative tools, by creating enabling frameworks and state of the art infrastructure facilities, thereby generating higher returns to farming communities'.

Mission of the Policy, to make Karnataka as the most sought after investment destination for the agribusiness and food processing with focused attention and landholding.

To provide more and more opportunities for the agribusiness and food processing sector, there by generating large scale employment in rural and semi urban areas of the State.

Information & Knowledge Support Centres

Under 2015 policy ICT has been given much importance to enrich the activities in agribusiness. This support shall include website management containing information relevant for agribusiness & food processing sector in Karnataka. The information centre shall maintained at abases on agribusiness and food processing enterprises, infrastructure providers, key export destinations from Karnataka, and other such knowledge on agribusiness and food processing in the State. *Raitha Samparka Kendras* (RSK) / District Industries Centres in Karnataka will be utilised as information centers.

Karnataka Agribusiness Development Corporation (KABDC) shall be empowered to empanel consultants who can prepare bankable project reports. The supporting institutions like University of Agriculture Sciences, Horticulture Sciences University, Veterinary Sciences University, National Bank for Agriculture and Rural Development, Central Food Technological Research Institute, Defence Food Research Laboratory and other accredited institutions, etc. shall be pooled to the fold of knowledge centre.

Karnataka State Agricultural Portal

SAP(State Agricultural Portal) is one of the ICT based programme in Karnataka. A farmer would typically come to SAP to find information / avail any service through CSC / Internet. SAP would be in English and local language, and have easy to use navigation, search and browse features. SAP would be connected to the State gateway through firewall and SWAN / Internet and would be accessible to department, SAUs, KVKs for information update and to various service delivery channels like CSCs / State Call Centre, Kisan Call Centers, RSK's (Raita Samparka Kendra) and internet for public access. The State Agricultural Portal is a conceptual design of service delivery channel at the state level.

e-Mandi

The Department of Agricultural Marketing (DAM) had requested the NIC for the design and development of software for activities of Agricultural Produces Marketing Committee (APMC). After studying the requirements and activities in the APMC, National Informatics Centre (NIC), Karnataka had developed the e-tendering application in 2006 to automate the process of tendering of farmers' agricultural produces in the APMC. Subsequently, this system is improved and called as e-Mandi system, which captures all the activities of the APMC, from in-gate entry to out-gate entry including tendering, billing, DCB (Digital Cash Bill) preparation.

e-Mandi is a web-based application with 3-tier architecture. The e-Mandi system is a comprehensive system, meeting all the requirements of the APMCs. It has been built with number of features for easier use by the APMC staff, traders and Commission Agents. e-Mandi has been designed by incorporating the rules and regulations defined in APMC Act.

Advantages of e-mandi

- An electronically unified agriculture market will introduce transparency and reduce intermediation and multiple handling costs.

- It facilitates efficient price discovery and utilizes transaction functions of the marketplace
- It enables participation and benefits for the entire agri value chain. i.e. from farmer to consumer.
- It eliminates multiple tax levies and licences.
- Better logistics and infrastructure facilities will be made available to the farmers as it will encourage private sectors to invest.
- It is a single licensing system, and thus the farmers/trader need not register in all APMC's of the state.
- Karnataka's system has accommodated lakhs of farmers, traders and commission agents for trading in all the 92 regulated commodities.

Bhoomi

Historically, maintenance of land records system in India has been a prime social activity for land owners, tenants and the state for land reforms, taxes, administration, survey and various other purposes. Land records contain geophysical data of the land e.g. land size, forms and soil, information on crops, irrigation, land use, legal entitlements, liabilities and taxation. State land reform measures, thus, depend much on the land records management system. Further, it helps in protecting the legal ownership, assignment and settlement of land titles. Farmers utilise land records also to obtain bank loans, resolve legal disputes, collection of accurate crop data, insurance and ensuring efficient land markets. The need to reform the land record management system has long been recognised because in its current state, the system breeds bribery and corruption. In this project, the Department of Revenue in Karnataka has computerised 20 million records of land ownership belonging to 6.7 million farmers in the state. Computerisation of land records allowed the farmers to sidestep the village accountants for acquiring a copy of the Record of Rights, Tenancy and Crops (RTC), a process that earlier entailed delays, harassment and payment of bribes. Farmers today can obtain a print RTC copy for a fee of Rs.15 from a computerised land record kiosks (Bhoomi centers) located in 177 taluka offices.

Radio

Radio is one of the most important and cheapest mass media. It has been one of the traditional media for information seekers. Information revolution in rural India through radio has helped green revolution. It is very useful in rural development programme. It has a great variety content related to farm, home, community and entertainment.

Hassan Akashwani is one of the creative radio program stations in Hassan district. This station is broadcasting farmers centric programmes like *Dhumbi*- on agricultural commodity price disseminating program; *Krishikarigemahithi*- providing information on agriculture with personal interview of progressive farmers; *Petevishleshane*, *Ritharigesalahe*, *Manninamahathva*, *Maralibaamannige* etc., are broadcasted by Hassan Akashvani. In Hassan district this radio station is trying to create good agriculture awareness among the farmers with the help of *Kandly krishiVigyan Kendra*. Farmers are showing positive response and radio station is also conducting interactive sessions for farmers with the support of concerned officers in the district. Akashwani this is trying to enrich farmers knowledge in district.

AIR Mysore is unique in broadcasting regular farmer friendly programmes like *KrishiChinthana*, *Raitarigesalahe*, *KrushiNudimuttu*, *KrishiPathagalu*, *Krishikare*, *Krishivani*, which are all motivating and bringing them to single platform for sharing ideas, to learn and adopt latest technologies and pursue agriculture as a profession under the banner of *Banuli Krishi Belagu* programme. Under this programme one day training programme is conducted at the farmers' field on the last Monday of every month by the progressive farmers themselves. Importance is given for promoting organic farming and reduce the usages of fertilizers and other chemicals in agriculture apart from income generating allied activities.

Krishi Community Radio

The first krishi community radio in Karnataka was established in 2007 under University of Agricultural Science, Dharwad. It is recognized as one of the FM medium for transfer of agricultural technology to the needy farmers in coverage area. Krishi radio produces the programmes like interview with the farmers, successful events of farmers, Krishi Chintana, feedback of farmers' trainee, market information, weather report, seasonal hints for agricultural operation, etc. The Krishi community radio produces and broadcasts latest information like cropping pattern, improved agricultural practices, animal husbandry, fisheries, environment, poultry farming etc.

Television

Agricultural programmes on television started with introduction of Krishi Darshan programme in DD National channel on January 26, 1967. With the launching of satellite instructional television experiment in 1975 and Indian satellite in 1982, these programmes became familiar to a vast majority of rural viewers and Krishi Darshan was the first rural program. This programme created awareness among the rural viewers and acquainted them with the latest technical and scientific knowledge with regard to crop cultivation practices, use of fertilizers, soil testing, dairying animal husbandry, sericulture, horticulture, fishery, poultry, weather forecasts, etc.

In Karnataka DD Chandana Channel has been telecasting Krishi Darshan program for farmers, daily twice in morning 6.00-6.30 am and evening 5.30 to 6.00pm. ETV Kannada News channel also has been telecasting the farmer centric programme known as Annadata (Kannada). The programme telecasting time is morning 6.30-7.00AM many other TV channels also provide the information on Market price, subsidy related issues and some special programmes of success stories etc. These television programmes are creating awareness on farm activities to farmers with adequate and affordable information.

FAO (2001) reported that television is the most important medium for communicating information among rural people of developing countries in rural area as people are facing many problems and hindrances to get information relating to agriculture.

Mobile

Mobile access to technology is one of the most important enablers for small holders to improve productivity sustainably. Innovative mechanisms for technology transfer are required to bring relevant tools, knowledge and knowhow to farmers. ICT applications can foster dissemination of information on technology, market demand, price information, weather, pest, and risk-management information, best practices to meet quality and certification standards. Farmer Call Centre (Kissan Call Centre) the Department of Agriculture & Cooperation (DoA&C), Ministry of Agriculture, Government of India launched Farmer Call Centres across the country on January 21, 2004, to deliver extension services to the farming community. The purpose of these call centres is to respond to issues raised by farmers, instantly, in the local language. National level universal eleven digit number 1800-180-1551 has been allotted for Kissan Call Centre. The number is accessible through all mobile phones and landlines of all telecom networks including private service

providers. Calls are attended from 6.00 AM to 10.00 PM on all seven days of the week at each KCC location.

Krishi Vigyan Kendras and State Agriculture Universities

Agriculture research and education in India is spearheaded by the Indian Council of Agricultural Research (ICAR), an autonomous organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and farmers Welfare, Government of India. This apex body is mandated for coordinating, guiding and managing research and education in agriculture and allied activities. It has the largest network of agricultural research and education in the world with 109 institutes, 78 all India coordinated projects/networks,642 Krishi Vigyan Kendras (KVKs), 71state agricultural/ veterinary /horticultural /fishery universities and four general universities with agricultural faculty spread across the country. There are 31 Krishi Viogyan Kendras and 05 Agricultural Universities are in Karnataka. They have been working for enhance the technological innovation in farming activities.

Raita Samparka Kendrs (RSKs)

The Department of Agriculture established Raitha Samparka Kendras at hobli level with the objective of providing updated crop production related knowhow, arrangement of critical agricultural inputs, primary soil and seed testing facilities and arranging interface with public and private sector technologies. Developing country like India is carrying forward nationwide programmes of modernizing agriculture with a view to achieve food security and to bring about socio-economic changes among farming community since majority of population in the country depend on agriculture for their livelihood. Karnataka's agriculture, as in the rest of the country, has been making impressive strides, since mid-60s. Out of the total population, rural contributes to about 70 percent and most of them are engaged in agriculture and allied activities. According to the recent Economic Survey report of 2011, the contribution of agriculture and allied activities accounts to 16.78 percent of the state income.

Considering the importance of the need to provide effective extension services to the farmers, *Raitha Mitra Yojane*, a demand driven Agricultural Extension System was initiated in Karnataka state in 2001, replacing the earlier extension system by establishing agricultural extension centers at hobli level called *Raitha Samparka Kendras* (RSKs). So far in Karnataka state, 745 *Raitha Samparka Kendras* (Agricultural Extension centers) are established at Hobli/Sub-block level in 177 taluks (Anon., 2000) These RSKs cater to the need of 5628

Gram Panchayaths covering 78 lakh farmer families. These RSKs located in proximity to the farming community are aimed at addressing wide range of local issues related to agriculture. They also act as a common platform and create terminal linkage to the farmers to access and interact about agriculture based technology and information at the grass root level.

Conclusion

The study reviewed some of the agricultural extension approaches currently in operation in Karnataka and also revealed policy interventions that promote ICT for agricultural extension in Karnataka.

In the contest of providing information system, an innovation can emerge from many sources and through complex interactions and knowledge flows, with the farmer being at the center of the process. Some of them are Kissan Call Centre, Karnataka Government Websites of Agriculture and allied sector, innovative mobile applications like e-mandi, Krishi Vigyan Kendras, All India Radio, television, agricultural magazines, newspaper and so on. There is no scarcity of information sources, but the receivers are very less because of lack of awareness on ICT programmes and their utilization. Hence, public sector should provide information at grass root level for accessing innovative technologies and innovative knowledge to create smart farming community.

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