Information Technology in Indian Agricultural Sector

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Abstract: **The agricultural sector in India is not in a good condition. There are many problems in Indian agricultural sector like lack of insufficient land reforms, defective land management, non-providing of fair prices to farmers for their crops, inadequate investment in irrigational and agricultural infrastructure in India, lack of proper attention, etc. Agricultural productivity is declining. Poor farmers are getting trapped themselves in debt trap. Suicidal case among farmers is alarmingly increasing in India. In this situation IT sector can play a tremendous role in agricultural sector and for its development. IT can bring a significant change in Indian agricultural system by providing valuable inputs.**

Key words: agricultural productivity, agricultural sector, communication, farmers, Information Technology, rural development

I. INTRODUCTION

Information Technology (IT) of India is developed enough today and IT helps almost all the sectors of the economy by providing information and latest technology. But the real fact is that the agricultural sector is still lagging behind in utilizing the services of IT industry. It is urgent need to utilize the IT services in agriculture in order to increase its efficiency and productivity. IT sector can play a tremendous role in agricultural sector and for its upliftment.

There are different functionaries involved in agriculture such as farmers, industries providing inputs to agricultural, industries dealing with agricultural output, central and state governments and NGOs working for the benefit of farmers and research centres and agricultural universities.

In spite of huge government machineries 'Who' are devoted for Indian farmers, they suffer from lack of right information at the required time. The farmers need timely information on weather conditions, sowing time, availability of inputs including credit, expert advice on maintaining his crop in healthy condition, information on markets and on all other areas of interest to him and his family. But the conventional apparatus can not provide information up to the mark. So it is necessary to take the help of IT in agricultural sector which can provide information efficiently and effectively at even remote areas. But there are some difficulties for small and poor farmers such as low literacy rate, cost of computers, poor communication infrastructure, in adopting directly IT services. So institutional efforts is to be considered in order to provide IT based services to farmers.

To cop up with the latest technologies, National Informatics Centre (NIC) conducts various training programmes of IT applications regularly for the user organizations of agricultural sector. Agricultural informatics Division of NIC has adopted various initiatives in bringing IT led development which includes web enabled applications, GIS based application, multimedia applications, Database applications and e-Governance and training etc. in the ministry of agriculture.

II. ICTs FOR FARMERS' ADVISORY SERVICES

Besides traditional media like printed literature, newspapers, and farmer's exhibition/fair etc, the most used and available tools of farmers' advisory services are telephone based Tele Advisory Services, the mobile based Agri Advisory services, television and radio based mass media programmes, web based online Agri Advisory services, video-conferencing and Online Agri video Channel.

Most of the agricultural institutes and organizations use their own telephone based advisory services for farmers through a telephone number to provide useful information and advice. The on-line phone based expert advice service, Kisan Call Centres (KCC), launched by the Ministry of Agriculture , Government of India is available for all within the country since January 2004. A toll-free telephone number "1800-180-1551" has been provided that is operational on all days from 6.00 am to 10.00 pm. Beyond these hours the calls are attended in the Interactive Voice Response System (IVRS) mode. The mobile based Agri Advisory services through mobile phones are provided by text, voice and video content. Mobile phones are becoming an essential device for all types of users. In India mobile technology has become a very important device for communication to reach out to the masses.

ICTs in Animal Disease Management:

The modern concepts like Internet, Geographical Information System (GIS), Global Positioning System (GPS), Database Management, Computer Aided Design (CAD), computer Networking, Artificial Intelligence are used efficiently to the ICT in animal disease management. Most of the ICT tools currently used are in Herd Health management. Both GPS and GIS collect and analyze the data with geographical reference respectively. These geo-reference points are based on the longitude and latitude coordinates of the location under study.

Computer-aided design and drafting (CADD), is the use of computer technology for the process of design and for the documentation of design. With the introduction of Computer-assisted drug development (CADD) in pharmaceutical industry for drug development based on the integration of mathematical modeling and simulation, the cost of synthesizing and validating a new molecule becomes cheaper as the CADD reduces almost 50% of the cost. This methodology provides knowledge based decisional tool on alternative development strategies based on the evaluation of potential risks on drug safety, and the definition of experimental design of new trials with expected power and probability of success.

III. ICTs in Rural Development

The agricultural sector faces different problems like water shortages, declining soil fertility, effects of climate change and rapid decrease of fertile agricultural lands due to urbanization etc. However, the growing demand, including for higher quality products, also offers opportunities for improving the livelihoods of rural communities. New approaches and technical innovations are required to cope with these challenges and to enhance the livelihoods of the rural population. ICT promises a fundamental change in all aspects of our lives, including knowledge dissemination, social interaction, economic and business practices, political engagement, media, education, health, leisure and entertainment. ICTs can play a significant role in combating rural and urban poverty and fostering sustainable development through creating information rich societies and supporting livelihoods. If ICTs are appropriately deployed and realize the differential needs of urban and rural people, they can become powerful tools of economic, social and political empowerment.

ICTs for Soil Quality Assessment:

Assessment of soil quality can be done in farm level and also for regional level with some useful technologies, like remote sensing. Remote sensing is a process that collects data about an object from a remote location. Geographers use a number of mechanical devices to achieve this process and identify high productivity area and low productivity area.

ICTs for Market Information:

The farmers suffer from lack of accurate and timely market information which is a key constraint to the development of agricultural sector. In that case advanced information and communication technology (ICT) tools may be helpful for the farmers for getting right market information at the right time. With rapidly increasing access to cell phones and computer centres, the more remote areas of the country are benefiting also from the information offered through this advanced technology.

Some initiatives taken by Government

Now we describe some government initiatives taken and implemented for the development of Indian agriculture. Though miles to go in this way, but already government has taken several initiatives for implementing information and communication based services in Indian agricultural sector which are definitely important and significant steps towards the development path of agriculture and rural development.

IFFCO-ISRO cooperation: IT based services for farmers and cooperative societies have been initiated by IFFCO. It has taken up a project in association with Indian Space Research Organization (ISRO) for utilizing satellite based remote sensing data and Geographical Information Systems (GIS). For many years developed countries have been utilizing quality farming with the help of IT services. Though it is difficult in India, GIS has an important role to play even in the existing conditions. Remote sensing and information may provide warnings on evolving crop stresses, crop vigour etc.

The IFFCO-ISRO GIS project extends support for efficient and timely availability of IFFCO's fertilizer to farmers through better logistics and efficient operations. In addition to the GIS based services, effort is being made to create database that contain information of interest to the farmers. These include recommendation on package of practices for major cereals, pulses. Horticulture, floriculture and animal husbandry etc. provide information on various inputs such as seeds, fertilizers and credit; provide access to the nearest expert in case of stress or any other problem witnessed in the crops. Facilities are sought to be provided to encourage and share farm experiences by forging various crop forums. Many of the agricultural extension services are also proposed to be made online using multimedia facilities. It also provides information regarding prices of various crops prevailing in different approachable markets which helps the farmer to get best possible price.

Cyber Dhabas: Initiative has been taken to set up a large no of access point called cyber dhabas in order to make available IT to the doorsteps of the farmer. The farmers can avail the assistance of the operator of cyber dhabas bypaying a nominal charge.

E-Choupal: E-Choupal is a unique web portal all in Hindi. This helps the farmers in many ways by providing information about products and services they need to increase productivity and to reduce transaction costs. Farmers also can get the upto date local and global information on weather, scientific method of farming and also the market price. But the high rate of illiteracy and infrastructural constraints of the village level make it difficult for the farmers to access this facilities. So this model is designed to provide physical service support through a choupal sanchalak, himself a lead farmer, would act as the interface between the system and the farmers.

National E-governance Plan (2003-07): The National E-governance Plan (2003-07) is an important initiative of the central government to use IT to disseminate information faster to farmers, disburse loans, improve education and the health systems in villages etc. The World Bank, ADB and UN are generously funding e-governance projects; projects with PPP models in this area can be more fruitful.

Other IT services to Agricultural Sector:

1. **LAN at Ministry of Agriculture:** A high speed Local Area Network was established in the Ministry of Agriculture spread over various buildings Viz.Krishi Bhawan, Shastri Bhawan and Krishi Anusandhan Bhawan etc.

2.**Agricultural Marketing Information Network (AGMARKET):** The objective of this project is to improve prevailing agricultural marketing information system by minimizing the gap between generation and dissemination of market information. The major components of AGMARKET are the following:

a) Establishment of computing facilities and networking

b) Development of human resources

c) Information transmission

d) Development of database

e) Portal on market information.

NIC has tied BSNL to provide internet facilities at the AGMARKET nodes.

3. Strengthening of Informatics in the Offices and Field Units of the Department of Agriculture and Cooperation (DAC)-DACNET: The central sector project 'DACNET' links the directorates, attached offices, subordinate offices, autonomous bodies and public sector undertakings and field units of the Department of Agriculture and Cooperation, Ministry of Agriculture. This project includes networking of field offices of DAC, connectivity, procurement of H/W, S/W tools, Application Software Development and training of officials.

4. **Agricultural Extension Information System Network** : VISTARNET- The four pillar of sustainable agriculture are

Research, Education, Extension and Training. In order to make available the technology to small and poor farmers VISTARNET has been established for linking the extension functions at central, state and district level.

4. Infrastructural facilities and services provided by NIC to the ministry of Agriculture: These are as follows;

a. INTRANET/INTERNET

b. Telecommuting programme

c. Video conferencing

d. Information Kiosk

d. In-house training facilities

e. Web site design and development

f. Web enabled applications

g. Information bulletin

h. Intranet applications

i. Agricultural portal

j. NICNET based public information and facilitation centre.

5. **Animal Production and Health Information Network (APHNET):** APHNET builds up reliable database and network based information systems for all activities of the animal husbandry and dairying sector at district, state and national level, using NICNET facilities. As a part of APHNET, National project on Rinderpest Eradication (NPRE) which aims at capturing animal disease related information from various state Animal Husbandry Departments has been entrusted to NIC.

6. **Agricultural Research Information System Network (ARISNET) :** ARISNET has become an integral part of agricultural research, extension and education process. It links ICAR institutions and their regional research stations, central agricultural university, state agricultural university and their colleges, krishi vigyan kendras, zonal research centres with the ICAR headquarters.

7. **Market Information System for Horticulture:** As part of the project, NICNET based internet/internet facilities have been established at National Horticulture Board (NHB), Gurgaon. Computing facilities have been created at 33 market centres of the Board located all over the country. NIC has developed and implemented the necessary software for evolving a comprehensive database of the prices and arrivals of fruits and vegetables being received by NHB headquarters from 33 market centres on a daily basis. This information is being used by the Ministry of Agriculture.

8. **Integrated Fertilizer Management Information System (IFMIS):** The Department of Fertilizers (DOF) in collaboration with NIC has introduced computer based methods for decision support and to evolve an evaluation

system which ensures a uniform system of planning and control mechanism with signaling system to highlight deviations from desired performance indicators by plants/organizations for all the public sector enterprises.

9. **Computerization of Agricultural Census and Input Survey:** Department of Agriculture and Cooperation collects and maintains agricultural statistics such as number, area, tenancy, land utilization, cropping pattern and irrigation particulars of different classes of operational holdings regularly and make it accessible timely to the planners and policy making for decision making. A large database of about 8000 million bytes at national level and 1 GB at state level has been created. Agricultural Census and Input Survey database at DISTRICT/State/National level are procured and tabulated. Development and implementation of information retrieval system at micro and macro level for decision making at various levels are done also.

IV. CONCLUSION

Information and communication technologies (ICTs) have created a "global village" in which people can communicate with others across the world . There are significant benefits of ICTs for agriculture and rural people.The implementation ICTs in Indian agriculture needs organizational and social change and also needs high level of investment in new infrastructure – both hardware and Software which is the main barrier to realizing the economic benefits of ICTs in Indian agriculture. Use of ICTs can increase the efficiency and effectiveness of government as well as Indian agriculture, Private providers may therefore have also a role in delivering IT – based information services that are complementary to government services. The lack of access to ICTs in developing countries means that there will be a growing knowledge gap.

The Indian telecommunication industry is the world's fastest growing telephone (landlines and mobile) network and it is the second largest telecommunication network in the word in terms of number of wireless connection after china. The ICTs have positive effects on Education, Health, Employment and Agriculture which will have impact on Socio-economic aspects of rural poverty. Information and communication technologies (ICTs) are crucial for poor farmers in improving access to agricultural production and agricultural market . Accessibility and use of ICTs has become a major factor in driving competitiveness, economic growth and social development and contributing to the free flow of ideas and opinions.

The ICT infrastructure may also be used to bring down the cost as delivery of credit and crop insurance to farmers. But appropriate communications systems are needed to ensure that information come to farmers in an effective, accurate and clear way. This means that the information provided to farmers must be timely, reliable, comprehensive and

transparent. There are ample scopes of implementation of ICTs in Indian agriculture. Government is trying to implement the ICTs for poor farmers as well as for the development of total agricultural infrastructure. But due to various difficulties India is still lagging behind in utilizing the services of IT industry in agricultural sector. If proper policies are taken implemented honestly for the use of ICTs in Indian agricultural sector there will be a remarkable development in Indian economy and farmers will be most benefited from modern information and communication technologies.

REFERENCES

[1]. Upadhyaya, A. 2009. A Decision Support tool to select beneficial integrated farming system components. Annual Report of ICAR-RCER, Patna.

[2]. Sarvanan,R. 2010 (Edt.),. ICTs for Agricultural Extension- Global Experiments, Innovations and Experiences. New India Publishing Agency, New Delhi.

[3]. Sarvanan,R. 2010 (Edt.),. ICTs for Agricultural Extension- Global Experiments, Innovations and Experiences. New India Publishing Agency, New Delhi.

[4]. Salman, A.Z., E. K. Al-Karablieh, and F. M. Fidher (2001). An Inter-Seasonal Agricultural Water Allocation System (SAWAS), Agricultural Systems, **68**, 233-252.

[5]. Sharma,V.P 2001. Cyber Extension: The Extension Approach for new Millennium, MANAGE, Hyderabad. www.manage.gov.in

[6]. Bhatnagar S.C., E-Government : From Vision to Implementation – A Practical Guide with Case Studies, SAGE Publications Pvt. Ltd., New Delhi, 2004.

[7]. Gujarathi, D. M. and Patil R. S. (2009), Role of ICT and e-governance for Rural Development, International Referred Research Journal ISSN- 0975-3486 Vol. I Issue -9 (RNI: RAJBIL /2009/30097)

[8]. Kumar, Abhay and Singh, K.M., 2012. Role of ICTs in Rural Development with Reference to Changing

Climatic Conditions. In: ICTs for Agricultural Development Under Changing Climate, Ed: K. M. Singh,

M.S. Meena, Narendra Publishing House, New Delhi. Available at:

http://dx.doi.org/10.2139/ssrn.2027782

[9]Mani Gyanendra, Mohanty Smita, Ashok, M.V. "Agricultural Marketing in India: Review of some issues," Indian Journal of Agricultural marketing, Vol.29 September.-December (2015). p.2-3.

[10]Bhanwala, Harsh Kumar **"**Making Agriculture the most sought after career option," University News Weekly, Vol.53 No.46 November 16- 22, (2015),p. 25-29

[11]Inclusive development of small and Marginal Farmers," The Indian Economic Journal Vol.60, No.3, October- December. (2012),p. 60-75