



Study of Information Communication Technology in Agriculture in Vidarbha Region of Maharashtra State of India

Jayade, K. G.¹, Khot, P. G.², Ambani, G.³

¹Asst. Professor in Computer Science, Dr.PDKV, College of Agriculture, Nagpur, Maharashtra, India.

²Professor, ³Research Scholar, Department of Statistics, RTM Nagpur University, Nagpur, Maharashtra, India.

Abstract: In developing countries information and communication technology has played very important role in the development of education, research, extension, administration, health, e-governance, defence, space research, weather forecasting, rural & agriculture development. It has brought a significant change in agriculture development in the world where farmers directly connected with market, buyers, customers, government and metrological department to get information. It is indicated by different research that this technology has increased the product of agriculture and income of farmers by adopting information and communication technology tools in agriculture farming. Now, government is planning to develop the ICT in every village in the country to provide facilities to farmers and introduce technology in rural areas where farmers can use knowledge and skills regarding new agriculture technology. However, in Maharashtra, farmers are getting computerised land records, cropping record, benefits of other government schemes, online registry of their lands, online information of different schemes of government for farmers. In Vidarbha, many government organisations, NGOs, Private Organisations are working in agriculture and allied sector having ICT facility. ICT facilities used by the some of the organisations have been discussed in this research paper.

Keywords: Agriculture, Vidarbha, Information Communication Technology, PDKV, CICR, MSSRF, e-choupal, e-Agriculture

I. Introduction

Information and communication technology is the backbone of modern development in almost all sectors in the world. ICTs are those technologies that can be used to interlink information technology devices such as personal computers and mobiles with communication technologies such as satellite, telephones and their telecommunication networks. Computers and mobile phones with e-mail and Internet provides best example. ICTs are range of electronic technologies which when converged in new configurations are flexible, adaptable, enabling and capable of transforming organisations. The ranges of technologies are increasing all the time and there is a convergence between the new technologies and conventional media. Thus most devices can now be linked to others to share and exchange information and allow it to be used in such a way that they can also be categorised as ICTs. ICTs are expanding assembly of technologies that can be used to collect, store and share information between people using multiple devices and multiple media. Millions of websites and portals are being used throughout the world on Internet and Intranet for dissemination of knowledge. Knowledge on the internet and intranet can be used anywhere, anytime by any persons in the world.

II. Vidarbha Region

Vidarbha is the eastern region of the Indian state of Maharashtra, comprising Nagpur Division and Amravati Division. Its former name is Berar. Vidarbha comprises two divisions (Amravati and Nagpur). It has 11 districts namely, Amravati, Akola, Bhandara, Buldana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim, Yavatmal. Vidarbha has total population of 23,003,179 according to the 2011 census of the government of India. It occupies 31.6% of total area and holds 21.3% of total population of Maharashtra. It borders the state of Madhya Pradesh to the north, Chhattisgarh to the east, Telangana to the south and Marathwada and Khandesh regions of Maharashtra to the west. Situated in central India, Vidarbha has its own rich cultural and historical background distinct from rest of Maharashtra. The largest city in Vidarbha is Nagpur, the second largest is Amravati while Akola stands third in terms of population. A



Fig.1: Map of Vidarbha

Source: <http://majedarcornr.blogspot.in/2011/09/demanding-new-state.html>

majority of Vidarbhisians speak Marathi and Varhadi, a dialect of Marathi. The Nagpur region is famous for growing oranges, soya-beans, cotton, rice and red chillies. Vidarbha holds two-thirds of Maharashtra's mineral resources and three-quarters of its forest resources, and is a net producer of power. Vidarbha has Tadoba tiger project, Melghat tiger project, Pench tiger project, Bor wildlife sanctuary, Navegaon national park, Umred-Karhandla wildlife sanctuary and Nagzira wildlife sanctuary near Bhandara district. Geographically Vidarbha lies on the northern part of Deccan Plateau. Unlike the Western Ghats, there are no major hilly areas. The Satpura (sapta=seven; pura=mountain) Range lies to the north of Vidarbha region in Madhya Pradesh. The Melghat area of Amravati district is on southern offshoot of the Satpura Range. Buldhana has the Lonar crater created by impact of meteorite or comet. Wainganga is the largest of all the Vidarbha rivers. Other major rivers that drain Vidarbha region are the Wardha, Vena, Dham, Bor and Kanhan rivers which are all tributaries of Godavari river. In north, five small rivers, Khapra, Sipna, Gadga and Dolar along with Purna, are the tributaries of Tapti river. Penganga river is big river originates in Buldhana district.

III. Agriculture in Vidarbha

Agriculture in Vidarbha is characterised by dryland farming with 90 per cent of the cultivated area dependent on monsoon. Foodgrains account for about 54 per cent of the gross cropped area. The main cash crops of the region are cotton 28 per cent area, oranges and soya beans 7 per cent area. Amravati is the largest Orange growing district. Traditional crops are sorghum (jowar), pearl millet (bajra) and rice. Yavatmal is the largest cotton growing district. Gondia is the largest rice growing district. Bhiwapur Dist. Nagpur is famous for Red Chilies.

IV. Agro-ecology of the Vidarbha region

This region has been divided into four Zones on the basis of precipitation, number of rainy days, soil group, physiology and cropping system. The zone receiving 700-950 mm. precipitation with less than 52 rain days having vertisols of varying depth has been identified as the Assured Kharif Crop Zone consisting of the districts namely, Buldana, Akola, Amravati and a part of Washim district while the districts Yavatmal and Wardha and a part of Nagpur are characterised by its precipitation in the range of 950-1250 mm. , 52-62 rainy days having vertisol soils constituted the Moderate Rainfall Zone. The districts, namely, Bhandara, Gondia, Chandrapur and Gadchiroli have been categorised as the High Rainfall (1250-1700 mm.) Zone. While hilly tracks of Amravati district receiving rainfall in the range of 950-1700 mm. have been categorised as Moderate to High Rainfall Zone. The Vidarbha region is endowed with rich forests. The region has an area of 27.5 lakh hectares under forest which accounts for 52per cent of the total forest area of the State and 28per cent of the geographical area of the Vidarbha region.

V. Agriculture University in Vidarbha

Dr. Panjabrao Deshmukh Krishi Vidyapeeth (PDKV - Agricultural University), Akola, Maharashtra, India was established on 20th October, 1969 and is the only agricultural university in the region. This Agricultural University was named after the illustrious son of Vidarbha Dr. Panjabrao (alias Bhausaheb) Deshmukh, who was the Minister for Agriculture, Government of India. The jurisdiction of this university is spread over the eleven districts of Vidarbha region of Maharashtra state. The University is entrusted with the responsibility of agricultural education, research and extension education along with breeder and foundation seed programme. The University has its main campus at Akola. The educational programmes at main campus are spread over in 5 Colleges namely, College of Agriculture, College of Agricultural Engineering & Technology, College of Forestry, College of Horticulture and Post Graduate Institute. At main campus 4 degree programmes namely B.Sc.(Agri.) B.Sc. (Hort.), B.Sc. (Forestry) and B.Tech. (Ag. Engg.), two Master's Degree Programmes viz. M.Sc.(Agri.) and M.Tech. (Agri.Engg.) and Doctoral Degree Programmes in the faculties of Agriculture and Agril. Engineering are offered.

The University has its sub-campus at Nagpur with constituent College, College of Agriculture which offers B.Sc.(Agri.), M.Sc.(Agri.) and M.B.A.(Agri.) degree programmes. The Nagpur Campus is accomplished with a garden, surrounded by its natural beauty and a well established Zoo which attract the general public and visitors to the city. A separate botanic Garden is being maintained on 22 hectares with a green house for the benefit of research workers. In addition there are 2 affiliated grant-in-aid colleges and 14 private non-grant-in-aid colleges under the umbrella of this University. A Central Research Station is situated at the main Campus which caters to the need of research projects undertaken by crop scientists of the principle crops of the region namely food grain, cotton, sorghum, oilseeds and pulses.

VI. ICT in Agricultural University

Agricultural University have implemented the ICT facility successfully with the facility of high tech computers and high speed Broadband Internet for education, research, extension and administration. All the colleges, schools, agri-polytechnics, research stations, KVKs, etc. of PDKV in Vidarbha region have the facility of computers, servers, laptops, printers, scanners, copiers, projectors, integrated computer projector. Most of all

organisations have the broadband and leased line internet. All the centres and institution are using these ICT for education, research, extension and administration purpose. ICT is the means of high tech Communication. Their website www.pdkv.ac.in has the separate link for university, resources, education, research, extension, library, etc. It has weather information, magazine in Marathi language “*Krishi Patrika*”. This web site is informal for students, teachers, scientists, research worker, extension workers, farmers and administrator. PDKV website has the facility for Agro Advisory, Crop Varieties information system, seed availability, Agro Tourism, e-Krishi Shiksha, NISAGENET, National Knowledge Network, extension, library facilities like online journals, online theses, Krishi Prabha e-theses, CeRA Consortium, students resources, e-learning, research stations, AICRP, PKV Research Journal, telephone directory, email system, SMS to farmers, Video Conferencing with farmers, rainfall & weather forecast and agricultural practices information. Knowledge on website is most important to the public, students, teachers, scientists, extension persons, government and farmers. University have implemented online integrated university management system. Govt. of Maharashtra has successfully implemented online paybills systems for all four agricultural universities of state. Students and research staff of university uses statistical analysis software to do their analysis of their research data. Many softwares like office automation, web site development, data analysis, gpf information system software are being used.

VII. ICT and Central Institute of Cotton Research

Central Institute of Cotton Research (CICR), Nagpur is a research institute for cotton crop in the Vidarbha region of Maharashtra state established in 1976 by the Indian Council of Agricultural Research, New Delhi to promote long term research efforts in cotton production and provide support and conduct applied research on cotton with the active involvement of State Universities. The research efforts of CICR fall under the All India Coordinated Cotton Improvement Project (AICCP), initiated by the Council in 1967. Its headquarters are located in Nagpur and the other two regional units are located at Coimbatore, Tamil Nadu and Sirsa, Haryana. ICT facilities are used by the CICR for their research and extension purpose. The website is www.cicr.org.in. This site have the facility of National Agricultural Innovation Project, Integrated Pest Management, Insecticide Resistance Management, National Agricultural Technology Project, Package of Practices, KVK, ATIC, Cotton Database, Articles, Cotton Images, Cotton Farmers Forum, E-Procurement, Technology Bank, AICC Improvement Project, Weekly Advisory, Technology Mission on Cotton, Bt. Cotton Questions, Answers, etc. This ICT facility is used by farmers & agricultural related people for improvements of cotton crop in the region.

VIII. Agriculture Interventions harnessing ICT: MSSRF

The Village Knowledge Centres (VKC) of M.S Swaminathan Research Foundation (MSSRF), Chennai functions as the nucleus of agricultural informatics meeting the knowledge and information needs of agrarian communities through ICT-driven interventions. It facilitates sustained and equitable penetration of information and knowledge among households, reducing their vulnerabilities in agriculture and maximizing economic benefit. The strategies deployed in engaging with the communities are knowledge and skill transfer through strategic partnerships, gender sensitive approach, advocacy and networking with Panchayati Raj institutions and partners, institutional and capacity building, demand driven and locale specific information in time, knowledge products, research and development, community ownership and continuous handholding. Through a gamut of participatory, demand-driven ICT interventions, farmers receive locale-specific, timely, and effectual information, knowledge, and skill inputs. MSSRF is working for economical development of farmers in Wardha and Yavatmal districts of Vidarbha region.

Weather and Market Bulletins: Market fluctuations and vicissitudes of weather are critical determinants of farmer income in case of rain-fed agriculture. Timely and dynamic broadcasts through mobile devices and public address system update the community about prevailing weather conditions and market prices, enabling them to take informed decisions for maximum benefit.

Voice Messages: As a means of knowledge transfer, the communities receive mobile-based season and crop based agro advisories on agricultural practices, irrigation management, weed, pests and diseases management, seeds selection and treatment, land preparation and water conservation measures, weather based advisory, post-harvest preservation, and market information.

Video / Audio Conference: Theme-based audio and video conferences provide a platform for communities to interact directly with experts in agriculture and animal husbandry to obtain timely, and relevant responses.

Knowledge Management System: A server based Knowledge Management System (KMS) functions as a repository for static and dynamic contents in different formats and vernacular languages related to agriculture and animal husbandry practices. Through VKCs, farmers and extension workers access and contextualize the wealth of knowledge and information.

Plant-Clinic Programme: Plant clinics offer precise, diagnostic, and advisory services for plant diseases, helping create durable plant health systems, and food safety for smallholder farmers. Village Resource Centres (VRCs) facilitate plant clinics in Tamil Nadu, Puducherry, and Maharashtra. ‘Plant Doctors’ examine samples of affected plants, peruse case history, diagnose the problem, and issue prescriptions. They also spread

awareness about judicious use of pesticides and recommend locally available cultural, biological, and chemical field inputs.

Soil Health Management: IEC runs 2 soil testing laboratories in Vidarbha and 1 mobile soil testing and ICT van in Tamilnadu. The laboratory is equipped with pH, electrical conductivity, colorimeter, flame photometer, atomic absorption spectrometer to test the parameters of pH, electrical conductivity, carbon, nitrogen, potash, phosphorous, and micro-nutrients such as copper, manganese, zinc, calcium, magnesium and iron. Farmers are trained in correct method of soil sample collection and labeling. The soil health card carries details of the analysis, fertilizer recommendations and general advice for type of soil are provided to the farmers. The farmers are encouraged to call the experts through helpline of VRCs for further guidance.

IX. ICT based E-Agriculture

Farmers need information on six stages of crops through the agricultural cycle: (i) Crop planning (ii) Buying seeds (iii) Planting (iv) Growing (v) Harvesting, Packing and storing (vi) Selling. The application of Information and Communication Technology (ICT) in agriculture is increasingly important to find the solutions for all 6 stages of agriculture. E-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (ICT) in the rural domain, with a primary focus on agriculture. E-Agriculture is a relatively new term and we fully expect its scope to change and evolve as our understanding of the area grows. Information Communication Technology (ICT) has long been viewed as having great potential for improving decision making in agriculture. ICT has connected the world globally and is now changing our life style and social consciousness dynamically. In all phases of the agricultural industry, information communication technologies are vital to the management and success of a business. Agriculture has also been greatly influenced by ICT. Information Communication Technology is rapidly becoming more and more visible in society and agriculture. ICT refers to how we use information, how we compute information, and how we communicate information to people. People must have computer and information technology. To participate and make informed decisions in the agricultural industry a person must have ability to gather, process, and manipulate data. The Internet is a standing topic in newspapers and on television, and the number of users doubles every year. ICT supports new methods for precision agriculture like computerized farm machinery that applies for fertilizers and pesticides. Farm animals are fed and monitored by electronic sensors and identification systems. Selling or buying online began to become popular in the world. However, its most important role remains communication, and the Internet has provided us with an ideal opportunity to do so. One such communication tool is the Web Site, which simply replaces the shops as a communication tool. Presently, almost every government department, institute, research station, university, company has its own web site. The following are specific ways information technologies being applied through agricultural education: Basic Internet Applications; PowerPoint Presentations; Education, Research, Extension, Administration, Training, Global Positioning Systems (GPS); e-Commerce, e-shopping, e-trading, e-Agro-Business.

As with other economic sectors, effective agricultural development requires access to information on all aspects of agricultural production, processing and marketing and it seems that need is increasing. ICT is already showing the potential to play an important role in the delivery of this information to this sector in both developed and developing countries. The FAO distinguishes five broad categories through which ICT are used in the agricultural sector. These are technical and economic development for agricultural producers; community development; research and education; small and medium enterprise (SME) development; and media networks. In the context of agriculture, the potential of information communication technology (ICT) can be assessed broadly under two heads: (a) as a tool for direct contribution to agricultural productivity and (b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted. Precision farming, popular in developed countries, extensively uses ICT to make direct contribution to agricultural productivity. The techniques of remote sensing using satellite technologies, agronomy and soil sciences are used to increase the agricultural output. This approach is capital intensive and useful where large tracts of land are involved. Information and communication technology for weather forecasting, GIS, GPS and RS technologies helps identify potential areas where new technologies and new scientific tools developed by scientists can be applied to raise agricultural productivity, enhance farm incomes and promote better natural resource management. The tool is often used for integrated assessments of land degradation and water-harvesting techniques that consider different parameters, including economic and social factors.

X. E-Choupal

ITC's Agri Business Division, one of India's largest exporters of agricultural commodities, has conceived e-Choupal as a more efficient supply chain aimed at delivering value to its customers around the world on a sustainable basis. Launched in June 2000, 'e-Choupal', has already become the largest initiative among all

Internet-based interventions in rural India. 'e-Choupal' services today reach out to 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 namely Madhya Pradesh, Haryana, Uttarakhand, Karnataka, Andhra Pradesh, Uttar Pradesh, Rajasthan, Maharashtra, Kerala and Tamil Nadu.

As India's 'kissan' Company, ITC has taken care to involve farmers in the designing and management of the entire 'e-Choupal' initiative. The active participation of farmers in this rural initiative has created a sense of ownership in the project among the farmers. They see the 'e-Choupal' as the new age cooperative for all practical purposes. This enthusiastic response from farmers has encouraged ITC to plan for the extension of the 'e-Choupal' initiative to altogether 15 states across India over the next few years.



*Source: www.itcportal.com

Fig.2: Farmers using e-Choupal

XI. Conclusion

The role of Information Communication Technology is important for the development of economy in enhancing the effectiveness of agricultural market, productivity and competitiveness in Vidarbha region of Maharashtra state. ICT is advanced tools to disseminate the modern agricultural knowledge to the farmers. Through ICT scientists are delivering their research to the rural people. Institutes like Dr.PDKV, CICR, MSSRF, e-Choupal uses ICT for extension in agriculture in Vidarbha region. ICT and Mobile technology have improved the package of practices and improved the agriculture through knowledge dissemination by e-agriculture. Rural information systems have focused on supplying the information to the rural people about modern agriculture. ICT has reduced the gap among agricultural scientists, extension worker and farmers in Vidarbha Region of Maharashtra state. It has improved the economical condition of the farmers in the region.

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