

Role of Information and Communication Technology in Agriculture Extension – A Study on Ranchi and Khunti District of Jharkhand, India

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ABSTRACT

Agriculture is the mainstay of Indian economy. It sustains over 70% of the population. Agricultural extension efforts in India have made significant strides towards development of the agricultural sector. According to the National Commission's report on Agriculture (1976) has emphasized the need for massive extension efforts to modernize the outlook of the farmers and to make them more enterprising and willing to adapt readily to innovations so that agricultural production could be increased. Agriculture extension is nothing but an applied behavioral science. It is the knowledge to bring farmers or people through applying different strategies and technics through latest scientific and technological innovations. The present study is carried out in districts of Jharkhand (Ranchi and Khunti), which shows how the role of information technology has influenced the agriculture extension

in these two districts. It is found that more and more use of information technology has provided different new methods of agricultural work and the income and life style of the farmers has gradually increased. Therefore, we can say that information technology provides more information regarding agriculture knowledge and benefits the present farmers.

Keywords Agriculture, Economy, Extension, Developing, ICT, Social.

INTRODUCTION

Economic and social development in any country depends on the good education of the citizens of a nation. Therefore it is necessary to find ways to make education of good quality, accessible and affordable to all, using the latest technology available (Dhiman 1987). In the last two decades there has been a rapid development of ICT. ICT has changed the dynamics of various industries as well as influenced the way people interact and work in society. Internet usage in the home and workplace has grown exponentially. ICT can remove the hurdles and increase the rate of education in any country. It can be used as a tool to overcome the issues of cost, non-availability of teachers, and poor quality of education as well as to overcome time and distance barriers (Chole *et al.* 2010, Deshmukh & Kapse 2010).

ICTs are having great impact on the development of societies and have driving forces in economies

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world-wide. ICTs are no longer confined to assisting high end research and development, the new technologies have made significant improvements in the life-styles and the efficiency levels of all sectors of the economy. The positive impact of ICTs is most visible in service sector, where the efficiency levels have gone very high (Desai 2009). The agriculture sector is gearing itself to make optimal use of the new information and communication technologies. In agricultural education, research, development and dissemination Govt of India have been taken great initiatives to provide Information Technology hardware and connectivity to all organization. To develop agricultural content Ministry of Agriculture in collaboration with National Informatics Center (NIC) have taken initiative to provide marketing information of various agricultural commodities to the farming community.

To design, develop and implement Knowledge Management Systems (KMS) in agriculture the content-creation and aggregation initiative is being supported by ICAR Indian Council of Agriculture Research under its World Bank aided project NAIP National Agriculture Innovation Project, wherein the Leading Information Communication Technology Institutions such as Indian Institute of Technology Kanpur, Indian Institute of Technology Mumbai and International Crop Research Institute for Semi-Arid Tropics (ICRISAT) Research Institute in Telangana have been roped in to guide National Agricultural Research System.

India in recent decades has been focusing on the development of its educational sector. Higher education drives competitiveness and employment generation in India. There is a severe constraint on the availability of skilled labor. There exist socio-economic, cultural, time and geographical barriers for people who wish to pursue higher education. Innovative use of ICT can potentially solve this problem. Communication is the central mechanism of the extension process. ICTs provide new dimensions to communicate as a process. These include :

1. Access to information resources of the whole world, beyond state and national boundaries (improved reach).

2. Most of the time access is free (less cost).

3. Instant access to the important resources-people and literature, Extension journals, newsletters (less time).

4. Facilitates two-way communication-e-mail, chat groups, discussion forums.

5. Information is available any time.

6. Little or virtually no chance for information distortion, as the communication is between the user and communicator directly.

7. Easy documentation as all the communication is in digital form, including e-mails, audio and video exchange.

All the above dimensions of proper use of ICTs have generated a lot of interest among the Agricultural Extension Scientists and Extension Functionaries. 'Use of ICTs in Agricultural Extension' is emerging as a body of knowledge, popularly known as 'Cyber Extension'.

ICTs and agricultural extension

To improve the speed, accuracy of the communications at relatively low costs ICTs have opened different options for Agricultural Extension Scientists, Extension officers in research and extension systems. The Information Communication Technology tools like Internet, electronic-mail, call centers, information portals and on-line expert systems on subject specific discussion groups, packages of practices and on agricultural marketing information internet have enabled access to the extension personnel to the latest information within and outside the country.

The swift emergence of a global "information society" is changing the way people live, learn, work and relate. Millions of individuals now have access to knowledge and its numerous uses thanks to an explosion in the free movement of ideas and information, opening up a variety of new options and opportunities in some of the most important areas of human endeavor. Yet too most of the world's

population remains untouched by this revolution. The “digital divide” threatens to exacerbate wide gaps between rich and poor, within and among countries. The stakes are great indeed. Quick access to news and information can boost trade, education, employment, health, and wealth. One of the defining characteristics of the information society is transparency, which is an essential component of democracy and good government. Information and information are crucial to efforts to promote tolerance, mutual understanding, and respect for variety. Poverty reduction is the only long-term solution to closing the digital divide.

In the long run Governments need to do much by enhancing access to education and health care through distance learning and telemedicine. ICT can improve the quality of life for poor rural communities who do not have access to these facilities. The world is seeing a revolution in knowledge, which is being matched by the emergence of whole new communication technology. It is true that recent advances in the realm of information and communication technology are revolutionary. The fact that information and communication technologies are receiving hundreds of millions of dollars in funding shows how strongly people throughout the world believe in them.

By definition, Information and Communication Technologies are a diverse set of technological tools and resources to create, disseminate, store, bring value-addition and manage information. It’s interesting to note that ICT signals the emergence of a new type of society known as the Knowledge Society when it is employed as a broad instrument to combine locally developed knowledge fostered by communities with information found in distant databases and the public domain.

Knowledge thereby becomes the fundamental resource for all economic and developmental activities in the knowledge society of the people, with the global pool of knowledge with the scope for further enrichment lays the genesis for knowledge networking. Knowledge networking creates new avenues for interactive communication between governmental agencies, non-governmental organizations, educational and research establishments, and the general public (Ray 2007). It helps communities, both men

and women, to take appropriate steps to recognize and document the knowledge they possess and in reflecting this knowledge in a wider social domain for directed change through the application of communication and information technology.

MATERIALS AND METHODS

Objectives : To learn more about Information and Communication Technology’s function in Agriculture Extension.

Descriptive survey method is applied in the present study. The study was conducted in the two districts (Ranchi & Khunti) of Jharkhand state of India. Total sample study took 1999 farmers of 10 villages of each district, who had television and mobile connectivity with internet. The working population is taken as 3147, which includes farmers doing agricultural work in different area such as crop husbandry, vegetable cultivation, piggery, poultry, fishery. It is kept in mind the sample area is related with the agriculture extension. A structured interview schedule was prepared which contained multiple choice questions and open ended questions. The interview schedule was prepared in English and translated into Hindi to the respondents which were used to secure information systematically from the respondents. Personal interview technique was used to collect the data at respondents’ homes to get reliable data.

RESULTS AND DISCUSSION

Data relating to land owned by sample presented in the Table 1 indicated less than 27% landless farmers in both districts. A higher number of landless farmers (36.70%) were identified in Ranchi as against only about (18%) landless farmers in Khunti district. The farmers with land size below one acre were also higher Ranchi (20.19%) as compared to the farmers in the same land size category (17.56%) in Khunti district. Data also revealed that almost 90% of farmers owned land below 5 acres. A relative higher proportion of farmers held land above 5 acre in Khunti district as compared to Ranchi. The land size of more than 10 acre was held by only 0.21% farmers in Ranchi as against more than 3% among the sample farmers in Khunti district. In the framework of community de-

Table 1. Size of land own by the farmers.

District	Landless	Below 1 Acre	1-2.50	2.50-5.00	5.00-7.50	7.50-10.00	10.00 & above	Acre total
Ranchi	349 (36.70)	192 (20.19)	241 (25.34)	135 (14.20)	31 (3.26)	1 (0.10)	2 (0.21)	951 (100.00)
Khunti	189 (18.03)	184 (17.56)	291 (27.77)	186 (17.75)	105 (10.02)	61 (5.82)	32 (3.05)	104 (100.00)
Total	538 (26.91)	376 (18.81)	532 (26.61)	321 (16.07)	136 (6.80)	62 (3.10)	34 (1.70)	1999 (100.00)

velopment and the field of agricultural development, training is very important.

Extension, since the very essence of this program is to train rural people to solve most of their problems. Farmers' training is provided at the local level through Krishi Vigyan Kendras (KVKs), vocational agricultural schools and field demonstrations. It creates a forum where not only the trainer speaks but also where the farmers and the trainers debate observations, experiences and new ideas from outside the community. Such centers where farmers' trainings are organized are termed as Farmers' Training Center (FTC) (Maheshwari 1985).

The training classes may cover varying topics from conservation agriculture, organic agriculture, animal husbandry, soil husbandry, to income generating activities such as handicrafts, pickle making, mushroom cultivation and the like. The new information that farmers gain through these training sessions makes their daily farming activities much easier. It also leads to an increase in productivity and bigger profits in the long run. Besides this, the reason for organizing farmers training is for the following purposes :

I. Providing information and skills to farmers

II. Improving farmers' capacity for key decision-making

III. Introducing farmers to fresh perspectives and approaches to problem-solving

IV. Assisting farmers in developing their own business organization skills

V. Making farmers expert in their own field.

Interactive methods of training have been launched through which farmers learn about new technologies by experiencing them first hand. Partnerships with institutions such as MANAGE, Xavier Institute of Social Sciences and Sri Ramakrishna Mission have been formed for conducting such training programs. New training methodologies that are being used include group discussion, sharing of experiences, video shows, field trips and practice sessions.

According to the information in Table 2 the average annual income of the sample farmers in both districts turned out to be Rs 51057 in the year 2021 – 22 from the agriculture only. Compared to Khunti, where the average annual farmers' income was just Rs 48485, Ranchi district's average annual farmers' income was higher at Rs 53892.

The reason behind this found out that Ranchi districts have more market setups and more consumption due to high population, whereas Khunti district has less market setups and market value as well as less

Table 2. Annual income generated through agriculture (2021–22).

Income (Rupees)	Ranchi	Khunti	Total
Below 20,000	239 (25.13)	97 (9.26)	336 (16.81)
20,000-30,000	202 (21.24)	214 (20.42)	416 (20.81)
30,000-40,000	201 (21.14)	234 (22.32)	435 (21.76)
40,000-50,000	76 (7.99)	182 (17.37)	258 (12.91)
50,000-60,000	25 (2.63)	106 (10.11)	131 (6.55)
60,000-70,000	49 (5.15)	16 (1.53)	65 (3.25)
70,000-80,000	41 (4.31)	46 (4.39)	87 (4.35)
80,000-90,000	33 (3.47)	46 (4.39)	79 (3.95)
90,000-100000	29 (3.05)	64 (6.11)	93 (4.65)
Above 100000	56 (5.89)	43 (4.10)	99 (4.65)
Total house-holds	951(100.00)	1048 (100.00)	1999 (100.00)
Per house-holds (RS)	53,892	48485	51057

consumption due to low population. More than 25% of farmers had annual income below Rs 20,000 in Ranchi. Whereas only 9.26% farmers held annual income below Rs 20,000 in Khunti district. On an average 16.81% farmers held annual income below Rs. 20,000 in the both districts. More than 72% of sample farmers had average annual income of less than Rs. 50,000 in these districts. Less than 5% of farmers held annual income between Rs. 90,000 and 1,00,000. Within the sample area, less than 5% of farmers earned more than Rs. 1.0 lakh per year.

Cyber extension

It can be defined as the 'Extension over cyber space', however, in the context of applied agriculture, "cyber extension" refers to the use of communication channels and online computer networks to deliver content in the form of text, graphics, audio, and video, either passively or interactively, in order to help spread agricultural technology (Dhama & Bhatnagar 2009). In order to improve information access for farmers, extension workers, research scientists, and extension managers, cyber extension involves making good use of ICTs, national and international information networks, the internet, expert systems, multimedia learning systems, and computer-based training systems. At the federal, state, and local levels—and, perhaps most crucially, at the level of State Agricultural Universities and Research Institutes—the cyber extension process requires a clear vision.

Learning the lessons from various experiments needs to focus on following aspects :

- i) Develop state-of-art ICT infrastructure to connect key stakeholders.
- ii) Creating ICT awareness in all the developmental department.
- iii) Create information packaging mechanism at key participating agencies.
- iv) Network with e-governance initiative of concerned state or district.
- v) Create a model cell in each state to monitor the

progress of cyber extension.

- vi) Identify a national co-ordinating agency for cyber extension.

Kisan call center

A Kisan Call Center is a complex network of computer support, human resources, and communication infrastructure designed to handle farmer inquiries quickly, effectively, and in the local language. At a call center, farmers primarily communicate with Subject Matter Specialists via phone and computer to comprehend the issue and get answers to their questions (Chitambar 1973). This is a functional area within a company such as Research Stations, ATICs, KVK Agricultural Colleges, or an outsourced firm, where distinct facilities are only available to answer incoming calls, make outgoing calls, and address outstanding call inquiries. Typically, it refers to an advanced voice operations center that offers various types of call handling services, such as multilingual customer care, direct assistance, and customer support, for both incoming and outgoing calls. This is a new approach to agriculture extension management that fully utilizes the ongoing revolution in information and communication by making the best use of communication bandwidth to connect farmers in even the most remote regions of the nation with the nation's top agricultural scientists (Ezedinma & Onazi 1986).

For the current extension mechanisms, who would otherwise struggle to reach their target clientele in terms of infrastructure and funding, this is a significant value multiplier. Agricultural scientists, extension functionaries, farmers, and marketing agencies—the main players in the extension system—will be able to create strong ties and a smooth communication mechanism as a result (Axinn & Thorat 1972). Kisan Call Center is a combination of two technologies that were previously distinct: Agricultural Technology and Information & Communication Technology (ICT). Each has unique work cultures and speciality areas. It was suggested to fully utilize the professionally run call center mechanism and integrate it with the specialized subject matter experts knowledge of agricultural scientists and extension officers in order to make the most of

Table 3. Classification of population according to their occupation.

Occupation	Ranchi	Khunti	Total
Vegetable	266 (19.29)	484 (87.38)	750 (23.83)
Poultry	108 (7.83)	137 (7.75)	245 (7.79)
Crop husbandry	531 (38.51)	469 (26.33)	1000 (31.38)
Forestry	104 (7.54)	85 (4.81)	189 (6.01)
Piggery	134 (9.72)	81 (4.58)	215 (6.83)
Bee keeping	86 (6.24)	85 (4.81)	171 (5.43)
Cattle	107 (7.76)	289 (16.35)	396 (12.58)
Horticulture	31 (2.25)	69 (3.90)	100 (3.18)
Sericulture	12 (0.87)	69 (3.90)	81 (2.57)
Total	1379 (100.00)	1768 (100.00)	3147(100.00)

both systems' strengths and expand their reach to the farming community (Sunil 2013). Thus, it is suggested to leverage the specialized infrastructure already in place at call centers, which are typically driven by industry and cater to the high-end and frequently mission-critical service sector. This communication core would then be made available to subject matter experts in marketing, horticulture, agriculture, animal husbandry, and other related fields.

Table 3 depicts the highest population of the working population found to be engaged in crop husbandry (31.78) followed by vegetable cultivators (23.83%) in both districts. The population engaged as a poultry farm turned out to be only 7.79%. The share of crop husbandry in total has been far higher in Ranchi (38.11%) than the same in Khunti district (26.53%). More than 16% population was doing work in cattle work in Khunti district whereas less than 8% of farmers engaged themselves in cattle work in Ranchi district. At the same time, a higher proportion of population was working in bee keeping in Ranchi district as compared to Khunti district. Engagement in forestry work was higher (7.54%) in Ranchi district than in Khunti district (4.81%).

CONCLUSION

Farmers use many different sources, including their

own, to obtain the knowledge and information they need to manage their farms. The new knowledge is developed not only by research institutes but also by many different actors. These constitute the AKIS i.e. Agricultural Knowledge and Information System for an area or for a group of people and comprise: Other farmers, Government extension organizations, private companies selling inputs and buying the produce, banks and co-operatives, the government agencies and marketing boards, leaders and elected representatives of the people, farmers' organizations, farm publications and mass media, voluntary organizations. The AKIS must be analyzed to find any gaps that could impede development and any overlaps that could result in resource waste and conflict. An important task of the extension agency is to see that there is a unified approach at the local (operational) level, and that the system components do not contradict each other in providing information and knowledge to the people.

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