ROLE OF INFORMATION, COMMUNICATION AND TECHNOLOGY (ICT) IN RURAL DEVELOPMENT

[*]Madhu Bala

[*]Assistant Professor, Department Of Commerce, DAV College For Girls, Yamuna Nagar, Haryana

ABSTRACT

The government of India has been giving high priority to rural development with the objective to achieve rural-urban integration in growth processes. The focus of development is to include disadvantaged sections of society i.e. it includes' equality in growth' and 'equality of opportunity to all. This paper presents a review of the various study made by different investigators, researchers, and agencies regarding implications of ICT Tools on rural societies of India, significance and role of ICT in Rural Development; Rural Community development and after knowing the observations made by various researcher, investigator and experts concluded that ICTs play a major role in environmentally sustainable rural development and rural community development. ICTs have remarkable contribution towards improvement of economic and social development of societies in rural India. In developing country like India, to create information rich societies, to empower poor people, to reduce digital divide, sustainable development of rural community's dissemination of ICT in grassroots level of rural villages is necessary.

Key Words: *Rural, Rural Development, Information, Communication & Technology, ICT, Agriculture, Rural Health, Rural education and skill training,*

1. INTRODUCTION

Mahatma Gandhi had said that ***"India lives in its villages", "If we want to build our Nation, we have to start from villages***" and "***The soul of India lies in its villages***". Though the importance of science and technology for rural India was appreciated in the 1930s by Gandhi, giving rise to the work of the Centre for Science for Villages, advanced institutions of education, science and technology turned their attention to this area only about 40 years later in the 1970s. Even today, after decades of rapid urbanization, around 70 per cent of Indians live in more than 1000 villages; this is what we believe rural economy. Therefore for the Agriculture still employs half of the labour force. With these statistics, it is obvious that India cannot develop without developing its villages.

India consists of more than 500 villages. It is known as a rural economy as 65 percent of its population resides in the villages. For the development of the country, rural reconstruction and development has been a major thrust of economic planning. The government of India has been giving high priority to rural development with the objective to achieve rural–urban integration in growth processes. The focus of development is to include disadvantaged sections of society i.e.it includes' equality in growth 'and 'equality of opportunity 'to all. The present strategy of rural development is to provide better infrastructure, for agriculture development, public health services, business and financial services in rural areas. In this context, information technology holds the potential to offer a new approach to rural based development. Today It has emerged as a strategic source for achieving macro goals of the economic development process. It is the most effective tool to be used in the processes of development that can facilitate environment conducive to lead a better life of a rural people.

Government schemes such as Deendayal Upadhyaya Gram Jyoti Yojana (for rural electrification), Pradhan Mantri Gram Sadak Yojana, Rurban Mission are focused on rural development. Effective implementation of these schemes would depend on the efficiency of our administrative machinery at ground level, but one more factor that can make or mar the government efforts is availability of right technology for rural needs. There for this paper is an attempt to explore the role of ICT in rural development.

2. PROBLEM DISCUSSION AND OBJECTIVE

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas. Rural development has traditionally centered on the exploitation of land-intensive natural resources such as agriculture and forestry. Rural development incorporates farming development, setting up of financial and social framework, reasonable wages as likewise lodging and house destinations for the landless, town arranging, general wellbeing, training and utilitarian proficiency, and correspondence and so on. The motto of the rural development is so as to achieve the following four factors such as raised economic growth, raise in income of the rural masses, independence of rural masses both political wise as well as economical wise and finally to enable easy access to various resources like education, medical care, job opportunities and so on. There is a need for taking advantage of the recent developments in information, communication and technology (ICT) in rural areas which is the need of the hour to increase the socio-economic status of the rural population. Science and technology are two crucial components of all efforts aimed at fostering growth and socioeconomic development of nations (Herz, 1993). Many developing countries

face the challenge of increasing in comes of rural sector through different approaches and to minimize the gap between the urban and rural. The question before us is that how effectively ICT to be applied in rural sectors - rural areas. However, there are different ways according to the contexts. This paper focuses on the role of ICT in solving the problems of rural economy in India. *Its main objective is to explore the application of ICT on rural development. Based upon above discussion, the objective of this paper is to explore the role of ICT in Agriculture, Diary Sector, Effective implementation of Welfare Schemes, Rural Education and Skill Training, Rural Health and in Marketing Needs in Rural India*

3. METHODOLOGY

The study is based on secondary data. The study uses extensive secondary data collected websites, various national and international journals, articles, publications, conference papers, reports. The methodology used was that of a critical review.

4. REVIEW OF LITERATURE

The review of past investigations highlights that ICTs has proven, to be valuable contribution for solving development related issues and problems of society and perform successful task in Agriculture, Education, Industries, Banking, Governance, Business, Health, Tourism, etc. in rural and urban area of country and hence ICT becomes a most popular tool of all human beings aspect of life in rural and urban society. Review presented below includes literature pertaining to *implications* of Information and Communication Technology and its Tools on rural society as well as *application* of Information and Communication Technology for Rural Development and related aspects.

World Bank (2002) stated that "Information and communication Technology consists of hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information voice, data, text and images". Atul D et.al. (2016) conveyed that Information and communication Technology (ICT) is the combination of three magic revolutionary words, 'Information', 'Communication' and 'Technology'. 'Information' is disseminating and promoted using 'Communication' and transmitted through 'Technology'. The term 'Information and Communication Technologies' (ICT) can be used to embrace a multitude of standalone media, including telephone, television, video, tele text, voice information systems and fax, as well as those requiring the use of a personal computer fitted with a modem. The latter can include direct dial-up services such as electronic banking, file exchange and closed information services.

Kumaresan and Chitra (2003)studied to assess the need of rural information centers in the villages of Tamil Nadu. According to the authors the villagers who are dependent on different professions other than agriculture for livelihood have no such facility that fulfills their information requirements from information center. Authors studied twenty villages in the state of Tamil Nadu to access the need for rural information centers.

Simone and Scott (2003)studied to identify whether the information and communications technology applications contribute to poverty reduction from Indian perspective. According to the authors ICT can reduce poverty by improving poor people's access to education, health, government and financial services. In this study authors discussed some ICT projects for poverty reduction in rural India and concluded that ICT can empower the poor by expanding the use of government services and to reaching the poor and realizing the potential of ICT in the area of opportunity, empowerment and security is a difficult endeavor.

Prasad K. N. (2004) in his article entitled as "digital divide in India narrowing the gap; an appraisal" stated that the Modern ICTs can contribute to resolve the problems of a rural society of India and the major obstacle which has prevented rural areas from benefiting fully from the great potential of ICT is the low penetration of telecommunication services. Author also made observation that the rural community and individuals need to be empowered by enhancing their capacity to access, select and use information for development efforts, whether they relate to literacy, food, health and family welfare, population growth, environment, trade employment, etc.

Asheeta Bhavnani et al. (2008) conducted a study to examine the role of mobile telephones in sustainable poverty reduction among the rural poor and concluded that economic and social benefit of mobile will be highest in rural areas, which currently have limited or less telephony services. The induction of mobile phones does have a positive impact on sustainable poverty alleviation. The multiple benefits to the mobile phone: from reducing negative aspects such as corruption, crime, high prices, etc. and to increasing positive aspects such as levels of education, efficiency, health.

Shukla and Gautam (2008)made a study to examine digital divide in rural areas of Uttar Pradesh. According to the authors, ICTs can play an important role in sustainable rural development, and by establishing tele-centres in the rural area which facilitate socio-economic empowerment. The authors also noted that the presence of newer ICTs such as e-mail or the Internet was less compared to older ICTs like radio, television and landline phone and suggested that if properly deployment of ICTs in CICs, Panchayat Offices then these offices will become information hubs or kiosks and it can be interpreted that wider coverage, enhancement and up gradation of ICT initiatives required, especially for those who cannot afford it and do not have access to the information that is likely to improve their health, education, livelihood, and can protect them against vulnerable situations.

Rasheed Sulaiman et al. (2011) explored the role of Information and Communication Technologies in empowering Indian rural women through a review of ICT initiatives in India and concluded that, many ICTs based projects are disseminating useful information, knowledge for rural women, but many of them are not able to make use of that information, due to limited or no access to sources of support and services; and also noted that the community radio was found to have the greatest potential in reaching women with locally relevant content; ICT has massive potential to create new employment opportunities for rural women and to contribute significant gains in efficiency and effectiveness in rural women enterprises; efforts are also made to bridge the different types of digital divide such as rural-urban ;men-women.

Leisa Armstrong and N. Gandhi, (2012)made a study to investigate the factors influencing the use of Information and Communication Technology (ICT) Tools by the farmers of rural villages of Ratnagiri district of Maharashtra state, India. Authors were selected 100 respondents from one Tehsil Ratnagiri district and key stakeholders government officials and agricultural industry workers. Two different questionnaires were provided to farmers and key stakeholders. The study was revealed that, rural farmers of Ratnagiri district still not been adopted ICT fully and there is a massive opportunity to enhance the broadcasting of agricultural related information that farmers receives from government officers, fellow farmers and relatives. Most of the farmers were used TV and mobile phone to collect agricultural related information and also noted that number of factors constraining the dissemination of ICT in Ratnagiri District such as the gap between the currently used technology and the technology preference as well as the factors such as gender and land ownership did not significantly affect the use of ICT tools and also effective use of technology is a necessary prerequisite for the successful use of ICT by the farmers. Strengthening and motivating farmer groups to use the technologies such as internet, home phone is important to facilitate access for ICT facilities. Moreover the authors opined that establishing IT based information centres in rural areas could boost access to market information.

Balwant Singh Mehta, (2013) conducted a study by using field Survey method to explores the socioeconomic impact of mobile phone usage in rural areas of the two Indian States such as Punjab and Bihar and the survey revealed that, mobile phones have reduced the cost of accessing information and helped users to make communication with their relatives and migrant family members and to gather timely information related with agricultural and non-agricultural purposes and also Mobile users get benefit by obtaining timely information on a variety of subjects, including on employment opportunities and higher education for their children, funds transfer, etc. The author also noted that in Punjab state, peoples were early adopted new technologies and hence there is high usage of mobile value-added services (MVAS) and innovative uses like transfer of funds and agricultural related information. Finally the author made conclusion, With the spread of mobile use, it is very likely that it could be an arena of innovative activity, reducing costs and thus increasing incomes at the 'bottom of the pyramid'.

Jayade, K. Getal.(2014)published an article entitled as "Study of Information Communication Technology in Agriculture in Vidarbha Region of Maharashtra State of India." and concluded that ICT has improved the economic condition of the farmers in Vidarbha Region of Maharashtra state; ICT is advanced tools to disseminate the modern agricultural knowledge to the farmers and it plays an important role for the development of economy by enhancing the effectiveness of agricultural market, productivity and competitiveness in Vidarbha region of Maharashtra state. ICT and Mobile technology not only improved the package of practices but also improved the agriculture through knowledge dissemination by e-agriculture but also reduced the gap among agricultural scientists, extension worker and farmers.

Literature review above highlights that we will have to see overall impact of Information, communication & technology on rural society. We will have to weigh the pros and cons of the new technology and make the right choices keeping in mind the social and environmental impacts. A rational decision on the technologies for sustainable development will only be able to take our villages, and hence India, forward.

5. Analysis and Discussion of ICT Applications for Rural Development

There is a serious need for IT based and web-based development in rural India, so as to bridge the digital divide. To bridge the existing divide , Information Technology (IT) and various programs of Information Communication Technology (ICT)plays an vital role in building the gap made by the digital divide made due to un equality developments of Urban and Rural India and eventually set of poverty alleviation to a greater extent as rural India is concerned. Rural development can be achieved by improving various facilities of Information Communication Technology (ICT). By means of Awareness and usage of Various ICT programs among the rural masses leads to fruitful results that is raise in social and economic wellbeing and livelihood. Improved agricultural practices with high productivity, profitability and marketing of agricultural outputs by means of usage of new advanced technology and ICT enabled tools. We will analyze and discuss such application in this section.

5.1 ICT in Agriculture

E-Agriculture concentrate on the upgrade of farming and provincial advancement through enhanced data and correspondence forms (IT & ICT). One of the challenges for farmers in rural India is their lack of access to market information. This creates an imbalance in bargaining power with urban buyers which are big companies that have the resources and information to influence the market. Other than market information, a farmer needs to know about weather

on a day to day basis, about new technologies and various government schemes for farmer welfare. Up till now in India among various media, radio, television, literature and newspapers are certainly most utilized by the extension workers to transfer agricultural technology to the huge illiterate and literate segments of the rural populace. But this approach has some major drawbacks one, there is limited scope to get feedback from farmers and second it is not demand driven. One farmer may require information about new rice variety, but radio and newspaper may be giving information about sugarcane. These anomalies can be effectively solved by using IT tools. Through these, we can give exact information that a farmer might be looking for without any delay. Also it can be a two-way process using interactive tools and farmers' opinions and queries would reach the desired officer s within seconds. With the use of ICT, this information asymmetry can be solved effectively. Some of Smart Mobile Application and E-Agriculture are:-

SRIJAN (self-Reliant Initiatives through Joint Action) in Madhya Pradesh, India

- It is an Agricultural smart mobile application.
- Its aim is for monitoring Soya beans production.
- The result of this app is increased productivity, profitability and efficiency.

Jayalaxmi Agro tech

- It is an Agricultural smart mobile application.
- Updating farmers crop specific information by means of Audio/Visual tools.
- Works without internet.
- Information were been provided in regional languages as per the user choice.

M-Kissan

- It is an Agricultural smart mobile application.
- Information were been provided in regional languages as per the user choice.
- Updating farmers crop specific information like pest control, crop pattern, soil type, weather information, nearest market places, current market prices and so on.

M-ARD

- It is an Agricultural smart mobile application.
- Information were been provided in regional languages as per the user choice.
- Updating farmers crop specific information like, weather information, nearest market places, agricultural market prices, government services and extension services.

M-AGRI (IKSL, IFFCO, GSMA), M-Krishi

- It is an Agricultural smart mobile application.
- Information were been provided in regional languages as per the user choice.
- Updating farmers crop specific information like pest control, crop pattern, soil type, weather information, nearest market places, current market prices and so on.

Life Lines

- It is an educational smart mobile application.
- Educational Information were been provided to the rural teachers for teaching the rural farmers
- If any query is raised, for the raised query, the appropriate solution would be provided at the earliest.

Krishi Ville

- It is an Agricultural smart mobile application.
- Information were been provided in regional languages as per the user choice.
- Updating farmers crop specific information like, weather information, nearest market places, agricultural market prices and extension services.

Nokia Ovi Life Tools (OLT)

- It is an Agricultural smart mobile application.
- Agricultural Service provides farmers with personalized information pertaining to market prices of nearest mandis (marketplaces), local news, weather alerts/ forecasts, important information on schemes and subsidies, comprehensive and localized crop and advisory on a regular basis.

5.2 ICT in Diary Sector

Emphasing on the *'White Revolution'*, GoI (Government of India) have initiated four programmes – *Pashudhan Sanjeevani, Nakul Swasthya Patra, e-Pashudhan Haat, and National Genomics Centre*. Nakul Swasthya Patra is a 'health card' that can help the Diary farmer to keep a record of his livestock, as well as ready information on the age and dates on which he should get his animals vaccinated and inseminated. The card would keep track of the veterinarian who has given the medicine, vaccination, artificial insemination and genetic background of the bull or semen used. On the other hand *e-Pashudhan Haat* wants to create an online platform to buy and sell cattle. It is a known fact that farmers depend on informal channels such as friends and relatives to buy and sell their cattle. Therefore, a need for a virtual livestock market was long felt. 'Health Card' of an animal integrated with e-*Pashudhan Haat*, can help farmers in buying the desired cattle. This can be associated with *Pashu Posahn* app also. Also, farmers would be able to keep the past record of their cattle e.g. health, fertility, production, etc. This way, many concepts of genetics and breeding could be encouraged to develop Diary sector. Another area for IT application in dairying can be automatic milking systems which are computer controlled standalone systems that milk the Diary cattle without human labour involved.

5.3 ICT for Effective Implementation of Welfare Schemes

Every year, government spends billions on the welfare of the poor. As around two-third of the total population and large number of the poor reside in rural areas, most of these welfare schemes are targeted at the rural populations. Use of ICT can improve the efficacy of these schemes, plug leakages and eradicate corruption. Some examples are described as follows:-

i) ICT will be used in *Pradhan Mantri Fasal Bima Yojana* in a big way. In this, a farmer will have to send the photo of his damaged crop to authorities on net. Then the government will also access damage through satellite imagery of the field. After that insurance claim will be directly transferred to farmers' account. Thus delays and corruption in payment of claims would not be there. This scheme has the potential to change the way farmers' look at crop insurance.

ii) The Government is investing a lot in irrigation through *Pradhan Mantri Krishi Sinchai Yojana.* IT can be used here also for Smart Agriculture by measuring soil moisture through and then automatically supplying water through drip irrigation.

iii) Leakages in *Public Distribution System* can be plugged by connecting the ration shop through internet and using biometric authentication system of beneficiary.

iv) Through *Direct Benefit Transfers*, the government is trying to give subsidy directly in the bank account of the beneficiary. This has effectively stopped black marketing of subsidized LPG cylinders.

5.4 ICT in Rural Education and Skill Training

Thanks to the relentless efforts by the government and schemes like mid-day meal, India has achieved universal enrollment at primary level. But one worrying fact is that learning outcomes of enrolled children are very abysmal. Attention needs to be focused on this now. Using ICT tools in education can help improve the learning among the kids e.g. through projector and computer, teachers can make children understand complex concepts easily. But problem here would be to train the teachers in use of ICT tools so that their attitude towards teaching may be changed. The Government is promoting use of ICT through *Rashtriya Madhyamik Shiksha Abhiyan*. Under this following steps are being taken:-

- The establishment of smart schools, which shall be technology demonstrators.
- Provision for engagement of an exclusive teacher for ICT, training all teachers in use of ICT.
- Development of e-Content.
- National Award for teachers using ICT in schools in the teaching learning process.

Also a project called e-Basta is conceived under *Digital India Initiative* to make school books accessible in digital form as e-Books to be read and used on tablets and laptops. Further, ICT can be used in skilling rural youth under various Government skilling programmes e.g. Skill India, PM Kaushal Vikas Yojana.

5.5 ICT for Rural Health Sector

Healthcare is the right of every individual but lack of quality infrastructure, dearth of qualified medical functionaries, and non- access to basic medicines makes it difficult for the poor to access Medicare. There are few Primary Health Centres in villages and many of them do not have doctors as no one wants to be posted in remote rural areas. This can be solved effectively through *Telemedicine* in which a doctor sitting in a city can interact with the patient in the remote village and prescribe medication. This is not only cheap but also convenient and less time consuming. Also apps like *'Mera Doctor'* are launched by private sector which offers WhatsApp-like chat sessions between patients and licensed doctors to answer questions. Government has also adopted ICT in health by issuing biometric smartcards to the beneficiaries under *Rastriya Swasthya Bima Suraksha Yojana.*

5.6 ICT for Marketing Needs in Rural India

ICT in rural areas will provide unique opportunities to producers of rural products, agriculture/agro-processing products, rural handicrafts etc. to have direct access to markets. It can also be used to promote Village and heritage tourism. Many artifacts are made by the women in the villages which can be sold online to outer world. One important reform undertaken by the Government in the field of agri-marketing is *National Agriculture Market*. It is a well-defined plan to integrate the mandis through internet. It enables a farmer to sell his produce anywhere in India depending on the highest price which means a trader in Mumbai can buy a farmer's produce kept in a mandi of Delhi. Conclusion Thus we see that ICT has immense potential. If this potential is leveraged effectively, it can uplift the lives of the rural masses in a big way by bridging the cultural gap between different parts of the country.

6. CONCLUSION

Based on above discussion and findings, we can conclude this study as follows:-

1) ICT can play a major role in environmentally sustainable rural development; rural community development.
2) ICT has remarkable contribution towards improvement of economic and social development in India and have positive impact on rural society.
3) In the developing country like India, to create information rich societies, to empower poor people, to reduce digital divide, sustainable development of rural community's dissemination of ICT in grassroots level of villages is necessary.
4) E-agriculture services provides several benefits like increased productivity, increased quality in products, high in come, increased efficiency, raised Profit, easy knowledge gathering about climatic condition, humidity, soil type, crop pattern etc. and can share agricultural Information in a speedy manner. E-agriculture facilitates timely and accurate updates regarding current market price & market demand to farmers at lower cost and at lower risk by means of ICT enabled devices such as mobile phones, radio and television and through internet services.
5) Information technology has impacted the rural economy indirectly. It is observed that that effective applications and channels have been used to benefit the rural economy by government and corporates. However, it is essential that the government should take more initiative to increase the use of this technology in its development programs and educate people in order to use ICT effectively and efficiently.

ICT has immense potential. If this potential is leveraged effectively, it can uplift the lives of the rural masses in a big way by bridging the cultural gap between different parts of the country. There is a need to assess the needs of the rural people with regard to information technology i.e. linkage between demand and purpose of these services and product.

REFERENCES

1. Cecchini Simone and Christopher Scott. (2003). Can information and communications technology applications contribute to poverty reduction? Lessons from rural India. , Information Technology for Development, Vol. 10, Issue 2 (2003): 73 – 84.
2. David J. Grimshaw and Shalini Kala (2011) – Strengthening Rural Livelihoods: The impact of information and communication technologies in Asia - Practical Action Publishing Ltd., UK and the International Development Research Centre, Canada.
3. GulatiArchana (2008) - "Dialing in rural prosperity through universal cellular connectivity" - Kurukshetra – A Journal of Rural Development, Ministry of Rural Development, Government of India, Vol. 57, No. 1, ISSN-0021-5660.
4. Indiresan, P.V. (1989). Technology planning for rural development. IASSI quarterly, 8 (1), 52-63.
5. Jangid, UmeshArya. (2004). Information technology: boon or bane. Ed by Kiran Prasad. Information and communication technologies; recasting development, New Delhi: BR, 67-80.
6. Kumaresan, S.C. and Chitra, Alosia. (2003). A study on the need for rural information centers in the villages of Tamil Nadu. Annals of library and information studies, 50,137-145.
7. Malik, Netrapal and Bharadwaj, Neelam. (2001). Village information centers: a strategy of using information technology for rural development". IASSI quarterly, 19(3), 103-113.

8. Manish Kumar, ChitraPathak and Singh, A.K. (2001). Information sources of rural poor: a study in US Nagar district of Uttaranchal.IASSI Quarterly, 19 (3), 123-133.
9. Mathur, Akshay and Ambani, Dhirubhai. (2005). ICT and rural societies: Opportunities for growth. The international information &library review, 37 (4), 345-351.
10. Midda, Abdul Momin. And Mukhopadhyay, Sripati. (2006). Information and communication technology in e-education. Journal of library and information technology, 2(1), 42-48.
11. Mr. Atul D. Newase; Dr. Jitendra Sheetlani; Dr. Ranjit D. Patil; ICT: A Super Highway to Reaching the Unreached Rural
12. Ogunsola, L.A. (2007). Africa in the global village: the challenges of co-operation and linkages in the 21st century. Library progress (international), 27 (2), 165-179.
13. Prasad K.N. (2004). Digital divide in India narrowing the gap; an appraisal. Information studies, 10(3), 523-558.
14. Reddy, Naresh. (2003). I T for governance: opportunities. Information technology for participatory development. New Delhi: Centre for information research and development, 135-142.
15. Sharma, Aravind Kumar, (2007) Information needs and sharing pattern among rural women; a study. IASLIC Bulletin, 52 (3), 159-167.
16. Shukla, Saurabh and Gautam, J. N. - Impact of information communication technology in rural areas of Uttar Pradesh: bridging the divide. Ministry of Rural Development, New Delhi.
17. Upadhya, Padma V. (1996) Information Technology and Community Development. Role of libraries in national development. New Delhi: ILA, 323-328.
18. Warner M. F., Adoption of ICT in agricultural management in the United Kingdom: the intra rural digital divide. Agriculture
19. World Bank Group (2002), URL:http://web.worldbank.org/WBSITE/EXIERNAL/ TOPICS/ EXTGENDER/ EX11CTTOOLKIT/ 0"content MDK: 20273967-menu PK: 54 2826 –page PK: 64168445 -p iPK64168309- the Site PK: 542820, OO.html.