



Information and communication technology infrastructure in Kerala-A rural perspective

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Abstract

Various policies and projects created a new information society which has been transforming the rural economy of the states in India. The tele-density of India showed a tremendous increase from 2011. The urban tele-density was above national average which accounts to 154.20 per cent whereas the rural India had 51.30 per cent only. This easy access of mobile phone was due to private service providers in India. The market share of the public sector units of service providers has come down to 8.81 per cent in 2016 from that of 11.60 per cent in 2011. On the other hand, the private sector share is increasing from 88.40 per cent in 2011 to 91.91 per cent in 2016. The subscribers in southern states hold more access to internet. Kerala stands second in the case of internet subscribers in India next to Delhi, due to the internet infrastructure provided by the state. In rural areas, Himachal Pradesh has the highest internet subscribers. In Kerala, there is no marked difference between rural and urban areas in the internet usage because of the geographical condition of the state. Government of Kerala announced the first information technology policy in 1998 which created an information infrastructure utilizing human resources for Information Technology. A number of major initiatives taken by the government were the establishment of various institutions to strengthen e- governance, IT infrastructure Development, IT dissemination to bridge the digital divide and IT enabled information services of the state government. The second information technology policy of the government announced in 2007 aims to “knowledge society with sustainable development.” Numerous initiatives have been taken by the government over the years such as Kerala Statewide Area network, mobile services delivery platforms, Friends, Akshaya, Common Service Centres (CSC), etc.

Keywords: ICT, internet penetration, mobile

Introduction

Information and communication technology (ICT) is considered as an important input in the production process in all areas of economic activities ^[1], and ^[2]. It is being used not only as an engine of growth, but also for promoting social justice and equity in the society ^[3,4] and ^[5]. In India, a major chunk of deprived and marginalized people is residing in rural areas and there goes without saying the emphasis on rural development from the very inception of planning in India ^[6] and ^[7]. In recent years, along with other strategies, the application of ICT is considered as an important tool for enhancing the welfare of people in rural areas. The present paper has two parts. The first part discusses the role of ICT in rural development and various programmes initiated at the national level for the promotion of rural welfare. The second part gives the various ICT initiatives particularly for rural development under taken by the state of Kerala. It also covers the growth of various media through which the ICT resources are distributed in the state.

Data source and methodology

Methodology of this paper is descriptive. The secondary data was collected from the various documents of information technology policy of India and the States. In addition, the secondary sources of information are the leading research journal, statistical reports, books and websites, etc.

Scope of Information and Communication Technology (ICT) in Rural Areas

The application of Information and communication technology in various walks of rural development has great scope today. However, as compared to need, the rural areas in India are almost

under-represented in the distribution of ICT resources as compared to urban areas. India has a very large rural-urban ‘digital divide’. Even though the urban India has covered almost complete digital revolution, rural India still suffers from inadequate connectivity, approximately 50000 villages lacks the voice and internet connectivity even now. According to the 2011 census of India, 833.10 million people (around 68.84 %) live in 6,40,867 villages. The population size of the villages varies considerably, among these 2,36,000 villages in India have a population fewer than 1,000 while 3,97,00 villages in India having more than 10,000 population. information and Communication Technology (ICT) has been emerging as a key force for economic development in which the policy makers recognized that the digitalization can help the sustainable development and thus reshaping of the rural economy.

Growth of Modern ICT Infrastructure

Information and communication technology media for development refers to the application of modern ICT towards social, economic, and political development, with a particular emphasis on helping poor and marginalized people and communities. It aims to bridge the digital divide and providing equitable access to technologies.

a. Internet

The Internet is not a solution for rural and agricultural development, but it does bring new information resources and can open up new communication channels for rural communities and

agricultural organizations. It offers a means for connecting the gaps between development professionals, rural people and agricultural producers through the initiation of interaction and dialogue.

Though the rural areas are facing the digital age, it is not much accepted due to the various issues related with their social and economic structure. The information technology dissemination in rural areas leads to the transformation of lives in the community rather than discussing about haves and have not's (Seppanen, 2014), and degree of usage and usage patterns (Prodinik, 2014). Gilbert (2011) and Helpser (2012) pointed out that there is an increasing recognition of the complexity of the digital inclusion.

b. Internet Penetration in India

The internet penetration in India accounts 27.00 per cent of the total population i.e. 350.48 million use internet in India in the year of 2016. Table 1 indicated that the internet subscribing population in rural India as well as the difference in the internet penetration between the rural and urban across the country is

meager. According to the data, Kerala stands second in the case internet subscribers (45.38 %) while Delhi has the highest internet penetration (99.00 %). Among the rural areas, Himachal Pradesh has the highest internet subscribers (28.61 %) but in Kerala there is no marked difference between rural and urban areas due to the Kerala model of development. The rural areas of Kerala had 26.91 percentage accesses to internet which is above the national average. The subscribers in southern states in India possess more access to internet.

Internet and mobile users in India have increased by two-fold due to its development of network. Internet connectivity in urban area is mostly provided by private entities (Hossein and Hossein, 2011; TRAI, 2014). These private operators have fewer incentives in extending their network to rural villages on account of factors such as:

- Need to cover large areas with low population density which limit their return on investments
- High capital investments for digital infrastructure
- High operational cost

Table 1: Internet Penetration in India

Service Area	Internet Subscribers (in millions)			Internet subscribers per 100 population		
	Rural	Urban	Total	Rural	Urban	Total
Andhra Pradesh	9.60	16.26	25.86	15.04	65.68	29.19
Assam	3.31	3.41	6.72	12.13	64.84	20.64
Bihar	8.96	11.10	20.05	7.52	58.19	14.52
Delhi	-	-	21.42	-	-	99.70
Gujarat	6.15	15.57	21.71	16.61	58.08	34.02
Haryana	2.73	4.77	7.50	15.52	47.57	27.15
Himachal Pradesh	1.80	1.29	3.09	28.61	154.24	43.38
Jammu and Kashmir	1.83	1.72	3.55	20.35	49.37	28.46
Karnataka	5.44	17.12	22.56	14.24	70.28	36.07
Kerala	5.60	9.23	14.82	26.91	101.77	45.38
Madhya Pradesh	6.79	14.19	20.98	8.98	49.59	20.13
Maharashtra	10.25	35.91	46.16	16.27	60.36	37.67
North East	2.03	2.09	4.12	19.35	59.33	29.43
Odisha	3.85	4.57	8.42	11.00	60.30	37.67
Punjab	4.66	8.98	13.64	26.84	65.82	44.00
Rajasthan	7.01	10.77	17.78	12.61	60.77	24.26
Tamil Nadu	6.58	21.38	27.96	23.16	49.96	39.27
Uttar Pradesh	8.12	22.84	26.28	10.23	43.34	17.82
West Bengal	8.09	15.08	23.17	11.95	55.22	24.38
Total	113.71	236.77	350.48	12.98	59.53	27.51

Source: TRAI 2016

c. Mobile Phone and ICT

There are many examples of the use of mobile phones which helps in rural development (farmers in agricultural practice). Mobile phones either provide voice, text or photos, short message services (SMS) within the farmer and technology interaction. Whats App application reached another land mark which disseminates information in rural areas which helps in the dissemination of knowledge for accessing many agricultural practices.

There is a need to formulate information regarding the knowledge access and practice with farmers, addressing illiteracy and empowering farmers to use the modern mobile phones can lead to increased adoption of information technologies.

d. Tele-density in India

Table 2: Tele-density in India (00' population)

Year	Overall tele-density	Rural tele-density	Urban tele-density
2011	70.69	33.80	156.90
2012	72.90	39.30	162.20
2013	74.50	41.10	146.60
2014	79.38	44.00	145.50
2015	82.89	48.00	149.00
2016	91.61	51.30	154.20

Source: TRAI

Table 2 shows the details on tele density between urban and rural India.

The tele-density of India was 70.69 in 2011 while it was 91.61 per cent in the year 2016. Urban tele density accounts to 154.20 per cent whereas in rural India, it is 51.3 per cent. This is because of the easy access of the mobile phones and of the important role played by the private service providers. The market share of the public sector units of service providers has come down to 8.81 per cent in 2016 to that of 11.60 per cent in 2011. On the other hand, the private sector share is increasing from 88.40 per cent in 2011 to 91.91 per cent. Major service providers are BSNL (8.50 %), Airtel (7.91 %), Reliance Jio (7.88 %), Reliance (7.54 %), Telenor (4.51 %), Tata (4.51 %) Sistema (0.48 %) Mahanagar Telephone Nigal Limited (MTNL) (0.32), Quadrant (0.23 %), Bharti (23.42 %), Vodafone (17.94 %) and Idea (16.69 %).

Table 3: Tele-Density of Indian States

States	2012	2013	2014	2015	2016
Total India	72.90	74.50	79.38	82.89	91.61
Bihar	46.09	45.06	51.17	53.48	59.96
Assam	46.25	48.63	53.95	56.91	65.31
Madhya Pradesh	52.87	55.98	60.36	63.74	66.05
Uttar Pradesh	56.63	56.24	60.51	65.02	72.82
Odisha	59.59	61.08	60.85	67.93	79.18
Haryana	76.49	79.78	76.05	85.17	89.12
North East	67.08	69.46	76.18	78.94	89.84
Rajasthan	69.85	74.08	77.76	82.61	90.17
West Bengal	69.01	68.32	76.05	79.20	90.66
J&K	57.85	64.81	76.93	79.50	92.70
Andhra Pradesh	76.97	78.77	84.15	86.68	95.54
Maharashtra	87.70	90.01	93.41	98.70	108.35
Gujarat	86.57	89.71	95.61	99.62	111.25
Karnataka	90.50	93.39	97.52	102.00	112.71
Kerala	96.20	97.68	95.57	101.38	112.71
Punjab	102.52	105.59	103.78	105.40	122.37
Tamil Nadu	107.38	110.56	117.52	118.06	126.49
Himachal Pradesh	103.75	106.31	114.52	125.88	143.25
Delhi	221.45	227.20	237.94	239.11	253.61

Source: TRAI

Table 3 shows the tele-density among various states in India. The major contributors of tele-density among the states are Delhi, with the highest tele-density of 253.61, followed by Tami Nadu (126.49), Punjab (122.37), Kerala (112.71) and Gujarat (111.25). On the contrary, the tele-density is comparatively low in states like Bihar (59.96), Assam (65.31), Madhya Pradesh (66.05), Uttar Pradesh (72.82) and West Bengal (90.66). Among the metros, Delhi tops in tele-density with 253.14 per cent followed by Kolkata (184.56) and Mumbai (169.97). Cyber Media Research (CMR) data revealed that 47 per cent of the Indian population use smart phones and Kerala had emerged as the highest smart phone users in the country which accounts to 65 per cent.

ICT Projects for Rural India

A number of digital infrastructure initiatives were put forwarded by the various governments for rural development. Agricultural innovation and diffusion of new technologies for dissemination of information are important factors for all developing countries like India for their food and nutritional security. To achieve this, the farmers must have access to sustainable technology in crop, fisheries, livestock, forestry and other agriculture related sectors. Besides the public sector, various projects have been

implemented by the private agencies and non- governmental organisations (NGOs).

a. Information Village Knowledge Center (IVKC)

M.S. Swaminathan research foundation (MSSRF) was established in 1986 which is a non-profit organization. It was founded by Professor M. S. Swaminathan, Agriculture scientist who aims to accelerate the use of technology for sustainable and rural development. The foundation applied appropriate technology options to address various problems faced by rural folk. Village Knowledge Centre (VKC) or Information Village (IV) projects were also developed and implemented by the foundation. The project mainly concentrated on agriculture and animal husbandry related questions, digital images and printing, adult computing education, digital storage and dissemination of local cultural content like mythological stories, web based services with health examination results. The VKC project provided training in two stages; the first stage covered the formal available technology and their use together with village conditions in the agriculture practices. The second stage consists sharing of information through visiting similar institutions involved in services information, dissemination and modern agriculture practices.

b. Sustainable Access in Rural India (SARI)

The project aims to social, economic, and political development through comprehensive information and communication services by computer and information kiosks (IT) in rural areas. It was introduced in 2004 and had established 78 information kiosks in Melur Taluk, an administrative sub-unit in rural area of Madurai District. While thirty-six information kiosks are run by the self-employed entrepreneurs in rural areas, forty two are run by rural non government organization. This project is sponsored by the Development of Human Action (DHAN) foundation, a professional development organization. The innovations developed in the project are mainly for eradicating poverty. The important objectives are:-

- Establishing IT based community resource centers in rural, tribal coastal areas and providing wide range of e -services for the poor people
- Digital literacy including internet knowledge among poor women, thereby creating employment opportunity for the rural poor women
- Facilitating rural poor to get connected with the resources and expertise through online consultation for health, education, agriculture, etc.
- Developing software for agriculture which are now being used by farmers in community resource centre
- Community radio station to disseminate community information
- Various e-services such as e-mail, computer-aided school education, e-governance, etc.

The importance of making the kiosks disseminates information more widely among communities for their long term socio-economic sustainability.

c. IKISAN

It is an agricultural website which provides information on knowledge and business requirements to cultivators and traders

in agricultural sectors. This is an agri portal which provides all kinds of information related to agriculture such as crop diagnostics, local information for the use of farmers. Project services are available to farmers with membership, whereby a farmer can be a member by paying Rs. 100 per year or Rs. 10 per month. The operators of IKISAN information centres are agricultural graduates who act as the interface between the information networks and farmers. Online services viz., cultivation practices of 20 major crops, market information and weather forecasting are being provided. Currently the portal has information for the states; Andhra Pradesh, Tamil Nadu, Karnataka, Uttar Pradesh, Haryana, Maharashtra and Punjab.

d. Agri portal/Mathir Katha

This portal gives information in five different areas such as agricultural practices, marketing information, animal husbandry, fisheries and horticulture to citizens in West Bengal at the rural level. It was established in 2005, sponsored by the Indian Space research Organisation (ISRO) and implemented by National Informatics Centre (NIC). The target group of the project is farmers and cultivators.

The range of information covered in this portals include name of seeds, seeds availability, area of crops, crop management, agro-climatic zones and different information regarding the areas. Apart from these, updating of the content of sector wise information is also carried out on a regular basis.

e. Grameen Sanchar Society Public Call Office (PCO) Project

This is a nonprofit NGO working in rural West Bengal. The mission aims to provide interactive exchange of information for planning and day to day operations by farmers and to establish an agriculture centre in each village. It was established in 2003, generally known as GRASSO, an apolitical and unbiased organization run by culturally open ended and non-ethnic group of professionals from different background. Another mission of the project is to transform the resource into a successful network through many innovative and uniquely thought out self-employment schemes.

This was one of the first initiatives in the field of information dissemination by NGO in association with Bharat Sanchar Nigam Limited (BSNL) for improving connectivity in the rural areas by an IT based rural development on the existing self employment and poverty alleviation schemes.

f. Vasundhara Vahini Community Radio

Vasundhara vahini is a Community Radio (CR) programme which is dedicated to cater information to the devoted community like farmers in and around 35 Kilometer (KM) radius in Baramati. This initiative was underway in 2005 by the Vidya Prathistans Institute of Information Technology (VPIIT). This radio gives recent information related to agriculture from all over the world. This CR is a medium that gives voice to the voiceless, and power to the powerless people who are marginalized at the heart of communication and democratic process within the societies. It also addresses their real issues, their sufferings, their wisdom, their expressions, their anguish and their feelings. Vasundhravahini generates its own revenue from various advertisements and is able to support 100 per cent of its recurring costs.

g. Gyan Sanchar

Gyan Sanchar is an information technology project launched in 2010 by the BSNL in association with Canadian International Development Agencies (CIDA). The project was implemented in 40 villages of Hoshangabad and Itarsi districts in Madhya Pradesh. The purpose of the project is to disseminate knowledge and useful information to villagers through modern technology in villages. This is a special portal-based service which provides information such as market rates of agriculture product, weather forecast, animal husbandry, knowledge on latest agricultural practices, e-governance services, issuance of income and domicile certificates, etc. The project also gives the training facility to the youth and children for the use of information technology. The project has succeeded in participation of various government departments, private organization. People of all ages who come to this centre take advantages of the facilities of the information kiosks. The villagers are given services on charge which helps to raise the revenue for the Kendra's to run.

h. IFFCOKissan Sanchar Limited (IKSL)

It is a joint venture initiative of Barathi Airtel and StarMobitel, has been formed with the objectives of bringing cost-effective communication and value-added services to rural communities. This project is giving a green subscriber Identity module (SIM) which provides on daily basis three free voice-based messages in local language to all the customers and empowering farmers with high quality and timely relevant information and services. The duration period of the message is 60 second which covers a variety of topics relevant to the farmers like agriculture practices, animal husbandry, market rates, education, health, weather and the various schemes of rural development, etc. Nearly, three million farmers are getting benefitted by the project. Narula (2010) described that the IKSL strengthened the co-operative structure of the society and the farmers by the information technology on rural development

i. JANMithra

The main objective of the JAN Mithra Project is to provide a single window facility to citizens to ensure transparent, accountable and responsive governance and make the right to information an effective manner to the hands of the rural folk. Grievance redressal, provision and up gradation of information, e-application submission, agriculture market rates, Below Poverty Line (BPL) list, development works, agriculture, health education, animal husbandry are some of the information disseminated through the project. It was launched in 2003 as an integrated platform and was implemented in the Jhalawar Districts in Rajasthan and in the state of Uttaranchal. It is a Local Area Network (LAN) which connected the entire departments stands for the rural development.

j. Kissan Call Centre (KCC)

Kissan call centre was initiated in 2004 by the Department of Agriculture and Co-operation, Ministry of Agriculture. The objective of the programme is to provide agriculture, animal husbandry and allied sector knowledge free of cost to the farmers. This is a knowledge management system and the software is developed by the Telecommunications Consultants India Ltd. (TCIL). KCC shall be supported by the data base with the asked questions and their answers. It also provides all technical

assistance to the caller and will record queries along with the personnel details. The data generated like location wise, district wise, state wise, level wise, problem wise, call type wise, all India level will be available to farmers. KCC services will be available from 6 AM to 10 PM except on calendar holidays, further the call will be attended in the Interactive Voice Response (IVRS) by computer- telephone integration (CTI).

k. Tele support project

Tele support project aims to good practices technologies or methods which contribute to sustainable agriculture through various methods such as pest control of various crops, animal health improvement, soil fertility improvement by vermin composting, marketing, etc. This was initiated in 2006 by the European-Indian framework to develop integrated use of the web-based tool which provide communication and make information systematically to the farming community. The decentralized platform of information allows rapid on line availability of resources like texts, videos, experts and the agriculture practices available in local language. Direct beneficiaries were women and farmers group in rural areas of Kerala and West Bengal, who have access to good practices and technologies. NGO also plays a vital role for the tele support project

Conclusion

The foregoing analysis discussed the role of IT initiatives for the overall development of rural areas along with various IT initiatives implemented at national and state level. Most of the projects in India are agriculture and allied services oriented such as kisan call centers, rural radio and TV programmes and information kiosks and tele centers which provide information to the rural people. As compared to other states in India, the achievement of Kerala in the front of IT infrastructure is tremendous.

The various aspects which accelerate the rural development particularly agriculture is promoted through different types of information communication technology devices such as print, mass media, extension, mobile, internet and agri portal. The motto of all these IT initiatives in the state of Kerala is 'Knowledge society with sustainable development'. Though there has been a boom in various IT projects and infrastructure development in rural areas, the extent of real impact of these innovative practices on the avowed objectives of rural development is still an unsettled one. Some projects in the states are concentrated in village knowledge centers which provide various information to the rural community.

Even though some projects of the technology dissemination are developed with the help of Indian institute of technologies (IIT), National informatics centre (NIC) also provides technical assistance to the centre, states and NGOs also. Though most of the village projects are sponsored by the International agencies, many of the projects are run by their own funds. Even though Numerous projects of information and communication technology has been undertaken by the government for rural areas the development of infrastructure not up to the extent that the policy documents.

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