

# The Role of Information and Communication Technologies in Rural Development in India

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*Abstract*— Information and Communication Technologies (ICTS) are changing every sphere of our lives. It holds tremendous potential for rural development in India in the areas of agriculture, health, and education. One of the main reasons for the inequitable distribution of economic gains between urban and the rural population is the gap in access to information. ICTs can contribute in automation of Rural Banks, networking, information sharing and the provision of ICT enhanced distance learning in countryside areas. Issues such as unavailability of electricity, lack of ICTs equipment, high level of illiteracy, user acceptance and local content have to be addressed before the potential of ICTs can be achieved. The paper covers one such solution, Internet.org. By partnering with mobile operators and governments in different countries, Internet.org offers free access in local languages to basic internet services in areas like jobs, health, education and messaging. Internet.org lowers the cost of accessing the internet and raises the awareness of the internet's value. In India, Reliance network has already rolled out free services to millions of people in Tamil Nadu, Andhra Pradesh, Maharashtra, Kerala, Gujarat, and Telangana. Apart from analyzing the effective implementation of Internet.org in rural areas the paper also draws attention to the efforts made by past and present governments of India to solve the major problems facing ICT development. Some recommendations are made as to what the government and other development agencies can do to address these challenges.

**Key words:** Information and Communication Technologies, Rural Development, ICT

## I. INTRODUCTION

Information and Communication Technologies (ICTs) have transformed lives across India. According to the census of 2011, 68.84% of the population of India is rural whereas 31.16% is urban. These figures clearly indicate that India still breathes in villages. But even after more than sixty seven years of independence, illiteracy, poverty and backwardness in all terms still plagues rural India. Information and Communication technologies have become imperative to the progress of rural India. They have become an integral part in the information-flow for catalyzing the development efforts in rural India.

Today ICT can play a major role in improvisation of various sectors like agriculture, medicine, education, e-comers and many more. ICTs can help to create awareness among the rural public regarding new technologies in agriculture which would help them to contribute to the GDP of the country. The various ICTs can help to spread education among the rural masses like online video lecture and e-books are easily available on internet. ICTs can provide a platform for the social connectivity for villagers; they can easily report their problems to Gram Pradhan (head of the village elected by villagers) and easily share the information on a whatsapp group.

Thus bridging the digital divide not only helps in filling the infrastructural gap but also to take the rural population to the forefront.

A very good example of ICT which is recently working in this area is Internet.org.

It plans to deliver basic internet services to everyone by working to decrease the cost of connectivity, building more efficient services that use less data, and by partnering with mobile operators on new models for access that can help the industry grow while also bringing more people onto the internet.

The development-landscape has been transformed by the explosion of ICT, especially the mobile phone technology. According to a study, 1% growth in mobile networks led to increase of 5% in the per-capita GDP. Some of the more traditional forms of ICT such as radio and television have had a more prominent impact than the new forms of ICT due to their ease of use, easy accessibility and familiarity to the illiterate population, these forms of ICT will remain vital to rural India Development. The mobile phone is more important than the other forms of ICT when it comes to rural development of India. This is because of two reasons: firstly they are easier to access for the rural poor people than other forms of ICT which tend to expensive and require infrastructure. Secondly the use of mobile phones increases interaction between the users. Apart from these the use of internet is also boomed by the introduction of Wi-Fi in rural areas. Many villages have already installed the Wi-Fi base internet facility in their area and several others are going for it. Traditionally, the overall development has been seen as the result of development in various sectors such as agriculture, education, health, governance and banking.

## II. ROLE OF ICT

### A. Agriculture:

It gives information about purchase of fertilizers, their uses, Information on pesticides, herbicides, storage and NetMaking. Although the Green Revolution led to increased productivity of food crops, there is still the need of a new revolution which will bring new prices for consumers, contribute to smart agriculture and incentivize the farmers to increase their productivity.

Reuters Market Light, for example, services over 2, 00,000 rural subscribers in 10 different states in India for a cost of US \$1.50 per month. The farmers receive four to five messages per day on prices, commodities, and advisory services from a database with information on 150 crops and more than 1000 markets.

Internet can be used to store large amounts of data, and mobile phones can be used to disseminate temperature information to farmers cheaply. All these prevent crop losses and mitigate effects from natural adversities. Soil data can be collected and disseminated by a variety of ICTs.

Some of the web portals which are available currently for agriculture related help are as follows:

- AAQUA (www.aaqua.org)
- KISSAN Kerala (www.kissankerala.net)
- DACNET (www.dacnet.nic.in)
- E-Krishi (www.e-krishi.org)
- Agropedia (www.agropedia.iitk.ac.in)

#### B. Health Services:

ICTs can play a pivotal role in creating awareness on dealing with epidemics, treatments for different ailments and good health facilities. Different medical mobile applications available today can provide quick solutions to the people.

#### C. E-Governance:

With the ICTs pervading in every sphere of life, they have become omnipresent influencing political, cultural, socio-economic, developmental and behavioral decisions today.

A very good initiative taken by the government of India is launching the scheme Digital India scheme through which the government aims at eradicating the paper work involved in their offices and shifting every communication and information related work to the internet.

Government of India is having an ambitious objective of transforming the citizen-government interaction at all levels to the electronic mode (E-Governance) by 2020. In this light, the importance of ICTs has been shown in various rural e-governance applications implemented in recent years. In many of the remote villages, several government services are not available and the locals have to rush to nearby districts to get their work done. E-governance applications can provide online services which can reduce the cost of, not only the citizens but also of the government. The success of e-governance in rural India is reflected by the fact that the rural citizens are now using the online services. Projects like E-grampanchayat has made communication easy as now, government officials can be aware about exact situation of villages coming into their work territory very easily. To facilitate the easy access of the state and district administration services to the rural people, many states have implemented the State Wide Area Networks (SWAN).

State	Application	Status Of Swan
<b>Karnataka</b>	<ul style="list-style-type: none"> <li>- Bhoomi Monitoring Cell: It is responsible for managing the centralized Bhoomi database which would be shortly hosted in the State Data Centre.</li> <li>- Kiosks managed by an operator to assist the citizens in rural areas for accessing the services of the government. Rural Digital Services (RDS) to offer value Added services, including video conference, to citizens across the state by charging minimal costs.</li> </ul>	<ul style="list-style-type: none"> <li>- A satellite network, which is being set up by Revenue Department would connect 177 Bhoomi Data Centres located at various Taluka centers. BSNL will set up a wide area network (WAN) for the Karnataka government at an estimated cost of ₹ 170-crore. The WAN called Karnataka State Wide Area Network (KSWAN) will provide 2 mbps connectivity from Bangalore to all district headquarters of the state (27 locations) and 64 kbps connectivity to Taluka headquarters.</li> </ul>
<b>Gujarat</b>	<ul style="list-style-type: none"> <li>- Gyan Ganga Project with nLogue Communications Pvt. Ltd: 5 Talukas commissioned, 3 Talukas final stages, 70 kiosks connected and operational. Services started: Computer education, photography, email, video-mail, video conference. E-governance, Health, Veterinary – to start soon</li> <li>- SWAGAT (Online Grievance Redressal System)</li> <li>- Mahiti Shakti in Panchmahals district</li> </ul>	<ul style="list-style-type: none"> <li>- All districts HQ are linked with the Secretariat with 2 MBPS leased circuits and all Talukas (TC) linked with the District HQ (DC) with 64 KBPS leased circuits taken from Bharat Sanchar Nigam Limited (BSNL).</li> <li>- There are at least 20 other offices at each district HQ, in the process of integration with the district wide area node (DC) through bare copper from BSNL. Each DC has 10 telephone (receive only) lines from PSTN terminating on to dialup services. In all there are 250 dialup ports available through the state enabling units/offices/individuals to hook on to GSWAN just by making a local call, from anywhere within the state.</li> </ul>

Table 1: Application

### III. TECHNOLOGIES INVOLVED: INTERNET.ORG

This is a new initiative by the social media giant facebook.com. According to a data more than 4 billion people out of 7 billion are far from connectivity. The goal of Internet.org is to make internet access available to the two-thirds of the world who are not yet connected hence to bring the same opportunities to everyone.

The founding members of internet.org- Facebook, Ericsson, MediaTek, Nokia, Opera, Qualcomm and Samsung — have developed joint projects, shared knowledge, and mobilized industry and governments to bring the world online.

INTERNET.ORG was first launched in Zambia on July 2014. In India it was launched on 10 February 2015.

The company has achieved promising early results from their first set of partnerships. In the Philippines, they have worked with mobile operator Globe to offer free data access to the apps, made it easier for people to register for a data plan and get a loan for their plan. In just a few months it helped double the number of people using mobile data on Globe's network and grew their subscribers by 25%. In Paraguay, by working with TIGO they grew the number of people using the internet by 50% over the course of the partnership and increased daily data usage by more than 50%. These two partnerships alone helped almost 3 million new people access the internet.

Internet.org brings new users onto mobile networks on average over 50% faster after launching free basic services, and more than half of the people who come online through Internet.org are paying for data and accessing the internet within the first 30 days. These points show that Internet.org is not only a successful tool in helping bring people online, but it is successful in showing people the value of the internet and helping to accelerate its adoption.

#### A. In India:

Internet.Org Service is available for all GSM (Post-paid/Prepaid) & CDMA (Prepaid) Mobile Customers in Mumbai, Maharashtra & Goa, Gujarat, Andhra Pradesh, Telangana, Tamil Nadu, Chennai, and Kerala regions. Note that this service is for only Mobile device users.

Social media giant Facebook has garnered 8 lakh users in India for its Internet.org initiative that has been in the thick of the net neutrality controversy.

As part of the global initiative, Facebook had partnered telecom major Reliance Communications to offer free access to over 30 websites without data charges to users in India. About 20 percent of Internet.org users were previously not active on mobile data and thus, Internet.org is bringing new people online, the spokesperson said. Internet.org claims to have made Internet available to over 800 million people in nine countries, including India.

The rapid penetration of internet-enabled mobile phones in rural areas has helped the service to emerge as a link to the outside world. But more than 25,000 villages in India alone are not connected to the grid and do not have access to electricity. Although Innovative solar powered portable charging units have enabled charging of mobile handsets in off grid villages. These villages have been receptive to technology and innovative to use these powerful devices.

Apart from providing major services in various spheres, health service is one area which can experience massive change through Internet.org. Below are a few scenarios on how this initiative can impact healthcare experience in rural areas.

##### 1) Consultation:

A deficit in manpower in rural areas can definitely be looked into through online consultation. Patients can seek online medical advice through a doctor available in another location.

##### 2) Awareness:

Precaution and disease prevention awareness programs can be communicated through engaging and interactive solutions instead of other traditional, less engaging methods.

##### 3) Grievance Redressal:

Limited transparency makes it difficult to get concerns heard and addressed. It's a bigger challenge if a patient from an inaccessible rural location is trying to get concerns addressed in an urban hospital which she/he once visited. Conventional paper based feedback risk the chance of getting lost in the system. A transparent and automated grievance redressal system can remove this bottleneck and bring the voice of such customers in the mainstream.

##### 4) Information Gathering:

Limited healthcare facilities in rural areas make it imperative that people travel to urban locations for healthcare services. Gathering information in advance before reaching these urban locations not only reduces hassle for patients but helps them make an informed decision.

##### 5) Effective Distribution:

Agencies working in rural setups often rely on instincts for medical supply needs. Automated monitoring of drugs consumption pattern can enable effective distribution, supply and consumption of these drugs.

#### IV. MODEL VILLAGE EQUIPPED WITH ICT



Fig. 1: Model Village Equipped with ICT

There is a village named Akodara, a fully digital village. If you wondered in January, during the high-profile launch of the Digital India initiative, what 'digitising' rural India meant or would really look like, little Akodara represents a slice of the vision. The village of 1,200 people has been adopted by ICICI Bank, helped by the local administration, so that it can be showcased as an example of the bank's vision of the digital future that awaits India's hinterland.

The digital village is a technology-led concept; and internet connectivity is the foundation of digital life. The District Development Office has setup Wi-Fi internet connectivity covering the entire village. Wi-Fi connectivity is offered by the Gram Panchayat on subscription basis. Revenue earned from subscription goes to the Gram Panchayat, which is utilized for operation and maintenance of Wi-Fi infrastructure. ICICI Bank has partnered with the Government for district-level project, under which the entire Sabarkantha district will be covered with Wi-Fi facility.

The first of such useful interventions is financial inclusion and access to modern banking. Almost every adult in Akodara now has a savings bank account with ICICI, which he or she can access through the local bank branch, or the village ATM, or through mobile phones via SMS. The villagers' most important transactions — selling agri-produce at the local mandi or selling milk at the co-operative society — have been digitized and made cashless. The system has made them automatically less susceptible to corruption and fraud. Also, their accounts are linked to their Aadhar cards, which mean that government benefits are now transferred directly into their savings accounts. For the widows of Akodara, who had to earlier spend ₹ .70 to travel to the district headquarters to receive their monthly pension of ₹ .800, this direct transfer and easy access to their accounts makes for real and significant savings.

The second advantage is in the area of education. "Earlier, teaching used to be between just the teacher and the student. Now we have a digital aid," says Pranav Upadhyay, 32, high-school teacher in Akodara, before beginning his lecture on nanotechnology for Class 10 students. "Earlier when I used to talk about the universe to the students, it was just talk. Now they see it animated on the screen and it gets them interested and more engaged." The digital aid that Mr. Upadhyay is referring to is an audio-visual device that integrates a projector and a computer. In primary school, children use electronic tablets gifted by ICICI to learn Gujarati. Also, across all schools, a digital attendance system is being implemented that will inform parents, via SMS, whether their children have shown up at school or not. Apart from its practicality, this is also an important safety initiative.

With a nearly saturated urban market and intense competition over a reducing pie, rural India is where the future of banks lies. And the key for this growth is technology, as it is only through mobile phones, the Internet, and tablet banking that banks can keep costs down and open up rural consumption. Akodara's real symbolic appeal for Indian corporate entities lies in something beyond what ICICI has done. Hiteshbhai Patel, a resident in the village says, "Young men in our village regularly buy things from Flipkart and Snapdeal.

## V. LIMITATIONS

### A. Unavailability of Electricity:

Critical to the use of ICTs for rural development in India is the availability of electricity. Many rural areas in India have no access to electricity. In places, where solar power has been experimented, this has largely been unsuccessful due to lack of proper maintenance on the part of the local people.

### B. High Cost ICTs Equipment:

Another challenge in ICTs for rural development is unavailability and affordability of Computers and other equipment, as well as their maintenance. At present, the major means of access to ICTs in the rural areas is through the few telecentres that have been established in these areas.

### C. Low Literacy Levels and Lack of ICT Personnel:

Literacy rates are very low in rural areas in India. The situation gets worse when it comes to computer literacy. There are fewer computer-literate personnel in the rural areas compared to the urban centers. On the other hand, if farmers are to make good use of ICTs, the Officers who advise and train farmers need to acquire more knowledge and skills in ICTs.

### D. Internet Access:

There is also the problem of access to the Internet in the rural areas in India which is a major pre-requisite to the provision of effective telecommunication services to these places. Owing to the small number of Internet Service Providers (ISPs), access to the Internet is very expensive and highly limited to a few urban areas. A number of small businesses known as communication centres or internet cafes provide public access to Internet services.

## VI. CONCLUSION

There is a great potential for the use of ICTs for rural development in India. Unlike some other Asian countries, India is fortunate to have developed an ICT policy, which indicates the government's commitment to support ICT programmes in the rural areas. What is required now is policy implementation with emphasis on the provision of information to the rural areas. One of the ways of improving access to ICT in the rural areas in India is through the promotion of community ICT Centres. This has the advantage of mass usage, maintenance, the security of both service and equipment and the easier collection of charges. Individual communities should be assisted to build their own knowledge centres where indigenous knowledge is combined with exogenous knowledge to improve livelihoods. The government alone cannot carry out this programme. Support is needed from various non-governmental organizations, corporate bodies and individuals in this area. In all these, the urban-rural disparity in the distribution of ICTs which has created a localized digital and information divide must be

tackled and dealt with decisively if the rural areas in India are to take full advantage of these technologies to enhance their socio – economic development.

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