PUBLIC PRIVATE PARTNERSHIP AND PROSPECTS OF ICT IN SUSTAINABLE DEVELOPMENT OF RURAL INDIA

AMIRULLAH*

Abstract

The sustainable development of rural India is one of the most important challenges at present. The greatest obstacles for its development is long distances from cities and inadequate infrastructure for education, health services, power, agricultural markets, poor quality roads and other services. 21st century is called the age of Information and Communication Technology (ICT) that has played a significant role in developing the communication channels in rural areas, especially in education, local agricultural information and clinical services, health and social protection, grievance submission, community discussions, and so forth. It is also associated with economic benefits such as higher productivity, lower costs, new economic opportunities, job creation, innovation, and increased trade. Many ICT projects are running like Akshaya in Kerala, Saksham by Microsoft, Gyandoot in Madhya Pradesh, e-Mitra in Rajasthan, etc. It has helped in rural development in a sustainable way but has given rise to digital divide as it has penetrated limited rural areas due to budgetary constraint, lack of technical knowledge, in addition to high rural populations, more than 22 languages and scores of dialects, lack of adequate infrastructures, failures of power systems and poor broadband networks. Public Private Partnership (PPP) has emerged as a key strategy for infrastructure improvement, more effective service delivery and fiscal efficiency. It has helped in creation of IT infrastructure, mobile phone production, software development, hardware manufacturing facilities, the rollout of optical fibre cables, business process outsourcing, application development and so on. It will make digital villages through e-health, e-learning, Citizens' service delivery, e-commerce, information access (and sharing), e-taxation, e-participation, the use of ICT by people with disabilities or e-rural development. Many PPP projects are under various stages of implementation and provide vast opportunities for Indian states in sustainable development of rural areas.

Key words: Information and Communication Technology, Public Private Partnership, Sustainable Rural Development, digital divide, digital villages.

* Senior Research Fellow, Department of Political Science, Aligarh Muslim University, Aligarh, Uttar Pradesh, India

1. Introduction

India is a welfare state and the primary objective of all government endeavours has been the socio-economic upliftment of millions of common man. India got its independence carrying a legacy of around 90 percent of population living in rural areas, with around 15 percent of the people literate, more than 80 percent of the population dependent on traditional farming with massive poverty, under development and backwardness. The elimination of poverty, ignorance, sustainable development, providing better and higher quality of life was the basic premises upon which all the plans and blue-prints of development were built.

Rural development implies both the economic betterment of people as well as greater social transformation. In order to provide the rural people with better prospects for economic development, increased participation of people in the rural development programmmes, decentralization of planning, better enforcement of land reforms and greater access to credit are envisaged.

The Government of India (GoI) has given power to rural people in the form of Panchayati Raj Institution (PRI) through 73rd Constitution Amendment in 1992 and gave 29 functional lists for all round development of rural areas. In addition to giving power, it formulated many rural development programmes covering employment through the *Mahatma Gandhi* National Rural Employment Guarantee Act and the National Rural Livelihoods Mission, housing via the *Indira Awaas Yojana* and other state schemes and bank support, sanitation through the Total Sanitation Campaign, provision of drinking water via the National Rural Drinking Water Programme, social security through the National Social Assistance Programme, watershed development via the Integrated Watershed Management Programme, road connectivity through the *Pradhan Mantri Gram Sadak Yojana* and electrification via the *Rajiv Gandhi Grameen Vidyutikaran Yojana*. PRI were given the task to implement these programmes but the results were short of expectation due to corruption, lack of transparency and accountability, archaic rules and procedures, paper-based record keeping, interferences of central as well as state governments, urban centric offices leading to extreme inconveniences to rural folks are some of the problems. The rural areas often lack or lag behind urban areas in terms of essential infrastructures. The economic and income divides between urban and rural areas can be overcome only by the technological upgradation of rural professions.

ICT is now recognized as a technological tool which can serve as a catalytic intervention in respect of transforming the lives and livelihoods of rural families. It have played a catalytic role in dissemination of information, knowledge transfer, healthcare, local agricultural information and clinical services, capacity building and improved governance. It can help to improve productivity, overcome the constraints of an inadequate infrastructure and overall, improve the quality of life in rural areas. It is a powerful democratizing force, offering greater economic, social and political participation to communities and helping the people to meet pressing needs. It has become another resource that is denied to the people who need it most. It provides opportunities to reduce social and economic disparity and to support the creation of efficient and transparent administrative mechanisms. The need of the hour is to fulfill the need for internet and other services in every underserved village in India. However, the benefits have not been spread evenly. In fact, this has given rise to a new form of divide often called the 'digital divide'. The GoI has initiated programmes like National e-Governance Plan, State Wide Area Networks (SWAN), India Development Gateway but it has not helped in removing the digital divide due to many reasons. Now, the GoI has opened ICT for increased private participation in rural areas.

2. Rural India: A Brief Profile

Long ago Mahatma Gandhi in his celebrated book, *Hind Swaraj* said that India lives in its villages. In the 21st decade, the rural India is characterized with high population, poor infrastructure, low literacy, poverty, unemployment, deprived of basic civil amenities like power supply, primary health care, drinking water facilities, housing and education. Illiteracy, caste and gender barriers, poor governance and societal exploitation prevent the socio-economic development of the rural society. In this section, a brief introduction about rural India has been discussed.

2.1 Population: India, the second most populous country in the world is predominantly rural in nature. The census of 2011 estimates that 833.1 million people continue to live in 6,40,930 villages of India that comprises of 68.84 percent of the total population. The state wise as well as sex-wise population of rural areas has been shown in table-1.

Table 1: State-wise and Sex-wise Rural Population (2011)

(Number in Millions)

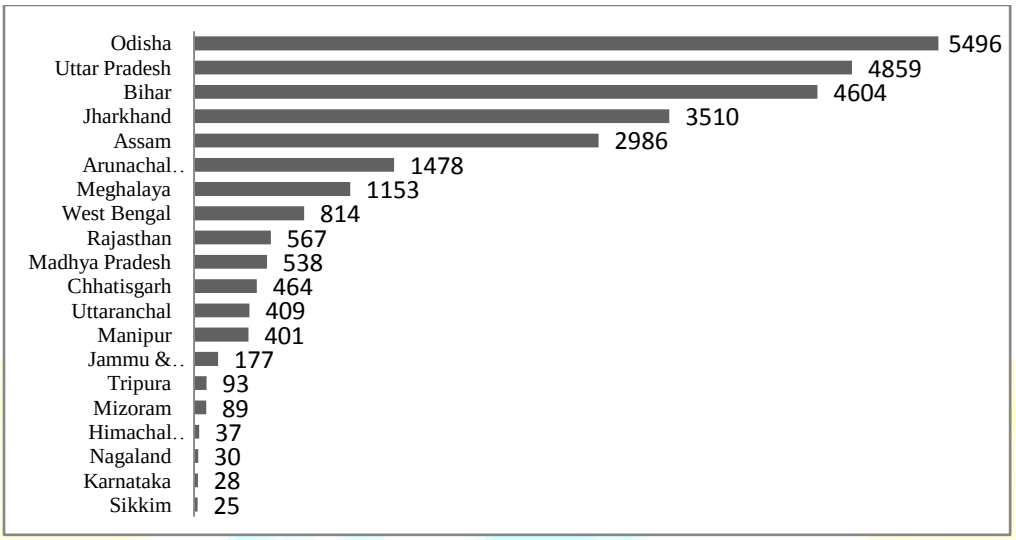
S.No.	State/UT	2011		
		Male	Females	Persons
1.	Andhra Pradesh	28.22	28.09	56.31
2.	Arunachal Pradesh	0.55	0.51	1.06

3.	Assam	13.69	13.09	26.78
4.	Bihar	47.98	44.09	92.07
5.	Chhattisgarh	9.79	9.81	19.6
6.	Goa	0.28	0.28	0.56
7.	Gujarat	7.80	16.87	34.67
8.	Haryana	8.79	7.74	16.53
9.	Himachal Pradesh	3.10	3.07	6.17
10.	Jammu & Kashmir	4.81	4.33	9.14
11.	Jharkhand	12.78	12.26	25.04
12.	Karnataka	19.01	18.54	37.55
13.	Kerala	8.40	18.53	26.93
14.	Madhya Pradesh	27.14	25.40	52.54
15.	Maharashtra	31.59	29.95	61.54
16.	Manipur	0.97	0.93	1.9
17.	Meghalaya	1.19	1.17	2.36
18.	Mizoram	0.27	0.26	0.53
19.	Nagaland	0.72	0.68	1.4
20.	Odisha	17.58	17.37	34.95
21.	Punjab	9.09	8.23	17.32
22.	Rajasthan	26.68	24.86	51.54
23.	Sikkim	0.24	0.21	0.45
24.	Tamil Nadu	18.66	18.53	37.19
25.	Tripura	1.39	1.32	2.71
26.	Uttarakhand	3.51	3.51	7.02
27.	Uttar Pradesh	81.04	74.07	155.11
28.	West Bengal	1.90	30.31	62.21
	Union Territories			
29.	A & N Islands	0.13	0.11	0.24
30.	Chandigarh	0.02	0.01	0.03
31.	D & N Haveli	0.10	0.08	0.18
32.	Daman & Diu	0.03	0.03	0.06
33.	Delhi	0.23	0.19	0.42
34.	Lakshadweep	0.01	0.01	0.02
35.	Puducherry	0.19	0.20	0.39
	All-India	427.92	405.17	833.09

Source: Census of India 2011, Provisional Population Totals, Paper-2 of 2011, Registrar General, GoI, India.

2.2 Power: India faces a significant challenge in providing access to adequate, affordable and clean sources of energy, especially to a large section of the population who live in rural areas. It is crucial not only for improved quality of life but also for the growth of rural industry. As per the 2011 census, only 55.3 percent rural households had access to electricity. Many villages have only partial access to electricity (three to four hours per day), power cuts and low voltage throughout the day. The rural per capita consumption of electricity is only 8 kWh per month as compared to 24 kWh in urban areas.

Figure 1: State-wise Number of Un-electrified Villages as of April 2012



2.3 Roads: Rural road constitutes about 80 percent of total road network in India. Though, the length of rural roads increased more than 13 times from 2.06 lakh kilometres in 1951 to 27.50 lakh kilometres in 2011, many areas are still to be connected. Around 38 percent of rural roads were surfaced as on 31st March 2011.

2.4 Health: Rural healthcare services are in crisis due to shortage of public sector infrastructure, prevalent high maternal and child mortality rates, and high disease burden. The central and state governments combined spend only about one percent of GDP on health. Moreover, posts of health workers at various levels lie vacant, existing facilities are underutilized, most health workers especially the doctors do not want to serve in the rural areas due to poor infrastructure and lack of incentives, etc.

Table 2: State-wise Number of Government Hospitals and Beds (Including CHCs) in Rural Areas (As on 01.01.2013)

S.No.	State/UT	Rural Hospitals (Government)		Rural Population 2011 (mn)
		Number	Beds	Persons
1.	Andaman and Nicobar Islands	31	625	0.24
2.	Andhra Pradesh	308	10370	56.31
3.	Arunachal Pradesh	382	4660	1.06
4.	Assam	985	6414	26.78
5.	Bihar	565	5442	92.07
6.	Chandigarh	0	0	0.03
7.	Chhattisgarh	1903	5842	19.6
8.	Dadra and Nagar Haveli	1	50	0.18
9.	Daman and Diu	0	0	0.06
10.	Delhi	0	0	0.42
11.	Goa	8	1800	0.56
12.	Gujarat	1476	18062	34.67

13.	Haryana	61	1212	16.53
14.	Himachal Pradesh	98	2911	6.17
15.	Jammu and Kashmir	1402	3428	9.14
16.	Jharkhand	545	4879	25.04
17.	Karnataka	423	9022	37.55
18.	Kerala	1091	13097	26.93
19.	Lakshadweep	3	120	0.02
20.	Madhya Pradesh	1157	6942	52.54
21.	Maharashtra	309	10384	61.54
22.	Manipur	217	664	1.9
23.	Meghalaya	29	870	2.36
24.	Mizoram	12	270	0.53
25.	Nagaland	21	630	1.4
26.	Odisha	1659	7099	34.95
27.	Puducherry	27	178	0.39
28.	Punjab	98	3000	17.32
29.	Rajasthan	2041	25620	51.54
30.	Sikkim	30	730	0.45
31.	Tamil Nadu	1614	12935	37.19
32.	Tripura	18	1170	2.71
33.	Uttar Pradesh	666	3746	155.11
34.	Uttarakhand	515	15450	7.02
35	West Bengal	1272	19285	62.21
	India	**26604**	**362996**	**833.09**

Source: Ministry of Health & Family Welfare, Government of India.

2.5 Agriculture: It remains at the heart of rural livelihoods, accounting for about 14 percent of the nation's GDP. Agriculture and Allied sectors which used to contribute 51.73 percent of GDP in 1954-55 has come down to 13.68 per cent in 2012-13 (AE) at constant 2004-05 prices. The most basic obstacle is inadequate infrastructure, including a good rural road network, access to electricity, poor quality of seeds, shortage of warehouses and cold-storage facilities, lack of information and efficient marketing channels.

2.6 Education: Around 96.5 percent of children in the 6 to 14 age group in rural India are enrolled in School. The rural literacy is only 69 percent compared to 85 percent in urban areas while literacy in rural India increased by 10 percentage points between 2001 and 2011. The Right of Children to Free and Compulsory Education Act 2009, *Sarva Shiksha Abhiyan*, Mid-Day Meal Scheme has helped in increasing enrollment of student in rural areas. There are also wide inter-state disparities in literacy rate between rural and urban areas.

2.7 Poverty: The person below the Poverty Line in 2011-12 has been estimated as 25.7 percent in rural areas, 13.7 percent in urban areas and 21.9 percent for the country as a whole. In 2011-12, India had 216.5 million persons below the Tendulkar Poverty Line as compared to 326.3 million in 2004-05, that is a reduction of 108.8 million persons over the seven year period (table 3).

Table 3: Incidence of Poverty in India

Year	Poverty Ratio (%)			Number of Poor (Million)		
	Rural	Urban	Total	Rural	Urban	Total
1993-94	50.1	31.8	45.3	328.6	74.5	403.7
2004-05	41.8	25.7	37.2	326.3	80.8	407.1
2011-12	25.7	13.7	21.9	216.5	52.8	269.3

Source: Planning Commission

2.8 Employment: About 39 percent of the population in the country is employed. The proportion was 41 percent in the rural and 35 percent in the urban. The rural female populations are mainly engaged in agricultural activities and outnumber the males. About 79 percent of the rural female workforce worked in agriculture in 2009-10 compared to 63 percent of the male workforce. The number of female workforce in construction, trade, hotel and restaurant, transport, storage and communications are very few (table 4).

Table 4: Proportionate Share of Sectors in Rural Employment (2009-10)

(Per 1000)

Industry Division	Male	Female
Agriculture	628	794
Mining & Quarrying	8	3
Manufacturing	70	75
Electricity, Water, etc.	2	0
Construction	113	52
Trade, Hotel & Restaurant	82	28
Transport, Storage & Communications	41	2
Other Services	55	46

Source: NSS 66th round (2009-10)

2.9 Telecommunication: The rural telephones have increased to 338.59 million by the end of December 2012. About 87 percent of villages had mobile coverage by March 2012. The rural teledensity has slightly improved as it increased from 39.26 percent at the end of March 2012 to 41.02 percent at the end of December 2012. The low level of ICT usage by households and individuals reflects the strong human, infrastructure, and digital divides that characterize rural India. The share of private sector in total telephones is 85.51 percent.

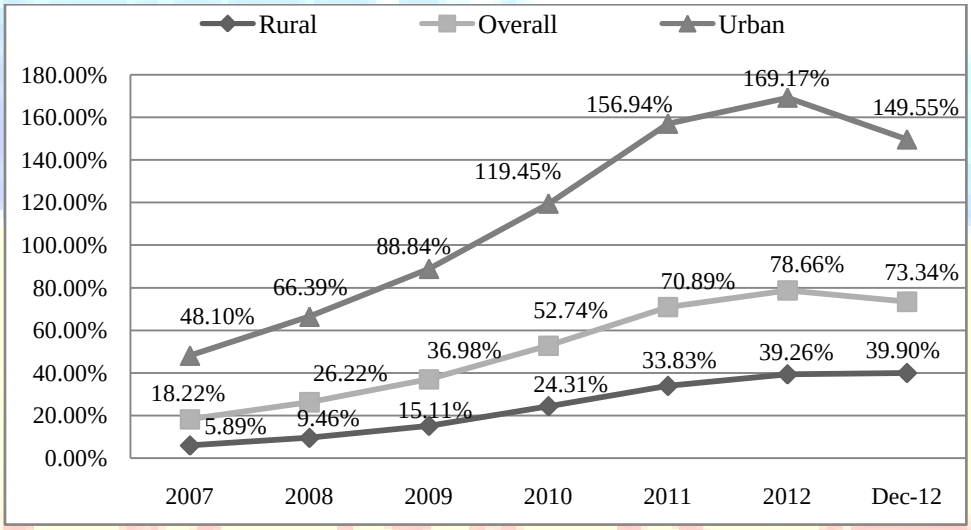
3. ICT in India

Telecommunication includes the old and traditional ICT of radio, television and telephone, and the new and advanced ICT of computers, satellite and wireless technology and the Internet. In India, it was first introduced in 1851 when the first operational land lines were laid by the British government between Kolkata (then Calcutta) and Diamond Harbour. Telegraph messages could

be sent from Agra to Kolkata by March 1884 and from 1900, telegraph and telephone had started serving Indian Railways.

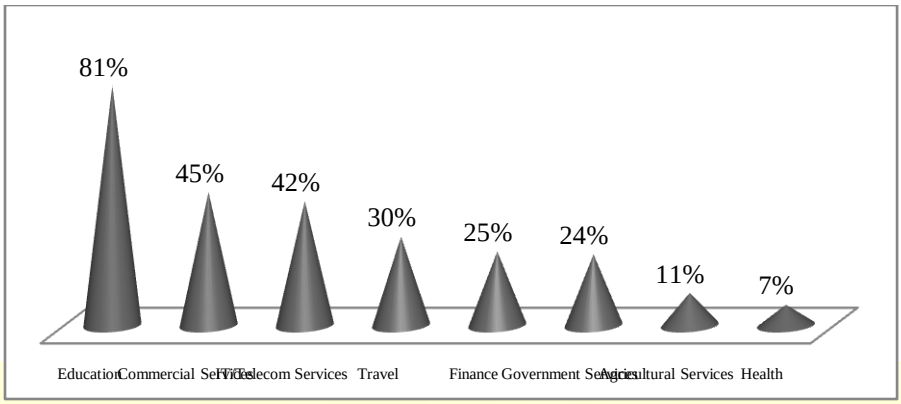
The Indian telecom sector was entirely under government ownership and from 1984 the private sector was allowed in telecommunication equipment manufacturing only. It was heavily government-controlled and small-sized market. After liberalization, private participation was allowed in almost all of its segments to bridge the resource gap. The government recognizes that private enterprises have immense potential to improve Internet infrastructure, incubate new businesses and promote digital literacy. Telecom Regulatory Authority of India (TRAI) was established in 1997 as an independent regulator and in 2000 Telecom Disputes Settlement and Appellate Tribunal was established.

Figure 2: Tele-density in India



The GoI announced Telecom Policy in successive years which laid stress on India's vision of becoming an IT superpower and to develop world class telecom infrastructure in the country. It also recognized private sector participation as it will provide a fillip to technology upgradation and help bridge the gap in adoption of new technology. The Indian teledensity increased from 2.33 in 1999 to 73.34 as on December 2012. Now, Indian telecom network is second largest in the world after China. But, the rural teledensity is merely 39.90 percent in comparison to urban tele-density of 149.55 percent when the overall teledensity of India is 73.34 percent (fig. 3).

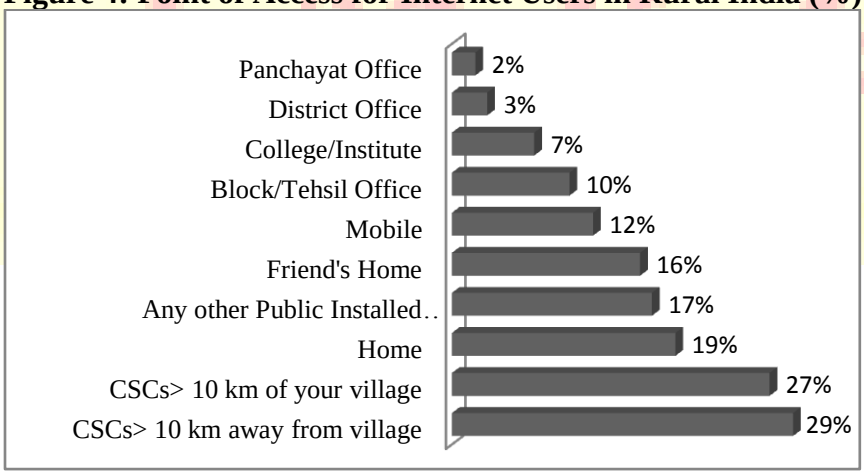
Figure 3: Percentage of Services used by Internet Users in Rural India



The government has taken policy initiatives which include the creation of the Universal Service Obligation Fund for improving rural telephony. But, it is estimated that even by 2015, overall Internet penetration likely to reach 28 percent and rural penetration is likely to be just 9 percent in comparison to 64 percent of urban areas. The GoI in the National Telecom Policy 2012 envisions rural teledensity to increase to 70 by 2017 and to 100 by 2020.

According to the report of IMRB International-Cube 2012, the internet is used mainly for education purposes in rural areas. The commercial and IT/Telecom Services find next heavy usage and health services are least used (fig. 4). In rural areas internet can be easily accessed through community service centres while the panchayats and district offices have least access (fig. 5). There is more participation of private sectors in rural areas whereas panchayats and district needs more computerization for better delivery of services in rural areas.

Figure 4: Point of Access for Internet Users in Rural India (%)



4. Benefits of ICT in Rural Development

The ICT can be harbinger of change in rural areas in many ways. It is generating social, economic, cultural and political changes in rural areas. It can overcome many essential infrastructure and services such as transportation, health, education and government services in which rural areas often lag behind in comparison to urban areas. It can also break the traditional geographical barriers to development. With ICT rural regions can get access to almost all the needed skills and resources (especially human) for their development. It can facilitate progress in other sectors such as trade, productive capacities, environment, disaster risk reduction, disaster management, education, gender mainstreaming, health, agriculture, and climate change as these technologies impact every facet of human life. It is also associated with economic benefits such as higher productivity, increased efficiency, lower costs, attracted investments, created new economic opportunities, job creation, innovation, and increased trade.

The ICT can bring real changes in the life of rural poor people in the following ways.

- Awareness of all rural development schemes and programmes meant for the poor class which remained suppress by the vested interest groups to exploit the rural poor people.
- After getting such information of the schemes the rural poor people may organise in the form of groups i.e. farmers clubs, self help groups, *mahilla mandals*, youth clubs, etc. to avail the facilities for their development.
- It may really cause social and economic impact upon the rural poor families.

Agriculture and allied activities forms the backbone of rural development as vast majority of low income, poor and vulnerable sections of society depend on it for their livelihood and food security. Indian agriculture depends on monsoon that is uncertain, erratic and unreliable. It destroys crops which amount to huge loss to farmers. ICT help in increasing the farm productivity, profitability and sustainability of farming systems, efficient use of natural resources and agricultural inputs etc. by customized farmers trainings at village cluster level in selected blocks as per their needs and aspirations and also to provide online information on weather parameters, demand and use of agricultural inputs like seeds, fertilizers, pesticides etc. and market intelligence. It can also provide easy access to all forms, copies of land records, applications, certificates, risk mitigation and reduction in vulnerability due to timely availability

of information on weather and market, guidance on improved farm practices and elimination of exploitation by the intermediaries.etc.

The ICT also serve as an instrument of awareness creation and feedback giving rural people a voice in the nation's socio-political life. It can act as a channel of delivery of e-government services including health and education through telemedicine and distance learning respectively. The people in rural areas can connect with the local, regional and national economy and banking/financial services. Thus bridging the digital divide also bridges the overall infrastructural gap and addresses other constraints faced by rural areas. It can help mainstream rural populations. It plays a catalytic role in the attainment of the Millennium Development Goals of the UN. It will also be the driving force of the new green economy. It can help to alleviate widespread rural poverty. It can improve people's understanding of environmental issues and their policy implications.

5. PPP in India

A PPP is a legally-binding contract between government and business for the provision of assets and the delivery of services that allocates responsibilities and business risks among the various partners. The guidelines for the Viability Gap Funding (VGF) scheme of MoF, GoI- '*Guidelines for Financial Support to Public Private Partnerships in Infrastructure*' defines "PPP as a project based on a contract or concession agreement, between a government or statutory entity on the one side and a private sector company on the other side, for delivering an infrastructure service on payment of user charges".

In India, PPP was first initiated during the latter half of the eighteenth century when British companies made investments of about 95 million pounds in rail and roads sectors. But the real development started from 1997 and by the of end December 2012 there were over 900 PPP projects in the infrastructure sector with total project cost of Rs. 5,43,045 crore. Though PPP policy has not been framed yet but guidelines have been issued for taking projects. It includes many sectors like roads, airports, tourism, health, telecommunication, etc. but telecommunications have done very good progress compared to limited success in other sectors besides power, ports and roads sectors.

6. PPP in ICT Projects for Rural Development

The GoI in partnership with private players have undertaken many projects in different sectors for rural development. In India, private operators hold 88.65 percent of the wireless market share whereas two public sector undertakings, BSNL and MTNL operators hold only 11.35 percent market share. The private partner can help in the telecom penetration in many rural remote areas. In order to encourage private sectors, the GoI has allowed FDI upto 100 percent under the automatic route in data processing, software development and computer consultancy services, Software supply services, Business and management consultancy services, Market Research Services, Technical testing and Analysis services.

Some of the states are ahead in implementing ICT projects like Andhra Pradesh, Gujarat, Karnataka, and Kerala while most of the states are yet to initiate. Some of these projects initiated in different sectors like education, health, agriculture, governance, skill development, rural marketing, etc. have helped in rural development and provides opportunities for its expansion in all the rural villages. Some of the successful projects through PPP that has helped in providing employment, good governance, economic, social and political empowerment, providing information, education and skill development, agriculture and agricultural extension projects, etc. have been discussed.

6.1 Project Nemmadi is an e-governance PPP project initiated in 2004 by the Government of Karnataka with Comat Technologies, 3i Infotech, and n-Logue Communication Ltd., aimed at improving the transparency, accountability and efficiency of the government administration at the village level i.e. creating Virtual Offices of Government at Village Level. These offer digital services to rural citizens across 800 hoblis (cluster of villages) in the state. The project has helped citizens get all revenue services at his doorstep saving time and money and empowered all the sections of society by facilitating them to gain knowledge about their rights and privileges. It also helped in bringing network infrastructure, services, and job opportunities to the rural people.

6.2 E-Mitra is an ambitious e-governance initiative of Government of Rajasthan which is being implemented in all 33 Districts of the state operational since 2005 using PPP model for convenience and transparency to citizens in availing various services of the government and private sectors under a single roof at their door steps using an e-platform. It provides a one-stop

facility for electricity, water and telephone bills in 850 e-Mitra kiosks. These kiosks also serve as processing centres for applications for revaluation of marks for board exams, ration cards, birth and death certificates, public grievance centre and a databank or for buying stamp papers, revenue tickets, rail tickets or deed writing. The services provided at the kiosks vary according to the needs and demands of a particular area.

6.3 Bangalore One (B1) is a PPP between the State of Karnataka and private consortium of CMS Computers Ltd. and Ram Informatics launched in 2005 to enhance speed, convenience, certainty and accountability in providing services through the concept of a 'One-Stop Shop' facility via public center kiosks for all G2B and G2C services in the state. It provides a lot of services from paying all forms of bills to register your shops and other commercial establishments.

6.4 Sahaj e-Village Ltd. (SSeVL) is a business integrator in the field of IT infrastructure with a focus on rural India through PPP under National e-Governance Plan initiatives of GoI in six states i.e. Assam, Bihar, Bihar, Odisha, Tamil Nadu and Uttar Pradesh. Till date, it has rolled out more than 26,000 Common Service Centres across the six states. It offer a range of over 30 services that includes digital photography, digital videography, MGNREGA photograph, MGNREGA data collection, government form submission, death certificate, birth certificate, e-Learning, electric bill collection, mobile top ups, railway and flight ticket booking, advertising, job portal and examination results, to name a few.

6.5 Gyan Ganga initiated in August 2003 by Government of Gujarat with the private partner n-Louge to increase the enterprise and productivity of the existing infrastructure and local enterprise by setting up a state-of-the-art computer communication networks. It provides agricultural, medical, and educational information to villagers at kiosk centers, distance education, communication facilities, and Geographical Information System (GIS) of the surrounding villages leading to greater transparency in administration especially in matters related to land. It has helped in building wealth by reducing farming costs, better credit options and facilities, increased crop yield, enabled effective post harvest management, provided expertise in animal husbandry and watershed management.

6.6 E-PCO is a collaborative initiate involving Bharat Sanchar Nigam Ltd's Karnataka Circle, Intel, Karnataka PCO Association and ItzCash. Citizens in rural and semi-rural areas can book

bus, train and airline tickets, pay utility bills, recharge their prepaid mobile accounts, operate bank accounts, obtain college admission forms and conduct online transactions through this facility. It has boosted broadband penetration and provides employment opportunities in rural Karnataka.

6.7 E-gram vishwa gram scheme envisages provision of internet-enabled education, including telemedicine, veterinary services, market linkage and other agriculture-related services to farmers, payment of electricity and telephone bills, issuance of death and birth certificates, land ownership records, application forms for various development and welfare schemes, postal services, reservation and purchase of bus and railway tickets, video conferencing and video broadcasting.

6.8 Communication Information Centers (CICs) under the National e-Governance Plan of India was launched on 17 August, 2002 in North Eastern states of India mainly in rural with PPP using 2Mbps connectivity being provided through NICNET/SWAN to provide Internet access and IT enabled Services to the community. The main services offered by CICs IT education and training, e-mail and internet access, information dissemination, citizen centric applications and entertainment and news. It has opened new opportunities for development in the remote and difficult hilly terrain.

6.9 Project Ashwini based on PPP model to provide access to a wide range of high quality services like e-Learning, e-Governance, e-Medicine, e-ticketing and e-Education besides virtual agricultural advisory services to rural areas in Andhra Pradesh. This project has provided expert consultation in gynaecology, cardiology, orthopaedic, paediatric and general medicine to about thousands of patients. More than 12,000 women have been trained virtually in tailoring, embroidery, fabric painting, etc., which helps them in income generation through self-employment, wage employment or an increase in productivity.

6.10 EKVI project is the e-Agriculture Marketing project of the Government of Madhya Pradesh, executed by Madhya Pradesh Agricultural Marketing Board (Mandi Board) and Madhya Pradesh Agency for Promotion of Information Technology on Build-Own-Operate (BOO) basis to reorganize the agriculture trading business, deliver real time information online, to make the operations more effective and completely transparent. The communication network established

in different locations across the state used to educate farmers on new techniques of farming, use of fertilizers, forecasting of weather, issue of disaster warnings in any part of the state to facilitate quick responses to the victims of disasters.

6.11 E-Krishi project was started in Malappuram district of Kerala through 146 Akshaya e-Kendras to enable farmers and other stakeholders to get information useful to them, including market demand, price, best practices, and expert advice on quality improvement. This was owned and operated by local entrepreneurs. They established a chain of *Bhoomi* Clubs that was an association of farmers, agricultural officers, LSG, e-krishi officials etc. across the district.

6.12 Indira Gandhi National Open University (IGNOU)-SREI Sahaj collaboration promises to make the on-line computer based skill development programmes made available to the rural youth in digital format through the 27,255 Sahaj Common Service Centers (CSCs) established in the states of Assam, Bihar, Jammu and Kashmir, Orissa, Tamilnadu, Uttar Pradesh and West Bengal. With this initiative, the rural youth will have unprecedented opportunities to acquire IGNOU's internationally recognized certification, diplomas, degrees right in their villages through computerized CSCs. These partnership programmes will help bridge the gaping educational divide within the rural landscape and make advanced Computer Education available to the villagers at their doorsteps.

Besides there are many other projects like MPOnline, APOnline, e-Choupal, e-Mitra, Saksham by Microsoft, and Lokvani Project that has helped in the sustainable rural development and provides vast opportunities for taking in other underserved rural areas. In addition to these projects, there can also be increased PPP in other areas through employment generation activities, opening Business Process Outsourcing (BPO) services and manufacturing of telecom equipment.

6.13 Employment Generation

ICT has absorbed the rural youth by ensuring them employment in villages itself. The opening of rural kiosks and community service centre's has created jobs that opened a ray of hope to rural youth. The type of employment includes operations like data entry, preparation and maintenance of database, revenue accounting, preparation of payroll, processing of insurance claims, human resource services, call center operations, running of customer support centers, medical

transcription, content development and animation, web site services, software development, hardware repair and maintenance, systems engineering, systems design and integration etc.

6.14 BPO Services

With the increasing penetration of telecom network in rural India, the potential of educated rural youth can be fully utilized by creating Rural BPO. This will provide new sources of income and employment to the villagers during seasonal as well as non-seasonal agricultural periods. This will also help in curbing migration of youth and unemployed skilled workers to urban areas when they get more service opportunities in rural areas itself.

For this, the data entry and processing work, human resource facilities, making pay-slips and other desktop works for the IT companies done in towns can be broken up into smaller components and outsourced to appropriate rural kiosks and skill centers that can be done by high school students and dropouts in villages. Comat along with other companies in India, such as Data-mation Consultants, Lason India and Satyam Computer have started operations in smaller towns and villages by outsourcing low-skilled people for data entry, digitization, and scanning and formatting of documents. Infosys uses its BPO for data storage and record maintenance of the pension scheme beneficiaries.

In Tamil Nadu, the District Collector of Krishnagiri district set up a 100 seater BPO after getting loan from the rural development funds of the District Rural Development Agency and formed a society called Electronics Corporation of Tamil Nadu (Elcot) that has BSNL and the Husur Industries Association as its members. Wipro BPO, the BPO arm of Wipro Technologies had launched its first rural BPO centre at Manjakkudi Village in Tamil Nadu. Infosys BPO had signed an agreement with the Andhra Pradesh government for rural BPO centres in 22 districts.

The rural areas are attracting IT-BPO companies due to range of factors like availability of untapped talent, affordable real state, lower labour and operational costs. The prime advantage of rural BPO is that the employee costs are half that of urban BPO and the overall operating costs are 30 to 40 percent below urban BPO. Moreover, the attrition rate at rural BPO centres is a measly 3-5 percent compared to 50 percent at urban centres and operational expenses are 30 to 40 percent lower.

6.15 Manufacturing of Telecom Equipment

The GoI has taken steps to promote Research and Development (R&D) in manufacturing of quality telecom and electronic equipment domestically considering national security due to induction of large scale imported telecom equipments in the network. As part of these initiatives, government has allowed 100 percent FDI under automatic route for manufacturing of telecom equipment. For this, no Industrial license is required but only Industrial Entrepreneur Memorandum (IEM) has to be filed with Secretariat for Industrial Assistance (SIA). The creation of National Investment and Manufacturing Zones (NIMZs) and incentivising manufacturers in line with Modified Special Incentive Programme scheme (MSIPs) and Electronic Design and Manufacturing Cluster (EDMC) of DeitY are other initiatives that need to be taken forward for the growth of telecom equipment manufacturing in rural India. The setting up of Mega Fabrication Units (FAB) facility for the manufacture of Integrated Circuits, Development of Hardware Manufacturing Cluster Parks (HMCPs), stable fiscal policies, tax structure that encourages manufacturing, market pull for domestic manufacturers, R&D facilities, access to low cost funds, testing and certification and so on, also need to be taken up to make India a telecom equipment manufacturing hub. The State Governments is planning to set up Software Technology Parks, IT parks on PPP model. Nokia and Nokia Siemens Networks have set up their manufacturing plant in Chennai. Ericsson has set up GSM Radio Base Station Manufacturing Facility in Jaipur. Motorola, Foxcom(OEM) has set up large manufacturing plants in Chennal. Elcoteq has set up handset manufacturing facilities in Bangaluru. LG Electronics has set up plant of manufacturing GSM mobile phones near Pune.

7. Challenges

The efforts of PPP have helped in the sustainable rural development through ICT. Still, there are many rural areas which do not have any ICT infrastructure and have given rise to digital divide in different states. There are many private players eager to invest but people oppose their participation. The government sanctioned limited budgetary amount that are not sufficient for setting up of ICT infrastructure in large number of villages. In addition to poor ICT infrastructure, there is failure of power systems and poor broadband networks. There are many un-electrified villages (fig. 1) and electrical breakdowns and cuts, lack of power backup in rural areas without which all efforts of ICT penetration will be useless. There is poor network in rural areas in comparison to urban settlements when there are many private network providers. Even if all facilities are provided in rural areas, the biggest problem is that there are more than 22

languages and scores of dialects besides illiteracy of rural people. It is estimated that rural internet penetration is likely to be a mere 9 percent, compared with urban penetration of 64 percent by 2015. The networked readiness index of India is 83 out of 148 countries in 2014 due to poor quality of political, regulatory, and business environment.

There are software being developed in main languages recognized by constitution but it is not sufficient in removing the digital divide. The literacy level is low and people also lack technical knowledge about the different software's of the computer. Therefore, the use of internet could not likely gain any prominence and the impact of ICT would be significantly reduced. So, there is a need to pave the way to digital empowerment and hopefully to poverty alleviation in India's hinterland. The ICT revolution has arrived silently in India's heart land and has also begun kicking.

8. Conclusion

ICT played a catalytic role in boosting GDP and economic growth, digital empowerment, poverty alleviation, facilitating the rural areas towards sustainable development. It has created access to information by bridging the rural-urban divide with a low cost revenue model generating employability to millions rural unemployed. It transformed rural society by changing conventional thinking and connecting people beyond the specified geographical boundary. In India, there are still many rural and remote areas which need to be connected with broadband. The government has allowed private participation in all the telecom policies to harness their technological knowledge and expertise to broaden the telecom network. The widespread adoption of broadband in rural areas will have a multiplier effect over the long-term. This has become one of the basic need of the society that can transform their lives and sustainable development of the rural areas. A combination of affordable smart phones, optic fibre backbone and local language content is likely to change the beat all projections of internet growth in rural areas.

Dr. Muhammud Yunus, Founder of Grameen Bank and Nobel Laureate said, "Indeed, this is a small world today and ICT is making it even smaller. ICT is changing the world, creating a distance-less, borderless world of instantaneous communication." Therefore, there is a need to promote the use of ICT platforms and convergence of technologies to ensure better delivery of public services, increased efficiency in the implementation of the Government's flagship

programmes and the overall competitiveness of the economy, since ICT applications will have a pervasive effect on the resilience and dynamism of all sectors of the economy.

References

[1] Arundhathi, Nanda Suchit and Arunachalam Subbiah, Transformative Impact of ICT: change stories from India (Jamsetji Tata National Virtual Academy (NVA) M S Swaminathan Research).
[2] BSNL launches ePCO services < http://www.hindu.com/2008/08/19/stories/2008081954490500.htm > accessed on 27 August 2014
[3] Chitla Arathi, Impact of Information and Communication Technology on Rural India, IOSR Journal of Computer Engineering, Volume 3, Issue 2 (July-Aug. 2012).
[4] Das Aundhe Madhuchhanda and Narasimhan Ramesh, Project Nemmadi: the bytes and bites of ICT adoption and implementation in India, Journal of Information Technology Teaching Cases (2012).
[5] Discussion Note on "Approach Paper on Defining Public Private Partnerships", Ministry of Finance, Department of Economic Affairs, GoI (February 2010).
[5] Dutta Soumitra, Bilbao-Osorio Beñat, and Lanvin Bruno (ed.), The Global Information Technology Report 2014: Rewards and Risks of Big Data, (World Economic Forum).
[7] Electricity sector in India < http://en.wikipedia.org/wiki/Electricity_sector_in_India > accessed on 27 August 2014
[8] Energy Statistics-2013, Central Statistics Office, Ministry of Statistics and Programme Implementation, GoI.
[9] Energy, Infrastructure and Communications, Economic Survey 2012-13, MoF, GoI.
[10] Gnanasambandam Chandra and others, Online and Upcoming: The internet's impact on India.
[11] Government is promoting production of telecom equipment in country to address security concerns; Deora < http://www.telecomtiger.com/fullstory.aspx?storyid=15545 > accessed on 27 August 2014
[12] Gross Domestic Product (GDP) from Agriculture and Allied Sector and its Percentage Share to Total GDP (1954-55 to 2012-13) < http://planningcommission.nic.in/data/datatable/1203/table_39.pdf> accessed on 27 August 2014
[13] India: A Reference Annual, (Publications Division Ministry of Information and Broadcasting, GoI).
[14] India Rural Development Report 2012/13.
[15] IT Park-Gwalior <http://www.mptrifac.org/PotSector/SProjectProfiles/IT%20Park%20-%20Gwalior.pdf > accessed on 27 August 2014
[16] IT-ITES <http://perkworksconsulting.com/it-ites.htm> accessed on 27 August 2014
[17] Many big IT firms like Infosys, Wipro, Genpact moving into rural BPOs. < http://articles.economictimes.indiatimes.com/2011-12-13/news/30511881_1_rural-shores-business-services-bpo-arm-bpo-centres > accessed on 27 August 2014

[18] Menon Sreelatha, BPOs go rural < http://www.business-standard.com/article/opinion/sreelatha-menon-bpos-go-rural-109042600017_1.html > accessed on 27 August 2014
[19] Nanda Suchit, Transformative Impact of ICT: change stories from India
[20] NSS 66th round (2009-10): Employment and Unemployment Situation in India, Ministry of Statistics and Programme Implementation, GoI, (November 2011).
[21] See www.emitra.gov.in/egovConstruction.jsp#_ accessed 30 May 2014
[22] See http://www.sahajcorporate.com/ accessed 30 May 2014
[23] Six per cent girls in rural India still out of school < http://www.thehindu.com/todays-paper/tp-national/tp-newdelhi/six-per-cent-girls-in-rural-india-still-out-of-school/article1096512.ece > accessed on 27 August 2014
[24] Status of PPP Projects as on July 31, 2011< http://www.pppindiadatabase.com/Uploads/Status%20of%20PPP%20Projects%20as%20on%20July%2031,%202011.pdf> accessed on 27 August 2014
[25] The Role of ICT in Advancing Growth in Least Developed Countries Trends, Challenges and Opportunities, International Telecommunication Union (ITU), (Geneva, 2011).
[26] Telecom Annual Report 2012-13, Department of Telecommunications, Ministry of Communications & Information Technology, GoI.
[27] Twelfth Five Year Plan (2012–2017) Vol-2, Economic Sectors, Planning Commission, GoI.
[28] What is the impact of ICT (Information and Communication Technology) on Rural Development and its acceptance? < http://www.researchgate.net/post/What_is_the_impact_of_ICT_Information_and_Communication_Technology_on_Rural_Development_and_its_acceptance > accessed on 27 August 2014