ICT Needs for Rural India: A Review

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ABSTRACT: For any country to progress, the rural area contributes a lot in development of that country. With reference to India, there are 638,000 villages, 5100 towns and over 380 urban agglomerations. The villages are in huge number as compared to urban areas. But the contradiction to this fact is that rural area is lagging in progress as compared to the urban areas. The primary occupation of India is agriculture; the rural area is quite concerned with this occupation. Still, the observation is that the strength of our rural areas in terms of financial, standard of living is not so good, which indirectly affects on the national growth. The paper deals with how effectively we can use ICT (Information and Communication Technology) to strengthen the rural areas. There are various aspects on which the rural development is based as agriculture, improving standard of living, imparting education, women empowerment and many more. Firstly, the active participation of citizens and positive response of them is necessary to implement all those things. "Information Communication Technology" concentrates on these three words: Information, Communication and Technology; to promote information via communication with the help of technology. The large business investment must be done in the agriculture, animal husbandry, etc. The paper focuses on the need of ICT for rural development. Implementing ICT involves a lot of things. First, to interact with people, establishing the network and so on. The strategies can be changed by using ICT as using it by connecting to the experts in the European countries and taking guidance of them to improve the current situation. The paper spotlights on all the points which contribute to the rural development.

KEYWORDS: education, ICT, India, rural development

I.INTRODUCTION

The world in which we live is in 21st century. The European countries like France, Germany, England, etc. are known as developed countries. India, historically known as "Sone ki chidiya", is still a developing country. 70% of the Indian population lives in rural areas. The paper spotlights the main problems and issues which are responsible for obstacles in rural progress and how ICT can be used in the development of rural areas.

The first thing is the education. Literacy is an important factor on the basis of which ICT can be bought in rural areas. People in rural areas must understand that without education there is no progress; and to equal up with the worlds' lifestyle, the first thing is to know the primary education.

4A's, i.e. Attitude, Aptitude, Approach and Appearance can be implemented to develop the rural part of the country.

On the basis of this factor, we can introduce "ICT" which is the central point of discussion of this paper. There are many aspects of ICT on which rural areas can be effectively developed. This will assure that India can 100% stand as developed country if the progress of rural areas is taken as priority by the government of India and our government is working on this issue.

"Information Communication Technology" concentrates on these three words: Information, Communication and Technology; to promote information via communication with the help of technology. Communication should be a process that contains the forces of backlash and promotes the forces of transformation and survival [1].

The subject is quite vast and there are many aspects on which effective work can be done. Roughly, it can be seen as:

 ➢ Rural development
 ➢ Ways to implement using ICT
 ➢ Problems faced during implementation of ICT solutions

Rural development can contribute a lot in progress of any nation. Information that would otherwise be conveyed through face-to-face contact, post, courier, print delivery, telegraph or telephone may instead be communicated in digital electronic form via the Internet[2]. This working will help in eradicationg rural-urban disparities and will fully contribute to national development. ICT includes the full range of computer hardware, computer software, and telecommunications facilities [3].

The following four points shortly give the description of points described in the paper.

Rural Development: The rural development is an overall development in terms of socio-economic and cultural development anytime, anywhere feature of ICTs is the ability to transcend time and space [4]. Discipline and literacy, both education and computer literacy, are essential for development right now because in order to implement ICT, the people should know its purpose and why it is being implemented.

There are many aspects in which ICT can be effectively used such as agriculture, improving standard of living, imparting education, women empowerment and many more.

Agriculture: Agriculture is the primary occupation in rural India. However, in the recent years, the position of farmer financially is not so strong. The strategies can be changed by using ICT as using it by connecting to the experts in the European countries and taking guidance of them to improve the current situation. The large business investment can be done in agricultural occupation like animal husbandry.

Rural information centers also provide a learning environment for farmer groups on the use of ICT but also on jointly solving problems in their livelihoods [5].The main thing in which our farmer is lagging is organization.

For example, large investment can be done in milk production. For this, **milk voluntary system** can be used to increase the milk production.

Fig: 1 Voluntary milk system [6]

Also the Smartphone apps are developing and are being used on large amount by the farmers. When farmers are healthy then they can give in their best and increase their labor productivity [7].

As a primary occupation, agriculture and agricultural based business and industries can be developed and expanded to contribute to the GDP. Many Smartphone apps are being developed to give climate and weather updates. However, the actual situation is very contradictory. To deal with this situation, the first thing which is very important is courage, to possess a positive attitude to approach to solve the problems and find the solution for it to improve the appearance.

The rural population is at an inherent disadvantage in India as they lack the pre-requisites to participating in their country's economic growth in the tertiary, modern services sector [8].

Improving standard of living: The rural and urban gap is seen to be divided widely this decade. We need to improvise the standard of living. For this, money is the important source. The self-employment is the powerful way to achieve this. The small business like STD, book-stalls, .It is important for countries to develop a robust ICT industry, complete with the newest digital facilities [9]. This is the conclusion drawn from case study of Nigeria. ICT allows consumers and citizens to articulate their demands, and companies and states to respond with better-targeted services [10].

Imparting education: In the developed world, the ICT revolution has affected every sphere of life and has been of immense benefit to the people [11]. Education is one of the strongest tools to develop the nation. The requirements are will to learn and a good teacher to teach. Online learning activities facilitate more effective education and offer significant benefits over traditional methods [12].

Women are not aware of the existence of national organizations to support and protect them because awareness campaigns do not seem to reach them [13]. In rural areas, it is seen that teachers are not much interested to teach the students. Additionally, teachers have to provide a plethora of learning strategies in order for the students to learn how to select the one that is most appropriate for their desired learning outcome [14]. Parents don't know the importance of education for their children. Internet is one of the strongest tools to impart education. Industry needs professionals who are technically trained to deal with ICT tools, systems and information sources [15]. The role of social variables i.e. education and health as enabling factors, fostering economic progress has recently received much attention in the development literature [16].

Women empowerment: Women are a very dynamic personality of the society. Gender inequality is not a big issue in the today's 21st century. There are also opportunities to train some of these rural women for self employment in the IT sector [17]. The handicraft art is preserved by the Indian women, especially the Indian rural women.

Four features that have characterized India since Independence continue to characterize India's elementary education system: incomplete enrolment, inequalities, poor quality, and ineffective school performance [18]. We just need to motivate them. Technology-based social empowerment especially for rural women is a new emerging concern in the present information world [19]. The difficulty she faces right from her childhood is unsafe feeling and lack of motivation. Good quality education is also the ultimate intervention in terms of promoting empowerment: it endows individuals with capabilities and a sense of their rights [20]. "Mahila Bachatgat" is a very good example for women empowerment. They have much power that they can contribute to the Indian economy and can be self-dependent.

II.RURAL DEVELOPMENT AND ICT

Indian industry has undergone through many revolutions. The success story of the Indian IT industry has benefited only urban India [21]. The rural India was deprived from this benefit. Although the primary resource for industry is from agriculture. In developing countries like India the concept of development linked up with the rural development [22]. Also, the roads for transportations are not proper constructed. The government has taken the initiative to connect the India via roads. It can facilitate speedy, transparent, accountable, efficient and effective interaction between the public, citizens, business and other agencies [23].

It was the situation when we want to send a letter or message, many days were required. Today, e-mail facility, social media have made it possible to cover a large distance in very small time. ICT as an enabler has broken all bounds of cost, distance and time [24].

In rural areas, one cyber cafe is sufficient to make the rural citizens known to ICT. The ICT kiosk movement has been able to create a stir in local communities in terms of knowledge and know-how about the use of technology for accessing information and using it as a means to a better livelihood [25].

The world is connected under one term globalization. So, rural areas must be provided training to make good entrepreneurs. The natural resources are available in plentiful quantity. The current era of globalization, marketization and increasing competitiveness requires that every citizen should be resourceful to run their livelihood enterprises [26]. ICT is the fastest medium for communication. From the perspective of information technology, India is most widely known for its impact on global markets in the software and services sectors [27]. We can give opportunity to Indian rural markets to trade in foreign countries. ICT is a major tool to leverage the scheme for ensuring access to the target group of beneficiaries [28].

The Information and Communication Technologies have facilitated the design of solutions to deliver government services for social development at the door step of villagers [29].

While there is a strong link between access to ICT and development, it is not a panacea, but rather a powerful tool to tackle development challenges [30]. A strong communication channel can be established with the help of mobile phones. Rural citizens can use the toll free numbers to call and leave messages about any issue concerning their community and listen/ learn from messages left by others from the same community [31].

III.PROBLEMS IN IMPLEMENTING ICT SOLUTIONS

While implementing ICT, the first barrier is language. The information available on internet is in English as it is a world-wide accepted International language. So, **education status is essentially needed to be improved.**

India is a prosperous nation in terms of resources. It may be then human resource, natural resources, etc. **Management is the ultimate solution for it.** Many industries can be developed in rural India like paper industry, handloom industries, etc. As such, the global ICT industry is fast changing as a result of emerging technologies, economic, social and business trends [32].

Connectivity is not available in most rural areas. There are other problems too like electricity. We need to focus on this too because rural development is a very vast subject which covers all the socio-economic, cultural and technological development and that's what is the rural development. ICT does not include only the Internet but a gamut of other tools which could be used individually or in convergence with each other [33].

Financial problems are faced by most of the rural families. This is the root cause for poor standard of living. ICT platforms help in generating incomes through new ways of carrying out business, reducing cycle times or increasing productivity [34]. Many government schemes are provided for those who want to start a new business, loan facilities are also available. The rural citizens should take benefits of such schemes.

To implement ICT, computer literacy in fact, technical literacy is also essential. In business, entrepreneurs must not bring international branded products because the rural economy is not so strong. So, this mistake should be avoided.

Problems in establishing network: This is a technical issue to establish a network. The first point is the large investments needed to establish a strong network along with infrastructure. To achieve the balance between rural and urban areas, communication is important. This communication is well established through internet. Access to the Internet as well as the telecommunications is confined mainly to the urban centers in India and the rural areas remain beyond the ambit of new technology [35]. The facility of internet is not so costly to connect from one place to another. The rural area is neglected in this case. At start of the invention of mobiles and telephones, this technology was unknown to rural areas. One important reason is the prohibitive cost of connecting India's vast rural areas with telecommunications [36]. Once an Internet connection is established in villages, it can serve as a multipurpose platform for imaginative entrepreneurs [37].

The projects have not adequately transferred capabilities to rural areas [38]. By bridging distances, telephony and the internet, which fall under a broader category known as Information and Communication Technologies (ICTs), allow people living in remote areas unprecedented access to resources and opportunities [39].

IV.OVERCOMING OBSTACLES: PLAN OF ACTION

The first success criterion of all analyzed projects is the great effort made to define objectives that take into consideration the socio-economic context of the target area [40]. In order to implement ICT, we need to consider the following points:

LAN Connectivity: The local area network can be established in the low cost. Telephone connection and modem are required for wired network. Dongle is also the option for LAN connectivity.

User-friendly & inexpensive PCs: Desktop PCs are available at affordable cost. They are user-friendly too. We can provide the computer facilities in the schools. To impart technical education, language-friendly software are also essential. Learning systems on projector startup is the good step that government can implement.

Multinational companies should motivate youth by taking the seminars and provide them employment opportunities.

Teachers training: In rural areas, education system is not so good. Vision and plan are needed to be designed.

We can encourage and enhance learning and their skills in rural people if we ensure communication in local languages, so that rural people can understand easily [41].

Designing the wireless network: Wireless Mesh Networks (WMN) emerges as a solution to realize the dream to connect rural regions to the rest of the world [42]. Designing a reliable and low cost network is the aim to connect to the rural areas. 'Digital Divide' is the popularly used phrase associating underdevelopment and lack of access to ICT and information [43]. Till now, the network failed in terms of power, data loss, security and reliability. So, the network designers need to concentrate on the protocols and make the network highly efficient. The most common means of internet access is through fixed telephone lines using dial-up in areas where the telephone network has penetrated [44].

The role of software developers in developing features using participatory interactive designing and agile methodologies is very crucial [45]. For a developing country like India which has a population of 1.23 billion, connectivity is a key driver for growth [46].

 Focus on the issue of hardware failure is important while designing a reliable network. Generally the literacy level in the rural communities is quite low so training and skill development of the people out there becomes indispensable for the effective implementation of any development project [47].

ICT is the fastest way of communication. The media's role in enhancing capability is to be reckoned as preeminent in broadbasing the changes by extending knowledge to influence opinions [48]. Transparent flow of information could play an important role in securing a degree of accountability in the delivery of services [49].

V.CONCLUSION

Following conclusions can be drawn from above description.

1) Rural development is essential to contribute the nations' progress. This is the very important thing which we need to understand. The strength of laws will work definitely to achieve this. This will reduce the standard gap between rural and urban areas.

2) The first and foremost thing to implement is education. The rural schools need to undergo a long development process. The talent is available on large scale in rural areas' students. The only thing is they need facilities.

3) The mutual understanding between rural and urban areas is essentially to be exclusive. The existing gap between them is due to the standard of living, education, employment and the most important the facilities in urban areas. The both areas play the vital role in contributing nations' progress.

4) Use of internet can cover this gap. This gap can be eliminated by online education, expert guidance how to improve the standard of living, etc. The youths migrate from rural to urban for education and employment purposes; but they are then not interested to go back again to rural areas. The major reason behind this is their approach changes, also their standard improves too.

5) Internet is a valuable source of knowledge. ICT kiosks can be implemented for health and education, occupations, business, etc. the government is also active in making rural areas developing. Just the thing we need is to broaden our scope of thinking.

REFERENCES

1) Vikram Gopinath, "Role of Information and Communication Technology in the Rural Development: Study of Thangachimadam Village Resource Center and its Village Knowledge Centers," MCmS Dissertation 2007,6-35.

2) Nirvikar Singh, "Information Technology and Rural Development in India", University of California, Santa Cruz, USA, March 2004

3) Md. Shahadat Hossain Khan, Mahbub Hasan, Che Kum Clement, "BARRIERS TO THE INTRODUCTION OF ICT INTO EDUCATION IN DEVELOPING COUNTRIES: THE EXAMPLE OF BANGLADESH", International Journal of Instruction, July 2012 Vol.5, No.2, 67-80

4) Niraj Kumar Roy, "ICT–Enabled Rural Education in India", International Journal of Information and Education Technology, Vol. 2, No. 5, 527-529, October 2012

5) Jac Stienen, Wietse Bruinsma, Frans Neuman, "How ICT can make a difference in agricultural livelihoods", The Commonwealth Ministers Reference Book – 2007, 4-4

6) www.delaval.com

7) Kwadwo Asenso-Okyere, Daniel Ayalew Mekonnen, "The Importance of ICTs in the Provision of Information for Improving Agricultural Productivity and Rural Incomes in Africa", WP 2012-015: January 2012, 13-30

8) Jasmine M. Bartolome, "How has India 's Rapidly Growing ICT Sector Impacted its Rural Poor?", Portland State University PDXScholar University Honors Theses, 2014, 5-27

9) Okogun Oluwanishola Abiodun, Abang Igwe Sunday, "Poverty Alleviation through Information and Communications Technology: A Case Study of Nigeria", INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY SCIENCES AND ENGINEERING, VOL. 4, NO. 7, AUGUST 2013, 23-24

10) Jeff Sachs, "Rural Realities, Real Solutions ICTs for rural development", 3-8

11) M.S. Boateng, "THE ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN GHANA'S RURAL DEVELOPMENT", Library Philosophy and Practice (e-journal) 2012, 2-22

12) Volery, T. and Lord, D. "Critical success factors in online education", The International Journal of Educational Management, 2000, 14 (5): 216–223.

13) Nomusa Dlodlo, "ACCESS TO ICT EDUCATION FOR GIRLS AND WOMEN IN RURAL SOUTH AFRICA: A CASE STUDY", CSIR, 2009, 4-12

14) Sanja Michael Mutong'wa, Mneria Esau, Evans Ogoti Ogenda, Evans Tenge, Bernard Nasiuma, "Investigation of Information Communication Technology in Kenyan Primary Education Sector", Journal of Emerging Trends in Computing and Information Sciences, Vol. 5, No. 7 July 2014, 539-555

15) Deepthi Shanker, "ICT and Tourism: Challenges and Opportunities", Conference on Tourism in India – Challenges Ahead, 15-17 May 2008, IIMK, 55-58

16) Gurshaminder Singh Bajwa, "ICT policy in India in the era of liberalisation: its impact and consequences", GBER Vol. 3 No.2, 57-61

17) Rashid Sulaiman V, N. J.Kalaivani, Nimisha Mittal, P. Ramasundaram, "ICTs and Empowerment of Indian Rural Women What can we learn from on-going initiatives", CRISP Working Paper March 2011, 11-84

18) Shrabastee Banerjee, Kalyan Sankar Mandal, Priyadarshini De, "A Study on the Permeation and Scope of ICT Intervention at the Indian Rural Primary School Level", 1-8

19) Dr. M. Arivanandan, "Socio-Economic Empowerment of Rural Women through ICTs", International Journal of Rural Studies, vol. 20 no. 2 Oct 2013, 2-7

20) Andrew Shepherd, Lucy Scott, Chiara Mariotti, Flora Kessy, Raghav Gaiha, Lucia da Corta, Katharina Hanifnia, Nidhi Kaicker, Amanda Lenhardt, Charles Lwanga-Ntale, Binayak Sen, Bandita Sijapati, Tim Strawson, Ganesh Thapa, Helen Underhill, Leni Wild, "Chronic Poverty Advisory Network Getting to zero", Overseas Development Institute 2014, 42-176

21) Ashok Jhunjhunwala, Sudhalakshmi Narasimhan, Anuradha Ramachandran, "Case Study: India", International Telecommunication Union and Korea Agency For Digital Opportunity And Promotion", September 2004, 38-61

22) Arathi Chitla, "Impact of Information and Communication Technology on Rural India", IOSR Journal of Computer Engineering, Volume 3, Issue 2, July-Aug. 2012, 33-35

23) Anita Kelles-Viitanen, "The Role of ICT in Governing Rural Development", November 2005, 2-8

24) S. Rajamohan, T. Dhanabalan, "RURAL DEVELOPMENT THROUGH ICT: OPPORTUNITIES AND CHALLENGES", Volume 2, Number 2, April-June' 2013, 354-358

25) Arvindd Narayanan and Gaurav Chakraverty, "Running ICT Telecenters in Rural India", IFIP WG 9.4 Volume 19, No. 1, February 2009, 21-31

26) Puneet Kumar, Dharminder Kumar, Narendra Kumar, "ICT in Local Self Governance: A Study of Rural India", International Journal of Computer Applications Volume 83 – No 6, December 2013, 32-36

27) J. Bussell, "Electoral Competition and Digital Development in India and South Africa", October 17, 2007, 236-240

28) S. Meenakshi, Dr. A. Murugan, "Enhancing Rural Development in Tamilnadu through ICT: An Evaluation of Latest Technologies in the scheme MGNREGS", International Journal of Computer Trends and Technology (IJCTT) – volume 7 number 2– Jan 2014, 122-127

29) R.K.Gera, Yunus Parvej, Dr H.M.Rai, "Improving the Image of Rural India through E-Governance of Panchayats", International Journal of Latest Research in Science and Technology ISSN (Online):2278-5299 Vol.1,Issue 1 :30-35 ,May-June(2012), 34-35

30) WBCSD, "Information and communication technology" August 2012, 2-13

31) S M Sehgal Foundation, "5 th Annual Conference on Good Rural Governance and Citizen Participation", March 13, 2015, 3-5

32) "National ICT Strategy and Plan NICI - 2015", 9-85

33) Maitrayee Ghosh, "Public Libraries in the Internet age: Indian scenario", IFLA Congress, 1-9 th August, 2003, 3-9

34)planningcommission.nic.in/reports/sereport/ser/stdy_**ict**/15_con.**pdf,** "Lessons from the ICT project implementation experiences", 25-29

35) Mukesh Ranga, Priyanka Pradhan, "Generationg Solutions For Rural Development Through ICT In India", Journal of WEI Business and Economics, Volume 3 Number 2, August 2014, 30-32

36) Ramesh Subramanian, Masilamani Arivanandan, "Rural Development through Village Knowledge Centers in India", Communications of the IIMA, 2009 Volume 9, Issue 2, 104-120

37) David Bollier, Rapporteur, "Connect and Catalyze: Can India Leverage ICT for Inclusive and Sustained Growth?", The Aspen Institute, Communications and Society Program, 2006, 19-63

38) Rafiq Dossani, D.C. Misra, Roma Jhaveri, "Enabling ICT for Rural India", Stanford University, 2005, 6-11

39) Sangamitra Ramachander, "Rural connectivity in India: The n-Logue example", Indian Journal of Radio & Space Physics, Vol. 36, June 2007, 188-191

40) Eilean von Lautz-Cauzanet, "ICT For Rural Education and Development: Success Factors and Lessons Learned[1]", March 2013, 3-34

41) Tauffiqu Ahamad, Jitendra Kumar Pandery, "A Study on Application and Role of ICT in Rural Development", Journal of Emerging Technologies and Innovative Research (JETIR), Volume 1 Issue 6, 456-458

42) Jean Louis Ebongue Kedieng Fendji, Jean Michel Nlong, "Rural Wireless Mesh Network: A Design Methodology", Int. J. Communications, Network and System Sciences, 2015, 3-9

43) Pradosh Nath, "ICT for Economic and Social Transformation: An Empirio – Theoretical Review of Indian Initiatives", CSSP Electronic Working Paper Series, November 2014, 3-21

44) N. H. Rao, "A framework for implementing information and communication technologies in agricultural development in India", TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE: ResearchGate, MAY 2007, 494-518

45) Dr. S. M. Haider Rizvi, "Sustenance of ICT Design Initiatives in e-Governance – Challenges and Ways Forward", Case Studies on e-Governance in India – 2012 - 2013, 14-17

46) www2.delolitte.com/in"Broadband The lifeline of Digital India", November 2014, 11-26

47) Ajay Narayanan, Akshaay Jain, B. Bowonder, "Providing Rural Connectivity Infrastructure: ICT Diffusion through Private Sector Participation", 23-28

48) Satish K. Puri, Sundeep Sahay, "Role of ICTs in Participatory Development: An Indian Experience", Information Technology for Development, Vol. 13, 2007, 152-160

49) Shruti, Ankita Sharma, Annie Vincent, "ICT for Women – Creating Gender sensitive eSpaces for Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)", Case Studies on e-Governance in India – 2013 – 2014, 25-32

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