Effective Implementation of ICT for rural development: Opportunities and Challenges

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Abstract— Information and communication technology (ICT) play a key role in rural development and the economy of a country. The present rural development strategy mainly focuses on poverty alleviation, better livelihood, provision of basic amenities and infrastructure facilities.. Usage of ICT in rural area, not only speed up the development process but also reduce the gaps between urban and rural sectors of the society. The ICT applications have lot of opportunities for rural development and will also have some challenges. It can be used to distribute its services to all - citizens, businesses, and government. ICT is changing at a rapid speed but its application in rural area is very progressing slowly, because of lack of literacy and resources. It is necessary to focus on the scope of ICT in rural development, the opportunities and the challenges [1].Major problems in rural areas are electricity, communication, transportation and lack of knowledge about new technology [2]. This paper is to focus on reviewing and analyzing interpreting existing ideas of the researchers and to explain the role of information communication technology in the rural development and to show how ICT approaches will be effective in helping the rural people for their sustainable development.

Keywords—Rural, e-governance , Rural development, Opportunities, Challenges

I. INTRODUCTION

Majority of rural development schemes are l mainly focusing on poverty alleviation, better livelihoods, provision of basic amenities and infrastructure facilities. Framing the policies, regulations and acts are necessary to enhance activities concerned to rural development which will improve the business and economy of the rural area e.g agriculture, handicrafts, fisheries, and poultry etc. ICT services will provide an opportunity for the rural people to improve their access to markets, health, and education [1][2].

The ICT can be used to provide the services in various ways such as government to citizen (G-C), government to business (G-B), government to government (G-G)
This will enhances better reach, minimize the expenses on processing, enhance clearness, and reduces processing and the sequence times.

ICT and e-governance can be used to implement the development activities which can empower the peoples of rural areas. Various government services, schemes and policies will reach to the rural community and widens access to micro finance. ICT for e-governance service can be divided into two categories i.e. improving government process and bounding interaction within public or society[3].

The main objective [4] of the paper study is to overview the present status of awareness and usage of information technology in the rural areas. The objectives of the study are as follows
• Determine the awareness about ICT in rural areas.
• Identify the importance of ICT in the growth of agriculture.
• Know the impact of ICT in the development of rural activities.
• Find out awareness of digital resources used by rural people.
• Find the opportunities and challenges for ICT implementation in rural area

II. LITERATURE REVIEW

Keshari Nandan Tiwari, et.al [3] reviewed the impact of information technology in rural development. Ankur Mani et.al [4] explained the key factor for rural development. Charu Malhotra .et.al[6] reviewed the ICT initiatives for rural area and development. Ankita Gupta et.al[8] reviewed about various activities of a Government and involvement of peoples in government's decision making process. Prabhakar.V[10] explained benefits of technology for agriculture. Premalatha[14] developed a system which increases system life, reduces the human intervention, therefore less efforts of the farmer is required. Rekha [15] proposed a system for tea garden farmers to replace some of the traditional irrigation technique

III. ICT AND RURAL DEVELOPMENT

1. Need of ICT for Rural Development:

ICT can be used in rural areas to improve employment opportunities, agriculture counseling, entrepreneurial activity and marketing scenarios, distance education and knowledge, solution to health challenges, rural empowerment and participation, women empowerment, better governance etc. Implementation of modern technology in rural areas have number of problems and hurdles such as – insufficient infrastructure, Poor literacy rate, Inadequate training and capacity building, Financial and Political constraints, Social and cultural challenges. Figure 1 shows the frame work for poverty alleviation. A number of issues related to rural development are ex;, education, agro-business, connectivity, Health sector, microfinance, laws, marketing and employment.
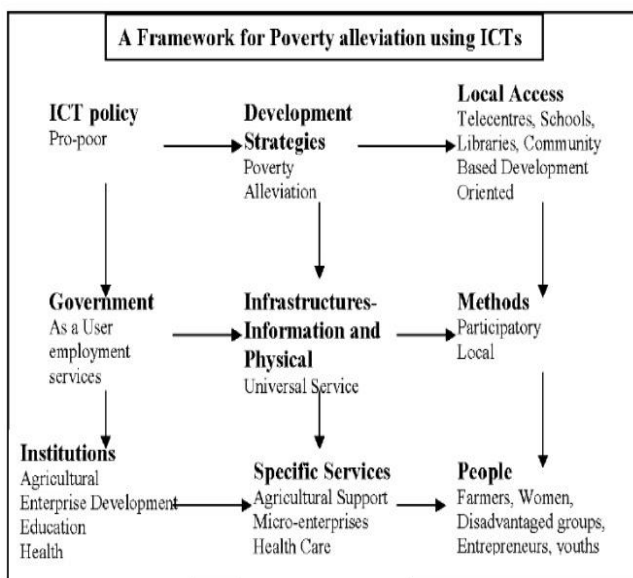

Figure1 Frame work for poverty alleviation

2. Scope of ICT in Rural Development

Information and Communication Technology (ICT) provides plethora of opportunities and ways develop every conceivable area of community [3]. It has created a new environment with global connectivity. It has reduced the world indeed into global village. ICT facilities demonstrated the development scenario and can be used effectively to bring social and behavioral change in the rural poor community. Initially, the approach lacked gender sensitivity. It has lead to indiscriminate applications in every aspect of information dissemination, management & governance of development. The ICT is changing the lives of peoples.

3. Importance of ICT for Rural Development:

Information technology witnessed tremendous progress in the last two decades, impacting every spheres of our life. The innovations n IT created various opportunities to improve the utilization and performance such as agriculture, education, health, services, etc. Application areas of ICT is shown in figure 2
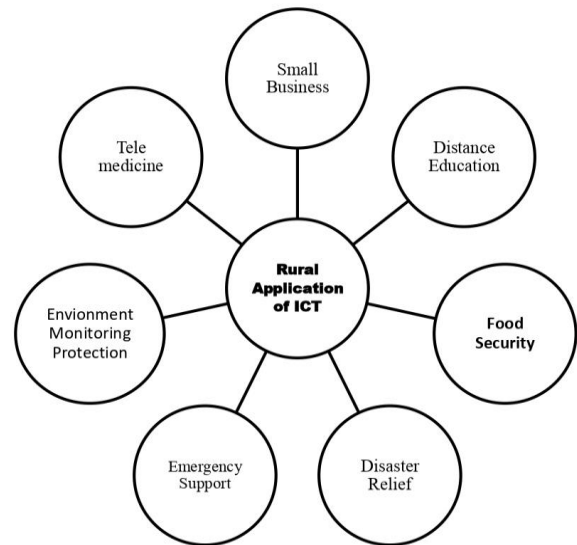

Figure 2 ICT applications in rural area

The Information Communication Technologies (ICT) has playing key role in implementing information to rural peoples ICTs provide locale-specific information to villagers related to prices of agricultural input and output, markets potential for export, animal husbandry, the different schemes of governments, health care in nearby hospitals, transport, weather, etc. The villagers use these databases, young people's access the database to know about the various entrepreneurial opportunity, training centers, courses available in nearby institutions and colleges, and also those in neighbouring states

Rural peoples can be empowered through ICT which will enable them to contribute to the development process and live with dignity. This enhances the rural people to express their views and opinions and can involve in decision making process. The ICT should provide participatory approach and support them for improved policy formation and execution process. ICTs can provide latest information on markets to rural users, thus increasing their selling knowledge. ICT has changed the way peoples and other sectors of the society communicate and   interact in terms of time, cost and distance. The Internet can be used to connect remote village which will enable them to access regular and required information as that of urban people.. Information Technology can be used in different ways to exchange the information Apart from providing basic information; it also helps to know the market scenario, fluctuation, better strategies to improve agricultural productivity and crop management information. ICT can be used as tool to provide information to farmers:

4. ICT as a key for rural development

Technology plays a major role for development rural areas. Growth of rural peoples totally depends upon the effective implementation of technology as shown[5] in figure 2
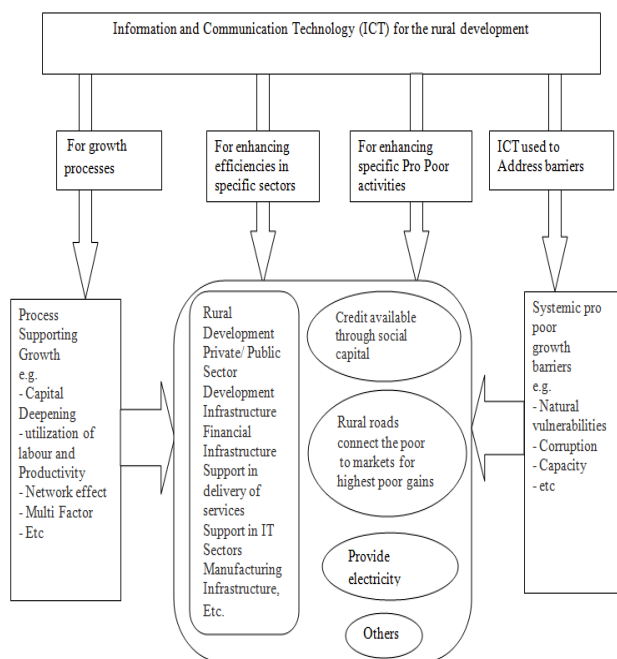
Figure 3.ICT for rural development

.This model acts as an aid to the rural community to know about all the things. Rural people can get information about the instruments, materials and price of the product by using ICT. It can play a major a prominent role to obtain maximum profit which leads to the rapid growth of rural development. The following factors aid in increasing the income of the farmer which in turn help to raise his standard of living.

1. Increased production
2. Increased farm productivity
3. Reduction in costs
4. Easier and cheaper access to finance
5. Timely access to markets and agri-inputs
6. Improved standard of living
7. Increase in disposable income
8. Better access to healthcare:
9. Better and cheaper access to finance

5. Employment opportunities to rural people:

ICT can be used to generate employment opportunities in rural areas such as electronic repair centers and information handling and training services etc . It can also be used to establish rural information centers which can create employment opportunities in rural areas. Rural community can be trained as field workers using ICTs through innovative designs or programs.

The Information Technology has opened the doors of prosperity to the entrepreneur who are a dynamic force to shape country's economy. It plays a significant role to facilitate the transfer of technology from institute to industry. It brings out the new technological changes and new methods of techniques to the entrepreneurs

This may help to set up and establish various things such as Computer training centers, Mobile services centers, Tele-centre, Cyber cafes, Information kiosk, Training centers etc. The peoples trained though these centers can also provide training and thus may become small-scale entrepreneurs..

6. Role of ICT in Rural Development

Efforts have been made implement different applications of ICT to improve living standard of rural masses[6]. So, rural development is an integrated concept of growth, and poverty elimination.

1. Provide basic facilities e.g. schools, health facilities, roads, water, electricity, health and education etc.
2. Improve agricultural productivity in the rural areas.
3. Increases agriculture productivity, rural employment by promoting rural industry
4. Encourage social transformation beyond the border of social and economic status.
5. Improves transparency, accountability and administrative efficiency of rural institutions, strengthens rural governance
6. Encourages participation of rural masses rural governing process , thus improves interaction with and within civil society
7. Provides commercial, social and educational benefits to improve living standards of people of rural areas
8. Provide support to local governance and solutions to queries of needs of the rural communities.
9. Provide information access to the rural poor about of their rights and availability of government schemes,

IV. RURAL DEVELOPMENT AND E-GOVERNANCE

1. Rural Development & Governance

Various factors such as physical, financial and human resources are to be included in rural development scheme to improve living standards rural people[5]. This will bring social reforms among rural people. This will reduce the migration trend of the people to urban area. E-governance process may act as an aid to the government to enhance development process in rural area. Various studies have proposed several institutions and experts e-Governance can be used to provide timely information to the rural masses and have the potential to spawn innovative means of wealth generation in rural context[5]. Living standards of remote area and rural people can be improved by providing them an access to commercial, social and educational benefits. ICT applications can be used to implement numerous development activities in rural area such as education, governance, environmental monitoring, health, human rights information, economic growth etc. However, poverty level in rural area is very high. Application of e-governance is a complex process as it is supposed to cover large number of rural community.

2. Frame work for e-governance in rural context

ICT initiatives enable the governance to achieve rural development An integrated frame work is to be developed for rural masses which should meet the requirements and

knowledge needs of rural community and also the inputs from other stake holders. A frame framework proposed in[6] is shown[6] in Figure4.
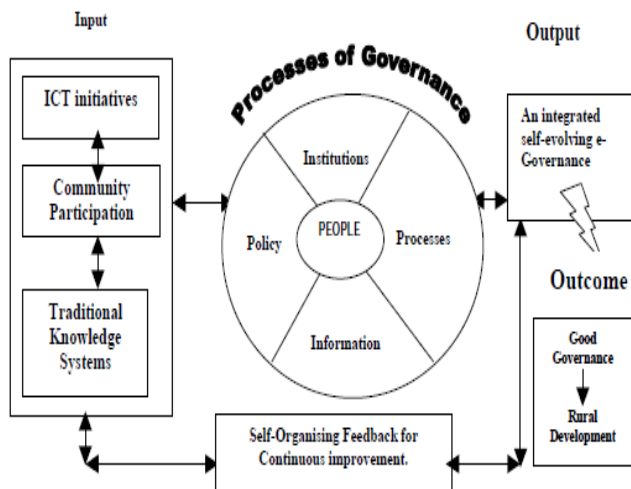

Figure 4: A Frame work for rural area

The objective of the frame work is create develop a sustainable development to create social empowerment at gross root level in rural areas6]. It is a bi-directional framework, which means it not only delivers governance services, products, but also accept community aspirations, practices and structures

This framework takes ICT inputs along with the existing traditional knowledge of rural masses production, resource allocation and conflict resolution etc in the processes of rural governance**.** The aim of the model is to involve rural masses in the design of rural e-governance schemes, and unsure cooperation and cooperative communication between various stakeholders of governance.

3. ICT & e-Governance
Information and communication technology and e-governance can empower the rural people by allowing the people to use government services shown[8] in figure 5]. The application of ICT in public domain by the government is known as e-governance [11][12]. It provides information, innovative ideas to generate revenue for rural peoples. ICT made a greater impact on various sectors in rural area such as education, governance, health, human rights, communication, financial growth etc.

This intervention of ICT in public domain, managed by government, is referred as *e-government* .Enhanced *ICT* involvement of public participation in the governing process is also called as *e-governance*. This will enable the rural masses to know various things in and around and can make a decision about their own progress by looking into their own self-efficacy and collective efficacy. Purpose of all the government is to give good governance to everyone, and then e-governance serves as a means to attain this goal [8].

ICT and e-governance application results in better, interaction, administration and transparency, in the government activities [3].. The services supported and offered by ICT using e-governance can be categorized into three types namely (1) providing information (2) improving processing efficiency and (3) facilitating transactions. E-governance is stand for electronic government and by the use of ICT it provide the interaction between government and citizens (G-C), government and businesses (G-B), and government to government (G-G). Figure 3 illustrates e-governance scenario. In all these modes government applied different policies and rules for completing the task related to the field[9][10]
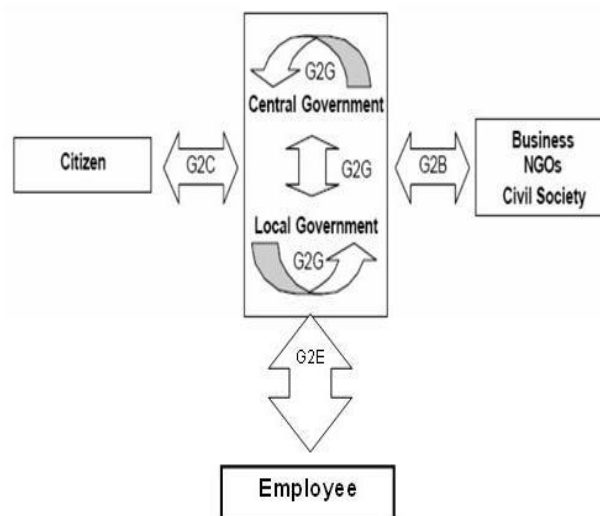

Figure 5: Sample e-governance scenario

Citizen interaction with various government facilities can be achieved through Government to Citizen (G to C) section of the model. Government to Business (G to B) sector includes both the procurement of goods and services by the government as well as the sale of surplus government goods to the public on line. Backbone of e-government is the government to government (G to G) This G-G e-government facilitates sharing data and exchange of information in electronic form between various governmental sectors and agencies [14][15].

Stages of 3-geverance is shown in figure6. E-governances introduced various administrative reforms which can be used to provide excellent governance to the peoples to meet their needs and demands. This not only improve the quality of life of various sections of society, but also provide them to access various provisions and facilities for economic and social growth. In this context, e-Initiative as a strategic tool for transforming governance and improving the quality of services provided to the people [16]. The e-governance/ ICT initiatives has improved accessibility, cutting down costs, reducing corruption, extending help and increased access to un-served groups.
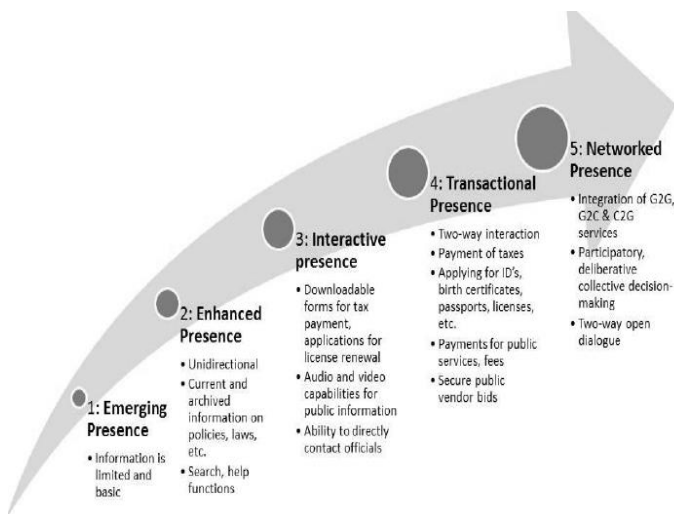

Stages of e-Governance

Figure 6 stages of e-governance

Benefits of e-Governance : The following are the benefits of e-governance is shown [17] in figure 7

Figure 7 Benefits of e-governance

4. Challenges for rural development:

The following are the challenges for usage of ICT for rural development [3][13]:

1. *Illiteracy:* The literacy rate in rural area is much less than the urban people. Because of the lack of awareness about e-governance and literacy, they are not capable of using the services provided.
2. *Poverty:* Internet access is a costly issue for poor people who do great effort for their daily living.
3. *Infrastructure:* Rural area does not have proper basic facilities and infrastructure for internet access such as electricity, internet and communication etc.

4. *Cost:* Cost is major factor where majority of the people living under the poverty line. to access internet connections etc.
5. *Resistance to change:* People are disinclined to change. Much of the hesitation that occurs on moving from a paper based to a web-based system.
6. *Lack of participations:* There is a lack of participations form various sections when designing of an application
7. *Privacy and Security:* Proper functioning of e-governance requires to guard privacy and security of user information. Improper security standards and protocols can limit the implementation of the scheme.
8. *Language dominance:* English is the dominant language on the internet which may limits the internet access to who does not know the English language and the internet are relatively is of no use for rural people.
9. *Trust:* Two levels of trust are required for effective implementation of e-governance. First trust new tool or technology which they are supposed to come across and use. The second is to trust the government.
10. *Shortage of professionals:* Skilled professionals are not available in rural areas,
11. *Mind set:* Unpredictable mindset of people owing to unpredictable   natural disasters, market rates, policies etc
12. Difficult terrain conditions
13. Heavy expenditure on advocacy
14. Investment for expansion
15. Buying inertia is high
16. Business revenue varies with seasons

5. Advantages

ICT plays a key role for the benefit and development of rural has many advantages:

1. Economic growth,
2. Improved delivery of social services
3. Greater transparency
4. Opportunities for self employment
5. Agricultural Extension
6. Access to market information
7. Access to finance
8. Weather Information, Disaster, Early Warning
9. Health care, Education and other allied services.
10. Market information.
11. Administration and public services functions etc.
12. Access employment Information
13. Opportunities for external investors.

V.   CONCLUSION

Information Technology is impacting almost every sphere of rural activity and making impact towards rural development. The ICT provide the services in different modes like government to citizen (G-C), government to

business (G-B), government to government (G-G) to get better reach. Rural community are to be trained use ICT effectively and efficiently. Rural poverty is a complex phenomenon and there obviously cannot be single dominant approach for its alleviation. The challenge is to suggest cost-effective ICT based solutions to improve the living standards of the rural populations of economically backward rural peoples. ICT needs a coordinated effort between different sectors because ICT is just a tool and one can use it properly to support the livelihoods of rural communities..

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