Enhancing Communication through ICT to improve livelihood of BOP

Kumara M.H., Kuruppu K.A.M.M.N., Kumara L.A.J., Mapa E.B. and Mannapperuma D.S.
Department of Computer Science & Engineering, University of Moratuwa

Abstract — *Poverty is a burning problem BOP societies. Since agriculture is the main occupation in most of rural areas, agricultural production and post-harvest activities mainly counted as their income which their lives will depend until the next harvests. Poor - health, natural disasters, education, lack of infrastructure, lack of financial services of rural areas hold the improvements of living standards. This paper analyze the possible ICT interventions that improve the general livelihoods of the rural poor that may also yield significant agricultural development investments on the part of rural families by making others aware of these issues that will provide the better policy deriving and make a better future for the BOP. ICT can be a powerful enabler of future goals because it helps to improve communication and the exchange of information to strengthen and create economic and social networks. It also can be applied to most of the human activities from personal use to business and government. This paper focus on integrating rural areas into global networks and making information, knowledge and culture available and also the possible ways of income generation and poverty reduction.*

Index Terms — BOP, ICT , Base of the Pyramid , poverty

I. Introduction

This review is mainly focused about the role of the ICT technology in enhancing the communication to improve livelihood of BOP people. As the topic implies review emphasize on the effective use of mobile telecommunication in agricultural development. This topic is discussed in different sections as how ICT affects the improvement of livelihood of BOP, how mobile telecommunication affects the lives of BOP, different perspectives an ICT company or an organization looks at the BOP, preservation of indigenous knowledge in the world of ICT, major emphasis on agricultural development through ICT and telecommunication and mobile usages in BOP.

II. BOP & ICT in Nutshell

Base of the pyramid (BOP) represents the largest group of people who are suffering from poverty. According to Wikipedia it says that there are 2.5 billions of people who are earning less than $ 2.50 per day. Agriculture is the main occupation of majority people in BOP.

Information communication technology (ICT) enable users to create, access, store, transmit, and manipulate information by developing high quality telecommunication services by integrating computers, middleware and other software application.

III. Effectiveness and Power of ICT

ICT has become the major driving force in the present world. It has a huge potential for providing sustainable solutions for the burning issues. As a result of it, it has been used for improving the livelihood of BOP by increasing the agricultural development and the telecommunication. According to Hannes Toivane (2011) [1] global challenge can be easily accessible and solvable by using ICT. ICT has approached the poor by understanding their daily challenges and prioritizing needs. India is the role model where they exactly show how they have improved their livelihood of people little by little using ICT with all the challenges due to poverty. Integrated ICT facilities, data-to-Knowledge transformation in vital sectors such as health, food, energy, education, finance, transport and consumer goods, will result in further expansion of productive gains, reduction in energy consumption, reduction of manufacturing waste and emission. With the revolution of information technology computers and network services started to provide unimaginable benefits such as BPO (Business process outsourcing) to developing economies. The total income of the BOP is the main income of many developing countries like India. BOP has very strong interests in ICT like the people who have higher earning capacities. If a technology properly focuses the needs of this group and is marketed with an appropriate business model, the people at BOP are willing to spend even more money for technology. This shows the effectiveness and approaches of ICT to eliminate the poverty.

IV. Government involvement in the development of livelihood of BOP

Government is the responsible authority in each developing country to facilitate infrastructure to enhance the ICT to improve the livelihood of BOP people. "Government needs to encourage the expansion of affordable access to rural areas through a range of policy, regulatory and investment measures that are market-extending rather than market-distorting so that technology roads will be created for the opportunities that will be available with modern and adapted society"[2]. Governments is responsible of finding models to increase rural voice on national policy on ICT issues including rural access issues with collaborating BOP people and private sector. Using ICT to provide critical education for rural population is major need of present world. Countries which invest for deployment of ICT for agriculture gain economic and social advantages. A road map that covers the infrastructure, rural services delivery infrastructure and platform of services that enables rural agricultural based transformation. Having significant amount of equipment which can be effectively used

for development of ICT is not the only requirement. Governments and other responsible parties need to provide with proper training for users. Because of the most BOP people are lack of IT literacy; knowledgeable people must give a proper guidance for BOP people.

A. Main responsibilities of government

- Increasing accessibility of affordable telecommunication infrastructure, especially in rural areas of developing countries that have undergone telecommunication regulatory reform that leads to increased competition among service providers and the establishment of universal access policies and programs;
- Increasing use of among development agencies, of Internet and telephone based services for "one-stop shopping" for information and knowledge sharing;
- Increasing attention to ICT training for staff responsible for agricultural and rural development;

V. How ICT can improve BOP livelihood

ICT has approached the poor by understanding their daily challenges and prioritizing needs. ICT use information, communication and transaction services as tools where the rural poor get benefited by a vast knowledge that could serve the needs of them. Ways of ICT effect the poor people can be point out as below.

- Understand, design and assess the impact of ICT interventions to promote rural development and sustain agriculture
- Prove ICT-enabled services for the rural poor to understand better scaling-up strategies and challenges in businesses
- Use the ICT dimension to link the objectives of various interventions in rural spaces
- Use better tools to evaluate the impact of ICT interventions in ARD projects
- To increase the variety and easy access to relevant content for rural populations like price and weather information
- Learn about rural kiosks and mobile based systems

VI. Benefits of Using ICT

There are number of ways that ICT can help BOP people to improve their businesses. Rural producers and suppliers can be facilitated to access the markets. ICT-enabled services are able to build the capacity of these local institutions and groups to serve as advocates for pro-access policies, regulations and investments.

ICT's impact on rural livelihoods requires an attention to the full set of relationships, institutions and economic processes in which rural poor families and communities are embedded, and not just a focus on the individual's direct access to ICT. ICT-enabled services will be building the capacity of these local institutions and groups to serve as advocates for pro-access policies, regulations and investments. It often serve as a key method for awareness raising and advocacy, educating and mobilizing rural stakeholders to demand strategies, policies and investments that will increase their access to affordable ICT infrastructure and services. These organizations help the rural poor to understand, adapt and effectively use these tools and services once they are available, in ways that will have positive impact on their incomes and livelihoods. Issues related to market information and marketing effectiveness are crucial. Improving timely access to information has a real positive impact on farmers' incomes. Spread of the Internet and mobile phones positively affects both farmers' incomes and on the performance of rural agricultural markets overall. Responding to these changes, a wide range of contractors and innovators are providing new mobile-based tools and services for these markets. The poor do not bank their income to give it a quality or they are uninvited due to low deposits or not having enough money to save. So the banks must welcome and encourage them to benefit liquidity. The Financial services could be improved by ICT with the reach and affordability and that will vastly help the poor to address costs and inefficiencies. The Rural Banking system served not only to strengthen the operations and controls of the banks, but also built human capacity, enabled better and more diverse affordable service offerings at reduced cost, and assured stronger client focus and customer service." Though the mobile telephony "footprint" covers a large majority of the population in most developing countries, the most dramatic and promising impact of ICT on rural financial services is in the emerging area of mobile-enabled" [3]. "Financial services ("m-banking") SMART Money and GLOBE G-Cash, currently serving over 3 million people and when comparing to M-Banking, it is a young but fast-growing field" [4]. This system is already an area of considerable promise and intense interest on the part of donors, governments, the private sector and others. It is likely to witness dramatic growth in the next few years. The rural poor must use accurate weather forecasting and timely warnings to help themselves to avoid natural disasters.

VII. How ICT help in effective contribution from BOP to business?

Business is the main source of selling BOP people products and having an income. The income and livelihood of BOP people mainly govern with the stability of the business. ICT makes businesses stable in different ways. Below list shows how ICT strength the business and BOP people interaction.

A. Enterprise ICTs will make BOP value chains more productive

Using ICT, manufacturers can increase their product quality, distributive network and speed of distribution and etc. than using conventional methods.

B. Enterprise ICTs will make the BOP a proving ground for transformative productivity gains.

There are many consequences that affect production, like climate changes. Therefore farmers can use ICT knowledge for overcome these circumstances. They can use climate adaptation methods, deforestation, energy management technologies to improve their production.

C. BOP businesses need data, which ICTs can provide

There are lot of tools and information that can be given through ICT, such as mobile devices, knowledge about new policies and standards etc. for development of BOP businesses.

VIII. ARE THERE COUNTRIES WHO GAIN SIGNIFICANT BENEFITS BY USING ICT?

African, Caribbean and Pacific countries have location-specific agricultural and rural development opportunities, and country specific telecommunications constraints to gain maximum advantage from ICT. Senegal and Ghana show effective evidence of economic growth through mobile phone usage. But there are majority of countries who still experiment with ICT to improve the income rates of their BOP people. Countries like Sri Lanka at a higher level comparing other countries. The main significant drawback of using ICT in some developing countries is the poverty. There are many organizations around in the world providing infrastructure to some poorest countries to enhance ICT technology. Developed countries already benefited from ICT, sooner day developing countries will gain maximum out of ICT.

IX. TELECOMMUNICATION CAUSE SIGNIFICANT IMPROVEMENTS IN BOP LIVELIHOOD

"Half the world's population has never made a phone call" [5] .Telecommunication is the major component of information and communication technologies (ICT) such as communication, internet access etc. "South Asia is less prevalent than Southeast Asia in phone ownership. Among the people where this study was conducted, many indicated that they are planning to buy a phone within the coming two years. When considering the cost of a phone, It appears that there is significant different between affordable cost by the BPO and real cost" [6]. Mobile phones are increasingly affordable to lower-income groups in developing countries. Granting privileges to Access to telecom provides fairly strong impact on these countries high BOP level countries. Many researchers have been found that ownership of some communication devices (mobile device, house hold device, neighbors' and etc.) is higher in Southeast Asian countries than other countries, however overall phone ownership at the BOP is much lower in India. Most of south Asian countries suffer from low income. Targeting improvements in mobile telecommunication will be effective. There are two kinds of benefits originating from telecom access; BOP can use these communication devices for income earning mechanism or cost saving mechanism i.e.: use phones as communication service supply, or in other way owners can save transaction cost by making call as opposed to taking bus ride in to town. Although the biggest and widest spread impact of access to telephones at BOP is ability to act in emergencies.

Telecommunication provides set of benefits. They are.

A. Connectivity and universal access

ICT connectivity and usage of globally is increasing rapidly among advance and developing countries except poorest countries. It is using for business and nonprofit activities and social e-services to increase their performance

B. Financial and other transactions via mobile phones

Those days 90% of world's population doesn't go to banks. money transaction and transfer facilities have become much easier using mobile phones with mobile confirm cash requests.

C. Openness and open access

ICT has provided facility to share knowledge using internet and open source software, therefore it allows all the societies to improve their knowledge and share their experiences among each other.

D. Human development and capable access

This is focused on human development and greater attention is to individual, external and group capabilities and freedoms, as highest level development. This facility gives freedom to enhance social relationships and educational knowledge.

E. Innovation and creative access

ICTs are the carriers of technological knowledge and the links that connect the many essential parts of a national innovation system. Lately, considerable attention has focused on innovation in and for the BOP, as example mobile phones enable or facilitate a range of economic and social innovations among poor populations.

Therefore ICT development is directly connected to knowledge distribution and human development; also it is connected to economic growth and poverty reduction. Mobile phones contribute to make their work process efficient for farmers and fishermen and in business development of small entrepreneurs. Returns from investing in telecommunications include the availability of more information in the marketplace, increased productivity, and new abilities to coordinate activity. A concept of Tele center is a local community center with personal computers where anybody can go to access Internet. The idea was driven by western countries to deploy new technologies to less developed countries.

X. AGRICULTURAL DEVELOPMENT THROUGH ICT

There are a large number of problems and constraints in BOP people who are doing agriculture as their main occupation due to lack of knowledge. A world food need is mainly depends on agriculture .Using ICTs for agricultural communication and information exchange can be used to overcome these constraints. Applying ICT in the domain of agriculture is major necessity of present world. When integrating ICT within extension in the rural areas connectivity is a major constraint. The connectivity constraint is relevant even for basic ICTs such as the telephone. The objectives for agricultural extension are to improve the wellbeing of rural communities and rural families, reduce poverty; sustain environmental resources, and achieve food security. ICT can help rural poor women and men to capitalize on emerging opportunities, especially in education and income

generation. It can improve agriculture and the social, economic and political status of rural people, improve the wellbeing of farm families, improve productivity and livelihoods for farmers, increase and improve farmers' incomes and productivity on a sustainable basis ,enhance farmers' production ,attain higher levels of efficiency in the farm enterprise, attain food security and improve rural livelihoods.

Lack of knowledge of farmers in income, literacy and access to Information and Service can be facilitated by providing access to information and services through internet. Farmers can select profitable crops, decide on fertilizes and manage their operations. Apart from that they can access information about competitive input and output market.

"Any ICT intervention that improves the livelihoods of poor rural families will likely have significant direct and indirect impacts on enhancing agricultural production, marketing and post-harvest activities – which in turn can further contribute to poverty reduction" [7].ICT interventions always do not have to be in the field of improving the production of agriculture but they can be used in different ways to enhance and improve the agriculture. For an example, providing a way to accessibility of rural payphone can be used open the rural market for buyers in throughout the country wide. This automatically helps to improve the living hoods of BOP.

Improvements of living hood of BOP people due to ICT interventions can be list as follow

- ICT help to preserve time through information which affects the unity and the health of the family.
- Provide access to household capital which can be leveraged for agricultural production or post-harvest improvements; and
- Enable rural families to better take advantage of remittance economies for enabling family members to live elsewhere and send capital home to improve agricultural work and other livelihood activities.

The objective of using ICT in agriculture is not all about agricultural production or post-harvest activities. The main objective is to reduce poverty of BOP people in the domain of context living standards of the rural families by improving agriculture which is main occupation of the people in the rural areas. Telecommunication is one the main source which pumps knowledge to improve agriculture. Communication is the way to spread out details about any field. People who are involved in the agriculture field are not wealthy and also they are at low knowledge level. Those people need to know much information about new trends and techniques of planting which effects to productivity of their harvest. Having a high productivity and harvest is not going to receive income as far as those people have good buyer of their harvest. In this point telecommunication comes into play a major role in solving above discuss problems. Conveying information can be effectively done by telecommunication.

A. Outcomes in living hoods of BOP people by using ICT in agriculture

- Increased farm family income
- Increased farm family savings
- Improved family health
- Greater access to education and training,
- Reduced vulnerability
- Reduced rural out-migration.
- Sustainable use of natural resources evidenced by the implementation of land ownership policies and procedures

XI. Enhancing Communication

Communication technologies such as internet, mobile telecommunication and traditional media are having high ratings in communication among BOP people.

1. What role will the Internet and other new ICTs play in rural and agricultural development given the changes facing agricultural in general and agricultural extension specifically?
   Internet and other ICTs act as a medium for conveying and communicating information to people in rural areas.

2. Are there adequate software and hardware, and support for agricultural areas, available in the countries or regions we serve?
   Telephone technologies can be easily use in the poor developing countries but using and internet is not a cost effective way in communication at rural areas.

A. Benefits of using ICTs extension in relation to traditional media

- A new range of additional media that can be part of the communication for development "mix" of traditional and/or appropriate media;
- Where accessible, these new media have features that enable bottom-up articulation and sharing of information on needs and local knowledge;
- They tend to reduce communication costs (often dramatically) in comparison to other available communication choices;
- They provide global access to information and human resources; and
- Rapid speed of communication - locally, nationally and globally.

B. Weaknesses of using ICTs extension in relation to traditional media

- Can lead to technological dependence;
- Capital cost of technologies, and the cost of on-going access and support can be high;
- There is an inherent need for capacity building;
- Lack of accessible telecommunication infrastructure in many rural and remote areas severely limits available choices of new ICTs;
- Many ICT projects are characterized by poor and non-participatory planning;

XII. Literacy in ICT of Woman in BOP to Improve Livelihood

Women are one of the major contributors in agriculture activities in rural areas. Women are twice likely as men to be involved in agricultural activities. Farming, agro business and food processing are major roles of women in rural areas. So income of women also causes to improve the living standard of BOP people.

- Ways of develop women know about ICT
- Training that uses local resource people, such as women entrepreneurs who are interested in, and use, ICTs;
- Opportunities to develop leadership capacity within farmers' organizations and rural women's and youth groups by engaging in ICT policy debates;
- Local development and testing of content oriented to women and their needs;

XIII. Trends in using ICT

Conventional agricultural education and training systems cannot satisfy the demand; therefore educational and training institutions are looking at ICT based agricultural education and training systems. Some countries have a long history with the application of open and distance learning (ODL). ICT-mediated ODL and Tech-MODE is evolving quickly.

XIV. Preservation of Indigenous Knowledge in the Rapid Change in ICT

Indigenous knowledge is known as knowledge which comes from shared beliefs and rules which are regarding to the physical resource, social norms, health, ecosystem, and culture. A person who is in both rural and urbanizes area has this human specific quality. Most of the people take decisions according to this knowledge. This knowledge is span by each day by getting new information. In this context ICT play a major role by improving the availability of indigenous knowledge while blending with modern scientific and technical knowledge. Telecommunication technologies such as telephony, cable, satellite and radio, as well as digital technologies, such as computers, information networks and software are already belonging to the ICT. Internet technologies are the new member in the ICT.ICT can be used for Capture, store and disseminate indigenous knowledge so that traditional knowledge is preserved for the future generation. Apart from that promote cost effective dissemination of indigenous knowledge, providing a platform for advocating for improved benefits from system of poor and Promote integration of indigenous knowledge into formal and non-formal training and education are express the way of using ICT.

XV. Limitations Challenges and Issues of Using ICT

As we know regions, countries, organizations, communities and people differ greatly in their capacity to create, adopt and use new technology. Economic, social, cultural and technological factors determine to a great degree how people can access and shape new technologies and their applications.BOP represents the largest, but poorest socio-economic groups, multiple and highly variable markets. Therefore lack of ICT capacity has become the critical development bottleneck. Main challenge is those farmers are very poor. They don't have much experience applying and using technology. Farmers always look for getting a good price for their harvest. ICTs can be used as a practical cost effective tool for facilitating and channeling farmer's demand. But one of the major problems in the developing countries is that rural areas not facilitated with internet and telephone connectivity. Some other issues can be listed as follow

- Lack of, or poor quality, health, education, and agricultural extension training resources
- Government policies, institutions and programs which may not reflect the interests or extension needs of the rural poor
- Rural community capacity to design, implement and manage community-based infrastructure
- Lack of private sector alternatives to public sector infrastructure provision

XVI. Conclusion

BOP people mostly live in rural areas of developing countries. Poverty is a burning problem in these societies. Since agriculture is the main occupation in most of rural areas, agricultural production and post-harvest activities mainly counted as their income which their lives will depend until the next harvests. Poor - health, disaster, education, lack of infrastructure, lack of financial services of rural areas hold the improvements of living standards. ICT interventions that improve the general livelihoods of the rural poor may also yield significant agricultural development investments on the part of rural families. So the overall conclusion is that ICT can make a huge difference in BOP livelihood. But also it can bring worst issues as well. Since through understanding of these issues will provide the better policy deriving and make a better future for the BOP.

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