



ISSN: 2249-894X
 IMPACT FACTOR : 5.7631 (UIF)
 UGC APPROVED JOURNAL NO. 48514
 VOLUME - 8 | ISSUE - 8 | MAY - 2019



THE IMPACT OF ICT ON RURAL LIVELIHOOD AND INCREASED INCOME OF FARMERS

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ABSTRACT:

This article focuses on the usage of ICT tools in the rural sector, categorically by farmers. In the course of the study the focus remains to understand the impact of ICT usage on rural livelihood and increased income of farmers. The study concludes that ICT has a positive impact on the rural livelihood. But though there are indications of raised incomes of the rural households, further research/deeper analysis is needed to find a direct correlation between ICT usage and

increased income.

KEYWORDS: *ICT, Livelihood and farmer.*

1. INTRODUCTION

When we focus on Information and Communication Technology (ICT) and its impact on developing countries, a major topic that opens up is how the rural population has assimilated it and what has been the outcome. More specifically, we try to drill down towards the economic impact of ICT in rural segment and the up-liftment of rural livelihood. Economic impact and up-liftment of rural livelihood in turn might have an impact on the economy of the country. However, the impact on the economy of the country does not fall in the scope of the current study. Over the period of time it has

been observed that there is a relationship between ICT, social capital and quality of life in developing countries. ICT has considerable potential for increasing the social capital among communities and thus for improving the quality of life for the inhabitants. It has been observed that ICT has the ability to reduce the costs associated with imperfect information and hence intensify social relationships. In rural sector the spread of ICT needs constant attention. With the advent of mobile telephony in rural areas, quite a few positive effects have been noted in the rural livelihood segment. The mobile phones have reduced the cost of accessing information.

von Braun (2010) mentions that ICTs can contribute to poverty alleviation by making markets more accessible to households,

improving the quality of public goods provision (such as health services), improving the quality of human resources (primarily through education), allowing more effective utilization of existing social networks, or extending them and creating new institutional arrangements to strengthen the rights and powers of poor people and communities. The reduction of the information gap at a low cost is of central importance to the poor. ICTs can be a powerful tool in removing the information asymmetries that often prevent the poor in remote areas from accessing markets, thereby leading them to lower income outcomes. ICT adoption in agriculture can allow improvements in getting timely information about prices and quality requirements, extension and latest technological know-how, and weather and water

resources.

2. OBJECTIVE OF THE STUDY

The objectives of the study are the following:

- 1) To assess the impact of ICT, on rural livelihood of the farmers.
- 2) To assess the increased income of the farmers due to ICT usage.

3. METHODOLOGY

Various articles published in journals, periodicals, books, edited chapter in books, conference proceedings, published occasional papers and reports has been referred to, as a part of this study to assess the impact of ICT on livelihood and increased income among the farmers. The same has been discussed in the subsequent sections to get a clear understanding if ICT has indeed an impact on the areas which is under the purview of the current study. Various materials have been accessed over a period of time to see the impact and across the various regions of the world to provide a wider angle to the topic.

4. LITERATURE REVIEW

Korsching and Bultena (1998) had observed that in rural America, telecommunication technologies could benefit areas by increasing the efficiency and competitiveness of rural businesses through faster communication with suppliers, customers and an expanded market. It could enable urban workers (in the information sector) to live in rural areas and telecommute to their jobs. It could facilitate the location of businesses in rural areas with rapid and accurate distant transmission of data and information. Telecommunication could maintain the viability of rural institutions such as schools, libraries, and hospitals by providing local access to distant, specialized information and other types of assistance.

Chapman et al., (2003) were of the opinion that ICT had the potential to impact the following:

- Distance education programmes in big volume.
- Campaigns on health.
- Awareness to combat diseases (for e.g. HIV/Aids).
- Adult education.
- Skill enhancement in agriculture.
- Agriculture goods processing and marketing.
- Trainings on managing finances.
- Government services to the poor.

Harwitt (2004) had observed that in rural telecommunication sector of China, the growth was happening at a steady rate. In addition to mobile telephony, internet penetration had also been in the rise. The telecom companies were making profit too.

The primary intention of spreading ICT was generating awareness among young and middle-aged farmers about the availability of ICT services (Meera et al., 2004). This study was based out of three projects in India (Madhya Pradesh, Maharashtra & Andhra Pradesh). Older population should be educated at a later stage. As small and marginal farmers were using ICT services, emphasis should be given in providing information in relation to farming. In the same study there was a recommendation that in drought-prone and less highlighted areas (w.r.t. ICT percolation), future ICT initiatives should provide the following information services:

- Facility to access land records.
- Services to handle queries.
- Information on rural development initiatives.
- Weather forecasting.
- Marketing information.

- Best options available for dry land agriculture.
- Crop insurance and post-harvest techniques.

In the case of highlighted areas (w.r.t. ICT percolation), where cooperative setups are in place, ICT initiatives should focus on the following:

- Cooperative accounting procedures.
- Market information.
- Services to handle queries.
- Input prices/availability.
- Early warning systems for disease and pest problems

Adésínà (2006) had observed contribution of ICT in sustainable development in Africa was highly significant. The impacts had been recorded in the following areas:

- Social connect with distant relatives.
- Economic activities.
- Providing remote diagnosis for hospitals.
- Sharing medical expertise.
- Digitization of rare manuscripts.
- E-book facilities for out-of-print materials.
- Resource sharing among libraries.
- Computer-based orthography for African languages.

But the observation was, that though much progress has been made by usage of ICT there are quite a few policy issues.

ICT is being considered as an essential tool for business and prosperity, and as a medium for entertainment. But it has provided a less focus on the under developed regions of the world. The Information for Development Program (infoDev), had commissioned a Knowledge Map (KM) to address this area. KM was designed to address the priority knowledge needs of policymakers, donors and other key stakeholders. KM builds on the Information and Communications for Rural Livelihoods (ICD4RL) project by the Overseas Development Institute (ODI) in cooperation with the UK Department for International Development (DFID), the Food and Agriculture Organization (FAO) and the World Bank (WB). The following eight principles for successful ICD4RL were identified:

- Content to be created adhering to local context.
- Building on existing systems and focusing on existing policies.
- Handling diversity.
- Building capacity.
- Ensuring equitable access and empowerment.
- Building partnership networks.
- Adopting realistic approaches to technology.
- Information costs.

McNamara (2008) was of the opinion that the drive to understand the potential benefits of ICT to rural livelihoods began by mapping connections between the livelihoods framework and the various perceived benefits of ICT. Subsequent advancements have sought to develop more coherent frameworks that emphasize on the key aspects of ICT policies, programs, and projects that are essential for development in the rural sector. In parallel, ICT is getting more enhanced with more participatory, flexible, and human-centred approaches to cater real user needs. A combination of these strategies is most likely to benefit rural livelihood initiatives that employ ICT.

As per Molony (2008), mobile phones are getting integrated into Tanzania's agricultural trading business culture chiefly because of the crucial role that ICT can play in improving the exchange of supply and demand information between farmer and the wholesale market. This market information

can be useful in stopping a farmer from sending his produce to the market blindly. It will allow him to know whether to divert his crops elsewhere for minimum profit more locally instead of maximum loss at a particular market place.

Millions of people in Africa have benefited with the mobile telephony. They were able to communicate quickly and at low cost. But the impact has not revolutionized all lives in general. New ideas/models are needed to be developed for higher reach and subsequent positive results (Etzo and Collender, 2010).

Based on this context a look into a study of Tanzania by Sife et al. (2010), focusing on mobile usage in the Morogoro Region, Tanzania is vital. The study indicated that mobile phones had provided rural households with fast and easy mode of communication, thereby increasing their ability to access livelihood assets and overcome the obstacles of daily life. With expansion and strengthening social networks (via mobile devices), people's ability to deal with emergencies has also increased. Similar views have been expressed by Souter et al., (2005). Additionally, the idea expressed is that people can work together which in turn would reduce cost and increase productivity. The study also mentions that mobile usage help farmers to cut down travel costs, send and receive money, secure better markets and prices and promptly communicate business-related information. Though (Souter et al., 2005), had agreed on saving time and money in reducing travel costs, they disagreed on the fact that mobile phones are a source of information. Sife et al., (2010) were of the opinion that, mobile phones have not made important contributions to improve incomes of rural households. But Souter et al., (2005), have showcased that, most respondents have felt life, particularly economic life, will be adversely affected without the phone. Another view expressed is that higher status groups appear to enjoy considerably more economic benefit from the use of telephones more than lower status groups. This suggests that telephony may contribute to widening the economic gap between more prosperous and more marginalized groups within rural communities.

Governments across nations need focus on the growth of telecommunication in rural areas, as because this sector has been quite neglected. In major sections of people in developing countries, sharing has been a common method for using access ICT. Policy needs to figure out whether the methods of indigenous sharing innovations are cost-effective and can be replicated across various regions, as was done in Grameen Telecom (James, 2010).

With respect to ICT in agriculture the following study can be showcased (Haider Rizvi, 2011). Lifelines, a mobile-based advisory service to farmers (in North-Central India), succeeded in bringing improvements in agricultural practices with new inputs and increases in production. Interestingly, the use of LifeLines services by farmers not only established evidence for role of ICTs in improvement of rural livelihoods but also highlighted the areas where more work is required to effectively satisfy farmer information needs. Haider Rizvi (2011) attempted to understand the influence of LifeLines through sample surveys and focus group discussions. The research has been conducted in 10 villages of three blocks inhabited by LifeLines beneficiaries. The sampling for the study was the total number of beneficiaries who used the LifeLines services. Hence 145 respondents formed the intervention group. To see the impacts, an equal number of respondents who did not use LifeLines in these 10 villages, were selected as a control group for the study. The technology was found very relevant in the given socio-economic conditions of the people and the region. The queries posed and inputs provided through LifeLines were diverse and covered aspects such as insect, pest and disease management, new varieties of crops, seeds and fertilizers, etc. The study showcases positive impact of ICT in agriculture.

Due to gradual and well-regulated expansion of telecom services in the country, people in rural areas are having access to mobile services. This has been boosted by the prepaid (or "pay-as-you-go") services. The farmers are also reportedly using the mobile phones for a variety of purposes. But it is yet to be established the extent to which the farmers would be willing to use and pay for getting the information regarding agriculture through mobile (Ansari and Pandey, 2013). In Latin America use of mobile phones in rural areas has shown reduction of transaction costs for traders (Barrantes Cáceres and Fernández-Ardèvol, 2012).

In Peru (Latin America), a link between mobile phone usage and positive contribution to the household income has been found (Chong et al., 2009). The effect of mobile phone is seen discussion of price for produce, when a critical mass is covered by mobile network. This phenomenon is also seen in Niger (Aker, 2010). Aker (2010) also discusses that mobile phones significantly reduce communication and information costs for the rural poor in developing countries. This not only provides new opportunities for rural farmers to obtain access to information on agricultural technologies, but also to use ICTs in agricultural extension systems. Since 2007, there has been a high usage of mobile phone based applications and services in the agricultural sector, providing information on market prices, weather, transport and agricultural techniques via voice, short message service (SMS) and internet.

The stratified differentiation of ICT adoption in rural China had been examined through three dimensions i.e. a) occupation, b) village membership and c) social status (Guo and Chen, 2011). Economic inequality resulting from occupational differentiation led to the differentiation in cell phone usage. Differentiation resulting from village membership demonstrated that while ICTs might have satisfied individuals' demands, they also reinforced the existing segregation between the insiders and outsiders in the same village. Social status, such as power, status and age, also generated social differences in the conception and usage of ICTs. Guo and Chen (2011) had examined stratified differentiation of ICT adoption in rural China in three aspects such as, occupation, village membership and social status. Economic inequality resulting from occupational differentiation had led to the differentiation in cell phone usage. Differentiation resulting from village membership had demonstrated that while ICTs might satisfy individuals' demands, they also demonstrate the existing segregation pattern between insiders and outsiders of the same village. Social status and age of the user creates social differences in the conception and usage of ICTs. Such stratified differentiation illustrates that on one hand, ICT adoption and diffusion had indeed energized rural China by providing easy access to information and bringing in modern and diversified means of communications. However, on the other hand, it also generates the Matthew Effect in peasants' differentiation i.e. ICT adoption both represents growing peasant differentiation and accelerates further growth.

Ansari and Pandey (2013) used an exploratory research design. Socio economic characteristics of the study included age, gender, education, occupation, type of family, family size, family occupation, type of house, landholding and type of farming of the respondents. Besides, ability to use the mobile phone, regularity, cost & benefits, ability to understand the message, trust in the information were assessed to understand the effect in farming. The data was collected through personal interview using a structured interview schedule. The data, collected during 91st kisanmela (in October 2011), was analysed using appropriate statistical tools. The findings showed that a large majority of the farmers own and use the mobile for various purposes. They receive information in relation to agriculture, agricultural marketing and agricultural credit.

Mutunga and Waema (2016) had few observations on mobile phone use and its effects on smallholder farmers' livelihood in Kenya. The study mentioned that the effect depends on the context in which the mobile phones are used. The context has been determined by the type of livelihood being pursued (whether subsistence or market-oriented), supporting infrastructures existing in the area, skills and knowledge of users and governmental and non-governmental Mobilizing for Development (M4D) policies and regulations on mobile phone use. Mobile phone was found to have greatest effect on smallholder farmers' livelihoods when used in the context of market oriented farming with adequate support of infrastructure, strong policies and regulations in the mainstream that integrates its use in agricultural activities.

Asongu et al., (2016) mentioned that poverty has been decreasing in all regions of the world with the exception for Sub-Saharan Africa (SSA) and more than 45 percent of countries in this region has been off-track out in achieving the Millennium Development Goal (MDG) particularly reducing extreme poverty. In light of apparent challenges in the post-2015 development agenda of Sustainable Development Goals (SDGs), the study has extended the existing literature by investigating the role of knowledge creation and diffusion in the inclusive benefits of mobile penetration in 49 SSA countries. The study has been based on data for a period 2000-2012 using a Tobit regression and is mentioned to

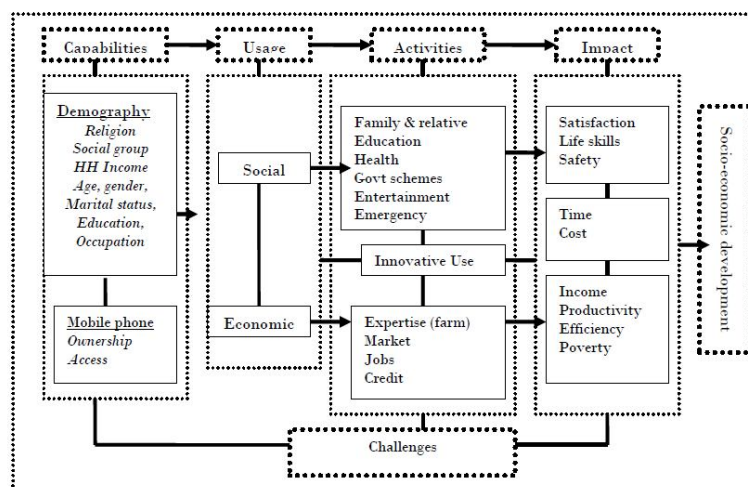
be one of the first systematic attempt in investigation of role of mobile phone technology, knowledge creation and diffusion on inclusive human development. The study found mobile phone penetration in SSA countries has been of extreme importance for sustainable and inclusive of human development. To shed further light on the results, the dataset has been broken into fundamental characteristics of income levels, legal origins, religious dominations, ‘openness to sea’, political stability and resource wealth, which previous literature indicates that those factors may have some bearing on human development. The results confirm that mobile phones have inclusive human development benefits irrespective of the country’s income category, legal origins, religious orientation and the state of the nation. Despite the significant contribution of the study, future study appears warranted as mentioned by the authors to look further at the underlying factors closely.

Asongu and Nwachukwu (2016) had laid down the following observations in relation to mobile phones and inclusive human development. The previously apparent positive correlation between mobile phones and inclusive development in Africa could be extended to a positive effect in Sub-Saharan Africa. As a policy implication, in the post-2015 development agenda, the mobile revolution remained a relevant means for development and pro-poor growth in the Sub-Saharan region. As a policy implication, governance could consolidate the gains of development from mobile phones. Future studies could bring out the actual areas of development and the gain from the impact of ICT.

5. ANALYSIS AND DISCUSSION

Singh Mehta (2013) employs Qureshi’s Modified Framework to assess the socioeconomic impact of ICT usage. In the study “capability” plays an important role in ownership and access to any technology. These capabilities are termed as “physical” as well as “environmental”. Environmental capabilities include socio-economic indicators like household income, religion, social group, occupation, gender, age and literacy level. Physical capabilities include ownership of mobile phones or any ICT related device. In rural areas, usage of mobile phones has been divided broadly into two categories: social and economic purposes. Mobile phone usage can help improve the economic status of the rural population by providing timely information on farming, jobs or the labour market, trading and credit. In addition, usage of mobile phones can help improve life skills and social capital by providing timely information on healthcare, education, government schemes, family and friends.

Fig. 1: Impact evaluation framework for mobile for development (M4D)

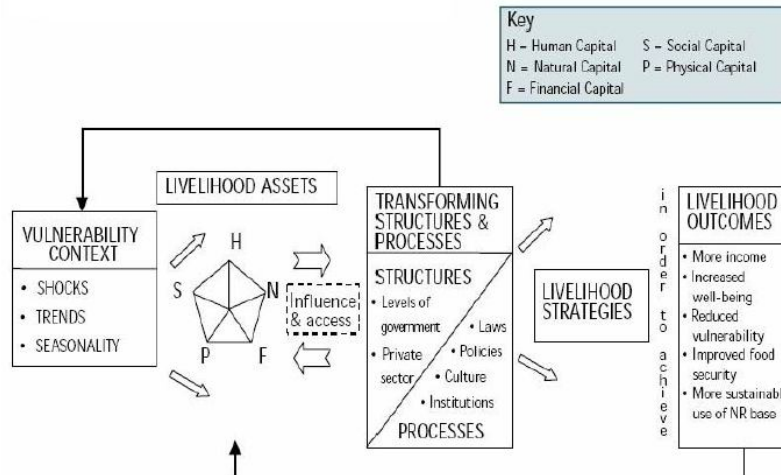


Source: Singh Mehta (2013)

Sife et al., (2010) employed the Sustainable Livelihood Framework (Fig. 2), in their study. In its simplest form, the Sustainable Livelihood Framework depicts the poor as operating in a “Context of

Vulnerability”, within which they have access to livelihood assets. The assets gain their meaning and value through the current social, institutional and organizational environment. The context decisively influences the “livelihood strategies” that are open to the rural population to pursue their “livelihood outcomes”.

Fig. 2: Sustainable livelihood framework



Source: Sife et al., (2010)

Sustainable Livelihood Framework provides a guidance in understanding the ways to which mobile phones usage contributes to livelihood outcomes by facilitating access to information which can be used for following purposes:

- Preparing rural population to handle sudden changes in various conditions that affect their day-to-day lives.
- Increasing the ability of people to access various livelihood assets. They can combine various livelihood asset with better understanding.
- Increasing rural population’s knowledge local laws, policies in place, interactions with govt. institutions. These in turn help in shaping their livelihoods.
- Employing various livelihood strategies.

The above study shows that mobile phones provide rural households with fast and easy modes of communication, thereby increasing their ability to access livelihood assets, and overcome their shortcomings/vulnerabilities. Mobile phones contribute to reduce poverty and improve rural livelihoods through a number of ways. First, by expanding and strengthening social networks, to reach out to others for emergencies, work together thereby reducing costs and increasing productivity. Secondly, mobile phones enable to cut down travel costs, maximize the outcomes of necessary journeys, send and receive money. Thirdly, mobile phones help rural people to secure better markets and prices and easily discuss business matters.

A study on village pay phone in Bangladesh in poverty reduction by Bayes et al., (1999), had shown that production of goods could be increased by reduction of transaction costs. Further, services originating from telephones in villages are likely to deliver significant benefits to the poor.

In a study conducted on Indian fishermen in Kerala, (Jensen, 2007) showcased some interesting findings. The mobile phone has increased price dispersion and reduced waste. It in turn increased farmer’s profit and consumer welfare. It represented a persistent rather than one-time gain over the period of time. Mobile had simply offered the poor with a relatively affordable and accessible option,

compared to other ICTs (Rashid and Elder, 2009). Hence mobile can be a very useful tool of economic empowerment among the poor in rural areas.

A study on the impact of mobile phones on the urban poor in India Sarin and Jain (2009) showcases the point that many believe that the mobile phone has indeed led to improvement in their economic level. In addition to the economic factor there has been a positive impact on the social front also.

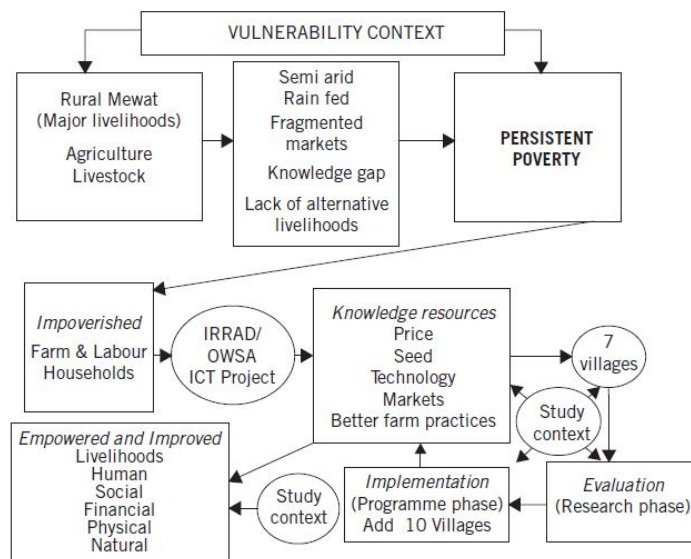
A specific study in West Bengal has shown use of mobile phone in the form of “social logistics” (Tenhunen, 2008).The study shows that the villagers have experienced the benefits from phones, such as the ability to call for help, to save time, and to find market information.

In study of Tanzania, it is revealed that prior to introduction of mobile phones, farmers were forced to sell their produce at lower price. With the introduction of mobile services and increased usage by rural community, farmers could use the price information available at various places and sell their products at a good price (Molony, 2008).

Will look into a different scenario, in which users at the Bottom of Pyramid (BOP), in developing countries (particularly South Asia) have challenges in mobile use. They make a few calls many of which are not in relation to any intelligent decision making. Hence in this category, it is difficult to apply any strategy (Zainudeen et al., 2006). For instance, users at the BOP do not seem to see how instant access to important information might be helpful in making decisions that could enhance one’s earning capacity or how gaining some time (otherwise spent personally conveying a message by foot) could help reduce transactions costs (de Silva and Zainudeen, 2007). A contrasting view in a later study on the mobile phone adoption at BOP level in the same region, shows that mobile phones now are increasingly affordable and hence the penetration has increased. Hence there is an increased potential to extend the overall social benefits to rural regions, which in turn drives growth (de Silva et al., 2011).

Once again in our current analysis, the study of Haider Rizvi (2011) in relation to LifeLines is showcased. LifeLines was initiated in September 2006 by One World in collaboration with British Telecom and CISCO and reached out to rural communities in 53 districts across four states of India with information services in agriculture as well as the education sector. The sustainable livelihoods model from The Institute of Rural Research and Development (IRRAD) which is depicted below (Fig.3) is the basis of the study from Haider Rizvi (2011).

Fig 3: Sustainable livelihood framework (IRRAD) for poverty alleviation



Source: Haider Rizvi (2011)

The main thought process behind the usage of LifeLines the importance of timely information for agriculture sector. The study revealed that there was an increase in the yearly income of the farmers after they received information through LifeLines services. The annual average income of users of LifeLines was about 37% more than the control group. For 67% of the intervention group there was an increase in savings and earnings because of increased productivity and disease control. Increase in produce was the most immediate and visible benefit to the farmers. This restored their confidence in agriculture as a livelihood by increasing their knowledge about new agricultural practices, technology, seed, fertilizers, etc. and had a positive impact on their health.

Asongu et al., (2016) investigated a group of 49 SSA African countries with data from the World Bank for the period 2000-2012. The dependent variable was the Human Development Index (HDI), which represents a national average of achievements in three areas: (i) decent living standards, (ii) health and long life, and (iii) knowledge. The standard Tobit model was adopted to examine the relationship between the mobile phone penetration and inclusive human development. The results confirmed that mobile phones have inclusive human development benefits irrespective of the country's income category, legal origins, religious orientation and the state of the nation.

6. CONCLUSION

Based on the studying the various artefacts as highlighted in the above sections, there is clear evidence that usage of mobile telephone has impacted rural livelihoods. The areas affected are: i) reduction cost of transportation, ii) helping farmers gaining access to market prices in different locations, iii) enabling rural people to access knowledge about crop and livestock rearing, iv) provide cheaper social interaction which helps in emergencies and in co-working which might ultimately lead to productivity and v) provide access to funds for their day-to-day/agricultural activities. Additionally, there are indications of raised incomes of the farmers as a result of all the factors mentioned as above. But further research/deeper analysis is needed to find a direct correlation between ICT usage and increased income.

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