

Role of Information and Communication Technologies in Improving Livelihoods: A Case of Mewat

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Abstract

Knowledge gap is considered as one of the reasons for backwardness in Mewat where agriculture sector dominates the livelihoods option, despite harsh climatic conditions. The introduction of ICT Mobile Technology in 2009 could be seen as an emerging opportunity to fill the knowledge gap in agriculture and improve the livelihood and development of the region. On this backdrop, this paper evaluates the impact of ICT intervention in Mewat region using the Sustainable Livelihood framework and also identifies the scope for its up scalability. The results of the study show that the ICTs has made an impressive impact on livelihoods aspects i.e., social, human, natural, and financial. However, there are caveats that need attention for up scaling the ICTs in Mewat and other backward regions of the country. The technology needs to be molded according to the local conditions so as to provide local and more practical solutions to the farmers. The response time to the query must be reduced to improve the adoption of the technology. Furthermore, inclusion of the MMS system can improve the success rate of the solutions provided through ICT Mobile Technology.

1. Introduction

The Mewat region of Haryana falls under the semi-arid zones and is majorly inhabited by Meo–Muslims, who are a unique ethnic group. Culturally withdrawn, this region is one of the most backward districts in India. Apart from social exclusion, farmers in Mewat are also defenseless against the current climate scenario. Water is scarce in this

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region and consequently, rain continues to be the major source of irrigation. Despite harsh climatic conditions, agriculture is the major livelihood option in this region. Furthermore, due to the cultural practices, farmers in Mewat still use traditional farming techniques and have not ventured into non-farm livelihoods such as migration even during drought years. All these have resulted in persistence of acute poverty in the region.

Given the local conditions in Mewat, there are several critical issues that need attention in order to reduce poverty in the region. As majority of people are engaged in agricultural sector, it is vital to increase efficiency in the existing agricultural practices in this region, which are traditional otherwise. In other words, use of non-traditional technology (modern technology) that is more efficient should be enhanced in this region. Due to diversity in the geographic and climatic conditions in Mewat, the farm income can also be increased through crop diversification and adoption of value addition activities by the farmers. There is also a need to develop sustainable market linkages for improving the income of people in this region. In all these cases, information plays a vital role. Information on alternative technologies, market opportunities and new crops are crucial in improving the farmers' decisions on livelihood strategies. It is only through improved information that individuals and institutions can make informed choices about the opportunities and constraints associated with agriculture-based strategies (Chapman *et al.*, 2003) that improves their livelihoods.

The major bottleneck in this region is the knowledge gap in the agricultural sector. Farmers generally remain unaware of the developments in the field of agriculture. There exist a wide range of information related problems which include lack of accurate information on prices and markets for agricultural products as well as limited access to information to solve problems in production and marketing processes (IICD, 2006). This is specifically due to the limited presence of government research and extension services. Dearth of the private players has resulted in the emergence of monopoly in the research and extension services in this region. Consequently, they exploit farmers by charging higher prices for the services they render. The farmers remain at the receiving end and generally prefer to use the local knowledge to cater to their farm related problems. Lack of communication facilities further hinders the growth of farmers and the region. In this

backdrop, the introduction of Information and Communication Technology (ICT)² could be seen as an emerging opportunity to address the above mentioned issues/concerns that help in reducing poverty³, thereby improving the livelihood and development in the region.

In Mewat, the ICT intervention (Lifelines technology)⁴ was implemented in early 2009 in 10 villages across three blocks where the Kisan Mitras (KM) or Farmer's Friends of IRRAD and their mobile phones were used to deliver the technology. Varied information has been provided to the farmers through ICTs that encompasses several aspects including information on agricultural inputs, prices of inputs and outputs, quantity and quality of seeds, availability of alternative technologies, control measures for crop and animal diseases and marketing opportunities in the vicinity among others. Given the bottlenecks in Mewat with regards to limited opportunities for livelihoods and a 'closed' culture, it remains to be seen if an ICTs intervention will effectively work in this region⁵. It is important to note that the conducive impact of an ICTs is contingent upon the right mix of policy and capability to access and utilize the information and knowledge being provided (Madon, 2000).

In this backdrop, the central question arises that whether and under what conditions, improved access to information and knowledge facilitated by Lifelines technology can enhance the individual and collective capabilities of the poor, to better improve their livelihoods. The prime objective of this study is to assess the impact of an ongoing ICT intervention (mobile technology) on the livelihoods of the poor in Mewat. In addition, the study also identifies the potential factors for up scalability of ICTs in the rural areas. The

² The technology is a telephone based agro-advisory service that operates with the purpose of realizing the value of digital inclusion by educating the users in remote rural areas in terms of expert guidance on maximizing crop efficiency and life-enhancing advice on animal husbandry via a digital platform veteran.

³ ICT can reduce poverty by improving poor people's access to education, health government and financial services (Cecchini and Scott, 2003)

⁴ Lifeline Technology is the term of the ICT services provided to farmers in Mewat. In this paper, we use ICT and lifeline technology interchangeably.

⁵ ICT has made an impressive impact on the livelihoods of the people in the developed regions, whereby it bypassed nearly one billion people – the rural poor, in the marginal regions (ODI, 2008). There is a need to find the impact of such intervention in the backward and marginal regions and find ways to improve the benefits of ICT in those regions.

hypothesis of the study is that refined access to information through Lifelines technology leads to livelihood enhancements of the poorest and marginalized in Mewat.

2. Methodology of the Study

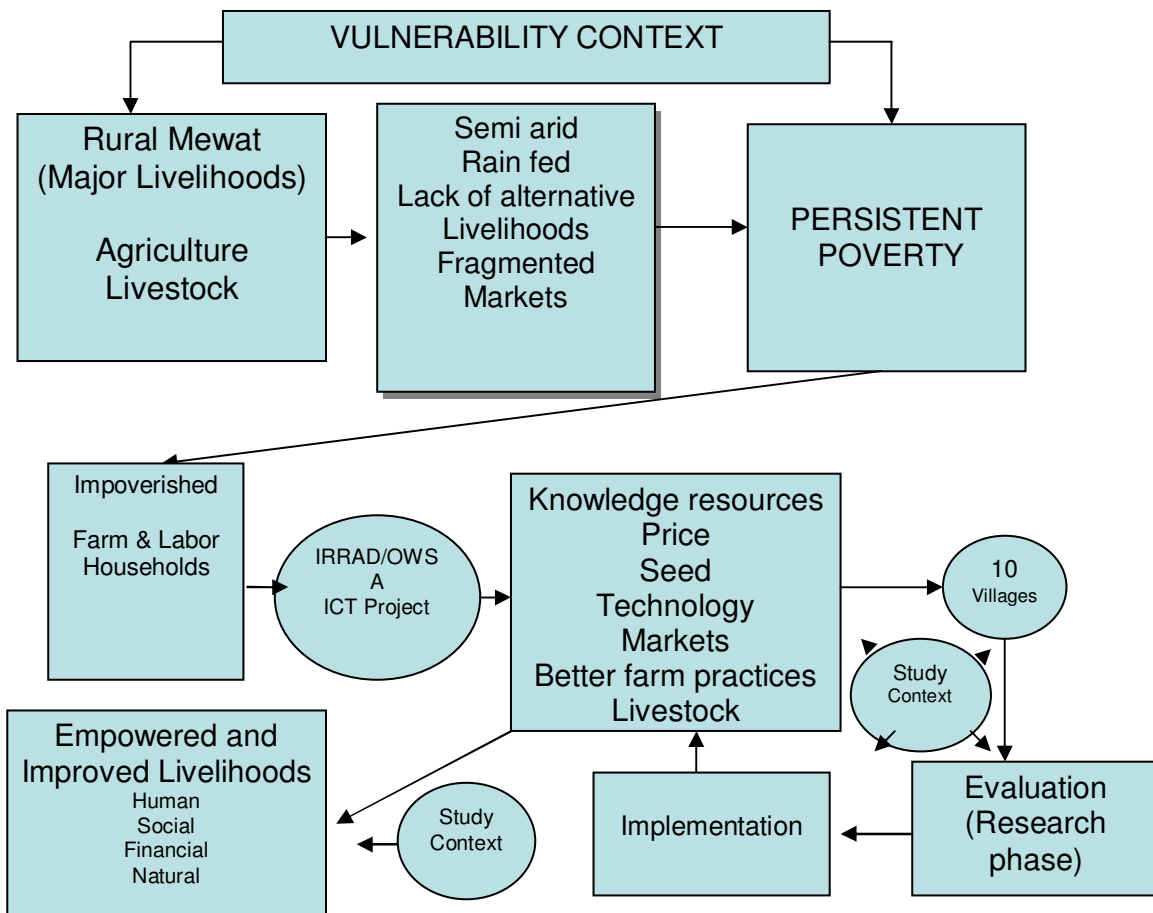
The lifelines technology is being implemented in three blocks of Mewat i.e., Firozpur Jhirka, Nagina and Tauru. The study has been conducted in all the three blocks covering 10 villages in which the lifeline services were provided to 107 farmers. To examine the impact of the lifelines technology, 10 villages from the same blocks have also been selected as control group. Since the number of farmers using lifelines technology was less, purposive sampling method was used. The sample size is 107 farmers from experimental group and 107 farmers from control group. Both the quantitative and qualitative techniques of data collection were used in the study. A well-structured questionnaire was designed to capture the impact of ICTs. In addition, interviews with kisan mitras, case studies and Participatory Rural Appraisal (PRA) were used as qualitative tools.

The conceptual framework for this study is largely drawn from the Sustainable Livelihoods Framework. The benefit of using the concept of sustainable livelihood is that it goes beyond the conventional definitions and approaches to poverty reduction by covering multiple dimensions of poverty (Krantz, 2001). The sustainable livelihood framework used in this study covers four different dimensions of poverty and has been customized for Mewat (Figure 1). The four types of capital are identified on which the impact of ICTs was evaluated:

- **Natural capital:** The natural resources (Soil, and land: soil health, area under cultivation and land productivity) for improving the livelihoods of farmers.
- **Financial capital:** The capital base including savings and borrowing patterns, income and expenditures of the household and changes in the assets base are included under financial capital.

- **Human capital:** The health and nutrition, skills, knowledge and education for promotion of livelihoods of the people.
- **Social capital:** The social interactions and networking, collective participation, and co-operation are the part of social capital base.

Fig 1: From Impoverishment to Empowerment through ICT



3. Socio-Economic Profile of the Respondents

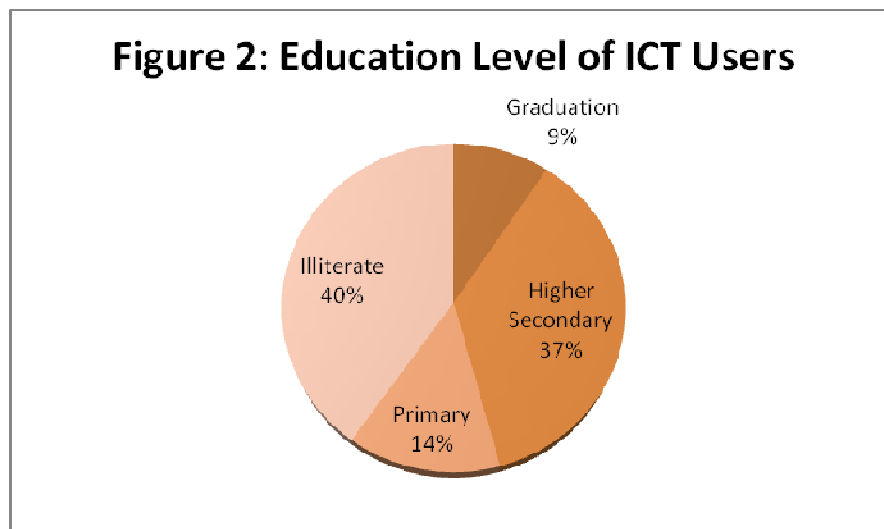
Information on the socio-economic profile of the users of the lifelines technology reflects that the average age of its users is around 40 years (Table 1). Their households are mainly headed by males (95%) and their average household size is quite huge with 6.2 persons per household. Among the user group, there is no household with less than 5

members at home. Around 40 % of the lifeline users are illiterate and merely 12% of them have done graduation (Figure 2). This shows that even uneducated farmers are also able to use the mobile technology and education may not be the constraint for up-scaling ICTs in the rural areas. The economic condition of the ICT users reveals that the average household income of their households is around 1.16 lakhs rupees per annum which is higher than that of the farmers from the control group with an average annual income of 85,000 rupees per annum. The prime source of income for both the groups (experimental and control) is farming and most of them are Meo- Muslims. Merely, 13% of the households using ICTs are found to be poor and are below poverty line, whereas around 23% of the households from the control group are below poverty line.

Table 1: Socio-Economic Details of Users and Non-users of ICT in Mewat

Variables	Indicator	Experimental Group (N=107)	Control Group (N=107)
Age	Mean age of the household head	40.61	43.55
Gender	Number of households headed by males	101	100
Family Size	Average number of household members	6.2	6.9
Income	Average Annual Income of the Household (n Rs.)	1,16,000	85,000
Poverty Level	Proportion of Households Below Poverty Line (BPL)	13.1	22.9

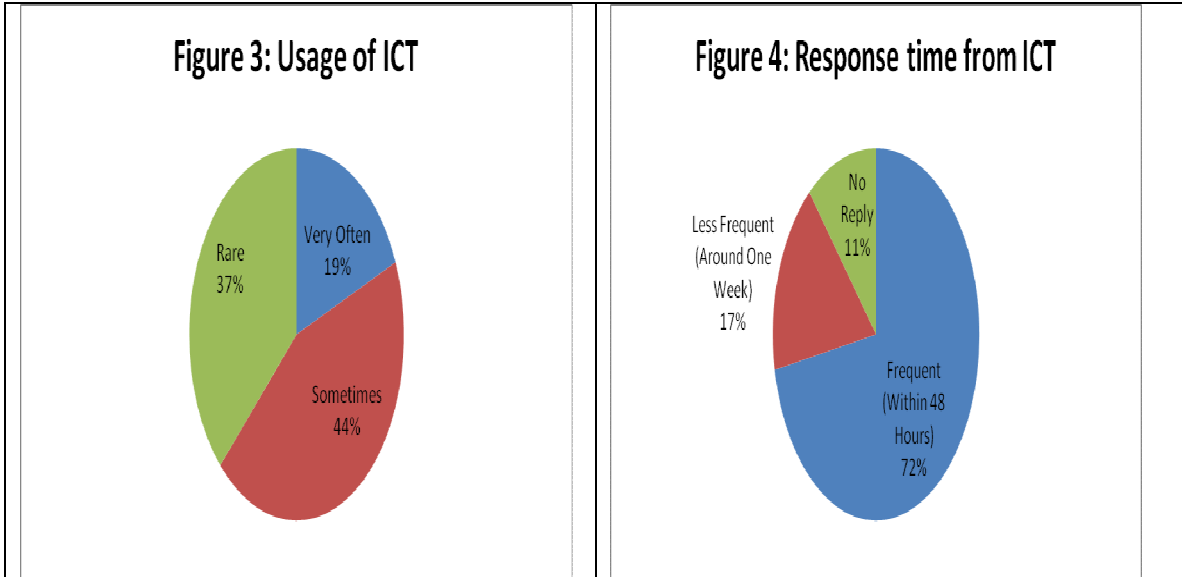
Source: Primary Data



Source: Primary Data

4. ICT in Mewat: Utility and Perception

The use of the lifelines technology could bring several changes in the life of people. But at the same time, there can be several constraints, especially if there are delays in response and if one gets unsatisfactory or contextually unsuitable answers. The information was obtained from the users about both the aspects and it is revealed that 19 % of the respondents used the services very frequently (once in a week), whereas 44% of the respondents used the services once in two-three weeks. However, around 37 % of the respondents were found not availing these facilities frequently. The frequency of response time shows that around 72% of the respondents got frequent answers from the technology services. Since timely response is crucial for the relevance of the information obtained from ICT, it is possible that timeliness of response could affect the use of the technology. The cross-tabulated results show that timeliness did affect the frequency of usage of lifelines technology. 55 out of 77 respondents who used the technology frequently received timely response to their queries (Table 2).



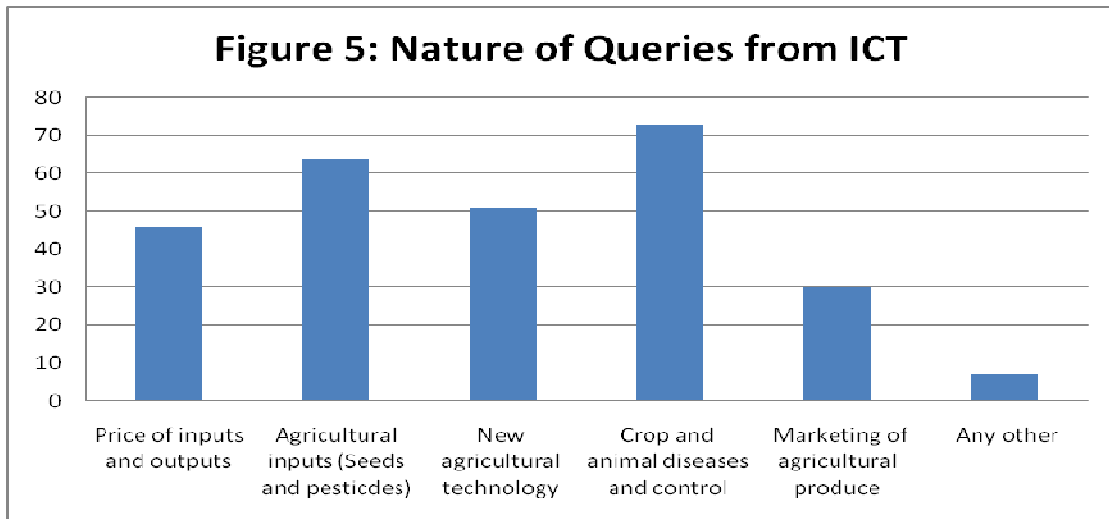
Source: Primary Data

Table 2: Frequency of Usage of ICT and Response Time

Frequency of Usage of ICT	Response Time	
	Delayed	Frequent
	High	12
Low	18	22

Source: Primary Data

The nature of queries being asked through the lifelines technology was found to be quite varied. Majority of the questions were asked about control of crop and animal diseases (73 farmers). Since, the queries pertaining to disease control need immediate solution for its use, the farmers suggested that the queries must be answered within 4-5 hours. Around 64 farmers posed queries pertaining to the use of agricultural inputs including seeds and pesticides, whereas 51 users asked questions about availability of new technology in agriculture. Quite surprisingly, very few queries were about marketing of the agricultural produce. This could be due to the dominance of subsistence nature of agriculture in Mewat region.



Source: Primary Data

Perception about the utility and desire to continue using the technology shows positive results. More than 93% of the respondents expressed their desire to continue using the technology, whereas more than 50% of the users found the technology to be

very useful for their profession. The group of respondents that did not find the technology useful suggested that if the time taken for response to the queries reduced, they would be encouraged to use the technology more often.

5. Impact of ICTs on Livelihoods

The impact of the lifelines technology is evaluated on the basis of sustainable livelihoods framework within the broad areas of natural, financial, human, and social capital. The methodology provides insight on the following aspects: improvement in the soil health; change in area under cultivation and land productivity; change in the amount and pattern of income, borrowing, savings and expenditure; improvement in skills and education; social networking and collective participation etc.

In terms of the natural capital, the impact of the use of lifelines technology is mapped on the health of the soil and changes in the area under cultivation and land productivity. It is found that around 67 farmers found the impact of information used through lifelines technology on their soil health (Appendix 1). Other farmers did not ask questions pertaining to soil health. Out of these 67 farmers, quite interestingly, 63 of them reported that the information resulted in improvement in the health of their soil. Merely, 4 of them said that the soil of their land was adversely affected after the use of information provided through the technology. On the other hand, farmers of the control group faced a different experience with respect to their soil health. Though, 13 farmers experienced improvement in soil health, 34 farmers experienced degradation in the health of their soil. In terms of area under cultivation, fourteen farmers from the experimental group, as compared to eight farmers of control group, were able to expand their area under cultivation. Moreover, four farmers from the control group witnessed a decrease in the area under cultivation, which was opposite in the case of experimental group. There also lies a significant difference in the amount of area expanded under cultivation by the farmers from the experimental and control group. In total, 35.4 acres of land was added to the area under cultivation by the experimental group as compared to 14.5 acres by the control group. The additional land and better information about use of other resources including labor and capital could potentially improve the agricultural produce at the farm

level. In total, 74 respondents (experimental group) experienced improvement in the agricultural produce, which increased by 206.4 quintals. Though, 30 farmers from the control group also experienced increase in the agricultural produce, there was a decline in the agricultural produce in case of 70 farmers of the same group. This shows that the information provided through the lifelines technology was conducive for the development of natural capital of the region.

On the financial front, impact of the lifelines technology was again found to be remarkable. Seventy four farmers admitted that the implementation of the advice received through the lifelines technology resulted in them saving more money. Furthermore, the loan requirements of 31 respondents also decreased after having experienced an increase in the net income. In contrast, only 11 respondents from the control group notified increase in their savings whereas 14 respondents experienced decline in their savings. This was found to be unlikely in the case of experimental group, where none of the farmers ever noticed any fall in the savings post the use of lifelines technology. Forty two respondents from the experimental group experienced increase in their total income as compared to only seventeen farmers from the control group. This difference was mainly attributed to the increase in the farm expenditures by the farmers from the control group and increase in the asset base of farmers of experimental group. The use of lifelines technology proved to reduce the farm expenditure by the way of providing useful and innovative solutions to the farmers. The case of Mr. Sharma (name changed) has reflected the process, in which it is discussed how the use of lifelines technology could bring gains to its users.

Case Study: Increasing Income through ICT

Mr Sharma (name changed) has used the services many times and has been one of the frequent users of ICT. The main purpose of using the service was for crop related issues includes seeds, fertilizers, pesticides and so on. In addition, he also used the service for taking care for his livestock.

According to him, the need for service usually arises at the pre-harvest period as the leaf of the

standing crop goes yellow from green due to the attack of various insects in the field. Additionally, he obtained necessary guidance throughout the crop growing stages, as and when he required the same. The usage of the information obtained on crops and diseases led to increase in his profit margin as on the one hand, there was an increase in the quantity of produce and on the other hand, he noticed reduction in the incidences of crop diseases. He also used lifeline service for his livestock. He had one buffalo, which was not giving enough quantity of milk. With the help of medicines advised through the lifelines technology, he could overcome the issue of short supply of milk. He also used ICTs for medical aid of his buffalo. Prior to the use of lifelines, when his buffalo was pregnant, he had to take the buffalo to the hospital again and again for regular check-ups and delivery procedure, which was very expensive due to the transportation cost. With the help of ICT, he could get his buffalo to deliver a calf at his own house premises in the village. This saved a huge sum of money which he used to incur for transportation. He mentioned that the excess income generated through lifelines would be used in education of his children, to purchase more farm land and purchase other items including machinery, house property, etc.

The service has helped him ensure a good and healthy living for himself as well as for his family.

Enormous social benefit of the lifelines technology has also been observed. The use of technology has enhanced the mutual trust and support between the fellow farmers; 69 respondents from the experimental group, as compared to 2 respondents from the control group, indicated of improved mutual trust and support. Increased collective participation in the economic and social activities in the villages were noticed by ICT users whereas the same activity was totally absent from the control group farmers. This resulted in improvement in the co-operation among the fellow farmers using ICT. More strikingly, farmers not only built networking with other farmers fellows, but also with other members including block officers, members of Kisan Bazaar (Farmers market) and members of other vegetable markets and stores. The establishment of such linkages were able to, on the one hand reduce transaction cost of doing business and on the other hand improve the income through providing more alternatives and opportunities. The control

group farmers mentioned of not building any such linkages and continued to remain unaware about several opportunities to improve their livelihoods.

The changes brought on the human capital by the use of lifelines technology also showed some promising/encouraging results. Sixty one respondents from the experimental group as against merely four respondents from the control group noticed positive changes in their health. With the use of information obtained from ICT, they witnessed improvement in their work productivity and also their ability to perform domestic chores. The major effect was, however, on decline in the health expenditure by ICT users. Around 43 farmers from the experimental group could learn more about trade after the use of lifelines technology, whereas 46 farmers could adopt diversified livelihoods during post-technology use. The farmers from the control group failed to experience any change in their individual skills in the past one year. The lifelines technology also brought significant changes in the educational status of its users; 54 respondents admitted that their knowledge about new farm practices improved; 29 users started sending their children to schools and 31 started sending their children to better schools.

The overall impression of the results shows that the impact of lifelines technology has been very significant on the life of its users. However, there are several problems associated with the technology that, if addressed, could bring more and better changes in their life. The next section deals with the issue of up scalability of lifelines technology.

6. Issues for up-scaling ICTs in Mewat

The lifelines technology has indeed brought several positive changes in the lives of the people in Mewat. However, there are several issues that have limited the use of this technology in the area. The success of the lifelines technology depends on several factors. PRA technique is used to elicit the responses of the farmers in order to identify the factors for replicability of lifelines technology in Mewat and other backward regions of the country. Following are the issues to be addressed for up scalability of lifelines technology:

- **Attention to the local Conditions:** Consideration of local conditions including language and socio-economic conditions are vital for ensuring the success of ICTs. For instance, the language spoken in Mewat is different from the server of ICT. Due to difference in the dialects, there remains a gap in communication between farmers and the ICT server. Many a times, farmers cannot understand the answers provided only due to lack of understanding of the language (dialect). There are several instances when farmers feel that they (the answer from the server) speak too fast to understand. In addition, there is a disconnect between the information needs of the users and the information provided by the ICT server. For example, in case of medicines prescribed by the server, most of the medicines remain unavailable in the local market. Many a times, farmers need to go to far off markets to get the medicines. There is a need that the experts who provide advice should be well versed with the medicines available in the market/region from which the call comes.
- **Consider cost effective measures:** Information obtained through the ICT proves to be a costly affair to its users. According to the users, it generally takes 3-4 minutes to lodge a complaint and takes around 10-15 minutes to get the answer. This works out to be 15-20 minutes per complaint which farmers sometimes find difficult and costly. In addition, there are several instances reported that claims that it takes more than 3-4 calls after 48 hours of complaint to get the answer to the query. It results in nothing but further increasing the cost of obtaining information. There is a need to address this issue to ensure wide replicability of lifelines technology in the poor and marginal regions.
- **Timeliness of the Solutions:** The lifelines technology implemented in Mewat provides solutions to farmers through a server, which takes enormous time to respond. At present, it takes minimum 24-48 hours to get answers to the query posed by the users. There is a need to provide answers to the some queries in an urgent manner. There are several problems, especially pertaining to pests or livestock diseases that need to be resolved immediately, say in 4-5 hours, otherwise, the information obtained becomes redundant and of no use. But the minimum time in which the reply comes through the server is 24 hours. There is a need for provision of emergency calls that responds to some given problems in a shorter period of time.

- **Appropriate answers to the queries:** There are instances reported by the users pertaining to the mismatch of the queries being asked and answers received. In other words, sometimes answers given by the server are not relevant to the question asked. For instance, if the farmer asks about a variety of seed and s/he is told about how the seed is to be sowed. The farmers also pointed out that sometimes, it is difficult for them to explain the problem to the server, which happens especially in the case of crop diseases. They have advised that there should be a Multimedia Messaging Service (MMS) system, through which they can send the photograph/video of the disease, so that the server could easily and correctly understand the problem in the field. For the success of ICT, it is important to ensure that the correct and accurate answers should be given by the server.
- **New and up gradation of Information:** Information on some key aspects are either not available or out of date information is given by the server. For instance, there is no information on the local government schemes available that are of great use for the farmers. The ICT solutions are able to provide details only about the central government schemes but they remain silent about the state or local government schemes and hence, are unable to guide farmers about the same. Also information on prices of the outputs, especially vegetables are found to be out-dated. There is a need to constantly upgrade the information made available through the server for its greater relevance.

7. Conclusion and Recommendations

Scattered rainfall, high temperature and water scarcity have been the major characteristics of Mewat region in Haryana. Despite harsh climatic conditions, agriculture continues to be dominating livelihood option of people living in Mewat. This partially results in acute poverty in the region. To reduce poverty in the region, it is vital to address several aspects including increasing efficiency in the existing agricultural practices in the region; crop diversification and adoption of value addition activities; developing sustainable market linkages for improving the income of the people in this region. ICT was implemented in the Mewat region in early 2009. The introduction of ICT

could be seen as an emerging opportunity to improve the livelihood and development of the region. This paper aims to assess the impact of an ongoing ICT intervention (mobile technology) in Mewat region in Haryana and identifies the issues for its up scalability.

The results of the study show that the lifelines technology is beneficial for the region. The impact of ICTs on the livelihoods aspects i.e., social, human, natural, and financial are found to be positive. Information obtained through ICT has improved the soil health of the farmers, which resulted in increased agricultural productivity and farm income. Financially, farmers could increase their savings and their intensity of borrowing also reduced. Also, there has been significant improvement of user's health and skill sets. Socially, there has been increased social networking with other fellow farmers and agencies including markets.

However, there continue to be several challenges to upscale ICTs in Mewat and other backward region of the country. The technology needs to be molded according to the local conditions. Many of the medicines prescribed through telephone are not available in the local market. There is a need to provide local solutions to the farmers. ICT takes, minimum 24-48 hours to respond to a particular query. There are several queries that need immediate solution, especially pertaining to the livestock and crop diseases. Their answers are sought within 4-5 hours of the registration of the query for the usefulness. ICT needs to modify the design so that it can have a separate module for immediate problems. The technology is also found to be costly by several users as they need to call 4-5 times to get the answer to their query. The transaction cost can be reduced by reducing the response time, which would increase the adoption of the technology. At times, the users find difficulty in explaining the problem to the server, especially in the case of crop diseases, and it is advised to introduce a MMS system, through which the users can send the photographs of the disease, so that the server could easily and correctly understand the problem in the field. As experts can only get an idea through telephonic conversation about the query/problem, sending the photo/video of the disease through MMS can improve the understanding of the problems by the experts and hence, the efficacy of solutions provided by them.

References

- Cecchini, S. and Scott, C. (2003). Can Information and Communications Technology Applications Contribute to Poverty Reduction? Lessons from Rural India. *Information Technology for Development*, Vol. 10 , pp 73-84.
- Chapman, R., Slaymaker, T., & Young, J. (2003). *Livelihoods Approaches to Information and Communication in Support of Rural Poverty Elimination and Food Security*. ODI London.
- International Institute for Communication and Development (IICD) (2006). *ICTs for Agricultural Livelihoods: Impact and Lessons learned from IICD Supported Activities*. Netherlands.
- Krantz Lasse, (2001). *The Sustainable Livelihood Approach to Poverty Reduction*. Division for Policy and Socio-Economic Analysis, Swedish International Development Cooperation Agency (SIDA).
- Madon, S. (2000): The Internet and socio-economic development: exploring the interaction. *Information Technology & People*, Vol. 13, No. 2, pp. 85-95.
- Overseas Development Institute (ODI) (2008). *Enhancing the Livelihoods of the Rural Poor through ICT: A Knowledge Map. Working Paper No. 9*. ODI, London.

Appendix 1: Impact of ICT on Livelihoods

Natural Capital

Features	Experimental Group	Control Group
Soil Health		
Increased Soil Quality	63	13
Decreased Soil Quality	03	34
No Change	01	00
Agricultural Area		
Increased agricultural land	14	08
Decreased agricultural land	00	04
No Change	93	95
Agricultural Productivity		
Increased Productivity	74	30
Decreased Productivity	00	70
No Change	33	07

Source: Primary Data

Financial Capital

Features	Experimental Group	Control Group
Savings		
Increased saving	74	11
Decrease in income	00	14
No Impact	33	82
Borrowings		
Increase in borrowing loan	05	12
Decrease in borrowing loan	31	00
No Impact	71	95
Total Income		
Increase in income	42	17
Decrease in income	09	28
No Impact	56	62
Asset Base		
Increase in Assets (buying)	40	03
Decrease in Assets (sold)	05	06
No Impact	62	98

Source: Primary Data

Social Capital

Features	Experimental Group	Control Group
Increased Social Networking		
Mutual trust and support between fellow farmers and Kisan Mitras	69	02
Increase collective participation in village economic & social activities	29	00
Increase co-operation amongst fellow farmers	48	05
Increased Inter-Village Networking		
Agriculturalist/farmers	49	03
Block officer	06	01
Kisaan bazaar	32	01
External linkages with vegetable stores and markets	25	03

Source: Primary Data

Human Capital

Features	Experimental Group	Control Group
Individual health		
Better Nutrition	61	04
Increased work productivity	28	02
Ability to perform domestic chores better	28	00
Less expenditure on health	48	02
Individual skill		
Learnt a trade	43	01
Diversified livelihood	46	00
Educational status		
Increase knowledge about new agricultural practices	54	00
Sending children to school	29	06
Sending children to better school	31	03

Source: Primary Data