

A STUDY OF THE USE OF ICT AMONG RURAL FARMERS

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Abstract

Information and Communication Technology (ICT) can revolutionize Indian farming sector and can benefit all farmers including small landholders. Agriculture is the most important sector with the majority of the rural population in developing countries depending on it. The traditional approaches of agriculture being adapted, has numerous challenges in terms of production, marketing, profit etc. The challenges of the traditional agriculture are addressed significantly by using Information and Communication Technologies (ICT) that play an important role in uplifting the livelihoods of the rural small landholder farmers. ICT helps in growing demand for new approaches. It also helps in empowering the rural people by providing better access to natural resources, improved agricultural technologies, effective production strategies, markets, banking and financial services etc. This article explores the role of ICT in agricultural sector.

Keywords: *Agricultural Market Information, Market Access, Information and Communication Technology (ICT), Small Land Holder Farmers.*

1. INTRODUCTION

This research investigates the use of ICT as the means for achieving agricultural development in Pollachi, Coimbatore District. It examines how the farmers make use of the ICT, how the technology is integrated with their lifestyles and what is the impact result from that interaction. It has been claimed that through this ICT, farmers can obtain information that they can use to improve their agricultural income, and their lifestyle. It has been suggested that farmers with large land can use ICT more efficiently than the farmers with small land. However, it is necessary to comprehend how the farmers make use of ICT.

Objectives:

- To find out the ways the farmers can use ICTs.
- To find out the farmers perceived benefits from the use of ICT.

Research questions:

1. How the farmers make use of ICT to meet their agricultural information needs?
2. What are the attitudes of the farmers toward the use of ICT?
3. How the use of the ICT enables the farmers to confront the challenges they face in agricultural work?
4. What is the need of the farmers in regards to the use of ICTs?

Conceptualization

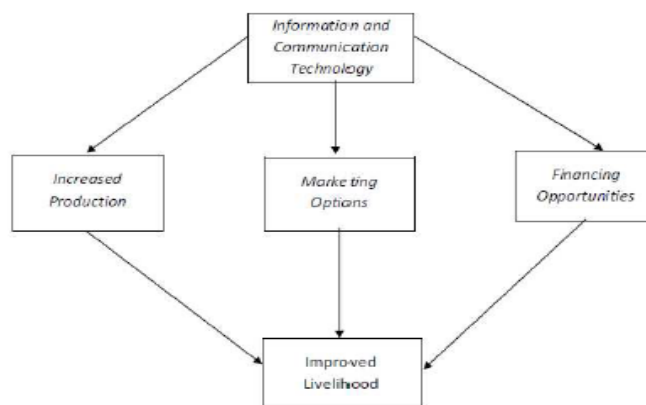


Fig. 1. Conceptual framework of the study

2. ICTS FOR AGRICULTURE DEVELOPMENT - LITERATURE REVIEW

I. The use of ICT

RQ1: How the farmers make use of ICT to meet their agricultural information needs?

Research study on the effectiveness of ICT in rural area revealed some factors, which influenced the use of ICT tools. The use of ICT requires

positive attitude from the actors, such emphasized and proved by a number of previous studies (Kenneth and Liquat, 2006; Simpson, 2005 and Loh et al., 2009). Referring to attitude, Horne (1985) states it represents a mental and neural state of readiness, organized through experience. It exerts a directive or dynamic influence upon the individual's response to all objects and situations with which it is related. For Breckler et al., (1992), attitude can be formed based on individual's degree of like or dislike towards something.

II. The attitude towards ICT

RQ2: What are the attitudes of the farmers toward the use of ICT?

A positive attitude is an important requirement for ICT usage. Based on what has been completed by Shiro (2008), the rural communities have a very positive attitude towards ICT and they welcome any ICT project to be developed in their areas. However, their lack of ICT knowledge prohibits them from using ICT frequently. Dixon (2009) has stressed that frequent usage and exposure to ICT must be considered if someone wants to form a positive attitude towards ICT. When people frequently use and expose to ICT, it will inform them that ICT is helpful and beneficial to them thus creating a positive attitude towards ICT usage. Zhang and Aikman (2007) have revealed that attitude can be a mediator on the role of attitude toward object on behavioral intention. In this case, related development government agencies or private companies should understand that a positive attitude toward a particular ICT would lead potential users especially the rural communities to decide to accept or use the ICT. Besides, efforts should be put into identifying factors that can contribute for positive attitude toward ICT usage.

So to ensure the effectiveness of ICT, the rural community especially their leaders must have a positive attitude towards ICT usage.

III. Farmers challenges of ICT

RQ3: How the use of the ICT enables the farmers to confront the challenges they face in agricultural work?

Information plays a vital role in empowering these farmers to improve their livelihoods.

Important information such as sowing, improving soils, seeking the best price for their produce and ways to combat pests and diseases all empower the farmer and their decision making capabilities. Seasonal variability in weather patterns, deterioration in soil conditions and sporadic climatic events such as drought, floods, pest and disease outbreaks complicate the decision making process of the farmers and influences their information requirements. Providing such knowledge can be challenging as the information must be tailored specifically to distinct conditions. Given these challenges the arrival of Information and Communication Technology (ICT) is well timed. The benefits of ICT to contribute for improving agricultural productivity have been previously proposed (Armstrong *et al.*, 2010, Armstrong *et al.*, 2011, Armstrong *et al.*, 2012a, b). As a result both public and private sectors have long been on the search of effective solutions to address both the long and short term challenges in agriculture including how to answer the abundant information needs of farmers. ICT is one of these solutions that have recently unleashed incredible potential to improve agriculture in developing countries. With the growing mobile, wireless, and Internet industries, ICT has found a position even in poor smallholder farms and in their activities. Acquiring knowledge from information and making decisions based on that knowledge is the most effective tool for the farmers (Armstrong *et al.*, 2011). ICT has been shown to have an increasing impact on agricultural sector and on the processes associated with food production (Blurton, 2010). This impact has coincided with great efforts by government and industry in developing countries such as India to improve the sustainability of agricultural systems in order to provide food for an increasing world population and to improve rural livelihoods.

So up-to-date information through ICT allows farmers to survive and even benefit from these changes and challenges.

IV. Farmers need of ICT

RQ4: What is the need of the farmers in regards to the use of ICTs?

Information and Communication Technology (ICT) can play a significant role in achieving such a transformation as it consists of three main

technologies. They are: Computer Technology, Communication Technology and Information Management Technology. These technologies are applied for processing, exchanging and managing data, information and knowledge. Recent developments in information and communications technology (ICT) offer a great opportunity to facilitate the flow of information and technology services delivery especially to the farmers (Maningas, 2006). It is comprehensible that on the one hand agriculture is becoming highly science driven and knowledge intensive, but on the other hand the existing public extension system, has become less effective, more time consuming and costly and fails to meet the expectations of those involved in agricultural production (Mruthunjaya and Adhiguru, 2005). The extensive use of modern information technology needs to be promoted for communication between researchers, extension workers and farmers to transfer technologies and information in a cost effective manner. ICT has many potential applications in agricultural extension (Zijp, 1994). It can bring new information services to rural areas where farmers, as users, will have much greater control than before over current information channels.

So the use of ICT is an important pillar of agriculture extension and in the current scenario of a rapidly changing world, has been recognized as an essential mechanism for delivering knowledge (information) and advice as an input for modern farming (Jones, 1997).

Review Conclusion

Here, an attempt has been made to analyze the reaction of the farmers towards ICT as a source of reliable and timely information about best production practices, processing, marketing, input and output prices, financial and risk-covering institutions etc. The favourable attitude of farmers towards ICT as an effective and efficient information support tool would lead to stronger conviction and efficient extension programme planning in changing agri-rural environment.

So these studies have been focused on the attitude of farmers towards Information and Communication Technology as a source of information.

Hypothesis of the study

H: There is a positive attitude among farmers' in the use of ICT.

Diffusion of innovation theory and adoption of ICTS

Diffusion of Innovation (DOI) Theory, developed by E.M. Rogers in 1962, is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. The end result of this diffusion is that people, as part of a social system, adopt a new idea, behavior, or product. Adoption means that a person does something differently than what they had previously (i.e., purchase or use a new product, acquire and perform a new behavior, etc.). The key to adoption is that the person must perceive the idea, behavior, or product as new or innovative. It is through this that diffusion is possible. The guiding principle for the diffusion of innovation framework is that an innovation's reception is dependent on social context, which explains why proven-efficacious interventions are not used in community practice, while other interventions with minimal research support gain widespread acceptance. As Freedman (2002) summarizes, "social forces consistently trump unvarnished effectiveness" in how interventions are used (p. 1539). Diffusion is the process by which a new practice (an innovation) is communicated over time among members of a social system (Rogers 1995, 2003). The decision to accept, adopt, and use the intervention is not an instantaneous act, but a process consisting of four stages: dissemination, adoption, implementation and maintenance (Rohrbach et al. 1993). During dissemination, administrators are made aware of programs and encouraged to adopt them. During adoption, administrators form attitudes towards the intervention and commit to initiate the program. During implementation, practitioners begin to use the innovation. Re-invention (changing or modifying an innovation) is especially likely at this phase. Finally, during maintenance (or sustainability), the innovation moves from implementation to institutionalization. At this

phase, administrators and practitioners make a commitment to continue or discontinue use of the program.

Technology Acceptance Model (TAM) proposed by Davis (1989) has been widely used, accepted and tested. Davis' model is based on the premise that attitudes affect intentions, which in turn leads to certain kind of behaviour. To explain user acceptance behaviour, Davis proposed two constructs; viz; "perceived usefulness" and "perceived ease of use". Both these independent variables represent the end users' belief in technology and can be used to predict their attitude towards the technology and its ultimate acceptance. Perceived usefulness has been defined as "the degree to which the person believes that using a particular system would enhance his or her job performance". Further, perceived ease of use is "the degree to which a person believes that using a particular system would be free of effort". A set of external variables influence "perceived usefulness" and the "perceived ease of use". Despite the vastly different fields of application both Davis' model and Rogers' theory have certain commonalities. Diffusion research indicates that "perceived ease of use" interpreted in terms of complexity plays a prominent role in the adoption of an innovation. Similarly, "perceived usefulness" as manifest in the form of relative advantage and compatibility significantly influences adoption of innovations.

3. METHODOLOGY

Operationalization

The research methodology used here is interpersonal in-depth interview. The interpersonal in-depth interview allows the interviewer to delve deeply into social and personal matters. Data also include observer descriptions of group dynamics and analyses and it integrate the interaction dynamics within each group. Interpersonal in-depth interviews are widely used by agriculture researchers to co-create meaning with interviewees by reconstructing perceptions of events and experiences related to farming and agricultural information delivery etc.,. These interviews are able to inform the answers for a wide range of

research questions: i) How AMIS providers use ICT as an excellent tool for agriculture development? ii) What are the attitudes of farmers in obtaining new buyers by using ICT? iii) How the traders are beneficial to manage the sales through ICT? iv) Why agricultural officers say ICT as better communication mode?

Interviews:

I. AMIS PROVIDERS - Excellent tool for agriculture development!

AMIS (Agricultural Market Information Services) is providing better farm management and solutions to improve marketing capabilities. This system helps farmers and traders to efficiently develop business relations.

Field agents use the system to update their records and monitor quality standards, which improve planning and protect small landholders from market disruptions.

II. FARMERS - Obtain new buyers . . .

Farmers can identify additional buyers and having multiple buyers available is advantageous. New buyers may be willing to pay a higher price, may wish to buy higher volumes of products also.

Using mobile phones facilitates transactions and provides farmers access to relevant timely information, allowing them to sell at a higher price and improve their income.

The current ICT solutions offer limited access to new buyers for small landholders. So small-scale farmers has less capability than the large scale farmers.

III. TRADERS - Beneficial to manage sales ...

ICT solutions are being launched in developing countries to deliver market information to small farmers. Pricing is the most widely shared information from traders.

Using ICT to deliver this type of information can benefit small landholder farmers by raising their bargaining powers with traders.

Personal travel is traditionally the most common method of obtaining market information. But now this has been reduced.

IV. AGRICULTURAL OFFICERS - Better communication mode!

Issues most often relate to communication. This tool manages the growing activities of

hundreds or thousands of small landholder farmers along with oral communication.

4.RESULTS AND DISCUSSION

The study was conducted in Pollachi of Coimbatore district to analyse the experience of farmers using ICT services for agricultural information.

I. The use of ICT

The study says more young farmers are getting involved in making use of ICT services, for agricultural information, they were functionally literate. It is an advantage to provide ICT services in Tamil and other regional language. The research result says farmers use the ICT services frequently as and when they needed information. It was observed that exposure of farmers to mass media was found conducive to utilization of ICT by farmers.

II. The attitude towards ICT

The research result says that the farmers are having positive attitude towards Information Communication Technology. The frequent usage and exposure to ICT must be considered if someone wants to form a positive attitude to ICT. When people frequently use and expose to ICT, it will inform them that ICT is helpful and beneficial to them thus creating a positive attitude towards ICT usage. Utilization of ICT services in agriculture and rural development is in the takeoff stage and farmers experienced many problems.

III. Farmers challenges of ICT

Information and Communication have always played a key role in agriculture. Ever since farmers have grown crops, they have searched for ways to improve the crop production. Farmers have difficulty in searching the answers to such issues even if they are very experienced in the specific cropping regime. Up-to-date information allows farmers to survive and even benefit from these changes. The role of Information and Communication Technologies (ICT) to support agriculture production system has been investigated by many government agencies has proved to play a vital role in the transfer of

technology and to share the modern agriculture practices with the farmers. However many of these farmers are not completely utilizing the full potential of the ICT. There are number of factors hindered the utilization of the service including the failures to visit farmers, lack of promotion of the service and training of farmers. Language and traditional constraints to ensure adequate ICT infrastructure in the agricultural communities have been found to impact on the effectiveness of adoption of ICT by agribusiness.

IV. Farmers need of ICT

The main focus of ICT application in agriculture is to meet the information need of farmers. Here, therefore, an attempt was made to find out agricultural information that was considered relevant to the need of the farmers under their socio economic and biophysical circumstances. The farmers perceived market information, including daily updates on the prices of agricultural commodities in the local markets of the surrounding district, as one of the most relevant ICT services. The farmers enabling them to sell at that markets where their goods would command the best prices. The information on animal husbandry and dairying was very much needed by majority of farmers and regarded as most appropriately relevant to their need.

For that the following things have to be changed. Behaviour changes are required for the farmers to integrate the solution into their agricultural works. Income is the one of the barriers for this so their economic status has to be improved. Farmers should be trained with the technical knowledge to successfully use the ICT. To create awareness the agricultural universities have to conduct more agricultural campaign in the farmers own village along with some new subsidy. And even the government has to take some steps because the technology penetration and usage continues to evolve rapidly, while many have yet to reach rural farmers. It has to ensure low prices for broadband internet connection in rural areas. They have to foster public- private partnerships to make market and business information accessible and for cost arrangement. And ensure the availability of relevant information useful to farmers.

5. CONCLUSIONS

The application of ICT in agriculture has emerged an important pillar of agriculture extension focusing on the enhancement of agricultural and rural development through improved information and communication processes. Effective utilization of ICT has potential to make the rural communities prosperous as it enables the dissemination of requisite information in user friendly form, easy to access, cost-effective ways at the right time. ICT presented unprecedented opportunities to empower small land holder's farmers by strengthening their capabilities in marketing their products and all agricultural works. Despite these opportunities when it come to building trust and collaboration, face - to - face communication remains hard to beat. Because for rural farmers communication is still about building personal relationship only, not for conveying the information. Using ICT services, indicating that all farmers, irrespective of their landholding size, were using them. It means that farmers' landholding size has no bearing on their frequency of use of ICT services. From these results, it is important to encourage the use of ICT tools in rural level, by some measures such as: ICT infrastructure development, training on ICT tools use towards farmers, especially smallholder for setting market information.

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