



# A Study on Users and Non-Users of ICT among Farming Community

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## Abstract

This paper considers the specific role of Information and Communication Technologies (ICT) in rural development through its application in agriculture. The differences in agricultural livelihoods of farmers who make use of ICT and of those farmers who don't use ICT in agriculture for information are examined. The study analyses the information needs of the farmers, whether ICT enables timely, relevant and affordable communication needed for the farmers with ease of access and how it benefits the farmers in agriculture. When it comes to farmers who don't use ICT, the barriers to using ICT are analyzed and whether they lag behind farmers who use ICT is also examined. The study makes use of information asymmetry approach, diffusion of innovation theory and uses and gratification theory for understanding use of ICT among farmers and factors that hinder ICT usage among farmers. The study takes a qualitative approach by interviewing farmers from Somanur village in Coimbatore district. This topic comes under the theme, 'people and problems'.

**Keywords:** ICT, Agriculture; Farmers; Information need

## Introduction

### Information and communication technologies

ICT is an umbrella term that refers to a range of technologies such as internet, wireless networks, cell phones, and other communication mediums. The technologies used for creating, storing, processing, transmitting, displaying and sharing information in digital form through electronic media are referred to as Information and Communication Technologies. ICT is often considered as an extended synonym for Information Technology (IT), but the scope of ICT is even broader. ICT has more recently been used to describe the convergence of several technologies where in a common transmission line is used to carry very diverse data in different communication types and formats, as in merging of

audiovisual, telephone and computer networks through a common cabling system.

ICT has assisted the society with vast array of communication possibilities and has created a 'global village,' in which people can communicate with others across the world. This new era is often referred to as the 'digital age' where access to the internet has become a vital development tool. But even though the digital revolution is a global phenomenon, there exist disparities between and within countries when it comes to the penetration, affordability, and performance of ICT services.

### Agriculture

Agriculture was the key stimulus for the development of human civilizations and its history dates back thousands of years, and has been driven and defined by different climates, cultures, and innovations. Agriculture is the largest livelihood provider in India, more so in the vast rural areas. At the same time, farmers being on the brim of leaving agriculture sector and selling their agricultural land due to unfathomable loss are not something astonishing in our country. The economic contribution of agriculture to India's GDP is steadily declining with the country's broad-based economic growth. This is mainly because of the rapid economic growth in service, industrial and non-agricultural sectors. Still, agriculture is demographically the broadest economic sector and plays a significant role in the overall socio-economic fabric of India. Agricultural development and empowerment of the farming community are among our nation's foremost challenges.

### Information and communication technologies (ICT) and agriculture

Internet makes it possible for farmers to gain knowledge on all aspects of technology before its adoption [1]. One of the best ways to develop agriculture is by mastering ICT knowledge and skills [2]. When India has taken significant strides in the field of agriculture through the Green, Yellow, White and Blue revolutions, now it has embarked upon a 'cyber revolution' [3]. Transfer of technology to farmers is of prime importance when it comes to agricultural development.

Indian agricultural sector is still in progress in terms of adopting itself to an industrialized and market oriented economy from a traditional farming society. ICT is an important tool to achieve national and individual goals for agricultural production and sustained rural economic viability [3]. Information and communication technologies can increase the efficiency, productivity and sustainability of agriculture sector, by helping farmer's access information easily and cheaply to improve farm operations, through e-agriculture [4].

When every sector is embracing technology to get increased production rate and reduced production cost, with great efficiency and better time management, agricultural sector too need to adopt technological innovations in farming and be better equipped to tackle the problems faced by the farming community. When farmers are vested with the responsibility to feed the world, we are vested with responsibility to arm them with technology to help them come to the forefront and do farming without being victimized to bear hurdles and loss in agriculture by letting someone else take the benefits of their toil.

In order to get a rough idea on ICT adoption and constraints, a study was undertaken to identify the information needs of farmers and bottlenecks in the use of ICT by soliciting information from users and non-users of ICT among farming community.

## Need for the Study

When adoption of Information and Communication Technologies to farming operations is said to be of prime importance for development of agricultural sector, there arises a need to analyze the extent to which farmers are able to adopt ICT to their farming routines. To evaluate the benefits of using ICT in agriculture, it should be examined whether there are any notable differences in agricultural livelihoods of farmers who make use of ICT compared to those farmers who don't. By doing so, we also get to understand whether farmers are rightly exploiting the opportunities that come with ICT usage in farming. It is also essential to investigate the information needs of the farmers and constraints in adopting ICT to agriculture, so that this research results can be utilized for giving appropriate information beneficial to farmers and formulate effective plans to help farmers to overcome the identified barriers in adopting ICT to farming activities.

## Aim of the Study

The study aims to analyze the difference in agricultural livelihoods of farmers who use Information and Communication Technologies in agriculture compared to those farmers who haven't adopted ICT to agriculture and also to identify the challenges associated with agriculture in Somanur Village and constraints in adopting ICT to agriculture.

## Objectives of the Study

The objectives of the study are to analyze,

- The difference in agricultural livelihoods of farmers who make use of ICT and of those farmers who don't use ICT in agriculture.
- Challenges associated with agriculture in Somanur Village.
- Constraints in adopting ICT to agriculture by farmers.

## Research Questions

**RQ1:** Is there any difference in agricultural livelihoods of farmers who make use of ICT compared to those farmers who don't use ICT in agriculture?

**RQ2:** Which are the most challenging stages in agriculture where information through ICT is needed for farmers?

**RQ3:** What are the major barriers to using ICT in agriculture by farmers?

## Theoretical Background

### Information asymmetry

Information asymmetry can be defined as a situation or transactions where one party has more or better information than the other. This causes power imbalances in transactions. The study analyses the difference between users and non-users of ICT in agriculture among the farming community and hence the concept of information asymmetry help to understand this gap or difference. When it comes to market economy, information regarding market conditions is assumed to be available and accessible to all the market participants. Due to some of the choices made by the market participants, they have preferential information compared to others and such markets are considered as markets with Information asymmetry [5].

### Uses and gratifications approach

The uses and gratifications inquiry has been used for many years to gain an understanding of motivations for using media, and researchers have advocated applying the approach to new communication technologies and specifically to the internet to explain why users are attracted to the medium. The uses and gratifications approach is designed to address the needs a particular mass medium fulfills for its users [6]. When it comes to ICT and agriculture, this approach can be used to understand ICT usage by farmers in agriculture.

### Diffusion of innovation

Diffusion of Innovation theory by E.M. Rogers can be used to understand the process by which an idea or product gets adopted by specific population or social system, over time. Adoption means that a person does something differently than what they had previously as in purchasing or using a new product, acquiring and performing a new behavior, etc. The key to adoption is that the person must recognize the idea, behavior, or product as new or innovative. The diffusion of innovation approach helps to understand ICT adoption to agriculture by farmers.

## Review of Literature

Search for relevant literature was initiated to get an outline on usage of ICT in agriculture by farmers, barriers to ICT

adoption for farming and information needs of farmers. Major findings applicable to the study are tabulated below (**Table 1**):

**Table 1:** Relevant literature was initiated to get an outline on usage of ICT in agriculture by farmers.

Sl. No	Authors	Context	Findings relevant to the study
1	Chauhan [1]	Expectations of farmers from ICT	Results show that majority of farmers (70%) agreed that internet is the richest source and fastest means to share information, and it should be utilized for the betterment of the farming community. · Farmers expected the Government to fund Community Internet Centres and provide proper training to use internet facility.
2	Abdullah and Samah [2]	Factors affecting technology usage among farmers	Education, farmers' perception and poverty are ranked first among the factors affecting technology usage among farmers. Training, extension personnel (methods and knowledge of extension staff) and infrastructures and ecosystem are ranked first among the outside household conditions affecting technology usage among farmers.
3	Mahant, et. al. [7]	Application of ICT in agriculture	Cost of technology, not understanding the value of ICT (awareness) and personal impediments (Illiteracy or ICT skills) are the main constraints to ICT adoption by farmers.
4	Kameswari, et al. [8]	Users and non-users of Agricultural Market Information System (AMIS)	Information needs of farmers in order of importance are market price, pest control, subsidy and credit, post-harvest technologies, organic farming, weather, new varieties and improved technologies. There is significant difference in the mean price obtained by farmers using AMIS and non-users. · Farmers' groups are better equipped to access critical services and inputs. · AMIS along with farmers' cooperatives and government support will fetch more benefits.
5	De Silva and Ratnadiwakara [9]	Reducing transaction costs in agriculture using ICT	Information search cost was found to be highest during decision stage and selling stage among farmers not using ICT. · The study suggests an integrated mobile phone platform that addresses the total information needs of the farmers.
6	Islam and Grönlund [10]	Mobile phone based AMIS in rural context	AMIS was found to be appropriate in processing and disseminating information. · Half of the registered users who get regular information updates, found it effective.
7	Meena, et al. [11]	Tackling climate change situation in agriculture through ICT	Opportunities: Enhancing agricultural production, improving market access and Capacity-building and empowerment. · There is inadequate awareness on use of ICT in agriculture and language difficulty in accessing the contents. Challenges: ICT programmes and policies in agriculture, relevant and timely information in appropriate formats, tailor-made information to end users, cost sharing and sustainability.
8	Awuor, et al. [4]	E-agriculture framework	Presents a model with target oriented data base with information on pricing, production and agriculture extension, information on demand from Ministry of Agriculture and Research institutions and ways to making these information accessible to farmers. Challenges: improved and stable communication infrastructure and connectivity, new innovations in e-agriculture, e-agriculture data as public domain and requirement of supporting applications.
9	Patil, et al. [3]	Adoption of ICT in agriculture	Information in demand: market information and weather updates. Adoption constraints: illiteracy, cost and lack of awareness. Consequences: lack of contact with timely information and innovations, loss of competitiveness, income, subsidies, production and management efficiency.
10	Gunupudi and De [12]	Role of AMIS	The reasons for poor success rate of AMIS are identified as economic unsustainability and ineffective implementation. Market information empowers farmers to make informed production decisions and negotiate with traders.

## Method

The study implements qualitative method and information is gathered through in-depth interviews from farmers of Somanur Village in Coimbatore district of Tamilnadu. Questions for the interview were prepared based on the literature reviewed. The interview was carried out by going from one house to another in Somanur Village. Farmers who were available and willing to spare their time responded to the interview. Farmers were given enough freedom to discuss their opinions and add that information that they felt was important though it wasn't part of the questions asked. We needed to understand the thoughts and behaviors of the farmers as well as the context and complete picture in terms of ICT usage among the farming community.

The study relies mainly on opinion of the farmers to understand the major problems they face in adopting ICT for agriculture. The focus area of research was selected based on proximity and where farming is the foremost means of livelihood. 16 farmers were interviewed through snow balling technique among which 11 farmers were non-users of ICT and 5 were users of ICT in agricultural context.

## Findings and Analysis

The responses from farmers who use ICT and who don't make use of ICT in agriculture are analyzed and presented below.

## Farmers who use ICT in agricultural context

Finding farmers using ICT for agricultural purposes in Somanur village was a difficult task. To understand the extent to which farmers are implementing ICT in agriculture and the benefits enjoyed by those farmers who make use of ICT in agriculture, five users of ICT were interviewed and their responses, opinions and views are consolidated below.

It was found that all of the five farmers were using smart phones with internet facility. Though they have mobile phones with internet connectivity, none of them are aware on how to make use of it to get the information they need at various stages of farming apart from using Whatsapp platform. All of them are said to be part of one or more agriculture related Whatsapp groups with friends and friends of friends from different places as members and they discuss their issues, needs and share agriculture related information. Other than that they depend on traditional sources of information such as television, radio, newspaper and magazines to get agriculture related information.

They were all aware of the scope of using ICT for taking a step forward in agriculture sector. According to the farmers, there is a need for educating them and giving them practical training on how to use internet facility and access agriculture related information for agricultural development. "The service providers should offer their service at low cost or they have to come forward to promote internet use among the farming community," says Govindarajan. The farmers are of the opinion that the younger generation should teach farmers on how to use internet, since they have learned it either with the help of their sons or younger brothers. They said that there are no Community Internet Centres in their village, where they can access agriculture related information, which is also a requirement for the farming community.

The farmers also expressed their need to have an efficiently working farmers' association or peer group where there is sharing of needful information. According to a farmer, success and failure stories of farmers should be shared among farmers. Government schemes and policies were also said to be necessary for promoting ICT use among farmers for uplifting the farming community.

"If a person is well informed about the route before he starts his journey, he will clearly know the path he need to take, the turns he should make use and thus save time, but when an uninformed person starts his journey there are chances that he can take wrong turns and get stuck in between," remarked Govindarajan when asked about the difference between farmers who use ICT in agriculture and farmers who don't. Govindarajan has referred the person who is well informed about his journey to a farmer who use ICT for agriculture purposes and the uninformed person is referred to as farmer who doesn't make use of ICT in agriculture.

**Water management:** The most challenging task in agriculture seems to be water management according to these farmers. During the time they get adequate rain, there is no knowledge about how to properly store water for future. All the interviewed farmers have told that they have sold portion

of their agriculture land at one point or the other due to inability to do agriculture because of water scarcity.

**Selling:** As per these farmers there is information need at selling stage regarding storage of agricultural products. One of the farmers opined that the market demand should be known by the farmers because sometimes most of the farmers end up cultivating the same vegetable and getting fewer amounts. According to him, farmers should be equipped with professional efficiency in marketing agricultural products.

## Farmers who don't use ICT in agricultural context

To understand the problems of farmers who don't use ICT in agriculture, 11 non-users of ICT were interviewed and their responses, opinions and views are consolidated below.

## Barriers in adopting ICT to agriculture

**Lack of awareness:** The non-users of ICT were found to share common reasons for not having used ICT for agricultural purposes. All of the 11 farmers who are non-users of ICT expressed their lack of awareness on how to use ICT in farming routines. They do have various information needs but are uninformed on using ICT to access the information that is required at various stages of farming. They haven't ever attempted to know about using internet facility to gather information for farming, as they say that they have many other major concerns at hand which they have to deal with presently.

There are no Community Internet Centres or farmers' associations or groups functioning for the welfare of the farmers in Somanur village. Also, no awareness programmes have been organized on implementing ICT in agriculture for the betterment of farmers' livelihoods. Internet penetration is nil among these farmers. They also expressed that the Government should allocate funds to promote use of internet facility among farmers to access information they need and should also implement programmes and policies for the benefit of the farmers.

**Traditional practices:** When asked about the latest advancement they know in the field of agriculture, they were only familiar with the drip irrigation system, which was actually introduced long back. Other than the drip irrigation system, the farmers were using traditional practices in all stages of farming. Even the younger generation, sons of these farmers, also tend to follow the traditional practices in agriculture and have not taken any steps forward to integrate technology into agriculture or using internet facility to find solutions to problems they currently face. The farmers who were not using internet facility was lacking information on latest updates in the field of agriculture.

## Major challenges in farming

**Water scarcity:** Lack of sufficient water for doing farming is a major threat to farmers of Somanur District. "There is no water at all to do farming. Thankfully we received somewhat

rain this time, but last year we had to buy water to save the vegetation,” notes Aarmugam, a farmer from Somanur. “Water is not at all there! How can we do farming? It is really challenging for us to do farming in this situation,” says Shanmugam, another farmer.

**Harvesting:** All of the 11 farmers expressed that the most challenging stages in agriculture are harvesting and selling. During harvesting, labor cost is said to be very high and wage per laborer can be Rs. 400 to Rs.1000 per day. “Farmers are not able to succeed due to high labor cost,” notes Shanmugam. The farmers expressed their necessity to have newer technologies to bring down labor cost by reducing manual work. But, none of the interviewed farmers are sure on what new methods or technology should be adapted to effectively reduce labor cost. Due to high labor cost these farmers are said to be facing significant loss in agriculture.

**Selling:** When it comes to selling, packaging and preserving the agricultural products are the challenging tasks, according to these farmers. Hybrid varieties in the markets will stay fresh for longer period than the organic agricultural products and hence the farmers are in need for cool storage facilities and proper preserving methods during the selling stage. They all agreed that they need to be updated on effective methods to preserve and store their agricultural produce.

## Conclusion

Farmers using internet facility through their mobile phones are not well aware as how to make best use of it to access agriculture related information they are very much in need of. They use Whatsapp groups to connect with other farmers and share information. When it comes to farmers who are not using internet facility for accessing agriculture related information, they lack knowledge on the scope and benefits of using ICT in agriculture and are following traditional methods being unaware of latest technologies and updates. Both the groups of farmers face problems due to inadequate water for farming and challenges during selling stage. Farmers, who use internet, lack practical training to access needful information to tackle the problems they face currently. When non-users of ICT are confronted by high labor cost and loss in agriculture, they are not in a position to buy smartphones and pay for internet connectivity. There is a great need for establishing Community Internet Centres funded by Government and active farmers’ association for promoting as well as providing practical training for farmers on using ICT for agricultural development and attaining professional efficiency in marketing agricultural products. So the Information asymmetry

approach, uses and gratification theory and diffusion of innovation theory are partially applicable to the study.

## Recommendations

The study can yield more insightful information if conducted through focus group interviews and discussions with farmers. Awareness programmes related to ICT and agriculture can be organized by the Government and farmers’ responses to it can be evaluated.

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