

Awareness of Farmers towards Information and Communication Technology (ICT) in the Indian Agriculture Sector

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Abstract: Information and communication are crucial in raising awareness among various farmers in various ways, such as by affecting farmer's costs and time. In a rapidly developing information age, ICT is used in all facets of our lives, and it has the huge potential to change agriculture in ways that are more intelligent. Farmers are using modern technologies, such as mobile phones, televisions, and radios, but the most popular ICT tool is the mobile phone. Farmers utilised their mobile phones frequently for social communication, getting in touch with middlemen for the marketing of their produce, and getting real-time advice on agriculture from experts. ICT tools assist farmers and enhance their capacity for data-driven decision-making. ICT has been a huge help in many areas of agricultural decision-making. ICT has now spread to every home, allowing those farmers to exploit their resources to the fullest with the aid of ICT. Farmers are well-known and use specialised technology to tackle their issues connected to various agro climatic conditions, size of land holdings, soil types, types of crops, and associated pest/disease, etc. It facilitates the timely accessibility of the appropriate information, and its efficient application is essential for agriculture. Farmers can adopt sound agricultural practises, choose better inputs, and appropriately plan their crop with the aid of timely information and workable solutions to agricultural challenges. Services provided by information and communication technology (ICT) are currently influencing every aspect of human existence and opening up new chances to close the information gap in developing nations.

Keywords: Agriculture, Awareness, Farmers, Impact, Information and communication technology (ICT),

Introduction

Agriculture can also be defined as the biological use of soil for production purposes. However, the branch of applied science that deals with the production, improvement, protection, processing, marketing and expansion of crops through the proper use of natural resources. Natural resources include soil, sunlight, air, water and temperature. (Mirza, 2020)

Information and communication technology is simply a collection of technologies that support data/information processing, data/information storage, data/information dissemination/ communication, or both. In order to conduct information processing and communication tasks, ICT incorporates technologies including desktop and laptop computers, software, peripherals, and Internet connections. (Singh et al., 2015)

Technology is the process of utilizing human and scientific resources to fulfill human needs and goals. What you can understand and communicate is what is on your own page. Information technology (IT), also known as information and communication technology (ICT), is essentially the use of information to fulfill human needs or goals connected to the use of contemporary gadgets like the Internet. (Bates, 2000)

(Burman, 2008), ICTs can significantly contribute to the farming community's access to information at reasonable prices. Information on agricultural productivity and the market connection between farmers and mandis have undergone a significant revolution thanks to ICT in the Indian farming community. The Indian government has undertaken numerous significant ICT-related initiatives.

Farmers consider it crucial to have up-to-date information about technology, monsoon behavior, and market opportunities. Regular extension services are frequently unavailable to farmers at convenient times or locations. Thanks to current

information and communication technology (ICT), there are new chances to close the knowledge gap that rural households, farmers, fishermen, and women suffer (Swaminathan & Swaminathan, 2018).

Literature Review

Such deep changes are changing conventional farming methods and opening up new opportunities in the face of diverse difficulties. Farmer's may now track the state of their crops in real time because of the chances that has been provided. Farmers can automate tasks in the farmland with the help of automated IoT solutions because these solutions have the ability to make precise decisions based on underlying challenges, execute actions to overcome such challenges, alert farmers in real-time, and ultimately result is increased productivity and higher harvest. In this context, we demonstrate the requirement for smart agriculture by presenting a cloud-enabled low-cost sensorized IoT platform for real-time monitoring and automating chores pertaining to tomato plantation in an indoor environment (Thilakarathne et al., 2023).

Economic cost-benefit analysis and knowledge about particular technologies are needed to help overcome the main obstacle to adoption (cost), which includes highlighting the long-term financial advantages of adoption and working to enhance interpretations and interactions to support farmer's judgment and uptake. Farmers and end users should be clearly included as major stakeholders throughout the process, from the conception of the initial idea to the commercialization of the product, as advocated by institutions for innovation, legislation, and education promoting the adoption of smart farming technologies in emerging agricultural economics (Zaman et al., 2023).

The level of education also affects the adoption of technology. Higher education level affects understanding of information acquisition and adoption of latest technical methods or innovations and government policies to increase rice production (Santoso et al., 2023).

The main recommendations of this study are that the government should encourage investment in ICT in SSA because it can enhance the agricultural performance of the sub-region. However, to fully exploit and optimize the inherent positive externalities of ICT investments, the sub-region must seriously invest in training and education of farmers to enable them to adopt and implement ICT products in agricultural value chains. Also, considering the level of poverty in the district, the government should strive to make ICT products affordable for the poor, who make up the majority of farmers, to ensure access and adoption in agricultural activities (Oyelami et al., 2022).

"Smart agriculture", "Agriculture 4.0" and "digital revolution" are some of the terms that refer to the fundamental change in agriculture related to digitization, which we call digital agriculture. Governments, technology companies and research organizations are shaping digital agriculture mainly positively (Barrett and Rose, 2022; Klerkx and Rose, 2020; McCampbell et al., 2021).

Digitization is a socio-technical process of implementing new forms and combinations of digital information and communication technologies (ICT) (including sensors, the Internet of Things, big data analysis, robotics, artificial intelligence and machine learning) and is often touted as promising. It is possible for the agricultural sector to simultaneously challenge and overlap economic, environmental and social goals (Shepherd et al., 2020; Wolfert et al., 2017).

Information and Communication Technology (ICT) functions are the details of interactive communication - 24/7 accesses to information through Information and Communication Technology (ICT) tools. ICT in Indian Agriculture - Details on the current status of Indian agriculture and availability of resources for using ICT tools in Indian agriculture. Detailed information on soil and agriculture management in India through soil management (Shinkar, 2019).

(Panda et al., 2019) suggested developing awareness and skill of the farmers to use ICT tools for their farming benefits.

(Nesheim et al., 2017) found that the use of ICT in India has not reached its potential and many farmers do not understand the prediction made. This is mainly because farmers do not understand the information they receive or have doubts about the reliability of ICT.

It takes one hour to get relevant information through ICT and apply advanced ICT in agriculture. After reviewing and analyzing the current models of ICT-based information services, the following suggestions can be made, which are important for government agencies and ICT developers for future development and research (Singh et al., 2017).

Farmers need information and communication technology (ICT) tools that allow them to record and calculate costs, plan future tasks and make informed decisions based not only on cultivation and cultivation requirements but also on financial considerations (Paraforos et al., 2017).

ICT and information management can provide creative approaches to successful, socially acceptable agriculture that benefits species diversity, the environment (such as soil, water and climate) and farmers in both developed and developing countries. However, this is only possible by proactively developing policies that support the essential legal and market architecture of smart agriculture, engaging in dialogue between the proponents and opponents of agricultural technology, and carefully considering new ethical issues (Walter et al., 2017).

Information is one of the most important outcomes in improving agricultural productivity and helping farmers get the right price for their produce. Due to social, economic and infrastructural reasons, information asymmetry among Indian farmers severely limits the productivity of Indian agriculture. This paper investigated the agricultural search behavior of farmers using mobile devices in the state of Uttar Pradesh, India. It tried to explain the social and economic demographic reasons for using the M-Agriculture service. It was observed that mobile phones were widely available in the study area but were used to get information about crop diseases, weather, harvest season, seeds and market prices (Mohan et al., 2016).

The topic of introducing ICT in agriculture is increasingly important, and many ICT development projects have contributed to the sector (Aker et al., 2016).

The results of the survey showed that mobile phones, radio and television are the main mode of communication that farmers can use to obtain information and knowledge related to agriculture (Olaniyi, 2013; Chhachar et al., 2014).

Creation of agricultural communication networks for active participation of all agricultural stakeholders. Through the results of the study, it was also recommended that national agricultural institutions participate in the development of the information and communication technology curriculum for agricultural development and in particular support ICT platforms that facilitate farmers' access to high-quality agricultural information (Ajani, 2014).

For example, farmers also report that they use information and communication technology to know market updates, know where to sell produce and identify different market places to ensure effective marketing of produce (Oyeyinka & Bello, 2013).

(Colle et al., 2010) noted that among ICT tools, mobile phones have an impressive penetration in most developing countries, changing the process of information communication in agriculture. Mobile phones have enabled convenient, compact and fast access to information and easy access through personal communication in industry and developing countries.

With the help of information and communication technology, accurate and authentic information can be made available to the farmers at the right time so that they can use and get benefit from it. A decision support system implemented through ITC helps farmers plan crops; follow good agricultural practices in cultivation, harvesting, post-harvest and marketing for better results (USAID, 2010).

In agriculture, there is a need for versatile information on different agricultural climates, like's farm sizes, crops grown, technology followed, market orientation, weather conditions, etc. As many researchers reported that the "question and answer service" was perceived by most farmers as the best way to find individual solutions to their specific agricultural problems (Meera et al., 2004).

Farmers were reported to use traditional information and communication technologies such as radio and television to obtain agricultural information (Batte et al., 1990; Nazari & Hasbullah, 2008; Emmanuel, 2010).

(Bhatnagar & Vyas, 2001) believe that bringing information and communication technology to underdeveloped rural areas can bring about changes. Certain prerequisites, such as reliable software and electricity, are necessary for a deployment to be sustainable and cost-effective. If these essential parts are missing, it may be better to look for less advanced but more suitable solutions. Governments have transformed the provision of advisory services in the age of information and communication technology (ICT) to address the shortcomings of traditional advisory services and ensure timely and cost-effective delivery of quality information (Larochelle et al., 2019).

Research Objectives

- ❖ To study the awareness of farmers related to ICT
- ❖ To study the impact of ICT on farmer's livelihood in the Indian agriculture Sector.

Research Methodology

This research paper includes the secondary data studies, to find out the objectives of the study. Researcher collect the data from previous studies done by various authors national & international level and also collect the data from govt. websites, journal, magazines, newspaper, and many more sources of secondary data.

Conclusion

After various studies related to given topic, it is observed that information and communication technology is playing a very effective role in agriculture sector. ICT is given the various information related to agriculture activities to farmers. Mostly Farmers are use mobile phone as important source of information. Farmers can install various applications in the mobile phone & get information through these various applications. In now day's young farmer's generation is more familiar with information and communication tools in comparison of old farmers. Young farmers are also gives the training to his parents and other illiterate farmers regarding the use of information and communication tools. Education plays a very important role in awareness of farmers about information & communication technology. Because without awareness of government policies about ICT no any farmer take maximum benefit of government policies. Before announcement of every rule, regulations, act and policies government needs that they should research at the ground level about and collect the information from the farmers. In now days information and communication technology change the farmers perspective about agriculture activities they use ICT for more and more production. At last researcher found that as per today scenario urban area and rural areas which is situated nearby urban areas are more aware about ICT in comparison of faraway rural areas for awareness of these faraway rural areas farmers. Government need to give more information to faraway rural farmers through most used sources of information at village, block, district, state and national level.

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