Role Of Information And Communication Technology (ICT) In The Development Of The Indian Agriculture Sector And The Livelihood Of Farmers

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Abstract

Agriculture plays a very important role in the growth of the Indian economy. Sustainable development is required for the overall development of farmers and the Indian agriculture sector. It's possible only through the use of technology. Due to the increase in population and demand for food, there is a need for sufficient production of agricultural products. The last many years' information communication technologies are used for providing timely information to the farmers. The farming community is facing a lot of problems in maximizing crop productivity; despite successful research/technology on new agricultural practices, the majority of farmers are not getting proper information due to several reasons. Quality farming, popular in developed countries, uses ICT to make a direct contribution to agricultural productivity. The contribution of ICT is a Positive effect on the life of farmers by cutting down the cost of production, increasing efficiency, and improving productivity. It is observed that in past years, ICTs had become major tools used by farmers to manage the factors of agriculture production. To get accurate information at the right time and place it is very necessary for increasing the efficiency and capability of farmers, according to ICT. The Indian government wants to enhance the communication between farmers and governmental agencies related to ICT. This research paper provides knowledge about the impact of Information and communication technology (ICT) on farmers' Livelihood in the Indian agriculture sector and the other factors

related to the Agriculture sector to increase the production and income of farmers.

Keywords**:** Agriculture, Farmers, Information and communication technology (ICT), Life, Quality farming.

Introduction

The term Agriculture was derived from a Latin word known as 'ager' which means field and 'culture' which means to cultivate. Agriculture can simply be defined as the cultivation of the soil and rearing of animals for the purpose of feeding for survival.

Agriculture: The art, science, and practice of producing different types of crops, cultivating soil, raising & maintaining livestock and to varying degrees of preparing and marketing the products generated from those activities (Merriam-Webster).

(Padhiary, 2021) Doubling farmers' real income by 2022 is a goal established by the Hon'ble Prime Minister of India who is challenging the status quo of all involved stakeholders. Productivity and production increases in agriculture alone will not ensure doubling farmers' income. Meeting market demands requires a shift in mindset from "Farm to fork/plate" to "Fork to Farm". Secondly, market-intelligence must be made available to producers using innovative partnerships and communication technologies.

Many more Government initiatives are listed below (Yadav et al., 2020): Info kiosks, Kisan SMS Portal, Call centers, Community information center, Gyandoot, Krishi darshan, Lokvani, Friends, E-Mitra, Village Resources Centers, Krishi Vani, Krishi Gyan Sagar, Kishan Vikas Kendras, Mera Gaon Mera Gaurav, M-Kishan Portal, Kishan Suvidha, Pusa-Krishi, Bhuvan Hailstorm App, Crop Insurance App, Agri-Market, Pashu Posham, Pradhan Matri Fashal Bima Yojna, Prathan Matri Krishi Sinchai Yojna, E-Krishi, E-Agri Kiosk, Digital Mandi.

(Burman, 2008), ICTs can play a significant role in making information available at a fair cost to the farming community. ICT has a very big revolution in the Indian farming community related to information about agriculture production and a market link between mandis and farmers. Many major initiatives are taken by the Indian government related to ICT.

The Kisan Call Centre facility is available, where farmers can directly call and discuss their concerns with government representatives and get solutions for the problem. Apart from these TV Programmes for farmers run by State governments such as Kheti Badi, Krishi Darshan,

DD Kisan and many more. Radio Programmes for farmers such as Kheti Ri Bata help them provide the right information. Also timely, E-newspapers published by Government and Private Entities such as Krishi Goldline, Kheti Ri Batan, Haladhar times, Krishak Jagat and E-magazines such as Kheti, Fal-Phool, Krishi Jagran and many more (Yadav et al., 2020).

The government of India is presently focusing on increasing the livelihood of farmers through ICT with the use of more audio & video conferencing tools, sensor technologies, air and soil sensors, agriculture robots and drones for enhancing agricultural needs. Along with the technologies mentioned above, the Government of India is also providing an SMS Facility about farming, where farmers are informed timely about agriculture practices through quick messages on mobile phones. The Government of India has also opened e-Mitra kiosks, where a farmer may visit and make use of online resources such as bill payments, uploading of documents related to any subsidy application and many others at nominal charges. Also, many private companies help farmers with Geographic Information System (GIS), Global Positioning System (GPS), and Radio Frequency Identification Device (RFID) services and tools(Yadav et al., 2020).

Table: The effects of ICT on agriculture production and cost in some countries:

Country	**Effect of ITC on agriculture**
Indonesia (Gaol, 2020)	Planting rice using drones can save costs up to 60%, from these calculations at least the efficiency can reach 40% for tillage, 20% for the planting process and 28.6% for weeding.
Niger (Aker, 2008)	Cellular phones reduce grain price dispersion across markets by a minimum of 6.5% and reduce intra-annual price variation by 10% in Niger
India (Reddy et al.,2009)	Farmer's Responses as to the Flow of Benefits on account of e-sagu (ICT). (i) 83.3 percent of farmers responded positively to yield on account of improved technology. (ii) The average Yield Increased @1.5 quintals per acre amounting to Rs. 2485.3. (iii) Fertiliser saved @0.76 bags per acre, amounting to Rs. 229.7 (iv) Pesticides saved @2.3 sprays per acre amounting to Rs. 1105.1 (v) Total Benefit per acre Rs. 3820.1
Ghana (West Africa) (Halewood, 2012)	E-Soko, a mobile and web-enabled repository of current market prices and a platform through which buyers and sellers interact in Ghana, managed to increase farmers' revenue by 10% since they started using the platform in northern Ghana.

Literature Review

The highest popular ICT devices used by farmers are mobile phones, radio and television. They are used for receiving agriculture, market and weather-related information. Mobile phones have an added use for agriculture-related business for financial and marketing agricultural produce for establishing a connection with customers (Zougmoré, 2022).

According to Gill, 2021 for achieving sustainable development in agriculture timely access to vital information along with an efficient and reliable medium of communication are key elements. These attributes can be effectively used to increase information exchange and dissemination of knowledge and ideas in rural areas of the country. Educational status leads to exposure to the technologies and their usability in an encouraging manner. The annual income of the family plays a key role in the ownership of ICT tools. (Deepika et al., 2020).

The government of Andhra Pradesh needs to provide subsidies on ICT tools for the farmers so that they ought to effortlessly get the right of entry to the current day information on agriculture and allied sectors (Naik et al., 2020). Information and communication technology (ICT) policy is a dominant feature in the improvement of agricultural productivity in developing countries. ICT-driven agricultural information is one of the ways to realize higher yields (Kante et al., 2019).

They will get information about updated rates of their crops, and updated schemes by the government for farmers. Farmers can order fertilizers from home and many more. Mainly they will get a good platform for selling their output and get the best returns accordingly (Shankar et al., 2019). Furthermore, Panda et al., 2019 also suggested enhancing farmers' awareness and skills regarding the use of ICTs in farming. It has been argued that ICT policies can help increase agricultural production in developing countries (Hopestone, 2014; Kunyenje, 2019).

Sustainable agricultural future technologies will require systemic approaches to design, and local solutions which will be capable of contributing to larger-scale solutions that will be enriched with knowledge of the local context, needs and culture while also involving a range of actors and local user communities (Pigford et al., 2018.)

Nesheim et al., 2017 found that the use of ICT in India has not reached its potential and many farmers do not implement the forecast

received. This is mainly due to farmers not understanding the information received or having doubts about ICT reliability. Getting appropriate information through ICT and deploying advanced ICT in agriculture is the need of the hour. After reviewing and analyzing current ICT-based information service models, the following suggestions can be provided for future development and research that are relevant to government organizations and ICT developers (Singh et al., 2017).

As agriculture constitutes the backbone of the economies of many developing countries (Kante et al., 2019; Msoffe & Ngulube, 2016), it is imperative to adopt and implement national ICT policies to enhance agricultural productivity. The topic of ICT adoption in agriculture is of growing relevance and numerous ICT development initiatives have been carried out to aid the sector (Aker et al., 2016).

For instance, farmers also reported using ICTs to know the market days, to know where products could be sold and to identify different market locations for efficient marketing of produce (Oyeyinka & Bello, 2013). Exchanging information is critical for the stakeholders in the agriculture value chain to reduce the asymmetries in information and communication as well as to reduce the vicious circle of poverty (FAO, 2011).

Many ICT-based initiatives have been tried by various players and the same are analyzed in this paper. Based on the analysis of the various initiatives, an attempt has been made to advocate measures to tackle the full perspectives of ICT (Shalendra et al., 2011). ICT can broadcast important and genuine information at the proper time to the farmers so that they can use it and get satisfaction. The decision support system through Information communication and technologies eases farmers' organization of harvesting different types of crops and uses good agricultural processes for cultivating, harvesting and marketing agricultural products to get the best results (USAID, 2010).

Varied information is required in agriculture based on the different agro-climatic regions, size of land holdings, types of crops cultivated, technology followed, market orientation, weather conditions, etc. (Meera et al., 2004). Traditional ICTs viz., radio and television have also been reported to be used by farmers in accessing agriculture-related information (Batte et al., 1990; Nazari & Hasbullah, 2008; Emmanuel, 2010).

Research Objectives

- To study the role of ICT in the development of the Indian agriculture sector.
- To study the use of ICT on farmers' agricultural life in the Indian agriculture Sector.

Research Methodology

This research paper includes secondary data studies, to find out the objectives of the study. Researchers collect the data from previous studies done by various authors at national & international levels and also collect data from govt. websites, journals, magazines, newspapers, and many more sources of secondary data.

Conclusion

From the given various studies, it is concluded that at present world ICT is very important for agriculture. ICT plays a very important role in the growth of the production of agricultural products. We achieve our agricultural needs targets with the use of ICT. With the increase in production income of farmers also increased and the life of farmers improved. Various sources of ICT are used for giving information to farmers. Now day's farmers have knowledge of ICT and they use this to increase their earnings. To provide more and more information to farmers government need to connect with farmers through the most used sources of information. For the last many years, ICT change the farmers' thinking perspective on agriculture and its techniques. Through ICT cost saving is increased. Productivity and Farmers' life also improved with the use of ICT. More or more awareness about ICT is the main source of increasing the use of ICT. At last, the researcher found that there are many areas for improvement in ICT like (Awareness programs, Training, Corruption, Technology enhancement, Education related to agriculture and many more).

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