Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 06, Issue: 01 (JAN-FEB, 2026)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Digital Seeds of Change: ICT Utilization among Odisha's Farming Community

*Aparna C V[1] and Dr. Sarbani Das[2]
[1]M.Sc. Scholar, Department of Extension Education, College of Agriculture, OUAT, Bhubaneswar, Odisha, India – 751003
[2]Joint Director Extension (Information), Directorate of Extension Education,OUAT, Bhubaneswar, Odisha, India – 751003
*Corresponding Author's email: aparnacv26@gmail.com

Information and Communication Technologies (ICTs) are increasingly recognized as critical enablers of agricultural transformation in developing economies dominated by smallholder farming systems. In India, particularly in the agrarian state of Odisha, ICT-based interventions have gained prominence for their potential to enhance productivity, improve access to timely information, strengthen market integration, and support inclusive rural development (FAO, 2019; World Bank, 2017). This article critically examines the utilization of ICTs among Odisha's farming community, conceptualizing them as 'digital seeds of change' that are reshaping traditional agricultural practices. Drawing on secondary literature, empirical studies, and policy documents analyzes the evolution of ICT use in agriculture, the types of digital tools adopted by farmers, institutional and policy support mechanisms, and the socio-economic impacts of ICT adoption. While ICTs offer significant benefits such as improved decision-making, enhanced extension outreach, and better market access, persistent challenges related to digital literacy, infrastructural constraints, affordability, and socio-cultural disparities continue to limit their effectiveness. The article concludes by emphasizing the need for farmer-centric, context-specific digital strategies to ensure equitable and sustainable agricultural development in Odisha.

Keywords: ICT in agriculture; Digital farming; Odisha farmers; E-agriculture; Agricultural extension; Rural development

Introduction

Agriculture remains a central pillar of Odisha's economy, providing livelihoods to a majority of the rural population, most of whom are small and marginal farmers. Despite its socio-economic significance, the sector continues to face structural challenges such as low productivity, fragmented landholdings, climate variability, limited market access, and inadequate extension services. These constraints are further exacerbated in rainfed and tribal-dominated regions of the state. In this context, Information and Communication Technologies (ICTs) have emerged as innovative instruments for strengthening agricultural extension systems and addressing information asymmetries (Mittal & Mehar, 2016). ICTs encompass a broad spectrum of tools, including mobile phones, internet platforms, radio, television, mobile applications, and digital decision-support systems. Their application in agriculture enables the dissemination of real-time information on weather conditions, crop management, pest and disease control, market prices, and government support schemes. National initiatives such as Digital India, mKisan, Kisan Call Centres, and the electronic National Agriculture Market (e-NAM) have further accelerated the integration of ICTs into India's agricultural sector (Government of India, 2020). Odisha, with its diverse agro-climatic zones and socio-

economic heterogeneity, provides a relevant case for examining the opportunities and limitations of ICT utilization in agriculture.

Conceptual Framework of ICTs in Agriculture

The conceptual foundation of ICTs in agriculture is rooted in their role as knowledge intermediaries that enhance information flow between farmers, researchers, extension agents, markets, and policymakers. E-agriculture aims to reduce transaction costs, improve transparency, and support evidence-based decision-making at the farm level (FAO, 2019). Unlike conventional extension systems characterized by linear information transfer, ICT-enabled systems facilitate interactive and real-time communication, allowing farmers to adapt recommendations to local contexts.

ICT Tools and Platforms Used by Farmers in Odisha

Farmers in Odisha utilize a range of ICT tools depending on their access to infrastructure, digital literacy, and institutional support. Mobile phones are the most widely adopted technology, used for voice-based advisories, SMS alerts, and mobile applications related to weather forecasting, crop practices, and market prices. Mass media such as radio and television continue to play an important role, particularly among small, elderly, and tribal farmers. Digital kiosks and Common Service Centres (CSCs) further support farmers by providing access to e-governance services, crop insurance, and subsidy-related information. Empirical studies suggest that affordability and ease of use make mobile-based ICTs more prevalent than internet-intensive platforms (Mittal & Mehar, 2016).

Role of ICTs in Agricultural Extension and Advisory Services

ICTs have significantly transformed agricultural extension delivery in Odisha by improving the reach, timeliness, and relevance of advisory services. Digital platforms provide farmers with timely weather forecasts, crop-specific best practices, pest and disease diagnostics, and input recommendations. Services such as Kisan Call Centres and mobile-based advisories enable direct interaction between farmers and agricultural experts, thereby reducing reliance on physical extension visits. ICT-enabled extension systems have proven particularly valuable during climatic uncertainties and extreme events, enabling rapid dissemination of critical information (World Bank, 2017).

ICTs and Market Access for Farmers

Limited market access and price volatility remain major challenges for farmers in Odisha, often resulting in low farm incomes and distress sales. ICTs contribute to market transparency by providing real-time price information, demand trends, and alternative marketing channels. Digital platforms such as e-NAM facilitate competitive price discovery and reduce the role of intermediaries. Additionally, ICTs support collective marketing initiatives through Farmer Producer Organizations (FPOs), enhancing farmers' bargaining power and market participation (Government of India, 2020).

Institutional and Policy Support for ICT-Based Agriculture in Odisha

The diffusion of ICTs in Odisha's agricultural sector is supported by a range of national and state-level policy initiatives. Programs under Digital India and the National e-Governance Plan in Agriculture (NeGP-A) aim to integrate digital technologies with extension and service delivery mechanisms. At the state level, initiatives such as digital farmer databases, online input distribution systems, and ICT-based monitoring of agricultural schemes have been introduced. Collaborative efforts involving public institutions, private technology providers, and non-governmental organizations are critical for scaling ICT innovations at the grassroots level.

Socio-Economic Impact of ICT Utilization among Farmers

The utilization of ICTs in agriculture has demonstrated positive socio-economic outcomes, including improved farm productivity, enhanced decision-making capacity, reduced information asymmetry, and increased income opportunities. Access to digital information

supports risk management, particularly in climate-vulnerable regions. However, the benefits of ICT adoption are unevenly distributed. Marginal farmers, women, and tribal communities often face barriers such as low digital literacy, limited device ownership, and poor connectivity, underscoring the need for inclusive digital strategies (Mittal & Mehar, 2016).

Pros and Cons of ICT Utilization in Agriculture

Pros include timely access to agricultural information, improved farm-level decision-making, enhanced market transparency, cost-effective extension delivery, and increased farmer empowerment. Conversely, key challenges include the digital divide across regions and social groups, infrastructural limitations in remote areas, dependence on reliable electricity and network connectivity, and the risk of misinformation or information overload.

Conclusion

ICTs have emerged as transformative forces in Odisha's agricultural landscape, acting as digital seeds of change that modernize farming practices and strengthen rural livelihoods. While their potential to enhance productivity, extension efficiency, and market access is well established, challenges related to inclusivity, infrastructure, and capacity building remain significant. To ensure sustainable and equitable outcomes, ICT-driven agricultural development must prioritize farmer-centric design, localized content, digital literacy training, and strong institutional support. Integrating digital tools with traditional extension systems and community-based approaches will be essential for realizing the full potential of ICTs in Odisha's diverse farming systems.

References

1. FAO. (2019). E-agriculture in action: ICTs for agricultural innovation. Food and Agriculture Organization of the United Nations, Rome.
2. Government of India. (2020). National e-Governance Plan in Agriculture (NeGP-A). Ministry of Agriculture and Farmers Welfare, New Delhi.
3. Mittal, S., & Mehar, M. (2016). Socio-economic factors affecting adoption of modern information and communication technology by farmers in India. Agricultural Economics Research Review, 29(2), 199–212.
4. World Bank. (2017). ICT in agriculture: Connecting smallholders to knowledge, networks, and institutions. World Bank Group, Washington, DC.