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ICT and Today's Agricultural Extension: Has Extension Truly Adopted ICT, and Does It Reach the Village?

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Agricultural extension has historically played a vital role in enhancing agricultural productivity, food security, and rural livelihoods by facilitating the transfer of knowledge, technologies, and skills from research institutions to farmers. Conventional extension approaches—such as farm and home visits, demonstrations, field days, group meetings, and training programmes—have been effective in building trust and enabling location-specific learning. However, these methods are often constrained by inadequate manpower, limited financial resources, and difficulties in reaching a large and geographically dispersed farming population (Anderson & Feder, 2007; Swanson & Rajalahti, 2010).

In recent decades, rapid advancements in Information and Communication Technologies (ICTs) have transformed communication systems worldwide, including rural areas. Increased penetration of mobile phones, internet connectivity, and digital media has created new opportunities for strengthening extension delivery systems. ICT-based extension is often promoted as a cost-effective, scalable, and time-efficient solution capable of overcoming many limitations of traditional extension systems (Aker, 2011).

In India, ICT has been strongly integrated into agricultural policy frameworks through initiatives such as Digital India, the National e-Governance Plan in Agriculture (NeGP-A), mKisan, Kisan Call Centres (KCCs), e-NAM, Krishi Vigyan Kendra (KVK) portals, mobile applications, and community radio stations. These initiatives suggest that agricultural extension has formally embraced ICT. However, an important question remains unanswered: Has ICT truly been adopted in extension practice, and does it meaningfully reach farmers at the village level?

This article critically examines the concept, adoption, and real-world functioning of ICT in

agricultural extension, with a particular focus on village-level realities. It argues that while ICT adoption is evident at institutional and policy levels, its penetration, regular use, and impact at the grassroots level remain uneven and limited.

Concept of ICT in Agricultural Extension

ICT in agricultural extension refers to the systematic use of digital tools, communication technologies, and information systems to generate, store, process, retrieve, and disseminate agricultural information to farmers and other stakeholders (Aker, 2011; FAO, 2019). Unlike traditional extension methods that rely primarily on physical interaction, ICT-enabled extension enables rapid, interactive, and multi-directional communication across distances.

ICT Tools Used In Agricultural Extension Include

- Mobile phones (SMS, voice calls, IVR systems, mobile applications) for weather alerts, pest and disease advisories, market prices, and scheme information
- Internet-based platforms such as agricultural portals, e-extension systems, and social media (WhatsApp, YouTube, Facebook)
- Mass media, particularly community radio and agricultural television, which are highly effective for illiterate and semi-literate farmers
- Digital kiosks and information centres providing access to expert advice and government services
- Decision support systems, GIS, and AI-based advisories for crop planning, precision agriculture, and risk management

The primary objectives of ICT-based extension include timely and accurate information delivery, cost-effectiveness, wider outreach, improved transparency, and farmer empowerment (Davis et al., 2014). ICT also enables feedback mechanisms, allowing extension systems to become more participatory and demand-driven. However, effectiveness depends not merely on technology availability but also on user capacity, content relevance, and local contextualization.

Extent of ICT Adoption in Today's Extension System

Institutional Adoption

At the institutional level, ICT adoption in agricultural extension has increased significantly. Most agricultural universities, research institutions, line departments, and Krishi Vigyan Kendras (KVKs) maintain websites, digital repositories, and social media accounts. Extension advisories are disseminated through mobile messages, WhatsApp groups, YouTube videos, and online training modules (Davis et al., 2014).

This widespread institutional use indicates that ICT has been structurally integrated into extension systems. Digital reporting, online meetings, and e-learning platforms are now common within extension organizations.

Policy and Programme Support

Government policies strongly promote ICT-based extension. Under Digital India and NeGP-A, emphasis is placed on farmer-centric digital governance, online service delivery, and real-time advisory systems. Programmes such as mKisan, KCCs, soil health card portals, and weather-based advisories reflect this commitment (Government of India, 2020).

From a policy perspective, ICT adoption appears robust and progressive. However, policy enthusiasm does not automatically translate into effective field-level implementation.

Readiness of Extension Personnel

The digital readiness of extension personnel varies widely. Younger professionals and researchers tend to adopt ICT tools more readily, while many field-level extension workers continue to rely on traditional approaches due to limited training, infrastructure constraints, or lack of confidence in digital tools. This uneven capacity significantly affects ICT utilization at the village level.

Real Village Scenario: ICT in Practice at the Grassroots Level

The village-level reality of ICT-based extension presents a mixed and complex picture. While smartphones are increasingly available, their use for agricultural purposes remains limited. Most farmers primarily use mobile phones for voice calls, entertainment, and social communication rather than independently accessing agricultural applications or portals.

In many villages, ICT-based extension functions through intermediaries such as extension workers, KVK scientists, progressive farmers, or input dealers. WhatsApp groups managed by these intermediaries are common, but active participation is limited to a few members. Information often spreads verbally rather than digitally, maintaining the dominance of interpersonal communication.

Community radio and locally produced agricultural videos have shown greater acceptance, especially among women, elderly farmers, and marginal farmers. Collective listening and discussion foster shared learning and trust-building. However, access remains uneven, with progressive and resource-rich farmers benefiting more than smallholders.

Thus, ICT in villages often supports extension rather than replacing traditional methods. Trust, personal interaction, and local experience remain central to farmers' decision-making processes.

Does ICT-Based Extension Truly Reach Villages?

Despite the proliferation of ICT platforms, their reach into villages remains partial and uneven. Infrastructure constraints such as poor internet connectivity, unreliable electricity, and limited access to smartphones restrict ICT use, particularly in remote and tribal areas (Aker, 2011; FAO, 2019).

Digital literacy is another major barrier. Many farmers lack the skills required to navigate mobile applications, portals, or online advisories. Language barriers further limit effectiveness, as content is often technical and insufficiently localized.

Gender disparities also affect reach. Women farmers frequently have limited access to digital devices and fewer opportunities for ICT training, reinforcing existing inequalities (FAO, 2019). Consequently, ICT-based extension has expanded information availability but has not ensured equitable access.

Challenges Limiting Effective ICT Adoption

Several challenges constrain the effective adoption of ICT in agricultural extension:

- Persistent rural–urban digital divide

- Inadequate infrastructure and connectivity
- Low digital literacy among farmers and extension staff
- Generic and non-localized content
- Gender and social inequalities
- Weak feedback, monitoring, and evaluation mechanisms

These challenges create a gap between the availability of ICT tools and their meaningful use at the village level.

Way Forward: Making ICT Truly Reach Villages

To ensure meaningful ICT adoption, digital tools must complement rather than replace conventional extension approaches. A blended extension model that integrates ICT with interpersonal communication is essential for building trust and improving technology adoption.

Key strategies include strengthening digital literacy through village-level training programmes, promoting community-based ICT tools such as community radio and participatory video, and developing localized, need-based content. Capacity building of extension personnel, gender-sensitive inclusion strategies, improved rural infrastructure, and robust feedback mechanisms are also critical for ensuring that ICT-based extension genuinely reaches and benefits village communities.

References

1. Aker, J. C. (2011). Dial "A" for agriculture: A review of information and communication technologies for agricultural extension in developing countries. *Agricultural Economics*, 42(6), 631–647.
2. Anderson, J. R., & Feder, G. (2007). Agricultural extension. In R. Evenson & P. Pingali (Eds.), *Handbook of Agricultural Economics* (Vol. 3, pp. 2343–2378). Elsevier.
3. Davis, K., Babu, S. C., & Blom, S. (2014). ICTs and agricultural extension: Challenges and opportunities. *Journal of Agricultural Education and Extension*, 20(1), 1–6.
4. Food and Agriculture Organization. (2019). *E-agriculture in action: ICTs for rural development*. FAO.
5. Government of India. (2020). *National e-Governance Plan in Agriculture (NeGP-A)*. Ministry of Agriculture & Farmers Welfare.
6. Swanson, B. E., & Rajalahti, R. (2010). *Strengthening agricultural extension and advisory systems*. World Bank.