

Use of ICT Tools in Agricultural Extension: Revolutionizing Farmer Outreach

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Agricultural extension is the cornerstone of transforming agricultural research into practical application on the ground. Traditionally dependent on human agents and face-to-face interactions, extension services have long struggled with challenges such as scale, timeliness, and inclusivity. In India where agriculture supports over 50% of the population reliable and timely extension is essential to improve productivity, adapt to climate variability, and ensure sustainable development.

Information and Communication Technologies (ICTs) are reshaping this dynamic. From radio broadcasts to smartphones and AI-powered apps, ICT tools provide opportunities for more efficient, interactive, and farmer-centric outreach. They bring expert knowledge directly to the fields and mobile devices of even the

most remote farmers, thus bridging the persistent research-extension-farmer gap.

Evolution of ICT in Agricultural Extension

ICT use in agriculture has gone through several distinct phases:



1. Radio and Television Era (1950s–1990s):

Initiatives like *Krishi Darshan* provided generic farm advice on national broadcast platforms. Despite low personalization, this was the first large-scale

information outreach.

2. Telephony and Helpline Phase (1990s–2000s):

The introduction of toll-free farmer helplines and agricultural call centers (e.g., Kisan Call Centres) allowed two-way interaction and real-time problem solving.

3. Internet Portals and Kiosks (2000s):

Web portals such as AGMARKNET and farmer-accessible ICT

kiosks (e-Choupals) offered access to localized information on prices, weather, and schemes.

4. Mobile and Smart App Revolution (2010s onwards): With the rapid spread of smartphones, a wave of mobile applications and SMS-based advisory systems revolutionized communication between farmers and experts.

5. AI, Big Data, and IoT (Emerging Phase): Today, precision farming tools powered by artificial intelligence and the Internet of Things (IoT) offer predictive analytics, automation, and hyper-local advisories.

Major ICT Tools Used in Agricultural Extension

1. Mobile Phones and SMS-Based Services

Mobile penetration in rural India has enabled millions of farmers to access information through voice calls and text messages. Services like mKisan deliver agro-advisories, market prices, and weather updates in regional languages.

Advantages

- Works even on basic phones
- Reaches farmers in remote areas
- Low cost and easy scalability

2. Agri-Apps and Smartphone Services

Mobile apps have become a popular platform for delivering customized and location-specific agricultural information.

Popular Apps

- **IFFCO Kisan App:** Offers weather forecasts, agri-advisories, and mandi prices.
- **Kisan Suvidha:** Government app that connects farmers with input suppliers and crop experts.

- **AgriApp & RML AgTech:** Deliver soil testing advice, pest alerts, and credit linkages.



Picture – Farmer using Agri apps

3. Interactive Voice Response Systems (IVRS)

IVRS allows farmers especially those with limited literacy to listen to pre-recorded advisories or connect directly with extension officers.

Example: Services like *Digital Green's* voice outreach programs have been successful in tribal and remote belts of Odisha and Bihar.

4. Radio and Community Radio Stations

Community radios remain an accessible and trusted platform in rural areas. These stations broadcast region-specific advisories in local dialects.

Examples:

- Krishi Community Radio Stations (run by Agricultural Universities)
- Radio programs like *Hello Kisan* and *Rythu Mitra*



Picture -Farmer listening to Agriculture radio program in the field

5. Television-Based Extension

TV programs like *Krishi Darshan* and regional language shows continue to serve as important educational tools for millions of farmers.

Impact: Especially popular among older farmers who may not use digital platforms.

6. Digital Portals and Knowledge Hubs

Government and private digital platforms are centralizing agricultural knowledge.

Examples:

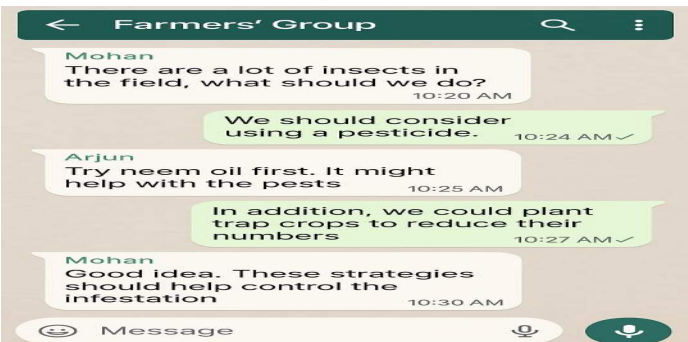
- **e-Choupal (ITC):** Kiosks installed in rural villages for agri-inputs and market access.
- **AGMARKNET:** Real-time mandi price information from thousands of markets.
- **Farmer Portal (Government of India):** A one-stop hub for schemes, advisories, and expert guidance.

7. Social Media Platforms and Messaging Apps

WhatsApp, Facebook, and YouTube are increasingly being used by farmer groups, extension workers, and agripreneurs.

Use Cases:

- WhatsApp groups sharing pest alerts
- YouTube farming channels explaining drip irrigation and organic methods
- Facebook pages for farmer cooperatives



Screenshot of a rural WhatsApp group discussing pest control strategies

8. Artificial Intelligence and Chatbots

AI is powering smart tools that can answer farmers' queries or provide forecasts based on data models.

Example:

- *Microsoft and ICRISAT's AI Sowing App* helped increase crop yields by 30% in Andhra Pradesh.
- *KisanGPT* and other AI chatbots are now being used to deliver interactive advisory in multiple languages.

9. Remote Sensing, GIS, and IoT Devices

These high-tech tools help monitor crop health, soil conditions, and weather, providing data-driven inputs.

Example: CropIn and Fasal use satellite imagery and sensors to deliver precision advisories to farmers.

Government Initiatives Promoting ICT in Agriculture

The Indian government has launched several initiatives to mainstream ICT in agricultural extension:

Program	Focus Area
mKisan Portal	Integrates SMS, IVRS, and expert consultation
Digital India	Promotes rural connectivity and digital literacy
NeGP-A (National e-Governance Plan – Agriculture)	Digitizes extension services across states
Agri Stack (under development)	Will create digital profiles for farmers to provide tailored services

Common Service Centers (CSCs)	Access points for farmers to use digital agri-services
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Benefits of ICT in Agricultural Extension

- **Scalability:** One message or advisory can reach thousands of farmers instantly.
- **Real-Time Updates:** Critical during pest outbreaks or climate events.
- **Cost-Effective:** Reduces the need for physical infrastructure or travel.
- **Customized Advice:** Based on crop, location, soil, and weather conditions.
- **Farmer Empowerment:** Informed decision-making leads to better yield and income.

Challenges in Adoption

Challenge	Impact
Digital Illiteracy	Limits ability to use apps or internet platforms
Language Barriers	Most platforms still lack comprehensive multilingual support
Connectivity Gaps	Internet penetration in some rural areas remains low
Mistrust in Technology	Older generations may resist digital tools
Data Privacy	Concerns about misuse of personal and farm-level data

Case Studies

Case Study 1: e-Choupal (ITC)

Deployed in over 40,000 villages, this digital platform has enhanced access to inputs and markets, reducing dependence on middlemen.

Case Study 2: mKisan SMS Service

Reaches over 5 crore farmers with timely advisories and government scheme updates in local languages.

Case Study 3: Digital Green Videos in Bihar

Localized video content produced and disseminated by rural women led to 25–30% higher adoption of recommended practices.

Future Outlook and Recommendations

- 1. Localization of Content:** Translate and tailor content to local languages and cultures.
- 2. Public-Private Partnerships:** Collaborate with startups and tech companies for innovative solutions.
- 3. Farmer Digital Literacy Campaigns:** Train farmers to use ICT tools effectively.
- 4. Policy for Open Data Access:** Encourage transparency and farmer data rights.
- 5. Focus on Marginalized Groups:** Ensure inclusivity for women, SC/ST farmers, and remote tribal communities.

Conclusion

ICTs have revolutionized the delivery of agricultural extension services by making them more accessible, efficient, and responsive to farmers' needs. From voice-based advisories to AI-driven apps, these tools are helping farmers make smarter decisions, increase productivity, and cope with climatic and market uncertainties.

Despite infrastructural and socio-cultural challenges, the momentum toward digital agriculture is unstoppable. With inclusive planning, sustained investment, and community participation, ICTs will continue to be instrumental in building a smarter, more resilient agricultural system in India.

References

1. Chand, R., & Saxena, R. (2021). *Digital Agriculture: Bridging the Information Gap*. NITI Aayog Discussion Paper. Retrieved from: <https://www.niti.gov.in>
2. FAO. (2021). *Information and Communication Technologies for Sustainable Agriculture*. Rome: Food and Agriculture Organization of the United Nations. Retrieved from: <https://www.fao.org/documents>
3. ICRISAT & Microsoft. (2019). *AI Sowing App for Farmers in Andhra Pradesh: Pilot Report*. International Crops Research Institute for the Semi-Arid Tropics. Retrieved from: <https://www.icrisat.org>
4. ITC Limited. (2022). *e-Choupal: Empowering Rural India through ICT*. ITC Sustainability and Social Impact Report. Retrieved from: <https://www.itcportal.com>
5. Kumar, A., & Mittal, S. (2020). *Role of ICT in Agricultural Extension: A Study from India*. *Agricultural Economics Research Review*, 33(1), 23–35. <https://doi.org/10.5958/j.0974-0279.33.1.003>
6. Ministry of Agriculture & Farmers Welfare. (2023). *mKisan Portal and Kisan Call Center Services*. Government of India. Retrieved from: <https://mkisan.gov.in>