



# Digitalisation Impact on Agriculture in India: Recent Developments

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## **Abstract:**

Agriculture remains the backbone of the Indian economy, employing nearly half of the workforce and contributing significantly to rural livelihoods. Traditionally characterized by manual practices and fragmented markets, the sector is now undergoing a digital transformation propelled by government initiatives, emerging technologies, and startup innovations. This digitalisation is reshaping farming into a knowledge-intensive and data-driven activity, enhancing productivity, sustainability, and farmers' incomes.

**Key Words:** *Digitalization of Indian agriculture- innovation and transformation in India's agricultural sector*

## **Introduction**

Government has finalized an India Digital Ecosystem of Agriculture (IDEA) framework which would lay down the architecture for the federated farmers' database is being built by taking the publicly available data as existing in various schemes and linking them with the digitized land records. The IDEA would serve as a foundation to build innovative agri-focused solutions leveraging emerging technologies to contribute effectively in creating a better Ecosystem for agriculture in India. This Ecosystem shall help the Government in effective planning towards increasing the income of farmers in particular and improving the efficiency of the agriculture sector as a whole. Further, Technology/Agri-tech/StartUp companies were identified and invited to collaborate with the Government of India and develop Proof of Concepts (PoC) based on the federated Farmers' database. A public notice through the Department's website was also issued inviting proposals for MoU. Companies were invited to sign MoU on purely pro bono basis for a period of one year and develop PoCs.

## **Digital Agriculture Initiatives in India**

The Digital Agriculture Mission 2021–2025 was launched in September 2021 by Narendra Singh Tomar, Union Minister of Agriculture and Farmers Welfare. Five Memorandum of Understandings (MoUs) were signed to advance digital agriculture through pilot projects with Cisco, Ninjacart, Jio Platforms Limited, ITC Limited, and National Commodity and Derivatives Exchange (NCDEX) e-markets Limited (NeML). The Digital Agriculture Mission 2021–2025 aims to encourage and speed up projects based on cutting-edge technologies, including AI, blockchain, remote sensing, robots, and drones. In August 2019, Cisco created an

Agricultural Digital Infrastructure (ADI) solution to improve farming and knowledge exchange. This played an essential role in the data pool that the Department of Agriculture developed under the National Agri Stack. The Jio Agri (Jio Krishi) platform was introduced in February 2020, and it digitalised the agricultural ecosystem along the entire value chain to empower farmers. The platform's primary function leverages data from standalone applications to offer counsel. Its advanced features use data from various sources, input it into AI algorithms, and then deliver precise, individualised advice.

## Objectives of Digitalisation of Agriculture in India

### 1. Enhance Agricultural Productivity

To improve crop yields and farm efficiency through data-driven decision-making,

### 2. Improve Farmers' Access to Information

To provide timely information on weather forecasts, soil health, pest management, market prices, and best farming practices through mobile applications and digital platforms.

### 3. Promote Efficient Resource Management

To optimize the use of inputs such as water, fertilizers, seeds, and pesticides by leveraging AI, IoT, satellite data, and soil profiling technologies.

### 4. Strengthen Market Linkages and Price Realisation

To connect farmers directly with national and global markets through digital marketplaces like e-NAM,

## What is the Digital Agriculture Mission?

- **Digital Agriculture Mission:** The Digital Mission India was launched in September 2024 with an outlay of Rs. 2817 Crore to establish Digital Public Infrastructure (DPI) for agriculture, as announced in the 2023-24 and 2024-25 budgets.
- **State Collaboration:** The Government of India has signed MoUs with 19 States to facilitate the development of these DPIs.
- **Agri Stack:** Farmers will receive a digital identity (Farmer ID) similar to Aadhar with data on crops collected through mobile-based surveys.
  - The goal is to create digital identities for 11 crore farmers by 2026-27, with a nationwide crop survey set to launch within two years.
- **Krishi Decision Support System:** Launched in August 2024, this system will unify remote sensing data on crops, soil, and weather, aiming to create Soil Profile Maps for 142 million hectares of agricultural land.
- **Digital General Crop Estimation Survey (DGCES):** This initiative will provide yield estimates and roll out nationwide from 2024-25.
- **Krishi Sakhis:** A MoU signed in 2023 promotes the Krishi Sakhis initiative, training women in agricultural practices.

- Krishi Sakhis are trained in agro-ecological techniques and receive refresher courses on natural farming and soil health.
- They will be certified as Para-extension Workers after passing a proficiency test.
- It is estimated that certified Krishi Sakhis can earn over Rs 50,000 annually, enhancing their role in supporting rural agriculture.

A major milestone in India's agritech journey is the Digital Agriculture Mission, approved in September 2024 with an outlay of around ₹2,817 crore as part of broader agricultural reforms. The mission's core aim is to build Digital Public Infrastructure (DPI) for agriculture, enabling seamless service delivery and decision-making support for farmers. Key components include:

- **Krishi Decision Support System (DSS)** – Integrating satellite, weather, soil, and crop data to offer actionable insights.
- **Digital Crop Survey and Soil Profile Mapping** – Providing real-time data for accurate crop estimation and soil health assessment.

These integrated systems transform agricultural governance, making it transparent, efficient, and responsive.

The Union Budget 2024-25 further reinforced this digital push by allocating funds for DPI and related initiatives, strengthening agricultural tech infrastructure across states.

- **Improving Financial Accessibility:** Banks should provide low-interest loans, subsidies, and Microfinance specifically for digital agriculture investments.
  - Introducing flexible credit options and incentives for adopting digital tools will improve financial viability for farmers.
- **Enhancing Farmer Capacity and Digital Literacy:** Government-led training programs and awareness campaigns can bridge the digital literacy gap, ensuring rural communities can leverage digital tools effectively.
  - Extension workers should be trained to assist farmers in using ICT solutions, ensuring hands-on guidance.
- **Data Security and Privacy Measures:** With increased reliance on data through initiatives like AgriStack, robust data protection policies are essential to safeguard farmers' personal information.
  - Clear guidelines on data usage, transparency, and farmer consent should be established to protect data integrity.

## Conclusion

India is continually working to develop and implement regulations that would improve the sustainability of its agricultural industry. Partnerships between corporations and the government can aid in developing a smart agriculture industry, given India's dynamic corporate structure and to reach goals like doubling farmer incomes and sustainable growth, the Indian government is undertaking these initiatives and programmes. The widespread adoption of digital agriculture in India would therefore require a multi-stakeholder strategy in which the government plays a significant enabler's role in the ecosystem.

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