

Digital Agriculture Mission: Transforming Farming through Technology

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Agriculture has always been the backbone of India's economy, contributing significantly to GDP and employment. However, traditional farming methods face challenges such as climate change, water scarcity, and low productivity. To address these issues, the Union Cabinet Committee, chaired by Prime Minister Narendra Modi approved the 'Digital Agriculture Mission' with a substantial financial outlay of Rs. 2,817 Crore, including a central government share of Rs. 1,940 Crore, on September 2, 2024. Digital Agriculture Mission is a transformative initiative aimed at integrating advanced technologies into agriculture to enhance efficiency, sustainability, and profitability. India's digital revolution has significantly transformed governance and service delivery in recent years by creating digital identities, secured payments and transactions. This progress has paved the way for a thriving digital ecosystem across various sectors, including finance, healthcare, education, and retail, positioning India as a leader in citizen-centric digital solutions. The Digital Agriculture Mission is designed as an umbrella scheme to support various digital agriculture initiatives. These include creating Digital Public Infrastructure (DPI), implementing the Digital General Crop Estimation Survey (DGCES), and supporting IT initiatives by the Central Government, State Governments, and Academic and Research Institutions. The scheme is built on two foundational pillars:

- Agri Stack
- Krishi Decision Support System.

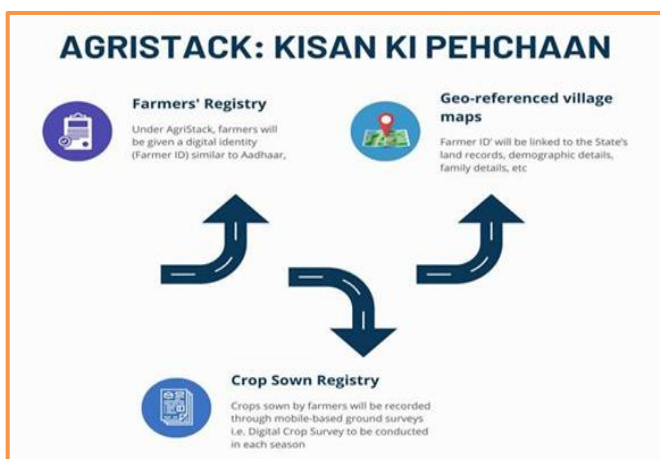


AgriStack

AgriStack is a farmer-centric digital ecosystem that consolidates agricultural data into a unified, interoperable system. It functions as a Digital Public Infrastructure (DPI), similar to Aadhaar and UPI in governance and finance.

Key Components of AgriStack includes:

1. **Farmers' Database** – A centralized repository containing detailed information about farmers, including land records, crop history, and financial data, enabling targeted service delivery and policy implementation.
2. **Unique Farmer ID (UFID)** – A digital identifier for each farmer to streamline access to subsidies, credit, and integration with government schemes like PM-KISAN, Soil Health Cards, and Fasal Bima Yojana while reducing duplication and fraud.
3. **Digital Land Records** – Integration with land registries to provide verified, real-time land ownership and usage data, facilitating easier access to loans and insurance.
4. **Agri-Marketplace Platforms** – Digital marketplaces connecting farmers with buyers, reducing middlemen and ensuring better price discovery through e-NAM and other platforms.
5. **Precision Agriculture Tools** – Internet of Things (IoT)-enabled devices, drones, and AI-based analytics to optimize irrigation, pest control, and crop management for higher productivity.
6. **Financial & Insurance Services** – Seamless integration with banks and insurers to provide farmers with customized credit, insurance (PMFBY), and risk management solutions.
7. **Extension Services & Advisory** – AI-driven chatbots, mobile apps, and helplines to deliver real-time advisories on weather, best practices, and government schemes.
8. **Supply Chain & Logistics Support** – Blockchain-enabled traceability systems for agri-products, ensuring transparency from farm to fork and minimizing post-harvest losses.



Krishi Decision Support System (Krishi DSS)

The Krishi Decision Support System (Krishi DSS) is an advanced digital platform designed to assist farmers and policymakers in making informed agricultural decisions by leveraging data analytics, weather forecasting, and AI-driven insights. It integrates real-time data on weather patterns, soil health, crop conditions, and market trends to provide personalized recommendations, optimizing farm productivity and sustainability.

Key features of Krishi DSS includes:

1. **Weather-Based Advisory** – Offers hyper-local weather forecasts and alerts to help farmers plan irrigation, sowing, and harvesting effectively.
2. **Crop & Soil Recommendations** – Analyzes soil health data to suggest suitable crops, fertilizers, and pest control measures for higher yields.
3. **Disease & Pest Prediction** – Uses AI and satellite imagery to detect early signs of crop diseases and pests, enabling timely intervention.
4. **Irrigation Scheduling** – Recommends optimal irrigation



schedules based on soil moisture levels and weather forecasts to conserve water.

5. **Market Intelligence** – Provides real-time price trends and demand forecasts to help farmers decide the best time and place to sell their produce.
6. **Government Scheme Alerts** – Notifies farmers about relevant subsidies, loans, and agricultural schemes they can avail.
7. **Mobile & SMS Integration** – Ensures accessibility even in low-connectivity areas through SMS alerts and voice-based advisories in regional languages.

Challenges

- **Digital Divide & Infrastructure Limitations** - A major hurdle is the **digital divide and infrastructure limitations**, where poor internet connectivity in rural areas restricts access to real-time farming advisories and digital tools. While mobile usage is growing, many small farmers still rely on basic phones, limiting their ability to utilize advanced AgriTech applications. Additionally, frequent power outages disrupt IoT devices and digital kiosks, further complicating tech adoption.
- **Data Privacy & Cybersecurity Concerns** – It's also pose significant risks, as the aggregation of farmer data—including land records and financial details—raises fears of misuse and corporate exploitation. Cyber security vulnerabilities in digital platforms could lead to hacking and data breaches, eroding trust among farmers who are already cautious about new technologies.
- **Fragmented & Incomplete Land Records** - **Land record fragmentation** remains a persistent issue, with incomplete digitization and ownership disputes hindering accurate farmer verification and subsidy distribution. The prevalence of small and marginal landholdings over 86% of farmers own less than two hectares makes investments in precision farming technologies economically unviable for many.
- **High costs of implementation** - An IoT devices, Drones, and AI-driven tools remain prohibitively expensive for small-scale farmers without subsidies. Heavy reliance on private agri-tech startups for innovation raises concerns about commercial exploitation, necessitating stronger regulatory frameworks.

Conclusion

The Digital Agriculture Mission (DAM) 2024 aims to revolutionize Indian farming by integrating AI, IoT, blockchain, and big data to create a smart, data-driven, and sustainable agriculture sector. Powered by AgriStack and the Krishi Decision Support System, Digital Agriculture Mission provides real-time insights on weather, soil, and market trends, helping farmers boost productivity, reduce costs, and manage risks. Precision farming, digital land records, and blockchain-enabled supply chains promise to double incomes and ensure fair pricing. For success, the mission needs strong partnerships, digital literacy, and tech accessibility—transforming farming into a modern, profitable enterprise. The road ahead is complex, but with **inclusive policies, robust infrastructure, and farmer-centric design**, India's digital farming revolution can become a reality.