BACKGROUNDERS
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Government of India

Role of Technology in Empowering Annadatas

Transforming Agriculture through Technology

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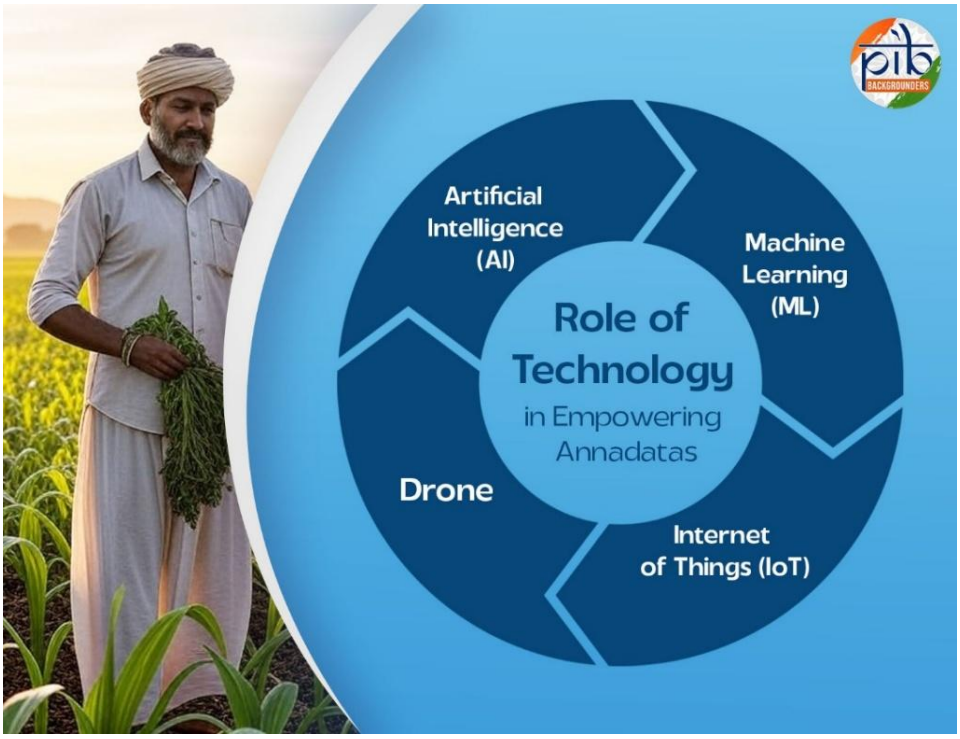
> *Our farmers are the 'Annadatas.' When our farmers prosper, India will prosper*
>
> *- Prime Minister Narendra Modi*

Introduction

India has been an agrarian country since ancient times, and therefore, the foundation of a strong and developed nation lies in empowering and uplifting its farmers—the Annadatas. Recognizing this, the government has consistently prioritized farmers' welfare, and worked on streamlining the *Beej Se Bazaar Tak* (from seed to market) journey to make it more efficient and productive. Technology is today playing a pivotal role in this transformation.

The sector is witnessing large-scale integration of modern tools—Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning (ML), drones, satellite mapping, and the JAM Trinity. These innovations are revolutionizing farming practices and improving the lives of millions of farmers.



Role of Artificial Intelligence (AI) and Internet of Things (IoT)

To modernize agriculture and improve farmer welfare, AI and IoT are being widely adopted. They help increase yields, encourage sustainable practices, and address challenges related to weather, pests, and market access.

- **Kisan e-Mitra**: Government of India has developed Kisan e-Mitra, an AI Chatbot –to address farmers' queries digitally in their own languages, thereby empowering them through technological interventions. The Kisan e-Mitra is removing technological and language barriers of the farmers. This AI-powered voice-based chatbot answers farmers on their queries regarding PM Kisan Samman Nidhi scheme, Kisan Credit Card & Pradhan Mantri Fasal Bima Yojana in **11 Indian languages**. It handles over **20,000 queries** daily and has already responded to more than **95 lakh farmer inquiries**.
- **National Pest Surveillance System (NPSS):** Launched on 15 August 2024, NPSS uses AI and ML to detect pest attacks and crop diseases early. Farmers and extension workers can upload crop images to NPSS app or its portal https://npss.dac.gov.in/for instant analysis and expert advice. Covering **61 crops** and identifying more than **400 pests**, it helps protect crops from climate-related risks. As on March 2025, **10154 pest management advisories** have been issued through NPSS for the benefit of farmers.
- **Satellite-based Crop Mapping:** AI-powered analytics help monitor crop growth with weather patterns, enabling accurate forecasting and better decision-making at the farm level.
- **IIT Ropar – Technology and Innovation Foundation** is developing IoT-based devices and sensors aimed at enhancing saffron cultivation and streamlining its supply chain across India.

Applications of AI and IoT include precision farming, climate monitoring, smart greenhouses, livestock tracking, and drone-assisted farming.

Space Technology in Agriculture

Space technology is being leveraged to make farming more resilient and data-driven:

- **FASAL (Forecasting Agricultural output using Space, Agro-meteorology and Land based observations) Project:** Under FASAL program, the Mahalanobis National Crop Forecast Centre (MNCFC) plays a crucial role in Crop Production Forecasting for India. Using methodologies developed by the Space Applications Centre (SAC), ISRO, the MNCFC generates crop forecasts at District, State, and National levels for major crops of the country. The program covers a wide range of crops, including wheat, rice, mustard, sugarcane, jute, rabi sorghum, cotton, soybean, tur, gram, and lentil, for which crop maps and acreage statistics are produced. Recently, the center has also started generating a Crop Health Factor for wheat and paddy. These forecasts are generated using a combination of optical and microwave remote sensing data, which help in estimating crop area, assess crop condition, and predicting production.

- **Real-time Drought Monitoring:** Geoportals developed with Space Applications Centre (SAC), ISRO provide live updates on rainfall, soil moisture, crop condition, water storages etc.
- **Support to PM Fasal Bima Yojana (PMFBY):** Under PMFBY, space technology is being leveraged for several operational applications, including smart sampling for crop cutting experiments (CCEs), yield estimation, and dispute resolution related to area and yield.
- **Krishi Decision Support System (Krishi-DSS):** A cloud-based geospatial platform integrating satellite images, weather, soil, and water data to guide farmers and policymakers.

Use of Drones

Drones are emerging as game changers in agriculture, helping with spraying, monitoring, and precision farming. The government has introduced several initiatives to promote their adoption:

❖ **Subsidies and Support under Sub-mission On Agriculture Mechanization** (**SMAM**):

The Sub-Mission on Agricultural Mechanization' (SMAM) is one of the Centrally Sponsored Scheme of the Rashtriya Krishi Vikas Yojana (RKVY) implemented through the State Governments. Under this scheme, financial assistance is provided to the farmers for purchase of agricultural machines and equipments including the post-harvest and processing machines on individual ownership basis. Financial assistance is also provided for establishment of Custom Hiring Centres (CHCs) and Village Level Farm Machinery Banks (FMBs) in order to provide machines and equipments to the farmers on rental basis as per their requirements.

- 100% financial assistance, up to ₹10 lakh per drone, is provided for purchase and field demonstrations by ICAR institutes, Farm Machinery Training & Testing Institutes, Krishi Vigyan Kendras (KVKs).
- Farmers Producers Organizations (FPOs) are eligible for grants up to 75% of the cost of Kisan Drones for demonstrations on farmers' fields.
- In order to make available drone services to farmers on rental basis, financial assistance @ 40% up to a maximum of Rs. 4.00 lakhs are provided for purchase of drones by Custom Hiring Centres (CHCs) under Cooperative Society of Farmers, FPOs and Rural entrepreneurs.
- Agriculture graduates establishing CHCs are eligible for 50% assistance, up to ₹5 lakh per drone.
- Individual small and marginal farmers, SC/ST farmers, women farmers, and farmers from North Eastern States are provided 50% assistance, up to ₹5 lakh per drone.
- Other farmers are eligible for 40% assistance, up to ₹4 lakh per drone.

❖ **Namo Drone Didi** Scheme: The Government has approved the 'Namo Drone Didi' Central Sector Scheme with an outlay of ₹1261 crore for 2023-24 to 2025-26, aimed at providing 15,000 drones to Women Self Help Groups (SHGs). The scheme seeks to promote

advanced agricultural technology for improved efficiency, higher crop yield, and reduced operational costs, while simultaneously empowering SHGs as drone service providers to enhance their income and livelihood opportunities. Under this initiative, selected Women SHGs are eligible for Central Financial Assistance (CFA) covering 80% of the drone package cost, up to a maximum of ₹8 lakh.

- **SVAMITVA** Scheme: The scheme helps people in villages get legal ownership papers for the houses and land they live on. Drones are also being utilized for land mapping, helping farmers obtain legal property ownership documents. As on July 2025, drone survey has been completed in **3.23 lakh** villages under the **SVAMITVA Scheme.** This not only reduces disputes but also facilitates access to bank loans, thereby improving farmers' prosperity.

JAM Trinity

The **Jan Dhan–Aadhaar–Mobile (JAM) Trinity** ensures transparent and leak-proof subsidy transfers directly into farmers' bank accounts. This system has eliminated middlemen and corruption, empowering farmers economically.For instance, on 2 August 2025, honourable Prime Minister Narendra Modi released the 20th instalment of **PM-KISAN**, transferring ₹20,500 crore directly to the accounts of 9.7 crore farmers. This is a powerful example of how JAM is transforming farmers' lives.

Beyond these initiatives, the government continues to push forward digital and technological missions in agriculture—whether through the Digital Agriculture Mission or e-NAM (National Agricultural Market). Each step is aimed at simplifying the farmer's journey from seed to market (*Beej Se Bazaar Tak*) and making Indian agriculture self-reliant, efficient, and future-ready.

Technology is no longer a distant concept for farmers—it has become an everyday ally in the fields, empowering the true providers of the nation, Annadatas.

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