

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
DEPARTMENT OF AGRICULTURE AND FARMERS WELFARE

LOK SABHA
STARRED QUESTION NO. 449
TO BE ANSWERED ON THE 24TH MARCH, 2026

PILOT PROJECTS USING AI IN AGRICULTURE

*449. SHRI B K PARTHASARATHI:

Will the Minister of AGRICULTURE AND FARMERS WELFARE कृषि एवं किसान कल्याण मंत्री be pleased to state:

- (a) whether the Government has implemented pilot projects using Artificial Intelligence (AI) in the agriculture supply chain, including applications such as blockchain-based traceability, warehouse management, quality assessment, grading, forecasting, logistics optimisation and procurement monitoring;
- (b) if so, the details of such pilot projects, including implementing Ministries/agencies, locations, commodities covered, technological solutions deployed and key outcomes;
- (c) the details of collaborations made with private sector partners, agri-tech start-ups, research institutions and technology companies for developing, testing or scaling AI-enabled agriculture supply chain technologies;
- (d) whether any assessment has been carried out on the impact of these AI solutions on efficiency, transparency, reduction of post-harvest losses, farmer incomes and market linkages and if so, the details thereof; and
- (e) the details of the measures taken by the Government to replicate or scale successful AI-based agriculture supply chain models across additional States, warehouses, mandis and FPOs?

ANSWER

MINISTER OF AGRICULTURE AND FARMERS WELFARE
कृषि एवं किसान कल्याण मंत्री (SHRI SHIVRAJ SINGH CHOUHAN)

(a) to (e): A statement is laid on the table of the House.

STATEMENT MADE IN REPLY TO PARTS (a) to (e) OF LOK SABHA STARRED QUESTION NO. 449 REGARDING PILOT PROJECTS USING AI IN AGRICULTURE RAISED BY SHRI B K PARTHASARATHI DUE FOR REPLY ON 24TH MARCH, 2026

(a) to (e): The Government is implementing pilot projects using Artificial Intelligence (AI) in the agriculture supply chain, including applications viz. blockchain-based traceability, warehouse management, quality assessment, grading, forecasting, logistics optimisation and procurement monitoring.

The Ministries are working in close collaboration with leading public institutions and technology partners, including the Indian Council of Agricultural Research (ICAR), the India Meteorological Department (IMD), the Ministry of Electronics and Information Technology (MeitY), the Indian Institute of Technology (IITs), and private entities with domain expertise. These collaborations support the development, testing, and scaling of AI-enabled solutions across agricultural value chains, including advisory services, crop monitoring and weather forecasting. Key initiatives undertaken by the Ministries in this regard are as follows:

I. Department of Agriculture & Farmers' Welfare:

- Under the Digital Agriculture Mission, the government is creating a database of basic farming-related information and using Artificial Intelligence (AI) to develop solutions that directly benefit farmers. The mission also aims to ensure that services and scheme benefits reach farmers quickly, easily, and with full transparency. An important component of this mission is AgriStack, a farmer-centric Digital Public Infrastructure (DPI). It is being developed as a public good, similar to Aadhaar, to enable faster and easier access to services and benefits for farmers. Under the AgriStack-DPI, every farmer is being provided with a digital identity called a Farmer ID. It functions like Aadhaar and is used as a “farmer’s identity.” This Farmer ID is linked to the farmer’s personal details, land records, crops grown, and assets such as livestock and fisheries. As of 20 March 2026, more than 9.2 Crore Farmer IDs have been created across the country.
- The Ministry of Agriculture and Farmers Welfare has initiated several AI-related projects and has also proposed new ones. These are being used for farmer advisories, pest control, crop identification, insurance, delivery of scheme benefits, and governance analytics. Some key AI initiatives are as follows:
 - i. National Pest Surveillance System (NPSS) – In this system, pests are identified based on photos, and farmers are provided with appropriate advice accordingly.
 - ii. AI-based Crop Identification – During digital crop surveys, AI is used to automatically identify crops, which helps in obtaining more accurate crop-related data.
 - iii. (AI-based Monsoon and Weather Advisory – This AI model is based on more than 100 years of data from the India Meteorological Department (IMD). It provides weather insights that help farmers make better decisions regarding sowing and irrigation.

- iv. **Bharat Vistar (Virtually Integrated System to Access Agricultural Resources)** – This is an advanced and integrated AI system that brings together scattered agricultural information onto a single platform. It integrates various schemes, institutions, and data sources, making it easier for farmers to access information. It is a conversational AI system through which farmers can interact directly to get information on government schemes, services, scientific farming practices, weather, pests, Soil Health Cards, and market prices (mandi rates). This helps reduce the information gap among farmers and provides accurate farming advice at scale. The service is also available on basic mobile phones. The first phase (Phase 1) of Bharat Vistar was launched on 17 February 2026.

II. **Indian Council of Agriculture Research (ICAR):**

- ICAR is focused on the development of AI-based technologies in Research & Development (R&D) programmes for achieving sustainable, climate smart, efficient solutions for precision farming, enhanced crop production, sustainable agriculture and improved live-stock management. During 2021-25, 115 AI-based research projects (List of the projects is given at Annexure-I) were operated in the following areas:
 - Mechanization of production and post-production operation of agricultural crops.
 - Agricultural/horticultural/plantation crops disease management.
 - Drone application in agriculture.
 - Jute fibre grading and jute retting system
 - Cotton ginning and Cotton yarn quality
 - Marine fishery species identification
- A technology namely “AI based Grain Analyzer Software” has been validated in the field by the private sector industry partner, M/s. Osaw India Pvt. Ltd (Indosaw), Ambala. The SPAD meter 2.0 which measures leaf chlorophyll concentration non-destructively has been licensed to the following three firms for multiplication and marketing:
 - M/s. GT Bio Science Pvt Ltd, Yavatmal, Maharashtra
 - M/s. SKR AGROTECH, Wardha, Maharashtra
 - M/s. WS Telematics Pvt. Ltd., Okhla Industrial Area, New Delhi
- In the aquaculture domain, fisheries research institutes have developed pilot-level AI/data-driven technology outputs under NEPPA-supported initiatives. The details are as follows:
 - **SMART Fish Feeder:** An intelligent fish feeding system for precision feed dispensing in aquaculture based on programmed schedules and culture requirements, aimed at improving feed-use efficiency and reducing feed wastage.
 - **CIFA AquaNIRNAY:** A geospatial decision-support tool using machine learning algorithms, remote sensing and GIS for identification of water bodies suitable for aquaculture development, to support scientific planning and prioritization.

- **LaksyaShrimp:** End-to-end block chain-based digital traceability system and method using IoT for end-to-end supply chain management in shrimp including broodstock, hatchery, nursery, grow-out, inputs, harvesting, aggregations, transportation, marketing, processing, exporting and retailing.

At present, the technologies developed are in pilot-scale evaluation.

III. Department of Food & Public Distribution (DFPD)

- DFPD is implementing the Artificial Intelligence (AI) based SMART Warehouse project in all Central Warehousing Corporation (CWC) food grain warehouses and 150 Food Corporation of India (FCI) owned warehouses. Components of AI enabled smart warehousing are:
 - AI enabled Bag counting system
 - AI enabled Face recognition system
 - AI enabled fire and smoke detection system
 - AI enabled rodent detection system
 - Smart locks
 - Gate automation
 - IOT sensors (CO2 and Phosphine Gas sensors)
- Besides, Bhandaran 360 (ERP system of CWC) has been implemented for warehouse management and also to support logistics optimization and demand forecasting. In addition, Transport Management System (TMS) has been deployed to enable live tracking and reduce dwell time.

IV. Department of Science & Technology (DST), Government of India

- The Department of Science and Technology is running two Technology Innovation Hubs (TIHs): one at IIT Bombay through the TIH Foundation, and another at IIT Ropar called AWaDH. These institutions are working on IoT/loE (Internet of Thing/Internet of Everything) and agricultural technologies, and are conducting pilot projects for the use of AI in agricultural supply chains.
- At IIT Bombay, the TIH Foundation is working in collaboration with the ICAR-Directorate of Onion and Garlic Research (ICAR-DOGR). The key areas of work include:
 - An image processing-based grading system for identifying different varieties of onions.
 - A smart sensor-based system for price management, which can detect onion rotting in advance using BLE mesh technology. This technology has been tested in farmers' warehouses in the Nashik region and has been shared with Jain Irrigation Systems Limited.
 - Additionally, under the NM-ICPS program, a project called "Bharat-Gen" is being developed to create multimodal and multilingual AI solutions. It also includes the "Krishi Sathi" platform, which provides farmers with personalized and real-time advisory services.

- At IIT Ropar (AWaDH), several AI-based pilot projects in the agricultural supply chain are being carried out through its startups. These include:
 - Quality assessment of maize and connecting farmers to markets in Punjab – by Roots Goods
 - Satellite and IoT-based crop monitoring and advisory services in Uttarakhand – by Bhoomi Cam
 - IoT-based food supply chain analytics in Maharashtra – by Qzense Labs
 - Climate-based decision-making and resource optimization in Haryana – by Navariti Innovation
 - A biodiversity monitoring system implemented in more than 38 locations, including India – in collaboration with Syngenta
 - Health monitoring of cows in Tarn Taran (Punjab) – by Moo Farm
- All these projects are being carried out with the support of TIH IIT Ropar (AWaDH), in collaboration with various partners through different startups. They cover sectors such as maize, cereals, and livestock.
- TIH AWaDH has established strong collaboration among industry, academia, and government, which is helping in the development, testing, and large-scale deployment of AI-based agricultural technologies.

These AI-driven innovation aims to facilitate to improved efficiency, enhanced transparency, better crop monitoring, a reduction in crop losses, and strengthened farmer decision-making. They also facilitate improved market linkages and supply chain management through better access to information and logistics support.

List of Research Projects incorporating Artificial Intelligence (AI) technologies operated during FY 2021-25:

Sl. No.	Project Name
1.	Development of robotic harvester for poly-house cultivated tomatoes
2.	IoT-Based Monitoring and Early Infection Detection in Dairy Cattle using Infrared Thermography (IRT)
3.	Image based Variable-rate Nitrogen Applicator
4.	Yield prediction using multi-temporal data from UAV-based multispectral imagery
5.	Plant Disease Detection Using UAV Multispectral Imagery
6.	Development of Plant Nitrogen Monitoring and Management System for Polyhouse
7.	Development of computer vision based human posture analyse system for ergonomic assessment
8.	Development and evaluation of robotic harvester for grape bunches
9.	Development of AI/ IoT Based intelligent Irrigation System for Field Crops
10.	Machine learning based Decision Support System (DSS) for micro-irrigation management
11.	Drone operated line seeder
12.	Drone Based Variable rate Fertilizer Applicator
13.	Development of robotic cotton picker
14.	Development of remotely controlled tree climber
15.	Development of robotic autonomous cart
16.	Development of computer vision based robotic manipulator for transplanting vegetable nursery
17.	Development and Evaluation of UAV-based Variable Rate Applicator for Fertilizer Application
18.	A machine learning approach for muscle fatigue detection during agricultural operations using smartphone
19.	Design, development, and safety evaluation of an AI-based emergency braking system for a tractor
20.	Image based hand held device for diseases identification in soybean
21.	AI-enabled hand held device for detection of abiotic stress in wheat and maize crop
22.	Development of automatic spraying system for polyhouse

23.	Deep learning based computer vision techniques for yield estimation of mandarin oranges
24.	Development of a controller based feed dispensing system for poultry
25.	Development of lab based robotic transplanter for plug-type vegetable seedlings
26.	Development remote operated weeder for wide spaced field crops
27.	Development of robotic transplanter for plug-type vegetable seedlings
28.	Development of unmanned rice transplanter
29.	Development of self-propelled track type vehicle for small farms
30.	Development and Evaluation of IoT based Smart Irrigation System for Field Crops in Vertisols.
31.	Development of digital weighing type lysimeter for irrigation scheduling of different crops
32.	Design and development of floating axial flow pump for small farms
33.	Development of robot for pollinator and spraying operation in the greenhouse to minimise drudgery
34.	Development of robot for pollinator and spraying operation in the greenhouse to minimise drudgery
35.	Development of robot for pollinator and spraying operation in the greenhouse to minimise drudgery
36.	Hyperspectral reflectance and multi-nutrient extractant based rapid assessment of soil properties for sustainable soil health in India
37.	Design and development of vision based inter and intra-row weeder suitable to small land holdings
38.	A cross platform application for Identification and advisory for managing diseases and insects in oilseed crops through Image Analysis and Artificial Intelligence
39.	Water demand estimation in a canal command area using Machine Learning
40.	Managing Irrigation Systems for Optimizing Water Productivity and Improving Resilience Using Advance Tools
41.	Natural grassland ecosystem monitoring system for peninsular and Trans Himalayan India to sustain pastoral communities
42.	Digital monitoring and mapping soil hydraulic properties using visible to thermal hyperspectral remote sensing of Indian west coastal region

43.	Empowering Farmers with Machine Learning-Based Price Forecasts for Plantation Crops of West Coast of India
44.	Deep Learning based AI models for Stress Detection from Plant digital Imageries
45.	Design and development of vision based inter and intra-row weeder suitable to small land holdings
46.	Assessment of important soil properties of India using Infrared Spectroscopy
47.	Development of hyperspectral-based model for in-situ estimation of soil carbon and nitrogen
48.	Network programme on Precision Agriculture (NePPA)
49.	Expanding breeding window of IMC (<i>Labeo catla</i>) for year-round seed availability
50.	IoT based precision enclosure culture and fisheries management in inland open waters
51.	A pilot project for developing drone technology for live fish transport and PAN India level demonstration
52.	Application of drone technology for Agriculture coordinated by ICAR-ATARI, Kolkata
53.	Development of Portable Fish Freshness Assessment Sensor
54.	Automated System for Marine Fishery Resources Landing Data collection via computer vision and AI-driven deep learning algorithms for species identification and quantification from Visual images
55.	ICAR-Network program on Precision Agriculture (NePPA) (Precision aquaculture/small scale culture fishery for fish production)
56.	Swachhta Action Plan and Commercial Utilization of Fish Waste from Urban Fish Markets
57.	Artificial intelligence powered diagnostic kit for real-time monitoring of nematode pests of sugarcane
58.	Screening of sugarcane progenies & germplasm for disease resistance, disease survey & surveillance and impact of climate changes on sugarcane diseases and disease management Disease surveillance
59.	Artificial Intelligence enabled Biotic & Abiotic Stress Detection and Advisory Mobile Application for Crops
60.	Development of Artificial Intelligence based Model and Tool for Genomic Studies
61.	Computational approaches for identification, structural and functional analysis of important genes for nutritional quality improvement and analysis of regulatory elements governing various traits in crops.
62.	M 15.10 Artificial intelligence based detection of disease and insect pests in sugarcane

63.	Development of a smartphone-based digital support system for the efficient monitoring of multiple diseases of sugarcane in India
64.	AE 1.27 Testing, evaluation and demonstration of different applications of spraying drone in sugarcane
65.	Studies on phylogenetic analysis and host pathogen interaction in leaf blight complex of wheat
66.	SoyAI: Transforming Soybean Cultivation Through Advanced AI Modelling
67.	Drone application in agriculture
68.	Development of Interactive Mobile Apps for Non-chemical Methods in insect pest management (In-House)
69.	Geo mapping of predominant insect pests and their natural enemies of India and development of IoT based crop advisory system for tomato (In-House)
70.	RAISE-Rice AI Stress Evaluator
71.	Smart precision models and Mobile Apps for real time advisories on Rice crop Management
72.	Insect-Pest and Disease Forecasting and Decision Support Systems in rice
73.	Active Optical Sensors based yield Prediction in Cotton and Crop Canopy Management using Unmanned Aerial System
74.	Deployment of AI Pheromone Trap for Real-time Monitoring of Cotton Pink bollworm in Punjab
75.	National Pest Surveillance System (NPSS)
76.	AI-based Mobile App for Identification of Key Pests of Brinjal and Okra and their Management
77.	Development of Mobile App for AI based Identification, Surveillance and Management of Key Pests of Maize
78.	Natural Grassland Ecosystem Monitoring System for Peninsular and Trans Himalayan India to Sustain Pastoral Communities
79.	Grassland Restoration and Rejuvenation for enhancing Grazing resources using Remote Sensing and Drone Technologies
80.	Establishment of information resource and prediction servers for the genes related to yield traits, biotic stress, and abiotic stress in agriculturally important crops.
81.	Genomic exploration of lesser-known chicken population of Jharkhand
82.	Agriculture Mechanization for implementation of its Component no. 1 under Agri Drone Project (ADP) Drone Technology Demonstration during 2022-23 under Central Sector Scheme of DA&FW
83.	Drone Robotics and machine learning

84.	Agri Drone Project (ADP) Drone Technology Demonstration during 2022-23
85.	Design and development of sensor based early pest detection technology
86.	Development of solar-powered variable swath herbicide applicator robot for high-value vegetable crop
87.	Development of sensor based low volume target sprayer for disease in vegetable crops
88.	Network Program on Precision Agriculture (NEPPA)
89.	Development of sensor based precision seeding retrofit module for cultivators
90.	Development and evaluation of automated sensors for a highly-efficient nutrition management system in indoor vertical farming
91.	Development of robotic precision planter
92.	Simulation modelling system for crop yield prediction in India (FASAL 2.0)
93.	Drone Robotics and machine learning
94.	Network Project on Computational Biology and Agricultural Bioinformatics Scheme
95.	Application of machine learning for Hyperspectral imaging and remote sensing aimed at early detection of fungal foliar disease and bacterial wilt disease in potato crop
96.	Yield forecasting for Maize, wheat and mustard in Delhi region under Forecasting Agriculture output using space, Agro-meteorology and land based observations (FASAL)
97.	Investment in ICAR leadership for Agricultural Higher Education (Activity-Capture of images using AI Mobile App for development and management of online disease & pest image database on various crops/Livestock and demonstration of developed mobile app to farmers and allied community)
98.	Farmer-driven localized artificial intelligence system for early detection of wheat rust disease and nutrient deficiency
99.	Development of IoT based custom hiring monitoring meter of agricultural machines
100.	Artificial Intelligence based studies on estrus and parturient behaviour of Mithun
101.	Machine Learning Approaches for Foot and Mouth Disease Virus Serotype and Lineage Prediction using the Virus Next Generation Sequencing Data
102.	IoT Solution for Smart Poultry Farm Practice (Lead Centre is CDAC-Kolkata)
103.	ICAR-Network Programme on Precision Agriculture-Developing precision livestock farming systems using sensors and artificial intelligence (ICAR-NePPA)
104.	Development of an automated blastocyst grading system using artificial intelligence in cattle and buffalo

105.	Facial Image-Based Biometric Recognition for Unique Animal Identification using Machine Learning (Artificial Intelligence)
106.	Milk production prediction in India under changing climate scenarios with machine learning algorithms
107.	A Machine Learning Approach to Assess Gait Kinematics for Prediction of Lameness in Crossbred Cattle
108.	Development of statistical and computational techniques for improving research methodology
109.	Development of standard operating procedures (SoPs) for drone based spraying operations in the management of pest and diseases in coconut and arecanut
110.	Development of an AI based Mobile Application for detection and advisory of diseases in Coconut
111.	Use of simulation models for the production system analysis of palms and cocoa
112.	Utilization of hyperspectral imaging technique for plantation crops
113.	Pest and disease surveillance on coconut using an unmanned aerial vehicle (UAV) (A collaborative project with M/s General Aeronautics Pvt Ltd, Bangalore, funded by Coconut Development Board)
114.	Development of an IoT-based embedded system for indicating the retting of jute plants
115.	Development of an Automated Jute Grading System
