GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND FARMERS WELFARE
DEPARTMENT OF AGRICULTURAL RESEARCH & EDUCATION

RAJYA SABHA
UNSTARRED QUESTION NO-660
ANSWERED ON- 24/07/2026

AGRICULTURAL RESEARCH INITATIVE AND TECHNOLOGY TRANSFER TO FARMERS

660. SHRI DEBASHISH SAMANTARAY:

Will the Minister of AGRICULTURE AND FARMERS WELFARE be pleased to state:

(a) the major agricultural research initiatives undertaken during the last three years;

(b) the new crop varieties released; and

(c) the measures taken to transfer technology to farmers?

ANSWER

THE MINISTER OF STATE FOR AGRICULTURE AND FARMERS WELFARE
(SHRI BHAGIRATH CHOUDHARY)

(a): During the last three years, ICAR has undertaken major research initiatives on climate-resilient agriculture, sustainable natural resource management, precision farming, and digital agriculture. These include the establishment of 448 Climate Resilient Villages, development of 651 District Agricultural Contingency Plans, the ACASA digital platform for climate adaptation, IoT-based irrigation scheduling systems, precision irrigation management using sensors and automation to enhance water use efficiency, digital soil and groundwater quality mapping, soil mapping and development of a unified information system (1:10,000 scale), the National Soil Spectral Library and contactless retrieval of soil properties, Integrated Farming System (IFS) models, natural farming protocols and scaling models for nature-positive outcomes, organic farming packages, agroforestry models and nursery protocol, STCR-based fertilizer recommendations, the e-FARMS fertilizer recommendation system, organo-mineral fertilizers, evaluation of new fertilizer materials such as nano, green ammonia, improving nutrient use efficiency, waste-to-wealth technologies for nutrient recycling towards Atmanirbhar in plant nutrients, agrivoltaics, groundwater recharge technologies, and digital transformation of stress ecosystems through IoT, sensors, and automation.

During 2023–2026, the ICAR advanced livestock productivity, sustainability, and rural livelihoods through multi-sectoral innovations. Major breakthroughs include indigenous vaccines, genomic tools, AI-enabled livestock technologies, sustainable feeding, introduced advanced disease surveillance alongside innovative meat processing and digital traceability systems and upgraded infrastructure and data management further accelerated translational research to ensure climate-resilient production. ICAR-Institutes develop location-specific technologies to boost aquaculture productivity, fish health, and fishers' incomes sustainably. Core research focuses on species diversification, cost-effective nutritive feeds, disease diagnostics, responsible fishing, and value-added processing and key recent initiatives include Genome editing in Rohu, Seabass, and Indian White Shrimp to enhance growth and disease resistance.

The ICAR advanced precision farming by developing conservation machinery, autonomous vehicles, and drone and sensor technologies. Research prioritised farm safety, cotton mechanisation, and innovative ribboning and retting techniques for natural fibres. Post-harvest innovations focused on climate-resilient processing, value addition, food safety, and advanced packaging systems. Additionally, portable digital instruments were created to measure the quality of cotton, jute, and natural resins at the farm gate. The technologies/machines/processes developed for production agriculture, post-harvest and value addition of the agricultural produce during the last three years are given in **Annexure-I**.

Major agricultural research initiatives undertaken during the last three years:

1. Clean Plant Programme - The Government has launched the Clean Plant Programme (CPP) under the Mission for Integrated Development of Horticulture (MIDH). The Union Cabinet approved the programme on 9 August 2024 with a total outlay of ₹1,765.67 crore to provide disease-free, virus-tested, high-quality planting material of major fruit crops through the establishment of nine world-class Clean Plant Centres (CPCs), a robust certification and traceability system, and support for certified nurseries. The programme is being implemented by the National Horticulture Board (NHB) in association with the Indian Council of Agricultural Research (ICAR).

2. Genome Editing Project: In the 2023-24 budget, the Government of India allocated ₹500 crores to ICAR for genome editing in agriculture.

3. National Mission on High Yielding Seeds: A National Mission on High Yielding Seeds has been launched with an outlay of ₹500 Crores during 2026-27.

4. Mission for Cotton Productivity: For the benefit of lakhs of cotton growing farmers, a 'Mission for Cotton Productivity' has been announced in 2025-26. This 5-year mission will facilitate significant improvements in productivity and sustainability of cotton farming, and promote extra-long staple cotton varieties. The Union Cabinet has approved Rs.5659.22 crore for Mission for Cotton Productivity (2026-27 to 2030-31) on 5th May 2026 to address bottlenecks, declining growth, and quality concerns in India's cotton sector.

5. Gene Bank for Crops Germplasm: The 2nd Gene Bank with 10 lakh germplasm will be set up for future food and nutritional security.

6. The Global Centre of Excellence on Millets (GCoE on Millets) was laid at ICAR-IIMR, Hyderabad.

7. 38 Verities released on the 98th Foundation Day of ICAR -**Annexure-II.**

8. Green Ammonia: Demonstration, validation and dose standardization of green ammonia for improving nutrient use efficiency.

9. Natural Farming & Agroforestry Models: ICAR established 2263 NF models for demonstration, validation and farmers learning besides mapping of domain areas of natural farming, Identification of potential areas for Greening and Restoration of Wastelands through Agroforestry (GROW Report).

10. FOM/LFOM: beneficiation of FOM/LFOM with indigenous material for nutrient enrichment is being carried out.

11. Developed Vaccine for Lumpy Skin Disease (Lumpi-ProVac Ind), Bovine Viral Diarrhoea (Inactivated BVDV-1), PPR and Goat Pox (combined PPR–Goatpox vaccine), Low Pathogenic Avian Influenza (LPAI), Foot-and Mouth Disease (Negative marker-FMD Vaccine) and Peste des Petits Ruminants (PPR, Negative marker PPR).

12. BRICS umbrella, ICAR has strengthened the BRICS Agricultural Research Platform (BARP), which was operationalized in 2021 under India's BRICS Chairship. In addition, a physical Centre of BARP has been established at the NASC Complex, Pusa, New Delhi. At the 16th BRICS Agriculture Working Group (AWG) Meeting held at Indore in June 2026, the Ministers agreed to establish a BRICS Network of Centres of Excellence (CoE) on Agroecology and Regenerative Agriculture, to be coordinated by ICAR-Indian Institute of Farming Systems Research (IIFSR), Modipuram.

(b): During last three years (2023-2025) a total of 1139 field crop varieties have been released and notified out of which 567 are of Cereals comprising 247 of Rice; 149 of Maize; 32 of Sorghum; 59 of Wheat; 4 of Barley; 24 of Pearl millet; 11 of Little Millet; 7 of Proso millet; 4 of Kodo Millet; 16 of Finger Millet; 8 of Foxtail millet; 2 of Brown top millet; 4 of Barnyard millet; 139 are of Oilseeds comprising 25 of Soybean; 22 of Groundnut; 30 of Indian mustard; 14 of Sesame; 5 of Niger; 7 of Sunflower; 3 each of Castor, Yellow Sarson, Gobhi Sarson; 16 of Linseed; 11 of Safflower; 163 are of Pulses comprising 26 of Mungbean; 25 of Urd bean; 17 of Pigeon pea; 9 of Cowpea; 38 of Chickpea; 16 each of Lentil & Field pea; 5 of Rajmash; 4 of Moth bean; 3 of Lathyrus; 2 of Cluster bean; 1 each of Faba bean & Indian bean; 78 are of Forages comprising 17 of Forage pearl millet; 26 of Forage sorghum; 8 of Forage maize; 14 of Oats; 5 each Lucerne & Berseem; 1 each of Forage cowpea, Dinanath grass & Bajra Napier Hybrid; 144 are of Fiber comprising 26 of Cotton; 105 of Bt cotton; 8 of Jute; 2 each of Mesta (Kenaf) and Mesta (Roselle) and 1 of Sunhemp; 19 are of Other crops comprising 8 of Grain amaranth, 1 each of Kalingda and Asalio, 2 of Winged bean; 7 of Tobacco and 29 are of Sugarcane. Apart from this, total 192 new horticultural crop varieties released which include 33 fruit crops, 115 vegetables and tuber crops, 19 spice crops including seed spices, 10 flower crops/ornamental plants, 10 plantation crops and 5 medicinal and aromatic plants.

(c): ICAR promotes technology transfer and sustainable agriculture through its network of institutes, KVKs, and universities, utilizing frontline demonstrations, Climate Resilient Villages, and farmer training programmes. To facilitate large-scale adoption, the Council has disseminated district-level fertilizer recommendations, organic and natural farming packages, Mera Gaon Mera Gaurav (MGMG) and Integrated Farming System models. Additionally, digital decision-support tools have been deployed to help farmers optimize site-specific soil, water, and nutrient management.

The Government has set up 731 Krishi Vigyan Kendras (KVKs) in the country for transfer of new technologies of agriculture and allied sectors to farmers through technology assessment, demonstration and capacity development among the extension functionaries of state governments and the farmers. The Government has strengthened the KVK network to accelerate the fast and efficient dissemination of latest agricultural technologies to farmers. Besides, the Central Government, in collaboration with the State Governments, organizes different programmes to disseminate need based technological information to the farmers. Recently, Viksit Krishi Sankalp Abhiyan (VKSA) was organized during 29 May-12 June 2025 to create awareness about improved agricultural technologies of Kharif season. Likewise, "Khet Bachao Abhiyan" was conducted nationwide from 1 June to 30 June, 2026 to create awareness among farmers about the balanced and judicious use of fertilizers, reduce the excessive application of DAP and urea, and encourage the adoption of alternative nutrient sources and natural farming practices. Through these efforts, the campaign aimed to conserve soil health, reduce the cost of cultivation, and enhance long-term agricultural productivity.

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ANNEXURE-I

[Part (a) of Rajya Sabha USQ No. 660 dated 24/07/2026]

The list of important technologies/machines/processes developed during last three years:

- Unmanned track type multi-purpose vehicle
- Cashew Nut separator, pulp extractor and fibrous material separating machine
- Continuous feed banana fibre extraction equipment
- Drone seeder
- Unmanned track type vehicle, remote control operated rice transplanter
- Small groundnut combine
- Tractor operated turmeric combine harvester
- Radio frequency controlled pesticide applicator
- Tractor operated adjustable sugarcane de-trasher
- Multi-row rotary weeder and sprayer attachment to ride on rice transplanter
- Remote-controlled drum seeder for paddy
- Pedal operated improved coconut dehusker
- Small tractor operated EPN applicator for white grub in sugarcane crop
- Speed-synchronized liquid fertilizer delivery system using proportional control valve
- Image based variable-rate nitrogen applicator
- Battery-powered long handled pruning device for selective pruning in pomegranate orchards
- Thinning device for establishing optimum plant population in a row crops
- Yield monitoring system for grain combine harvester
- Long beam floating mole plough
- Millet polisher
- Hybrid evaporative cooling system for on-farm storage structure
- Pulsed UV light system for selected fresh Fruits and Vegetables
- Battery operated back pack precision fertilizer spot applicator
- Automatic irrigation control valves for gravity-fed canal systems for surface irrigation
- Solar PV integrated green house for horticulture production
- Millet roaster
- Automated aeration based mini silo for chick pea
- Jackfruit De-Seeder
- Tractor operated spade plough with disc harrow
- UAV-based variable rate spraying system
- Tractor operated orchard grass cutter
- Battery-operated seed spice planter
- Three row animal drawn multi-crop precision dibble seeder
- Bullock drawn interculture implements for chilly and cotton
- Real-time sensor-based monitoring system of banana in supply chain
- AI-based grain analyzer software
- Wireless sensor and actuator-based IoT system for real-time monitoring and control of a cold room
- Vacuum fryer
- Peanut-based vegan whipping cream

- Fish anesthetizing and recovery machine
- X-ray imaging for internal quality assessment of mango
- Makhana Popped Grader
- Hybrid (AI) model for the detection of apples and obstacles for a robotic apple harvester
- Extraction and application of natural dye from beetroot peel using assisted techniques (ICAR-CIAE, Bhopal)
- Millet-based RTS instant beverage mixture
- Natural pigment (beetroot peel) based smart indicator and its evaluation on sapota and strawberry
- Investigation on efficacy of drone spraying system for nano urea application in wheat and maize crops
- Process technology for hydrogen production by dark fermentation
- Process protocol development for production of bio butanol using paddy straw
- Bio-oil based formulation against plant nematodes
- Standard Operating Procedure for Drone Spraying in Agriculture- Mobile app
- Process Protocol for Spinning of Novel Blends of Cotton/Hemp for Production of Sustainable Textiles
- Optimized Parameters and Operational Recommendations for Efficient Performance of Lint Cleaners in Ginneries
- Predictive Modeling of Cotton Yarn Tenacity Using Automated Machine Learning
- Standard process protocol for determination of ginning percentage of seed cotton.

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ANNEXURE-II

[Part (a) of Rajya Sabha USQ No. 660 dated 24/07/2026]

During the 98th Foundation Day of ICAR: Release of 38 Improved Crop Varieties

Sl. No.	Crop Varieties
1.	Pusa Basmati 3136 (IET 31307)
2.	Pusa DST Rice 1
3.	CR Dhan 338 (IET 29578)
4.	CR Dhan 330 (IET 28084)
5.	DRR Dhan 100 (IET 32072)
6.	HI 8849 (Pusa Biofortified Wheat Shri Mangal)
7.	HI 8851 (Pusa Biofortified Wheat Poshan Shakti)
8.	HI 8850 (Pusa Biofortified Wheat Prachand)
9.	NICRA Pusa Wheat 3471 (HD 3471)
10.	HD 3463, (Bread Wheat)
11.	HI 1683 (Pusa Biofortified Wheat Samrat)
12.	HI 1687 (Pusa Biofortified Wheat Atal)
13.	DBW 426 (Karan Devika)
14.	DBW 425
15.	DBW 445 (Karan Gourav)
16.	DBW443 (Karan Saanvi)
17.	DWRB 238
18.	DWRB 235
19.	Pusa Waxy Maize Hybrid-2 (AQWH 5)
20.	Pusa Waxy Maize Hybrid-3 (APQWH 8)
21.	Pusa Super Sweet Corn-4 (APTSKH 1)
22.	Pearl Millet HHB 344 (MH 2678)
23.	Pusa Mustard 38 (NPJ 261)
24.	DRMRCI (Q) 172 (BPMQ 172)
25.	CS 68 (CS 2020-10)
26.	NRC 270
27.	NRC 268
28.	ICAR Raj Mungfali 5 (RG 648)
29.	Pant Urd 13 (PU 1920)
30.	CAZRI Moth-8 (CZMO-20-8)
31.	CAZRI Moth-9 (CZMO-20-11)
32.	Nandyal Gram 844 (NBeG 844)
33.	LL 1798
34.	Aroh (Co 18003)
35.	Rajendra Ganna-3 (CoP 18437)
36.	IKSHU-18 (CoLk 19204)
37.	Rajendra Ganna-8 (CoP 17437)
38.	CICR 4 (CISAA 19-4)

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