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ICAR-CIAE
NEWSLETTER

WE'RE NABL ACCREDITED LAB

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FROM THE DIRECTOR'S DESK

Powering the Indian Farm: CIAE's Nearly Five Decades of Revolutionizing Agricultural Mechanization in India

For nearly half a century, the Central Institute of Agricultural Engineering (CIAE) Bhopal has played a pivotal role in transforming the landscape of Indian agriculture. Its relentless efforts to design and develop advanced agricultural equipment and machinery has not only modernized farming practices but has also significantly contributed to the nation's food security and the economic upliftment of its farmers. Established in 1976, the ICAR-CIAE started its mission to mechanize Indian agriculture, a sector traditionally dependent on manual labor and animal power. The subsequent decades have witnessed a paradigm shift, and CIAE has been at the forefront of this engineering-led revolution. Its contributions cover all the farming operations, from tilling the soil to post-harvest processing, leaving a significant mark on productivity, efficiency, and sustainability in Indian agriculture.

The institute has been instrumental in developing a number of user-friendly and region-specific agricultural machinery such as precision planters, efficient threshers, advanced harvesters and tillage equipment. Many of CIAE's designs have been successfully commercialized and adopted by farmers across the nation, empowering them to overcome labor shortages and enhance their yields. CIAE has also looked upon the appropriate mechanization. Recognizing the diversity of Indian farms from small and marginal land holdings to larger agricultural enterprises – the institute has focused on developing scalable solutions. This includes a wide array of innovations such as specialized equipment for horticultural crops, machinery for conservation agriculture that promotes soil health, and ergonomically designed tools and equipment that reduce the physical strain on farm workers, including women. Furthermore, CIAE's efforts in developing technologies for value addition and agro-processing at the farm gate have opened new avenues for rural entrepreneurship and employment.

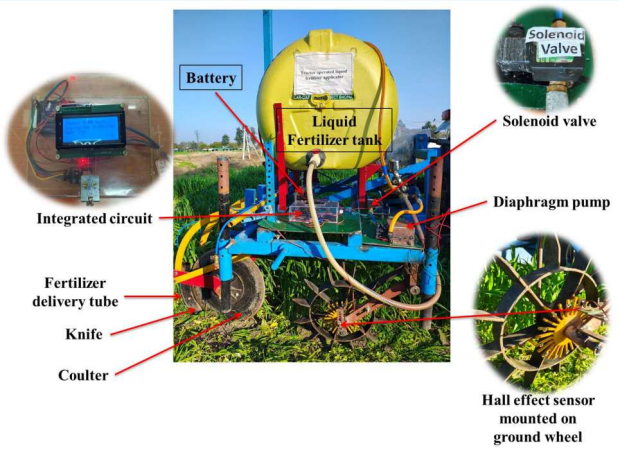
In recent years, as Indian agriculture faces new challenges such as climate change and the need for sustainable practices, CIAE has been increasingly focusing on cutting-edge areas like precision agriculture, the application of IoT, AI, and robotics in farming, and the development of energy-efficient machinery. The path ahead requires even greater efforts, and with its rich experience and visionary outlook of young scientists, CIAE is well-equipped to lead Indian agriculture into new age technological advancement. In this issue of CIAE Newsletter, I am happy to share our recent developments such as speed-synchronized liquid fertilizer delivery system, detection-based pesticide sprayer, tractor operated spade plough with disc harrow, process technology for cellulose extraction from corn cob and many more.

DIGEST

RESEARCH & DEVELOPMENT

Speed-synchronized liquid fertilizer delivery system using proportional control valve

The speed-synchronized liquid fertilizer delivery system was developed to optimize application through precise, automated control using an Arduino-based micro-controller. The system consists of a Hall Effect sensor for speed measurement, an Arduino Mega 2560 micro-controller, a solenoid valve, an LCD display and a data logger. The LCD display provides real-time data on key parameters such as speed, discharge rate and PWM output. The system adjusts the discharge rate proportionally to the real-time ground speed of the tractor using a control algorithm, ensuring that when the speed reaches zero, the calculated discharge rate also becomes zero. This ensures operators maintain full visibility and control over the application process.



Detection-based pesticide sprayer

A detection-based pesticide sprayer system was developed as an attachment to an unmanned track-type vehicle. The system consists of a pesticide tank (200 litre), two 12 V DC water pumps, two ultrasonic sensors, an electronic control unit (ECU) and two sets of lances with spray nozzles, each on both sides of vehicle. The ultrasonic sensors detect trees on both sides of the vehicle and send signals to the ECU. The programmed ECU processes the signals from ultrasonic sensor and activates the corresponding DC water pump. Each pump, mounted on the main frame, draws pesticide from the tank and delivers it to the spray lances and nozzles, ensuring targeted spraying. The developed system was evaluated in field at an operating speed of 2 kmh^{-1}. The system accurately detects tree canopies and achieves a droplet size (VMD) within the recommended range of 140-200 µm, with a spray coverage of 30-40%.

Tractor operated spade plough with disc harrow

The MPKV, Rahuri center of FIM has developed a tractor-operated spade plough with a disc harrow. The primary function of the spading plough is to break compacted soil and turn it over using a set of rotating spades. This mechanism cuts and lifts the soil, creating a loose, aerated layer ideal for planting. The disc harrow is attached behind the spade plough. Together, this combination allows for deep and thorough soil tillage. The effective field capacity and field efficiency of the machine were observed to be 0.39 ha/h and 77%, respectively. The cost of operation was Rs. 1100/ha, with 66% cost savings as compared to traditional plough.

Battery powered transplanting mechanism for two-row root wash manual transplanter

A battery-powered two-row paddy transplanter has been developed by DBSKKV for root-wash seedlings, making transplanting easier and more efficient. The cranking mechanism of the light weight, ergonomically designed

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transplanter runs on a lithium-ion battery, reducing physical effort as compared to traditional hand-cranking models. It improves efficiency by 24%, reduces operator fatigue by 18%, and lowers cardiac strain by 16.5%. With a battery life of 4 h and 30 min, this transplanter reduces drudgery, improves productivity, and makes paddy transplanting more convenient for farmers.

Non-invasive respiration rate monitor for cattle

The sensor-based non-invasive respiration rate monitor was developed by IGKV Raipur centre of AICRP on MAH. It enables continuous monitoring of cattle respiration. The device consists of a flex-type sensor, amplifier, micro-controller, and TM1637 4-digit 7-segment display, powered by an Arduino. It is secured using a 3 m nylon belt with a buckle. The flex sensor is made of plastic and carbon, where bending alters resistance, allowing it to function as a bend sensor or goniometer. The monitor's specifications include a RISC 8-bit AVR CPU, 32 kB program memory, 8 ADC channels, and 6 PWM pins, operating at 3.3–5 V DC with a 400 g weight. The development cost is Rs. 7500/-. The device was validated against reference methods (flank movement and nostril breathing). The results indicated high correlation (96.96%) between sensor-based monitoring and nostril-based counting, with a t-test indicating no significant difference ($P<0.01$). The sensor-based method recorded a mean respiration rate of 39.5 b/min and values closely matched with nostril-based values (38.15 b/min), proving its reliability.

Process technology for extraction of cellulose from corncob residues

Valorization of corncob residues was done through synthesis of high crystalline cellulose using chemical treatments, which involved alkaline pre-treatment and bleaching. The cellulose content was notably increased in the extracted cellulose (88.13%) as compared to corncob biomass (42.30%). The morphological, chemical, and thermal properties of the resulting cellulose were thoroughly examined through various analytical techniques. The fiber diameter of extracted cellulose was reduced compared to corncob biomass. The chemical structure of the cellulose was analysed using the FTIR, confirming the effectiveness of the treatments. The XRD results showed that crystallinity index of corncob, which was 29.63%, increased to 53.95% in extracted cellulose. Furthermore, thermogravimetric analysis demonstrated that the lower degradation temperature of extracted cellulose would be beneficial for degradation of bio based materials. This establishes the fact that corncob biomass has a great potential as a source of high crystalline cellulose which finds its application in the preparation of biocomposites.

Process technology for dried tomato products

A process has been optimized to make powder of tomato. The process involves slicing of tomato, infrared assisted hot air drying and grinding. Tomatoes at ripening stage result in lower slicing losses (2.68%) and higher slicing efficiency (94.21%). A slice thickness of 6

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mm was observed optimum, yielding better slicing performance, reduced moisture content, higher drying rates, and minimal shrinkage in the final product. The use of infrared (IR)-assisted hot air drying further enhances drying characteristics and product quality. A moderate IR intensity of 1500 W/m², with a source-to-sample distance of 100 mm, was found to be optimal, ensuring efficient drying with acceptable quality attributes.

Cleaner cum grader for millets

Small and variable size of millets and its lighter weight makes it a challenge for its cleaning with commercial cleaner cum grader machine. A cleaner cum grader machine has been developed for millets. It consists of a hopper for controlled feeding, a set of different sizes of sieves (screens) to separate millets based on size, and a blower to remove dust and light impurities. The machine is operated by a 0.25 hp electric motor (single phase). The machine was tested for cleaning cum grading of sorghum. The cleaning efficiency of sorghum was 90-92% at an operating speed of 400 rpm, stroke length of 10 mm. Two number of screens were used for testing of machine for sorghum. The aperture size of top and bottom screen was 4.30 and 3.20 mm, respectively whereas the percentage open area was 67% and 37%, respectively.

Multi millet de-husker

Dehulling of minor millets like kodo, kutki is a great challenge due to small size and strong adherence of hull to the kernel. A millet de-hulling machine, consisting of a pair of rubber rollers rotating at differential speeds in opposite direction for providing the shearing and crushing actions for de-husking of millets, was developed. The machine is operated by a 1.50 kW electric motor (single phase). The developed dehuller was tested for dehulling of kodo millet. The dehulling efficiency of kodo was 70-75% in single pass, at an operating speed of 400 rpm.

System for Infrared-UV based surface disinfestation of food grains

The infrared heat based surface treatment is effective for surface disinfestation of food grains prior to their storage or during intermediate handling. In the developed, IR-UV based surface treatment system, the grain was collected from ground and elevated up to hopper by synchronized screw conveyors and bucket elevator. The grains from the hopper was spreaded over reciprocating conveying deck maintaining single layer and conveyed downward. These grains during conveyance, are uniformly exposed to UV-C light (fitted at the top of serge hopper) and infrared heat radiation (fitted in an array at the top of conveying deck). The surface exposure of the IR-UV radiations disinfested the grains due to physical disruption of insect eggs and killing of adults insects. The system has been tested for chick pea and wheat grains. It was observed that the developed system was operated at 0.7 km/h speed and 6.36% of deck slope and effectively treated the grains with 100% of insect mortality and zero egg hatchability. During the storage study, IR treated and without treated grains have been stored in two types of bags i.e jute bags and nylon bags at ambient storage conditions for one year. It was observed that IR treated chick pea in nylone bag may be safely stored for 12

Wheat under conveying

Chickpea under conveying

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months however, the insect infestation started in grains stored in jute bags after 10 months of storage. In case of wheat, 12 months of safe storage life was observed for treated samples stored in both nylon and jute bags. At the same time, infestation started in control (without treated) samples in 3rd month and 4th months in chick pea and wheat, respectively for both the type of bags.

Development of Soy based edible bowl

Edible cutlery offers an innovative and sustainable solution to environmental degradation, with products engineered from grains to function as both utensils and consumables. These items are fully compostable and degradable within 15–16 days, significantly reducing environmental impact. The research focuses on the development of edible bowls formulated from deoiled soybean flour. These bowls have a protein content of approximately 40%, enhancing dietary value. Preliminary testing demonstrates that the bowls retain structural integrity up to 40 min in boiling water. Texture analysis reveals a fracture resistance of up to 100 N, making them viable for robust applications. Initial sensory evaluations indicate high consumer acceptability, validating the concept's feasibility.

3 in 1 Cashew nut separator, pulp extractor and fibrous material separating machine

Cashew nuts are currently manually separated from cashew apples. Factors such as bruising, nut type, and depth of embedding affects the efficiency of nut separation. Labour costs can be significant, especially in high-wage regions, making efficient separation crucial for maintaining product quality and market value. This machine was developed in collaboration with ICAR Directorate of Cashew Research , Puttur, Karnataka. It has three main assemblies viz., cashew nut separator, pulp separator and fibrous material separator. The machine processes all nut types and apple conditions. It has high cashew nut separation capacity of 250-300 kg/h (RCN) with high separation efficiency of more than 99% and minimal nut damage of less than 1.0%. The saving in cost of operation and time is 82.50% and 96%, respectively.

New External Funded Project

Title of the Project	Budget (Rs in lakhs)	Funded by
A novel nozzle system for bio-pesticide spraying using ground based and arial drone applications for sustainable agriculture	12.50	AgriHub by IIT Indore (MeiTY)

International Training Programme for Rwanda Government Officials

International training programme on "Use of Modern Water Control Techniques and Technologies" was organized for Rwandan Government officials during 1-30 January, 2025. The training was organized in collaboration with WAPCOS Ltd., Ministry of Jal Sakhti, GoI and sponsored by Government of Rwanda. A total of 8 officials working for Rwanda Agriculture Board participated in the program. During the training programme, the participants were exposed with the latest developments in the field of on-farm water management practices through class room lectures, hands on experiences and on-site visit to irrigation project sites.

TRAINING

Winter School

ICAR sponsored Winter School on "Robotics, Artificial Intelligence and Big data with Innovative cum Futuristic Engineering Interventions for Smart Agriculture" was organized at the institute during 28 February to 20 March, 2025. Twenty-five participants from 11 states attended the winter school. The program aimed to enhance participants' knowledge and technical skills in cutting-edge agricultural technologies through theoretical lectures, hands-on sessions, industry visits, and practical demonstrations. The program featured expert lectures on topics such as robotics, AI, big data, UAVs, UGVs, automation in food processing, precision irrigation using IoT, and disease identification with generative AI. Participants gained hands-on experience with Robot Operating System (ROS), Arduino programming, Google Colab, Python-based ML algorithms, and PLCs, while developing UGVs with vision systems and building wheeled mobile robots. Visits to Eicher Tractors (TMTL), Mandideep, and NITTTR, Bhopal provided industrial and R&D exposure. The training enhanced participants' technical competencies and fostered collaboration, paving the way for future innovations in agriculture and allied sciences.

CAFT Trainings

ICAR sponsored CAFT training on **"Recent advances in storage and Packaging technologies for Agro commodities"** was organized during 4-24 February, 2025. Twelve participants from different ICAR institutes, SAU's and KVK's participated in the training program. The content of the training program covers innovations in controlled atmosphere storage, modified atmosphere packaging, biodegradable and intelligent packaging, nano-technology applications, and other emerging

technologies that contribute to minimizing spoilage and enhancing food safety. The participants also experienced various technologies through hands on practical cum demonstrations and industrial visits.

Another CAFT training on **"Exploring Nutraceutical Bioactive Compounds: Extraction, Formulation, and Development from Millet, Soybean, and their By-products"** was organized during 4-13 March, 2025. This training brought together experts from AIIMS, NITs, ICAR institutes, universities, and industries, fostering knowledge exchange, capacity building, and advancements in nutraceutical research. Ten participants from four states participated in the training program. Participants visited 10 advanced laboratories and industries, gaining exposure to cutting-edge technologies, including drone applications, IoT-based innovations, and sensor-integrated systems in food processing. Hands-on training covered advanced analytical techniques essential for nutraceutical research, including GC-MS for bio-active compound identification, FTIR for functional group analysis, HPLC for nutritional profiling, and cell culture techniques.

TRAINING

Short Course

ICAR sponsored short course on "Advances in Hydrogen Production for Clean Energy and Environment" was organized during 17-26 March, 2025. The course was designed for scientists, academicians, and professionals from across India and focused on equipping participants with in-depth knowledge of hydrogen production technologies and their critical role in sustainable energy transitions and decarbonization of Indian agriculture and industry. Participants were trained in state-of-the-art hydrogen production techniques including electro-chemical methods, biomass-based conversion, microbial electrolysis, solar-to-hydrogen systems, auto-thermal reforming, and methane pyrolysis. Modules also covered hydrogen storage, gas chromatography, and India's National Green Hydrogen Mission, supplemented by hands-on sessions, lab visits, and industrial exposure. Total 10 participants from four Indian states viz Gujarat, Haryana, Madhya Pradesh, and Maharashtra, representing universities, research institutions, and agricultural engineering colleges participated in this training program.

Training on Value Chain Development of Soybean and Pulses

The DIU SMART Wardha-sponsored training program on "Value Chain Development of Soybean and Pulses" was organized during 17–21 March 2025, attended by 41 farmers from the Wardha district of Maharashtra. The program provided a comprehensive blend of lectures, hands-on sessions, and industrial visits. Key sessions included soybean nutrition, food safety, preparation of soymilk and tofu, and demonstrations on various soy-based value-added products. Experts also delivered lectures on pulse processing, marketing techniques, by-

product utilization, storage, and packaging. The training featured visits to soybean and pulse processing facilities and pulse research institute enriching participants' practical understanding of the soybean and pulse value chain

Demonstration of ICAR-CIAE-CTRI FCV Tobacco Leaves Stringing Machine

Regional Station, Coimbatore in collaboration with ICAR-NIRCA Rajahmundry (Formerly known as ICAR-CTRI) conducted training on ICAR-CIAE-CTRI FCV developed 'Tobacco Leaves Stringing Machine' on 24 January 2025. Officials from Tobacco Board Guntur, progressive farmers, auction specialist (Tobacco), Ongole, AP and field officer, Tobacco Board acquainted with the technical know-how of tobacco leaves stringing machines and had hands-on experience on the operation of them.

Training of newly recruited Assistants of ICAR Institutes

Module-II training of newly recruited Assistant for ICAR Institutes located in Madhya Pradesh and Nagpur was organized during 17-21 February, 2025. Thirty Assistants from 9 institutes (CIAE, Bhopal, NBSS&LUB, Nagpur, CICR, Nagpur, CCRI, Nagpur, IISR, Indore, DWR, Jabalpur, IISS, Bhopal, NISHAD, Bhopal, ATARI Zone-IX, Jabalpur) participated in the training. A total of 25 sessions were held during 5 days period on multiple topics like CCS

TRAINING/ EXTENSION ACTIVITIES

(leave) rules, GFR, Service matters of different cadres, Disciplinary proceedings, Cash and Bill proceedings, etc. related to the general working and responsibilities of Assistant which were conducted by experts from ICAR Headquarters, Administrative heads of multiple ICAR institutes and guest lecturer from NID, Bhopal through both offline and online modes. These interactive sessions were helpful in providing a detailed insight in the administrative working of the ICAR institutes and responsibilities of the Assistant.

Training on Custom Hiring

Three custom hiring training programs were organized, with a total of 85 participants during 6-10 January, 2025; 3-7 February, 2025 and 24-28 March, 2025. The training programs aimed at enhancing the skills and knowledge of individuals in custom hiring services, focusing on modern agricultural machinery and their efficient usage. The program was designed to equip participants with the necessary technical expertise, improving their capabilities to provide custom hiring services to farmers. This initiative is part of the institute's ongoing efforts to support agricultural development and promote mechanization in farming practices.

Strengthening SCSP farmers with irrigation equipment distribution

Under the Scheduled Caste Sub-Plan (SCSP) project, the beneficiaries of selected villages viz Bagoniya, Kalakhedi, Prithvipura, Parvaliya Sadak, and Chanderi of Bhopal district were distributed irrigation pipes/sprinkler pipes and water tanks. A total of 800 pipes were distributed among 80 farmers, directly benefiting the need of farmers. While in second distribution program, one 500-liter water tank and two sickles were distributed to beneficiaries from the identified villages viz Bagoniya, Kalakhedi, Tara Sevaniya, Bishan Khedi, Parvaliya Sadak, Chanderi, Agariya, and Rasla Khedi. More than 100 rural beneficiaries received 500 litre water tanks and sickles.

Promotion of drone spraying system in selected villages of Madhya Pradesh

Under the Sub-Mission on Agricultural Mechanization (SMAM) scheme, large-scale demonstrations of the drone spraying system was conducted during 2022 to 2025 and covered 550 ha area in 50 villages of Bhopal district. This initiative aimed to introduce farmers to modern agricultural practices, emphasizing the benefits of precision spraying technology for efficient nutrient and pest management. A total of 4,100 participants, including farmers, agricultural officers, and stakeholders,

TRAINING/ KVK NEWS

actively participated in 233 demonstrations conducted on farmer's fields (152 demonstrations) along with CIAE research farm (81 demonstration). The area covered at farmer's fields was 515 ha and 35 ha at CIAE research farm under different drone demonstrations program.

Training on conservation agriculture machinery

Training on conservation agriculture machinery and distribution-cum-demonstration of small tools was organized in three batches on 21 January, 2025; 23 January, 2025 and on 21 March, 2025, attended by total 116 farmers of village Kalapipal, District Sehore. The primary objective of this training was to equip farmers with fundamental knowledge and practical skills, helping them to improve agricultural productivity and livelihoods while contributing to the overall enhancement of farming practices. Farmers were briefed about straw management and advanced agricultural implements used in conservation agriculture and benefits associated with it. Demonstration of advanced agricultural implements used in conservation agriculture was organized. Hand-operated single row vegetable transplanter and multi-purpose horticultural crop harvesting scissor were distributed to farmers.

On Farm Testing and Frontline Demonstration, organized by KVK

Sl. No.	Crop/ Technology	Villages	No. of farmers	Area (ha)
On Farm Testing				
1.	Assessment of supplementation of nutritious Ragi-Barley Laddu on nutritional profile of pre-schoolers through Anganwadi centers	Raipur	10	-
2.	Assessment of Different Sowing Techniques in Potato Cultivation	Muriya Kheda	1	0.2
3.	Assessment of wheat variety HI 1633 (Pusa Vani)	Raipur	5	2
4.	Assessment of intake of bio-fortified variety of wheat: HI 1633 (Pusa Vani) on nutritional status of farm family	Raipur	5	2
5.	Assessment of post emergence weedicide in wheat	Gondarmau, Agariya Chapar, Bhairopura	5	2
6.	Assessment of plant growth regulator (GA3) in tomato	Raipur, Gondarmau, Kacchi Barkheda	5	0.5
7.	Assessment of Bio fertilizers for Growth and Yield in Wheat Crop	Ratatal Khajuri	1	0.5
8.	Assessment of Residue Management Machinery for Wheat Sowing	Ratatal Khajuri	2	1.0
9.	Assessment of calcium on growth and yield of tomato	Raipur, Gondarmau, Kacchi Barkheda	5	0.5
Frontline Demonstration				
1.	Potato Digger for Potato harvesting	Mudiya kheda	3	0.60
2.	Excel Dec omposer Technology for Residue Management	Gondarmau	2	1.0
3.	Demonstration of high yielding Mustard variety HI-1165-40 &HI-150-35	Mungaliya Haat, Parwa Kheda, Kalyanpura, Gondarmau, Khajuri Kalan	5	2
4.	Demonstration of Poshan Vatika for production of vegetables at household level	Raipur, Gondarmau, Kacchi Barkheda	5	0.1

KVK NEWS

Training organized

Sl. No.	Title of the training	Date	No of participants	
1.	Scientific Production Technology in Mustard Crop	6-7 January, 2025	39	Farmers learned about improved seed selection, pest control, and yield enhancement methods.
2.	Preparing Nutritious Ragi and Barley Laddus for Preschoolers	20-22 January, 2025	53	Anganwadi workers were trained in preparing nutritious ragi and barley laddus for preschoolers. The program focu sed on improving early childhood nutrition through locally available ingredients.
3.	Scientific Cultivation of Wheat	28-29 January, 2025	35	Farmers learned about improved seed selection, soil management, and yield enhancement strategies
4.	Post-harvest management & value - addition of soybean	25-26 March, 2025	42	The training focussed on advanced techniques to reduce post-harvest losses and enhance soybean -based product development. Experts and participants discussed innovative processing methods and market opportunities.

Media Activities

Speaker	Title	Media	Date
Mr. MP Singh, ACTO	लघु कृषको के लिए कोल्ड स्टोरेज स्थापना के लाभ	Gram Sabha programme, AIR, Bhopal	4 February, 2025
	Enhancing crop yield, minimizing losses, and tackling pest infestations effectively	Live telecast of Krishi Choupal	8 March, 2025
	Improved techniques for enhancing Zaid crop productivity	Hello Gram Sabha - Live Phone-in Program, Akashvani Kendra, Bhopal	30 March, 2025

Demonstration at Farmer's Fields

In an effort to introduce and promote modern agricultural practices, several key technologies were demonstrated across select villages. The tractor-drawn CIAE slit till drill proved to be a significant advancement, successfully implemented in Rasla Khedi, Kham Kheda, and Karond Khurd. This demonstration directly benefited eight farmers, cultivating a total area of four hectares and achieving impressive yields ranging from 4 to 4.3 tonnes per hectare. This highlights the potential of mechanization to boost productivity. Beyond field preparation, attention was also given to post-harvest management and processing. In Kham Kheda, a wider group of 36 farmers benefited from the introduction of practical tools such as the sack holder, manual screen grain cleaner, and groundnut decorticator.

IP&TM

Design Registration/ Patent Filed

Sl. No.	Technology	Design/ Patent	Date of Filing
1	Tractor operated drip laterals plastic mulch layer cum planter	Design Registration	20/01/2025
2	ICAR-CIAE-DCR - 3 in 1 cashew nut separator, pulp extractor and fibrous material separating machine	Patent Filed	12/02/2025

Design Registration Granted

Sl. No.	Design	Design No. & Date	Inventor
1	Perforated feeding apparatus for pyrolysis of chopped biomass	No. 420512-001 Date: 08-11-2024	Dr. Parmanand Sahu Dr. Sandip Gangil
2	Raceway pond for culturing microalgae	No. 420511-001 Date: 02-08-2024	Dr. Anil K. Dubey Dr. Ankur Nagori Er. Swapnaja Jadhav Dr. Sandip Gangil

Signing of MoUs

Sl. No.	MoU signed with	Purpose	Date of Signing
1	Krishak Jagat, a National Agriculture Newspaper , Bhopal	Dissemination of up-to-date technical know-how to the farmers and improve livelihood by enhancing farmers knowledge	14/01/2025
2	Atal Incubation Centre, Rabindranath Tagore University, Bhopal (AIC-RNTU)	Co-hosting the events/programs/activities related to agriculture and allied sector, startups co-incubation, value added services, etc	14/01/2025
3	Sarojini Naidu Government Girls PG (Autonomous) College, Bhopal	Promoting academic cooperation, students training, exposure visits, post - graduate, and doctoral research	14/01/2025
4	Krishak Vatika Nursery, Bhopal	Incubation on covered cultivation based nursery raising unit	14/01/2025
5	SKUAST-K, Srinagar, Kashmir	Academic cooperation and collabor ative research	20/03/2025


AIC, RNTU, Bhopal


Sarojini Naidu Govt Girls PG College, Bhopal


Krishak Vatika Nursery, Bhopal

IP&TM/ EXTENSION ACTIVITIES/ HRD

Technologies commercialized

ICAR-CIAE DCR 3-in-1 Cashew Nut Separator, Pulp Extractor, and Fibrous Material Separator was licensed to M/s. Phison Agritech Private Limited, Ramanagara, (Karnataka) for commercial production during the "Cashew Day celebration" on 11 March, 2025 at ICAR-Directorate of Cashew Research Puttur, Karnataka. The agreement was formally signed by Dr. CR. Mehta, Director, ICAR-CIAE, Bhopal; Dr. J. Dinakara Adiga, Director, ICAR-DCR, Puttur; Dr. Praveen Malik, CEO, Agrinnovate India Limited, New Delhi; and Mr. Varun Jose, Managing Director.

Participation in Exhibitions

Sl. No.	Exhibition	Date	Venue
1	Science and Standards Fair	1 February, 2025	Coddisia, Coimbatore
2	Agricultural Science Congress & Expo	20-22 February, 2025	GBPUAT, Pantnagar
3	National Horticultural Fair	27 February - 1 March, 2025	ICAR-IIHR, Bengaluru

Field Day

A field day-cum-distribution of agricultuiral impements was organized on 17 January, 2025 under the project "Dissemination of Climate Resilient Agricultural Mechanization Technologies in Selected villagses of Madhya Pradesh". Manual double screen grain cleaner, sack holder and groundnut decorticator were distributed to 36 farmers.

Field day-cum-demonstration of modern agricultural tools was organized on 21 March, 2025 for farmers of Kheri and Icchawar villages of Sehore district in Madhya Pradesh, participated by 47 farmers. This initiative represents an important step in improving the livelihoods of SC and BPL farmers through the provision of modern agricultural tools and essential training.

Ph.D. Awarded

Er DS Thorat, Scientist was awarded Ph.D. for his thesis entitled "Development of canopy volume based spraying system for pomegranate orchard" by ICAR-IARI, New Delhi on 22 March, 2025. He did his Ph.D. under the guidance of Dr. C.R. Mehta, Director, ICAR-CIAE.

Foreign Deputation

Dr. V.P. Chaudhary, Head, Agricultural Mechanization Division visited Thailand during 28 February to 2 March, 2025 to participate in ANTAM study tour for accreditation of testing station in Thailand.

AWARDS/ HRD

Awards & Recognitions

Sl. No.	Name & Designation	Award	Organization
1	Dr. Ajesh Kumar V, Scientist	Technology commercialization Award - 2024	ICAR-CIAE Bhopal (15 Feb., 2025)
2	Dr Syed Imran S, Scientist	First prize in oral presentation at International Conference on Sustainable Food- Water-Energy- Mechanization - Nexus and Whole Grain" during Jan 27-28, 2025	AEC&RI, TNAU; NIFTEM-T & University of Guelpa, Canada
3	Dr R Senthil Kumar Scientist	Reviewer Excellence Award for review of Article 'Agricultural Disparities: Causes and Consequences – A Study of Tribal Communities in Telangana'	Bhartiya Krishi Anusandhan Patrika (ARCC Journals)
4	Dr. Manojit Choudhury, SMS	Krishan Nath Synghal Memorial Gold Medal Medal for overall outstanding performance in Ph.D. degree programme in the discipline of Agricultural Engineering	63rd Convocation, ICAR -IARI, New Delhi, held on 22.03.2025
5	AICRP on MAH	Appreciation certificate for exceptional services and support in advancing mechanization in animal husbandry	TATA Steel Foundation, Sukinda

Human Resource Development

Name and Designation	Course Title	Duration	Venue/ Place
Dr. Ramesh Sahni, Scientist	Application of deep learning in agriculture using python	21 January - 10 February, 2025	ICAR-IASRI, New Delhi
Dr. Sweeti kumari, Scientist Er. Pravitha M., Scientist Dr RH Sadvatha, Scientist	CAFT Training on "Recent Advances in Storage and Packaging Technologies for Agro Commodities"	4-24 February, 2025	ICAR-CIAE, Bhopal
Muzaffar Hasan, Scientist	NABL Awareness Program (Gunvatta Yatra)	7 January, 2025	MP pollution Control Board, Bhopal.
Dr. Nidhi Joshi SMS (Home Science)	ICAR sponsored short course on "Advances in Extension Research and Evaluation Studies"	29 January - 7 February, 2025	ICAR-NAARM, Hyderabad
Dr. Shubham Singh SMS (Soil Science)	Winter School on Advancing innovations in Organic/Natural farming for efficient utilizations of natural resources and rural livelihood security	1-21 February, 2025	College of Post Graduate Studies in Agricultural Sciences, Central Agricultural University, Umiam, Meghalaya
Dr. Manojit Choudhury SMS (Farm Machinery & Power)	Winter School on "Robotics, Artificial Intelligence and Big Data with Innovative cum Futuristic Engineering"	28 February - 20 March, 2025	ICAR-CIAE, Bhopal
Dr Uday Badegaonkar, PS & I/c TTD	MDP on Intellectual Property Valuation and Technology Management	3-7 March, 2025	ICAR-NAARM, Hyderabad
Dr. Nidhi Joshi SMS (Home Science)	CAFT Training on "Exploring Nutraceutical Bioactive Compounds: Extraction, Formulation, and Development from Millet, Soybean, and their by-products"	4-13 March, 2025	ICAR-CIAE, Bhopal
Mrs. Sita Choudhary SMS (Agronomy)	Short Course on "Advances in hydrogen Production for Clean Energy and Environment"	17-26 March, 2025	ICAR-CIAE, Bhopal

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Republic Day celebration

The 76th Republic Day was celebrated with great passion on 26 January 2025. Dr. S Mangaraj, In-Charge Director unfurled the national flag. He highlighted the major achievements of the Institute and appreciated the staff members who brought pride by securing awards and recognitions at various platforms. He urged all members of the CIAE family to continue their dedicated efforts to sustain the momentum and work collectively towards realizing the Institute's Vision. Followed by the flag hoisting, sports competition for kids of residential colony was held. A cultural programme was held later where a students and staff of the institute performed and participated with great enthusiasm.

EVENTS

50th Foundation Day Celebration

The Institute celebrated 50th Foundation Day with a grand celebration during 15-16 Feb., 2025. The event was chaired by Dr. S.N. Jha, Deputy Director General (Agril. Engineering), ICAR, New Delhi, and attended by several distinguished dignitaries. Among them were Dr. Nawab Ali, Former DDG (Engineering), ICAR; Dr. R.P. Kachru, Former ADG (Process Engineering); Dr. K.P. Singh, ADG (Farm Engineering), ICAR; Dr. A.K. Sanyal, Director, NISHAD; Dr. S.K. Shukla, Director, CIRCOT, Mumbai; Dr. S.K. Dutta, Director, IISS, Bhopal; Shri P.S. Shyam, Director, Directorate of Agricultural Engineering, Government of Madhya Pradesh; and Dr. P.P. Rao, Director, CFMTTI, Budhni, Madhya Pradesh. In his welcome address, Dr. C.R. Mehta, Director, ICAR-CIAE, Bhopal, extended greetings to the esteemed guests and highlighted the institute's achievements in farm machinery development, agricultural processing, energy in agriculture, irrigation water management, and capacity-building programs for farmers and faculty members. Dr. S.N. Jha lauded ICAR and CIAE's contributions to transform Indian agriculture and ensuring food security. He stressed the need for appointing an agricultural engineer in every village panchayat to guide farmers in key areas such as farm machinery, agricultural processing, irrigation water management, and renewable energy in agriculture. Dr. Nawab Ali shared his experiences with ICAR-CIAE and emphasized the nutritional importance of soybean in human health. Dr. K.P. Singh underscored the institute's significant role in advancing agricultural mechanization and its impact on the holistic development of Indian agriculture. The event also included a felicitation ceremony, where employees who completed 25 years of service at CIAE were honoured, along with innovative farmers, entrepreneurs, and scientists who had made notable contributions, such as publishing high NAAS-rated research papers and commercializing new technologies. Shri O. P. Chouksey addressed challenges faced by Krishi Yantra manufacturers, discussing ICAR-CIAE's role in machine testing, issues with subsidy policies and testing, the need for extending the validity of machine testing, and a proposal for a single-window registration system for agricultural machinery, valid across all states. Shri V. N. Kale highlighted ICAR-CIAE's contributions and stressed the importance of policy development in agricultural engineering. He covered key topics such as the Agricultural Infrastructure Fund (AIF) for manufacturers, precision agriculture and technology access for small farmers, expanding custom hiring centers, and addressing concerns raised by the Krishi Yantra Nirmata Sangathan. Shri P. S. Shyam provided insights into Madhya Pradesh Government's mechanization policies, focusing on Yantra Doot Yojna, Custom Hiring Yojna, village-level mechanization initiatives, and Direct Benefit Transfer (DBT) schemes for farmers.

Dr. S.N. Jha and other dignitaries inaugurated an exhibition showcasing CIAE's latest technological innovations and newly developed facilities at the institute. The event concluded with a vote of thanks delivered by Dr. K.N. Agrawal, Project Coordinator, AICRP on FIM.

A Kisan Mela-cum-Agricultural Engineering Technologies Demonstration was held, featuring over 30 stalls showcasing agricultural machinery, tractors, drones, horticultural innovations, and processed agricultural products. The mela witnessed participation of more than 650 farmers and students over the two-day event. Additionally, a Krishi Sangosthi (Farmers' Seminar) was organized, where experts from various agricultural disciplines engaged with farmers and entrepreneurs.

50th Foundation Day Celebrations













EVENTS

Academia-Industry Meet

On 16 February, 2025, Academia-Industry Meet as part of its 50th Foundation Day celebration was organized. The event was chaired by Dr. S. N. Jha, DDG (Agril. Engineering), ICAR, and co-chaired by Dr. K. P. Singh, ADG (Farm Engineering), ICAR, New Delhi. Several distinguished dignitaries attended, including Dr. Nawab Ali, Former DDG; Shri V. N. Kale, Additional Commissioner (Machinery & Technology), Department of Agriculture & Farmers Welfare, Govt. of India; Shri P. S. Shyam, Directorate of Agricultural Engineering, Government of Madhya Pradesh; Shri K. K. Tiwari, Group Head - Tractors, VST Tractors and Tillers Ltd., Bangalore; and Shri O. P. Chouksey, President, MP Krishi Yantra Nirmata Sangha. The program highlighted the insights into the institute's journey, emphasizing its contributions to agricultural engineering and importance of academia-industry collaboration in advancing mechanization and improving farmers' welfare.

A major highlight of foundation day programme was the Prof. A. C. Pandya Memorial Lecture, delivered by Er. K. K. Tiwari, focusing on mechanization for small and marginal farmers. He emphasized the role of mechanization in India's economy, market potential, improvements in farmers' living standards, and the importance of lightweight tractors and advanced plant protection technologies.

Annual Workshop of AICRP on FIM

The 39th Annual Workshop of All India coordinated Research Project on Farm Implements and Machinery (AICRP on FIM) was organized at PJTAU, Hyderabad (Telangana) during 7-9 January, 2025. The workshop was chaired by Dr. SN Jha, Dy. Director General (Agril. Engg.)

and Co-Chaired by Dr. KP Singh, Asst. Director General (Farm Engg.) and Dr. CR Mehta, Director (ICAR-CIAE, Bhopal). Dr. Aldas Janaiah, Vice Chancellor, PJTAU, Hyderabad was the chief guest of the inaugural session. Dr. VM Mayande, former Vice Chancellor (Dr. PDKV, Akola) was the distinguished expert to review the progress of the centers. Senior officials and Research Engineers/PIs and associated scientists from 25 centres of AICRP on FIM, project coordinators of the associated scheme(s) of agricultural engineering division, scientists from ICAR-CIAE, Bhopal and Officials of PJTAU, Hyderabad (Host organization) participated in this workshop. Dr. V. M. Mayande highlighted the crucial role of mechanization, stating, 'Without mechanization, agriculture cannot progress'. Dr. C. R. Mehta spoke about the 50-year journey of AICRP on Farm Implements and Machinery, from manual to automated machinery for agriculture. Dr. K. P. Singh emphasized the importance of a three-way interaction among researchers, manufacturers, and farmers to achieve 100% implementation of research. Dr. S. N. Jha highlighted the important role of agricultural engineers at all levels, from panchayats to state directorates, in enhancing farm mechanization. Dr. Aldas Janaiah, stated that the future of agriculture lies in humanless farming, which can only be achieved with the help of agricultural engineers. He highlighted how technologies like mobile apps, drones, and others are reducing the need for human labor in farming. Dr. K. N. Agrawal, Project Coordinator, AICRP on FIM presented the progress of AICRP on FIM for the year 2024-25. Furthermore, the event included Farmers session and Manufacturers sessions followed by reviews of 25 centres of AICRP on FIM and 33 centres of externally funded project on "Assessment of farm mechanization Status and Prospects of Custom Hiring centres in India".

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Annual Workshop of AICRP on MAH

XXIV Annual Workshop of the All India Coordinated Research Project on Mechanization of Animal Husbandry (MAH) was organised at Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan during 28-29 January, 2025. Vice Chancellor Dr A K Karnatak was the Chief Guest during Inaugural Session on 28 January, 2025. DDG (Agricultural Engineering), Dr S N Jha was Chairman and Dr K P Singh, ADG (Farm Engineering) & Dr C R Mehta, Director ICAR-CIAE Bhopal were Co-Chairmen of the Inaugural session. Dr. Abhijit Mitra, Animal

Husbandry Commissioner, GoI and Chairman of the Animal Welfare Board of India, and Dr A K Tyagi ADG (ANP) ICAR were Guests of Honour. Dr S P Singh Project Coordinator (MAH) presented the PC Report of 2024-25. Dr C R Mehta Director ICAR-CIAE suggested having study on mechanization level in animal husbandry sector in the country to find the research gap and quantification of level of mechanization in different operations. Dr K P Singh, ADG (FE), ICAR spoke on the potential of mechanization in animal husbandry sector. Dr. Abhijit Mitra proposed to have a role model for mechanization of animal husbandry in the country. Dr A K Tyagi felt the need of mechanization in animal husbandry sector for small and marginal farmers having up to 10 dairy animals. Dr S N Jha highlighted the need of mechanization in animal husbandry sector and stressed the need to work for all the fields of agriculture. Dr A K Karnatak highlighted the need of machinery for feed & fodder, animal waste disposal, housing etc for small farmers. Research Highlights 2024-25 and some leaflets/bulletin of cooperating centres were released in the Inaugural session. A press briefing was done where thirty five persons from different print and electronic media participated. PIs of nine cooperating centres presented the progress of on-going projects and new proposals. Experts provided critical inputs on the progress of work of each centre.

Annual Workshop of AICRP on ESAAS

The XVI Annual Workshop of AICRP on Ergonomics and Safety in Agriculture and Allied Sector (ESAAS) was held at NERIST, Nirjuli, Arunachal Pradesh, on March 4-5, 2025. Chaired by Dr. S. N. Jha, Deputy Director General (Agril. Engineering), ICAR, the event brought together experts, researchers, and officials to review progress and plan future initiatives in agricultural ergonomics and safety. The Chief Guest of inaugural session, Shri Gabriel D. Wangsu, Minister for Agriculture, Arunachal Pradesh, praised AICRP's innovations in safety gadgets and ergonomic tools, emphasizing their role in reducing occupational hazards. Prof. Narendranath S., Director, NERIST, highlighted the institute's contributions to safe and inclusive agricultural practices, while Dr. Sukhbir Singh, Project Coordinator, presented key achievements, including two commercialized technologies and four patents. Distinguished experts, Dr. K.K. Singh, Former ADG (FE) and Dr. P.K. Nag, designation discussed advancements in ergonomics, AI, and safety standards. Publications such as Research Highlights 2024-25 and success stories were also released.

Brainstorming Session

Brainstorming session on the "Comfort Index for Workers Engaged in Agriculture and Allied Sectors" was organized by AICRP on ESAAS on 24 January, 2025 in hybrid mode under the chairmanship of Dr. S. N. Jha, DDG (Agril. Engineering), ICAR and Co-chaired by Dr. K. P. Singh, ADG (Farm Engineering), and Dr. C. R. Mehta,

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Director, ICAR-CIAE Bhopal . Prominent experts in the ergonomics, including Dr. P.K. Nag, former Director, NIOH Ahmedabad; Dr. L. P. Gite, Ex-Project Coordinator, AICRP on ESA, ICAR-CIAE, Bhopal; Dr. Debkumar Chakraborty, President, Indian Society of Ergonomics (ISE); and Dr. Saugata Karmakar from IIT Guwahati participated in the event. A total of 50 participants attended the session. Dr. Sukhbir Singh, PC, AICRP on ESAAS briefed about motive behind organizing the event and Dr. R.R. Potdar presented the brief review on the various aspects of comfort assessment in different fields. Dr. S. N. Jha highlighted on adopting the Comfort Index for assessment of technologies in workplaces over traditional measures like Drudgery Index, highlighting its focus on well-being, visual comfort, and aesthetic values to enhance satisfaction and productivity. Dr. K. P. Singh urged the ESAAS Project Coordinator to lead its development with expert collaboration and Dr. C. R. Mehta stressed the need for both subjective and objective assessments and suggested publishing a review paper based on experts feedback. Dr. P. K. Nag recommended using Principal Component Analysis (PCA) to identify key comfort factors. Dr. Chakrabarti advocated for certification from organizations like ICMR or BIS, incorporating gender adjustability, and safety allowances for younger and less-skilled workers. Dr. Karmakar also highlighted grouping of machinery and operations for comfort assessment related factors and identifying the most influential ones for greater effectiveness. All PIs and Co-PIs of cooperating centres of AICRP on ESAAS actively participated and contributed their views during the brainstorming session toward developing the Comfort Index.

Industry-Academia Workshop

One-day industry-academia workshop on 'Research Innovation for Commercialization' was conducted by the

AgriHub, jointly organized by Indian Institute of Technology (IIT) Indore, ICAR-CIAE Bhopal, ICAR-NSRI Indore and CDAC Pune at the Indian Institute of Science Education and Research (IISER), Pune on 10 March 2025. The workshop was inaugurated by the Chief Guest Dr. Prashant Dhakephalkar, Director of Agharkar Research Institute. The inaugural address was given by Dr. Anil Rai, ADG (ICT), ICAR, who emphasized on bridging the gap between research and industry in agriculture. The event featured distinguished speakers from academia, industry, and non-governmental organizations such as Dr. P. M. Govindakrishnan, Ex Project Coordinator, ICAR-CPRI Shimla; Dr. Vibha Ahuja, Chief GM, BCIL, New Delhi; Mr. Abhijit B. Joshi, Senior Vice President, Jain Irrigation Systems, Pune; Dr. Paritosh Shekhar, Director, APS Labs, Pune; Dr. Ashwini Gajarushi, TIH-IoT, IIT Bombay; Mr. Pravin Dravid, Basant Agro Tech; Mr. Akshay Zawar, Director, Genespectrum; etc. This event marked another step toward strengthening the synergy between academia and industry, fostering ground breaking advancements in agricultural and technological research. The major outcome of this workshop has been an agreement to sign the MoU with the Biotech Consortium India Limited (BCIL) a company promoted by the Department of Biotechnology, Government of India for developing collaborations on various technologies for the agriculture sector.

International Women's day Celebration and Educational Tour

On the occasion of International Women's Day, an educational trip to Adani Wilmar (a leading edible oil manufacturer specializing in refined soybean oil and vegetable oils) was organized for women employees of the Institute. During the visit, staff members were briefed on the processes involved in oil production.

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On 20 March, the Women's Cell organized International Women's Day celebration programs. Dr. Nita Khandekar, Chairperson, Women's Cell, ICAR-CIAE, Bhopal, delivered the welcome address, emphasizing how the progress of women in society is often supported by the male members of their families. In alignment with the sub-theme #Accelerate Action, a talk was delivered by Ms. Rachna Dhingra, member of the Bhopal Group for Information and Action. The event was attended by women staff, students, and family members of ICAR-CIAE. As part of the celebration, a Rangoli competition was organized, and the top three entries were awarded prizes. The day concluded with fun games and a vibrant cultural program organized by the staff and their families.

CIAE's Participation in Sports tournament

ICAR-CIAE Bhopal participated in ICAR Central Zone Sports Tournament 2024 organized by ICAR-IISS Bhopal during 4-7 March, 2025 at TT Nagar Sports Stadium, Bhopal. CIAE contingent for the tournament was of 86 members, out of which 12 were women players, participated in various sports team and athletics events. ICAR-CIAE bagged number of gold, silver and bronze medals in the events such as table tennis, badminton, cricket, football, kabaddi, athletics, etc.

DDG (Agril. Engg) , ICAR visits ICAR CIAE Regional Station Coimbatore

Dr SN Jha, DDG (Agril. Engg) visited ICAR-CIAE Regional Station Coimbatore and interacted with staff members on 17 February 2025. Activities under the ongoing research projects and future activities were briefed. Latest equipment developed by the station were also demonstrated. This was followed by visit to Farm Machinery and Post Harvest Machinery & Equipment Testing Centre.

Visit of DD Kisan Team

A team from DD Kisan, Doordarshan Channel from New Delhi visited the Institute to document the institute facilities. The recorded programme can be accessed at https://www.youtube.com/watch?v=3elbm0sQOyI&ab_channel=DDKisan

EVENTS/ PERSONNEL NEWS

DDG (Agricultural Engineeirng) inaugurates New Facilities

Open Gymnasium

Creche

OUR NEW COLLEAGUES

Mahesh Mulani
Chief Finance & Accounts Officer
01.01.2025

Sonu Kumar
Technician
17.02.2025

Brijprakash
Technician
06.03.2025

Tejeshwari Satpute
SMS (T-6)
13.03.2025

PERSONNEL NEWS

STAFF PROMOTED

Anant A Bhole
Asstt. Chief Technical Officer
wef 16.07.2023

Anjani S Parsai
Senior Technical Assistant
wef 29.09.2023

Transfer/ Selection/ Deputation of Staff

Dr HS Pandey, Scientist was relieved on 10 January, 2025 to join at ICAR-Indian Institute of Sugarcane Research, Lucknow (on his own request).

Dr MN Shukla, Assistant Chief Technical Officer was relieved on 17 January, 2025 to join at ICAR-Indian Institute of Sugarcane Research, Lucknow (on his own request).

Ms Uma Kumari Gupta, Technician was relieved on 17 January, 2025 to join as Forester in Sonbhadra, Uttar Pradesh.

Dr KVR Rao, Head, Irrigation and Drainage Engineering Division was relieved on 18 March, 2025 to join as Dean (Agricultural Engineering and Technology at Professor Jayashankar Telangana Agricultural University, Hyderabad (on deputation).

Staff Superannuated

Dr PP Ambalkar
Chief Technical Officer
31 March, 2025

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