



ICAR-CIAE *Newsletter*

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FROM DIRECTOR'S DESK

It gives me immense pleasure to present this issue of the newsletter of CIAE, an institution that continues to play a pivotal role in advancing agricultural mechanization, precision farming, and sustainable technological innovations for Indian agriculture. Our commitment to empowering farmers through cutting-edge engineering solutions remains focused, as we address emerging challenges in productivity, sustainability, and resource efficiency. This quarter, one of the Institute's most notable achievements has been the successful design and development of an indigenous cotton harvester tailored to Indian agronomic conditions. This innovation represents a major milestone in reducing dependence on manual labour, lowering operational cost, and improving harvesting efficiency for cotton farmers. In line with our vision of integrating robotics and automation in agriculture, CIAE has also made good progress in the development of a robotic grape harvester. This advanced system demonstrates the potential of intelligent machines to perform delicate harvesting operation with precision while ensuring quality. The Institute has further expanded its frontiers into advanced sensing technologies, particularly hyperspectral spectroscopy. Our work in this domain enables rapid and non-destructive assessment of crop health, quality parameters, and early stress detection. These capabilities are critical for precision agriculture, allowing timely interventions, optimized input use, and improved crop management decisions. CIAE's efforts in this field are strengthening the foundation for data-driven agriculture and digital farming ecosystem. In addition to agricultural mechanization and sensing, CIAE is contributing to national priorities in clean energy through its work on hydrogen generation via methane pyrolysis. This innovative approach offers a promising pathway for producing hydrogen with reduced carbon emissions, while simultaneously generating valuable carbon by-products. Such research aligns with national and global missions toward sustainable energy and carbon neutrality, reflecting CIAE's multi-disciplinary strength and forward-looking vision.



The Institute had the distinct honour of hosting the 59th Convention of the Indian Society of Agricultural Engineers (ISAE) during 10-12 Nov., 2025, which brought together leading scientists, engineers, academicians, industry experts, farmers and policymakers from across the country. The convention served as a vibrant platform for exchanging knowledge, showcasing technological advancements, and fostering collaborations aimed at accelerating agricultural mechanization and innovation. Hosting this prestigious event further reinforced CIAE's leadership and its central role in shaping the future of agricultural engineering in India.

As we move forward, CIAE remains dedicated to strengthen innovation, collaborations, and delivering practical engineering solutions that benefit farmers, industry, and society at large. I extend my sincere appreciation to our scientists, engineers, staff, and partners whose dedication and excellence continue to drive the Institute's in the path of success and glory.

RESEARCH & DEVELOPMENT

Air assisted recycling tunnel sprayer for horticultural crops



A tractor-mounted, three-point linkage mounted an air-assisted recycling tunnel sprayer was designed and developed to improve spray efficiency and ensure uniform chemical coverage in orchard crops with canopy heights up to 2.0 m. The system was conceived to overcome major limitations of conventional orchard sprayers, such as spray drift, uneven deposition, and excessive chemical losses. The prototype comprised three integrated subsystems: an air-blowing unit to enhance droplet penetration within the canopy, a PTO-driven chemical spraying unit for precise spray delivery, and a collapsible tunnel assembly equipped with a spray collection and recirculation mechanism. The tunnel width is

adjustable between 1.0 and 2.0 m, allowing effective operation in young orchards with varying canopy structures and row spacing. Spray parameters optimized for guava orchards included a nozzle spacing of 350 mm, nozzle inclination angle of 43° , tunnel opening of 1100 mm, and fin pitch of 41 mm. These refinements resulted in a 10.43% reduction in spray liquid consumption and an 84.71% increase in spray deposition on the target canopy. Excess spray intercepted by tunnel walls was collected and recirculated to the main tank using a DC pump, minimizing chemical losses and environmental contamination. Field evaluation indicated an effective working width of 1.5 m, field capacity of 0.45 ha h^{-1} , and field efficiency of 78.63%, demonstrating suitability for sustainable precision spraying in orchards.

Spreading disc mechanism for UAV-based urea application



A UAV-mounted fertilizer spreading disc mechanism was designed and developed for urea application. The developed system comprised a rectangular hopper with a 39° slope to ensure smooth granule flow, interchangeable spreading discs with 2 to 6 vanes, and a flow control unit. In the laboratory experiments, effect of flight height (1, 2, and 3 m), vane number, and lateral distance was assessed while in field trials effect of flight speed (2, 3, and 4 m s^{-1}), vane number, and lateral spread was examined. Increasing the number of vanes

significantly improved application uniformity, reducing CV values from 55.80% to 38.21% in laboratory and from 96.85% to 53.42% under field conditions. Optimal performance was achieved at a 2 m flight height and 6 vanes in the laboratory, and at a flight speed of 4 m s^{-1} with 6 vanes in the field.

Vision-based ripeness detection of grape bunches for robotic harvesting



Three grape varieties Panner (2021 images), Thompson Seedless (2188 images) and Crimson Seedless (1856 images) were collected across experimental farms and farmer fields under diverse illumination, orientation and background conditions. Low-quality samples were excluded, augmented, resized to 640×640 pixels, annotated into ripen and unripe classes and partitioned into training, validation, and testing sets (70:15:15). The selected YOLO model was trained on Google Colab using batch sizes of 16 and 32 across 100, 150 and 200 epochs. Model performance was assessed using mAP@50 , mAP@50-95 , precision, recall, and F1 score. For the Panner variety, YOLOv8 consistently

outperformed other models, achieving a mAP@50 of 0.820 and F1 score of 0.817 at batch size 32 and 200 epochs, demonstrating superior balance between precision and recall. For Thompson Seedless, YOLOv11 delivered the best performance, achieving the highest mAP@50 (0.980) and F1 score (0.940) under the same training configuration, reflecting strong fine-grained detection capability. For Crimson Seedless, YOLOv11 again emerged as the most reliable model, with a mAP@50 of 0.820 and an F1 score of 0.796, outperforming YOLOv5 and YOLOv8. Overall, YOLOv11 demonstrated robustness across two varieties, while YOLOv8 excelled in paneer Seedless detection. A vision-based grape ripeness detection system was developed with selected YOLO model and validated across Panner, Thompson Seedless, and Crimson Seedless varieties achieving high precision-recall balance. YOLOv8 excelled in Panner, while YOLOv11 achieved superior accuracy (mAP@50 : 0.980) in Thompson Seedless and Crimson in field condition.



Machine vision-based measurement of anthropometric dimensions of Indian farm workers

Precise anthropometric measurements are vital for ergonomic assessments and designing farm machinery. Traditional manual methods, although reliable, are time-consuming and prone to human error. A computer vision (CV)-based system was developed (AICRP on ESAAS, PAU, Ludhiana) using Multiview Stereo-Image Sensing for non-contact, measurement of key body dimensions, stature, vertical reach, trochanteric height, and chest circumference, as a viable alternative to manual techniques. Manual measurements from male and female farm-workers were obtained using standard anthropometric tools served as the reference standard. Accuracy was assessed using mean absolute difference (MAD) and mean

absolute percentage error (MAPE). The CV system achieved optimal accuracy at a 3.0 m front-facing view. Stature measurement showed MAD of 6 mm (male) and 4 mm (female) with MAPE below 0.5%. Vertical reach showed slightly greater variability (MAD: 55 mm male, 70 mm female; MAPE <5.0% and <3.0%, respectively). Trochanteric height produced MAD of 2 mm (male) and 9 mm (female), with MAPE <3.0%. Chest circumference had MAD ≤14 mm and MAPE <2%.

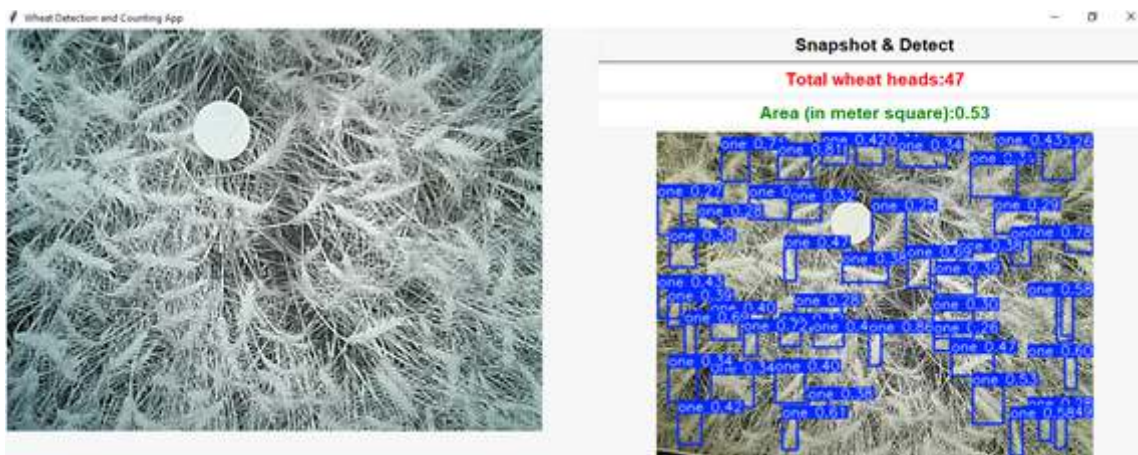
Remote-controlled battery powered boom sprayer

A remote-controlled battery-powered sensor-based boom sprayer was developed and evaluated at the Cotton Research Farm, CCSHAU, Hisar, using Bt-cotton as the test crop. The developed sprayer is equipped with ten Teejet AIXR110015 flat fan nozzles spaced 550 mm apart. It was operated at a forward speed of 3.4–3.8 km/h with a working width of 5.5 m and a height of 500 mm from the crop canopy. The discharge time, actual field capacity, application rate and field efficiency of developed machine was found to be 1.25 h, 440 l/ha, 1.17 ha/h, and 61%, respectively. The droplet density achieved by the developed sprayer was 92 droplets/cm² with 14.92% leaf area coverage and an average spray deposition volume of 856.05×10⁻³ µl/cm². The droplet size distribution ranged from 134–178 µm (NMD) and 236–254 µm (VMD), while the uniformity coefficient varied between 1.43 and 1.76, indicating acceptable spray uniformity and coverage.



AI and ML-based desktop application software for counting wheat ear-heads density on real time

A Python-based desktop application was designed to be integrated with a hand-held device for real-time wheat ear-head density estimation. The application uses object detection and machine learning algorithms to automatically count wheat ear-heads and calculate the corresponding area. This application has been developed using Python packages such as Tkinter, OpenCV, PIL, and Ultralytics. The GUI provides a user-friendly platform that can process field images in real time. The user simply captures a snapshot of the wheat plot from a distance of about one meter above the crop canopy. The application then processes the image, identifies and counts the wheat ear-heads, and calculates the actual area of the plot instantly.



IoT-enabled automatic irrigation system for rice

IoT-enabled automatic irrigation system under Alternate Wetting and Drying (AWD) technique for rice has been developed and evaluated in the field. The controller was developed using ESP 8266 micro-controller and water level data was stored on ThingSpeak cloud server. The pump controller reads the water level information from the cloud server and operates the pump as per logic given for alternate wetting and drying irrigation. The developed system was evaluated in a paddy field at CIAE farm during kharif 2024-2025 and kharif 2025-2026. Results from two years pooled data show the total water productivity as 4.5 and 2.1 $\text{kg ha}^{-1} \text{mm}^{-1}$ for automated and controlled (continuous ponding), respectively. The average yields for two years are obtained as 4.3 and 3.2 t ha^{-1} for automated and control system, respectively. The developed irrigation system saves 35% water as compared to conventional irrigation practices for rice



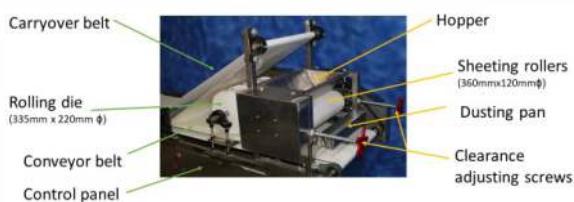
Design and development of manual-operated poultry litter Mixture equipment

A manually operated poultry litter management equipment was designed, developed, and fabricated based on ergonomic considerations. The handle dimensions were 550 mm in width, 1500 mm in length, and 1232 mm in height. The blade size was 150 × 25 × 2 mm, with three blades provided, giving a total working width of 300 mm. Two rubber wheels were incorporated for transport and to drive a bevel gear mechanism, which minimized bouncing and improved stability. A chain and sprocket system enabled horizontal rotational movement. Field evaluation in a poultry farm showed a field capacity of 121–165 m^2/h and a field efficiency of 62.1%, compared with 71 m^2/h for manual methods. The equipment achieved savings of 58.18% in operating cost, 61.8% in time, and 41.2% in labour. Litter spreading was uniform, and farmer feedback indicated satisfactory performance and adoption.



Banana papad making machine

A power-operated semi-automatic banana papad making machine was developed for shaping and forming papads from raw banana based dough. It consists of main frame, hopper, sheeting rollers, dusting pan, conveyor belt, die roller, carryover belt and control panel. A stainless-steel hopper with a capacity of 4 kg is mounted at the top of the machine for feeding banana papad dough. Two counter-rotating sheeting rollers are positioned below the hopper to sheet the dough. The clearance between the rollers is



adjustable by the screws attached with them to control the papad thickness. Oscillating pan with perforations is provided for dusting the papad to prevent them from sticking to the belt conveyor. A die roller, located in front of the sheeting rollers, is fitted with 15 circular dies of 90 mm diameter each that cut uniform circular papads. Dies are detachable and can be replaced with different need based sizes. A flat belt conveyor moves the cut papads forward for collection or drying. An inclined belt is provided adjacent to the die roller to carry the leftover dough and put it again in the hopper for reuse. The machine was evaluated with papad dough prepared from banana varieties viz., monthan, rasthali and poovan. The die roller was operated at the speed of 8 rpm. The speed of conveyor belt and carry-over belt was 0.12m/s. The capacity of the machine was found as 30 kg/h. It amounts to approximately 2000 papads per hour with initial moisture content of 70%.

Value added food products

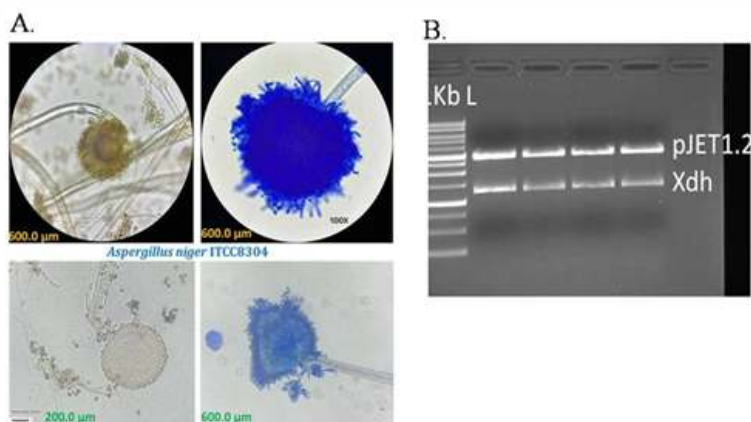
Three value-added food products were developed to promote nutritious and sustainable alternatives using plant-based and millet ingredients. Millet-oat butter is a plant-based butter alternative prepared from millets, oats, almonds, and vegetable oils to achieve a texture and spreadability similar to conventional butter. The standardized 100 g formulation included oat flour, jowar flour, ragi flour, roasted almonds, desi ghee, olive oil, hot water, soy milk powder, garlic powder, cinnamon powder, salt, and orange peel powder. This combination provides a balanced proportion of carbohydrates, fats, and proteins while adding dietary fiber and antioxidants that are absent in regular dairy butter. Biscuits were prepared by utilizing soy okara, a by-product of soy milk and tofu production. The standardized formulation used soy okara, maida, ghee, powdered sugar, baking powder, baking soda, and salt. Nutritional analysis indicated about 9.3% protein, 63.17% carbohydrates, and 23.9% fat, making the biscuits nutrient-rich and energy-dense. The estimated production cost is around Rs.160 per kg. Millet-atta biscuits were developed using sorghum, foxtail millet, and wheat flour along with maida, milk powder, ghee, jaggery, and sugar. The biscuits contain about 7.3% protein and provide a nutritious, fiber-rich product with a production cost of approximately Rs.207 per kg.



Identification of inhibitory compounds and xylitol in soybean hull hydrolysates

When soybean hulls are processed, the resulting liquid (called hydrolysate) contains sugars such as xylitol, along with some harmful substances. Two such substances are furfural and 5-hydroxymethylfurfural (HMF), which are known to interfere with microbial growth and fermentation efficiency. To measure these compounds accurately, high-performance liquid chromatography (HPLC) was used. Different detectors were used depending on the compound: xylitol was measured using a detector that senses changes in light refraction, while furfural and HMF were measured using a detector sensitive to ultraviolet light. The testing method proved to be reliable and consistent, meaning it could accurately measure both useful sugars and harmful by-products. A specific strain of *Aspergillus niger* was first identified by observing its physical features under a microscope. To confirm its identity more precisely, whole-genome sequencing was carried out. To further verify the accuracy of this genetic

information, a key gene involved in xylitol metabolism was isolated and checked. The gene sequence matched perfectly with the genome data, confirming that the genetic information was accurate and reliable.



Morphological examination of *Aspergillus niger*. (B) DNA ladder-based identification and validation of identified gene.

New externally funded projects

An externally funded project titled “Machine Learning based Maturity Assessment Device for Jackfruit using Electrical Impedance Method” has been sanctioned with a budget of Rs.49.5 lakhs under the ICAR Corpus Fund. The project aims to develop an advanced device for accurate and non-destructive assessment of jackfruit maturity using machine learning and electrical impedance techniques. The project is led by Dr. Dilip Pawar as Principal Investigator, with Dr. Bikram Jyoti and Dr. Adinath Kate serving as Co-Principal Investigators.

Technologies Licensed

A technology titled “Process technologies for soy-based prebiotic, probiotic and synbiotic milk chocolates” has been successfully licensed to M/s Mahabiofoods, Patiala, Punjab on 06 November 2025. The licensing of this technology aims to promote the commercialization of innovative functional food products with added health benefits.



Design Registration

A design titled “Drone (UAV) simulation platform” was registered with Design No. 407496-001 on 14.02.2025. The design was developed by Dr. Satya Prakash Kumar, Dr. Dilip Jat, and Dr. Manoj Kumar (FMP), contributing to advancements in simulation platforms for unmanned aerial vehicle applications.

Patent/Design registration application filed

Sl. No.	Title	Application filing date	Authors
1.	Instrument for rapid detection of aflatoxin-b1 in maize	08.10.2025	Dr. Subir K. Chakraborty; Dr. M. K. Tripathi and Er. Deepak Kumar
2.	Portable patternator for aerial drone spraying applications	16.10.2025	Dr. Satya Prakash Kumar Dr. Ramesh Sahni Dr. Deepak Thorat
3.	Tractor mounted two row differential depth trencher	16.10.2025	Dr. Abhijit Khadatkar Dr. C.P. Sawant

MoU Signed

An MoU was signed between NRSC, Hyderabad and ICAR-CIAE Bhopal on 'Field equipment for validation of evapo-transpiration and soil moisture products' on 7/10/2025.

Training organized
Rashtriya Karmayogi Jan Seva Program
Training of Master Trainers

A three-day training programme was organized during 6-8 October 2025 under Phase II of the Rashtriya Karmayogi Jan Seva Program, aimed at developing Master Trainers. The training focused on enhancing professional competencies, leadership skills, and service delivery efficiency among ICAR personnel. Total 32 participants representing various ICAR institutes across the country attended the programme. The sessions covered diverse topics such as understanding the core program, facilitation tools, platform training, practice, and closure, aligned with the objectives of Mission Karmayogi.



Three training programme (one day) for Institute Staff

Three training programs of one day duration were organized on 26, 29 and 30 December, 2025 under the Rashtriya Karmayogi Jan Seva Program, aimed at developing Capacity building of CIAE staff. The training focused on rediscovering of the 'Seva Bhav' among the government employees and aligning their work with the goals of National Development and making positive contribution to the life of citizen. The training also focussed upon enhancing the training skills of the staff. A total of 109 participants of CIAE Bhopal attended the programme. Participants included members from the scientific, administrative, and technical cadres, ensuring a multidisciplinary learning environment.



Entrepreneurship development programmes for custom hiring of agricultural machinery



Four Entrepreneurship Development Programmes for Custom Hiring of Agricultural Machinery as an enterprise, sponsored by Govt. of Madhya Pradesh were organized during 6-10 October, 2025; 27-31 October, 2025; 24-28 November, 2025 and 1-5 December, 2025, in all there where 88 participants. The training 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 services to farmers.

Entrepreneurship development program on soybean processing and utilization for food uses

Entrepreneurship development program on soybean processing and utilization for food uses was organized during 17-21 November 2025. Seven participants from different states participated in the program, which combined classroom sessions with extensive hands-on training. The training covered soybean nutrition, processing requirements, food safety regulations, packaging, shelf-life enhancement, and preparation of soy-based products such as soymilk, tofu, curd, mattha, and shrikhand.



Skill development training for tribal youth

The Regional Station, Coimbatore organized a series of one-month skill development training programmes for tribal youth on “Farm machinery repair and maintenance” with financial support from the Department of Tribal Welfare, Government of Tamil Nadu, Chennai. Four batches were conducted between 29 September 2025 and 18 January 2026, each comprising 25 participants, including a dedicated batch for women trainees. The programme attracted tribal youth from districts such as Kodaikanal Hills (Dindigul), Tiruvannamalai, Dharmapuri, Cuddalore, Nilgiris, and Villupuram. The training focused on developing technical skills in machinery diagnostics, repair, maintenance, engine systems, workshop safety, and operational techniques through a balanced combination of theory and hands-on practice. Participants also gained exposure to industrial visits and attachments with agricultural machinery manufacturing industries around Coimbatore, enabling them to understand production processes, quality control, and service management. In addition, trainees were sensitized to employment opportunities in manufacturing units, service centres, and farm machinery custom hiring enterprises.



Entrepreneurship development in food processing

An Entrepreneurship development programme in Food processing was organized during 6–10 October 2025 to promote entrepreneurial skills in millet and soybean-based value-added products. Two trainees from Kochi, Kerala participated and received both theoretical knowledge and hands-on training on product preparation and operation of food processing machinery.



Sl. No.	Technology demonstrated	Village(s)	No. of farmers benefited
1.	Awareness program on the prevention of accidents caused by tractor–trailers and agricultural machinery	Bawachiya village of Balaghat district	130
2.	Demonstrate Women-Friendly Technologies	Bagoniya village, Bhopal District	80

Participation in Exhibitions

International Herbal Fair

The Institute participated in the International Herbal Fair (Antar-rashtriya Van Mela) held during 17 to 23 December, 2025 at Bhopal and showcased agricultural engineering technologies through live display and demonstrations, along with soy-based products developed by the Institute, highlighting their relevance to value addition and agribusiness development. The exhibition provided an effective platform for interaction with farmers, entrepreneurs, students, and other stake holders.



Agri Expo, Tiruvannamalai

The Regional Station, Coimbatore participated in the Agricultural Exhibition and Seminar held at Tiruvannamalai, Tamil Nadu, during 27-28 December 2025. The two-day event, titled “Agricultural Exhibition and Seminar – 2025”, was organised by the Department of Agriculture and Farmers' Welfare, Government of Tamil Nadu. The event was inaugurated on first day by the Hon'ble Chief Minister of Tamil Nadu in the esteemed presence of the Hon'ble Minister for Agriculture and Farmers' Welfare, the Hon'ble Minister for Public Works, Highways and Minor Ports, the Agricultural Production Commissioner, and other senior officials of the Government of Tamil Nadu.

Commercial Machinery Testing

	No. of Test Reports Released	Revenue Generated (Rs. Lakh)
Farm Machinery	24	38.45
Post-harvest machinery	12	14.84
Total	36	53.30

Media Activities

Name	Topic	Date	Media
Shri MP Singh	Scientific cultivation of <i>Rabi</i> crops	06.10.2025	Krishi Darshan,
Dr. RK Singh	प्राकृतिक खेती	02.12.2025	Madhya Pradesh
Dr. Tejeshwari Satput e	सर्दियों में पशु प्रबंधन	05.12.2025	Doordarshan
Shri MP Singh	बागवानी प्रबंधन	08.12.2025	
Dr. Dipika Agrahar Murugkar	सोयाबीन से सोया दूध और एनर्जी बार तक - पोषण खाद्य नवाचार	14.10.2025	AIR, Bhopal
Dr. Uday R. Badegaonkar	रबी फसलों में निंदाई-गुदाई, खाद एवं सिंचाई प्रबंधन	14.12.2025	AIR, Bhopal

KVK News

On Farm Testing (OFT)

Sl. No.	Crop/ Technology	Villages	No. of farmers	Area (ha)
1.	Assessment of wheat variety HI-1650 (Pusa Ojaswi)	Ratatal	5	2.0 ha
2.	Assessment of intake of a biofortified variety of wheat: HI 1650 (Pusa Ojaswi) on nutritional status of the farm family	Ratatal, Kachhi Barkheda, Chanderi	9	3.6 ha
3.	Assessment of natural farming methods in wheat	Chandpur & Lambakheda	3	2.0 ha
4.	Assessment of bio fertilizer application in wheat crop	Gondermau	3	2.0 ha
5.	Assessment of residue management machinery for wheat sowing	Ratatal and Mugaliyahat	4	2.0 ha -
6.	Assessment of different sowing techniques in potato cultivation	Ratatal, Borkhedi, Muriyakheda	3	1.0 ha -
7.	One day FLD programme on women friendly tools (Improved Maize Sheller)	09.10.2025, Manger Darah, Gangtok	18 (11 male 07 female)	

Human Resource Development

Name and Designation	Course Title	Duration	Venue/ Place
Dr. AM Waghaye, Scientist	Deep learning concept to application with hands on practice	15-30 December, 2025	NIT, Raipur (Online)
Dr. Shubham Singh (SMS, Soil Science)	Nature based solutions for tropical and sub-tropical landscape management	3-5 December, 2025	ICFRE-TFRI, Jabalpur

CIAE hosted ISAE Annual Convention

This year CIAE organized the 59th Annual Convention of the Indian Society of Agricultural Engineers (ISAE) and an International Symposium on “Mechatronics and Robotics in Pre and Post-Harvest Agriculture” under the overarching theme “Engineering Innovations for Agriculture 5.0” during 10-12 November, 2025. The inauguration session of the convention was graced by Hon'ble Shri Lakhan Patel, Minister of State (Independent Charge) for Animal Husbandry and Dairy, Government of Madhya Pradesh as Chief Guest, Dr. M. L. Jat, Secretary (DARE) and Director General, ICAR (online), Dr. S. N. Jha, President, ISAE and Deputy Director General (Agricultural Engineering) and many other dignitaries. Shri Lakhan Patel highlighted the importance of innovation, automation, and technology-driven growth in developing sustainable and resilient agricultural systems.



A special Expert Panel Discussion on “Engineering Innovations for Agriculture 5.0” was organized which was moderated by Dr. S. N. Jha, DDG (Agricultural Engineering), ICAR, New Delhi. The distinguished panel included Dr. V. M. Mayande (Ex-VC, PDKV, Akola), Dr. R. C. Srivastava (Ex-VC, RPCAU, Pusa), Dr. Nawab Ali (Ex-DDG, ICAR), Dr. P. M. Chauhan (VC, SKNAU, Jobner), Dr. Indra Mani (VC, VNMKV, Parbhani), Dr. D. C. Joshi (Ex-VC, KAU, Kota), and Dr. Bangali Baboo (Ex-National Director, NAIP, ICAR, New Delhi). The experts emphasized the need for technological innovations, smart mechanization, and engineering-led strategies to transform Indian agriculture into a more efficient, sustainable, and climate-resilient system.

An Industry Panel Discussion was also conducted on key themes including Mechanization in the Changing Scenario of Modern Agriculture, Future-ready Tractors for Smart Agriculture, Agricultural Machinery Trade, Demand and Supply – Issues and Perspectives, Future-ready Irrigation Systems for Agriculture 5.0, Agro-Processing Industry – Trade Challenges, and Application of Renewable Energy Technologies in Agriculture 5.0. The discussions highlighted the importance of strengthening industry–research partnerships, addressing trade challenges, and promoting renewable energy adoption to meet the emerging needs of Agriculture 5.0.





The symposium aimed to advance the vision of Agriculture 5.0 through innovations in mechatronics, robotics, automation, precision farming, post-harvest processing, and renewable energy integration. Over 600 delegates, including scientists, academicians, industry leaders, policymakers, and entrepreneurs participated in this three-day event. The program featured several parallel scientific sessions, expert lectures, research paper presentations, and a technology exhibition displaying drones, robotics, IoT-based systems, and modern agricultural machinery. The event served as a dynamic platform for policy dialogue, knowledge exchange, and collaboration among academia, industry, and farmers, fostering innovation-led agricultural transformation.

The valedictory program was presided over by the Chief Guest, Shri Bhagirath Choudhary, Hon'ble Union Minister of State for Agriculture and Farmers' Welfare, Government of India, who formally declared the symposium closed. In his address, Shri Choudhary emphasized the importance of innovation, automation, and technology-driven growth in the agricultural sector.



An exhibition of agricultural machinery was also organized on the occasion of 59th ISAE Convention. Companies like John Deere, Kubota, New Holland & Cooper tractors displayed their products besides the farm machinery manufacturers like Kisan Kraft and drone companies. Hon'ble State Minister of Agriculture, Gol, Shri Bhagirath Choudhary also visited the exhibition on 12 November, 2025.





Live screening of the release of the 21st Installment of PM-KISAN

A live screening of the release of the 21st Installment of PM-KISAN organized on 19 November, 2025, attended by 252 farmers. The programme facilitated farmers' participation and awareness about the government support under the PM-KISAN scheme.



Awards and Recognitions

सीआईईई भोपाल को उत्कृष्ट हिन्दी कार्यान्वयन के लिए नगर स्तरीय राजभाषा शील्ड पुरस्कार

केन्द्रीय कृषि अभियांत्रिकी संस्थान, भोपाल कार्यालय को सरकारी कामकाज में राजभाषा हिन्दी के कार्यान्वयन, प्रचार एवं प्रसार की दिशा में उत्कृष्ट कार्य के लिए नगर राजभाषा कार्यान्वयन समिति, क्रमांक 2-कार्यालय भोपाल के द्वारा द्वितीय पुरस्कार के रूप में राजभाषा शील्ड 2024-25 से सम्मानित किया गया। यह पुरस्कार 11 दिसंबर 2025 को प्रदान किया गया था।



Name of Scientist	Details of award/honour	Awarding Society/Institute
Dr. MK. Tripathi	Recognized among the Top 2% Scientists in the World for the fifth consecutive year (2021–2025),	Global ranking released by Stanford University and Elsevier (USA),2025
Dr. Manojit Chowdhury (SMS, Farm Machinery and Power)	FAI Award for Outstanding Doctoral Research in Fertilizer Usage	Fertilizer Association of India.
Dr. Adinath Kate	ISAE Distinguished Service Award-2025	ISAE, New Delhi
Dr. Y. A. Rajwade		
Dr. Manish Kumar	Best Reviewer Award for the Journal of Agricultural Engineering (India)	
Dr. M K. Tripathi & Dr. S. Mangaraj	First prize in the oral presentation for the paper entitled “Utilization of tofu whey for millet fermentation: improving bioavailability, antioxidant and product development”	59 th Annual Convention of ISAE held at ICAR-CIAE, Bhopal during November 10-12, 2025.
Dr. RD Randhe	First prize in the oral presentation for the paper entitled “Development of timer-based linear move irrigation system for small farm”	
Dr. Dilip Pawar and Dr. SK Giri	Second prize in the oral presentation for the paper entitled “A natural anthocyanin-based colorimetric indicator for real-time freshness assessment in intelligent food packaging”	
Dr. Mukesh Kumar	Second prize in the oral presentation for the paper entitled “ Development of solar powered IoT enabled floating pump for small farms”.	
Dr. Adinath Kate and Dr. Dilip Pawar	Third prize in the oral presentation for the paper entitled “Infrared heat treatment based disinfection of <i>Callosobruchus maculatus</i> infested chick pea grains during storage”.	
Dr. AM Waghaye	Third prize in the oral presentation for the paper entitled “Machine learning based decision support system for crop grown under micro-irrigation system”.	
Dr. R K Singh	Third prize in the oral presentation for the paper entitled “Development of a floating beam mole plough for drainage of excess water from Vertisols fields in Central India”	
Dr. Sandip Mandal	Best Research Paper in Energy section for the paper entitled “Performance of Micro-scale Gasifier based Power Generation Unit using Pigeonpea Stalk Pellets with Mass and Energy Flow Analyses”.	
Dr. Tejeshwari Satpute (SMS, Livestock Production Management))	Second Prize in oral presentation for the paper entitled “Optimizing semen quality through microclimatic modification and nutritional strategies with insights into heat stress related gene expression in murrah buffalo bulls”	National Conference of Indian Society for Buffalo Development (ISBD) organized by ICAR-IVRI, Izatnagar, during 15-16 December, 2025.

Glimpses of Award Ceremony, ISAE 2025



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EVENTS

Agri-StartUp stakeholders Connect Programme

Agri-StartUp Stakeholders Connect programme was organized on 12 December, 2025 jointly by MANAGE, Hyderabad and NAIF-ABIC, ICAR-CIAE, Bhopal. The programme aimed at promoting and supporting agri-startups through collaboration, guidance, and exposure to innovation-driven opportunities. Dr. M. Mohanty, Director, ICAR-IISS, attended as Chief Guest and emphasized innovation-led agriculture for youth empowerment and rural development. Dr. Saravanan Raj, Director (Agricultural Extension), MANAGE, highlighted national initiatives and incubation support for agripreneurs, while Smt. Anwita Surin, General Manager, NABARD, elaborated on financial assistance and government schemes for agri-startups.



National Women Farmers' Day and International Day of Rural Women- 2025

The Women's Cell of ICAR-Central Institute of Agricultural Engineering (CIAE), Bhopal, in collaboration with the Institute's SCSP programme, successfully organized a one-day program on October 15th in Begonia village, Bhopal, to commemorate "National Women Farmers' Day" and "International Rural Women's Day - 2025". The main objective of the programme was to honour and acknowledge the vital contributions of women in agriculture. In this programme, about 150 women farmers actively participated and learn new things. On this occasion, Dr. Harsha Wakudkar, Scientist and Chairperson of the Women's Cell, sensitized rural women farmers about different efficient agriculture practices, solar sprayer, waste-to-wealth technologies such as briquetting/pelleting, biochar and value addition of crop waste to generate the self-employment. Dr. Rahul Potdar, Senior Scientist and Chairman of the Institute's Scheduled Caste Sub-Plan, emphasized the importance of personal protective



equipment in agriculture and highlighted the increasing participation of women in agriculture, which is leading to a growing demand for women-friendly agricultural implements. Dr. Deepika S. Channe, delivered a lecture on healthy dietary systems and nutrition gardens, raising awareness among women about health and nutrition. The programme ended with vote of thanks by Dr. Gopal Carpenter, Scientist, AEP.

Vigilance Awareness Week (27 October to 2 November, 2025)

The institute observed Vigilance Awareness Week 2025 from October 27 to November 2 under the theme “Vigilance – Our Shared Responsibility.” The programme aimed to promote transparency, accountability, and ethical conduct among employees, students, and the wider community. Director Dr. C.R. Mehta highlighted the significance of vigilance in strengthening integrity within the institute and society in the inauguration ceremony. The celebration began with an integrity pledge ceremony where participants reaffirmed their commitment to honesty and transparency. Awareness banners and pamphlets carrying anti-corruption messages were displayed across the ICAR-CIAE campus in Bhopal and its Regional Station at Coimbatore.



Several competitions and outreach programmes were organized during the week. A quiz competition engaged 36 participants. A debate competition at Oxford Convent School, Bhopal involved 250 students on the theme “Corruption can be controlled by integrity only.” At the Coimbatore regional station, quiz and essay competitions engaged 40 students. An outreach programme at Parvalia Sadak village interacted with 98 farmers, emphasizing transparency in agriculture. The week concluded with a closing ceremony and prize distribution, reaffirming ICAR-CIAE’s commitment to integrity and ethical practices.



Mass Singing of Vande Mataram

To commemorate the 150 years of Vande Mataram, an event of 'mass singing of vande mataram' by Institute Staff was organized on 7 November, 2025.



Celebration of National Unity Day at ICAR-CIAE, Bhopal



National Unity Day (राष्ट्रीय एकता दिवस) was celebrated on 31 October 2025 to commemorate the birth anniversary of Bharat Ratna Sardar Vallabhbhai Patel, the Iron Man of India. The day was observed to reaffirm the importance of unity, integrity, and security of the nation. The celebration began with the screening of short video on the theme “Ek Bharat Shreshtha Bharat” from the Ministry of Information & Broadcasting. Following the short video the Unity Pledge was administered to all officers, staff members, students, and contractual employees of the institute. During the pledge,

participants collectively resolved to uphold and strengthen the unity and integrity of our country and contribute to the spirit of national integration. To further promote the message of oneness, the institute also organized a Unity Walk and Run within the campus premises. All staff members, students, and trainees actively participated in the event with great enthusiasm.

Celebration of Constitution Day (संविधान दिवस)

Institute along with its Regional Station at Coimbatore, organized celebration of Constitution Day on 26 November, 2025. The program dedicated to reaffirming the core values enshrined in the Constitution of India. The event witnessed enthusiastic participation from all the staff members of both locations. The program commenced with the melodious rendition of the national song “Vande Mataram”, creating an atmosphere of national pride and unity. Following this, Director, CIAE addressed the gathering and subsequently, all staff members collectively read the Preamble of the Indian Constitution, reaffirming their commitment to the principles of justice, liberty, equality, and fraternity.



Swachhta Pakhwada Programme 2025

Swachhta Pakhwada programme was organized during 16-31 December 2025, during which a series of thematic activities were conducted daily. Under the theme “Massive Community Mobilization for Plastic Waste Shramdaan,” an awareness programme was organized on 28 December 2025 at the CIAE Colony, Nabibag, Berasia Road, Bhopal. The programme focused on promoting effective waste management practices, utilization of organic waste for wealth generation, achieving polythene-free status, curbing the use of Single-Use Plastic (SUP), and discouraging the use of plastic within office premises. Activities also included demonstrations on composting of kitchen and household waste, and the promotion of clean and green technologies along with organic farming practices in the locality.



Our New Colleagues



Dr. Sudeep Marwaha
Principal Scientist
On Transfer from ICAR-IASRI,
New Delhi, 14.10.2025



Dr. Aman Mahore
Scientist
New Joining
27.10.2025

Staff Promoted

Sl. No.	Name	Next higher grade/post on Assessment Promotion	Date of Promotion
1.	Sh. Rishi Sharma	Lower Division Clerk	24.10.2025
2.	Sh. Gaurav Kumar Soni	Upper Division Clerk	24.12.2025



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Editors: Dr. Adinath Kate, Dr. Ajesh Kumar, Dr. Abhishek Waghaye, Dr. Syed Imran and Dr. Bikram Jyoti
Word Processing: K. Shankar
Publisher: Director, ICAR-Central Institute of Agricultural Engineering, Bhopal - 462 038
Phone: 91-755-2737191
Email: director.ciae@icar.org.in, directorciae@gmail.com
Web: <https://ciae.icar.gov.in>



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