

ICAR-CIAE NEWSLETTER
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From the Director's Desk

The production and productivity in Indian agriculture cannot be enhanced by primitive and traditional practices of farming. The average farm size in India is small (1.08 ha) and small and marginal land holdings (less than 2.0 ha) account for 86% of land holdings. Mechanizing small and non-contiguous group of small farms is against 'economies of scale' for individual ownership of farm machinery. The population dynamics shows that by the year 2047, the population of agricultural workers in the country will be about 202 million (26% of total workers) of which 60% will be the female workers. Thus, there is going to be a significant role of farm women workers in country's agricultural production. With continued shrinkage in average farm size, more farms will fall into the adverse category thereby making individual ownership of agricultural machinery progressively more uneconomical.

Engineering interventions are going to be vital for growth of all sectors of agriculture. Be it for increasing productivity of resources and labour, for production of energy from alternate sources, for feeding extra mouths or earning foreign currency, engineering technologies with applications of electronics and IT would play a crucial role by 2047. Mechanization of majority of farm operations would be influenced by unavailability of human labour, higher targets of food production, need of timeliness of farm operations and economic feasibility of mechanization adoption.

Developments in other areas of science and technology would definitely influence the research and developments in the field of farm mechanisation. Some of the technologies currently considered as high-end and expensive, would be easily available at affordable cost and would prove their worth while performing arduous tasks. The human labour, replaced due to use of technology, would be available for the service sector and also for some better paid jobs related to use of advanced agricultural technologies. Mechatronics, robotics, drones, micro-bots, UAVs, IoT, cloud-seeding, data-cloud, green energy, etc would be some of the major highlights in the agricultural domain by 2047.

DIGEST

This issue of the newsletter focuses on research and development of farm equipment and machinery like Self-propelled chili pepper harvester, Multi-row rotary weeder and sprayer attachment to ride on rice transplanter, Tractor operated banana stem shredder, Hand held mechanical cotton picker, Small tractor operated seedling transplanter etc. Some of the prominent technologies developed by CIAE were displayed in the exhibitions in the form of posters and videos in 95th ICAR Foundation Day-cum-Technology Day organized at NASC Complex, New Delhi during 16-18 July 2023. The 27th meeting of ICAR Regional Committee No. VII was organized by ICAR-CIAE, Bhopal on 18 August, 2023 to identify issues related to agriculture, horticulture, animal husbandry and fisheries sectors in the states of Madhya Pradesh, Maharashtra, Chhattisgarh and Goa, and to provide solutions for those issues. In this quarter, one HoD joined at the Irrigation and Drainage Engineering Division of the institute, while two Project Coordinators joined at AICRPs on Energy in Agriculture and Agro-based Industries and Farm Implements and Machinery. Three staff members were promoted and six colleagues superannuated in this quarter as well.

As Director, ICAR-CIAE, I am happy to share this Newsletter for this quarter.

RESEARCH & DEVELOPMENT

Self-propelled chili pepper harvester

Hand picking is the most common traditional harvesting method adopted by the farmers to harvest chili peppers. It is time-consuming and requires 40-50 labours per day per ha which is about 50% of the total cost of production. The unavailability of labour during peak season causes the delay in harvesting and consequently deteriorates the quality of the product. Hence, AICRP on FIM (IIT Kharagpur centre) has developed a self-propelled chili pepper harvester which consists of crop guiding system, stripper reel mechanism, chili pepper conveying system, collection box and an engine. The harvesting efficiency is about 67% at a forward speed of 1.5 km/h and rotational speed of 180 rpm. It is also observed that the plant damage is of superficial type and plant damage caused by picking unit has not affected the yield of chili pepper.

Multi-row rotary weeder and sprayer attachment to ride on rice transplanter

A multi row weeder-cum- sprayer has been developed by AICRP on FIM (TNAU, Coimbatore centre) as an attachment to the riding type transplanter to increase the field capacity, reduce the labour requirement and drudgery in weeding and spraying operations in paddy crop. It consists of main frame, gear box, main shaft, rotary weeding units, two floats, a tyne and boom sprayer attachment. The field capacity of the weeder cum sprayer is 0.57 - 0.72 ha/h. The developed weeder-cum-sprayer can save 68 and 30% time as compared to weeding with power weeder and manual spraying with knapsack sprayer, respectively. The saving in cost of operation can be achieved by 96 and 93% as compared to weeding with power weeder and spraying with knapsack sprayer, respectively.

Tractor operated banana stem shredder

Disposal of banana stem is a labour intensive operation. After the harvest of the banana bunch, the pseudo stem is manually cut and left in the rows. After banana harvest, these are collected and left near the field boundary for drying and subsequent disposal by burning. This process is tedious, time consuming and environmentally harmful. The banana stem shredder helps in disposing off the stem immediately after harvest. Shredded material is suitable for mulching in the banana garden and also for vermin-composting. A tractor operated banana stem shredder has been developed by AICRP on FIM (MPKV, Rahuri center) and consists of simple cutting mechanism with four rotating blades in closed housing. Provision of vertical outlet chute has been incorporated in the design for proper throw of the shredded banana stems. The effective field capacity of shredder is about 0.2 ha/h at 82% field efficiency. The size range of chopped trash varies from 150 to 250 mm with shredding capacity as 23-24 ton per hour. The net saving with this machine is about 84% as compared to conventional method. The machine is useful for the banana growers for in-situ disposal of banana stems in the field.

RESEARCH & DEVELOPMENT

Hand held mechanical cotton picker

Manual cotton picking is not only tedious and laborious, but costly also. In order to mechanize the picking operation, the commercially available hand held mechanical cotton picker (HHMCP) has been evaluated by CIAE, CIRCOT, and CICR to assess its field performance, ergonomic aspects, suitability, and acceptability to farmers. The machine has been evaluated in the Central zone at ICAR-CICR, Nagpur, and in Southern zone at Regional Station, ICAR-CICR, Coimbatore, during first and second cotton pickings by male and female workers. The average output capacity, post-harvest losses, and trash content are 3.45 kg/h, 4.7%, and 2.1% in cotton picked with HHMCP as against 4.92 kg/h, 1.48%, and 1.6% in hand picking, respectively. HHMCP resulted in lower output capacity of 28.3% as compared to hand picking. The overall picking efficiency of HHCMP was 73.4% in comparison to hand picking. The physiological cost of work in terms of heart rate (beats), cardiac cost (beats/kg), total cardiac cost (beats), and %VO_2max were significantly higher in case of HHMCP as compared to hand picking. Also, Body Parts Discomfort Score (BPDS) in hand picking (13.3±1.92) is significantly lower than that of machine picking (20.35±3.6). Workers experienced more pain in the upper back, lower back, wrist, and shoulder regions of body while using HHMCP due to additional weight of the machine and battery carried by the workers. In subjective assessment, the overall acceptability of hand held cotton picker is very low as compared to hand picking due to ergonomic and technical shortcomings.

Small tractor operated seedling transplanter

A tractor operated sugarcane seedling transplanter has been developed in collaboration with ICAR-Sugarcane Breeding Institute, Coimbatore. The developed unit consists of main frame, hitching system, transmission system with ground wheel, seedling indexing mechanism, ridger, furrow opener, compaction wheels (two numbers), seedling tray and fertilizer applicator. The seedling planter is suitable for single row planting. Provisions has been made to change the plant to plant spacing of 300, 450 and 600 mm. Provision also has been made to change the depth of planting from 20 to 60 mm. The planter is suitable for sugarcane seedling raised in portrays and tissue culture seedling raised in poly bags. The unit was evaluated at R&D farm of ICAR-Sugarcane Breeding Institute, Coimbatore. The actual field capacity and field efficiency of the machine are 0.2 ha/h and 70%, respectively.

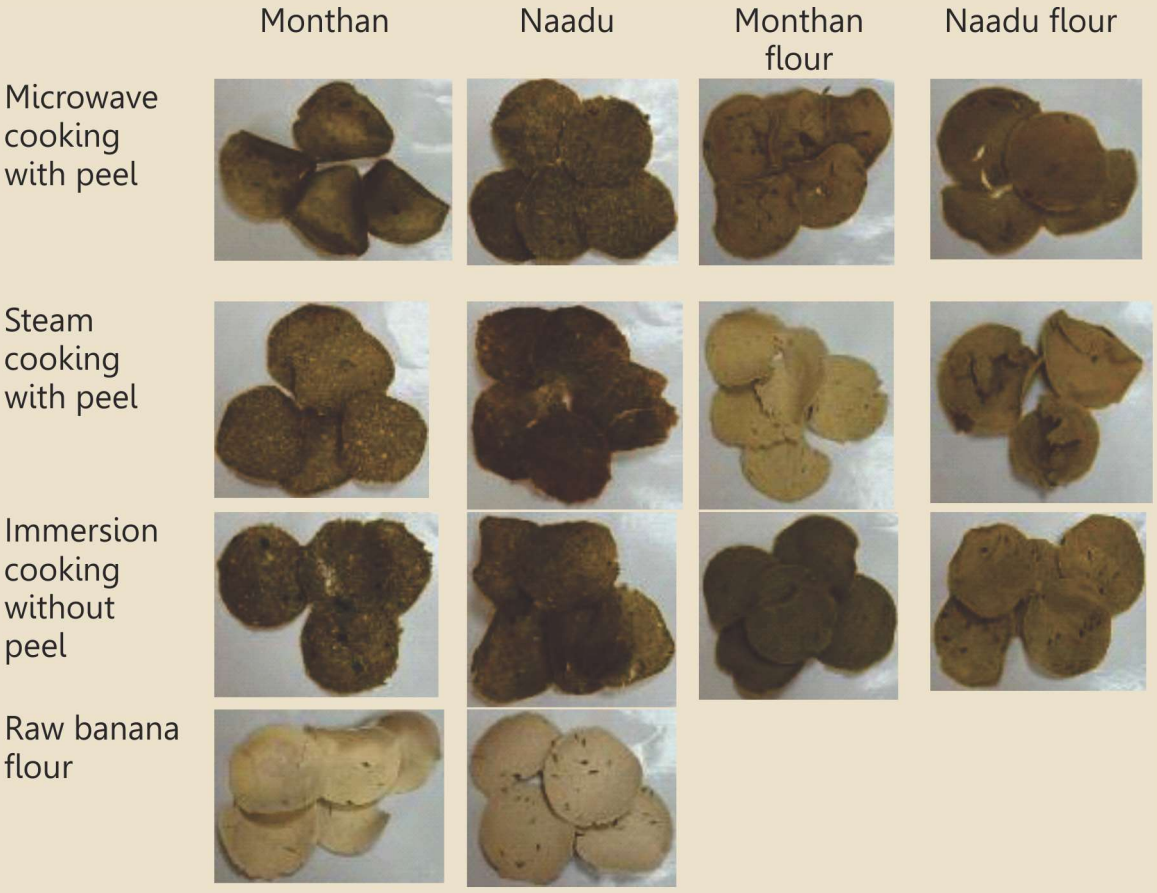
Bullock drawn 4-row seed drill for millets

In Odisha, the small and marginal farmers generally go for manual broadcasting of small seeds (Cereals- finger millet-ragi, small millet-suan, sorghum-janha, oilseeds i.e., mustard, sesamum, linseed) after twice ploughing with bullock drawn deshi plough in upland conditions. AICRP on UAE (OUAT, Bhubaneswar center) has developed a four-row bullock drawn seed drill for millets for getting better

RESEARCH & DEVELOPMENT

Processability of culinary type banana for papad making

Papads are the value added products from cereal, legumes, fruits and vegetables. Culinary type bananas which are high in fibre content are used for papad making. To determine the processability (papad making ability) of culinary type banana, two varieties of banana viz. Monthan and Naadu were selected. The unit operations followed for papad making were cooking (immersion cooking, steam cooking and microwave cooking), grinding with other ingredients, dough making, pressing and drying. Papads were also made from flour of raw as well as cooked and dried bananas. One lot of the treated bananas were ground into dough with other ingredients viz., salt, chilli powder and cumin and papads were made by rolling small dough ball. The other lot was cut into slices and dried at 50° C to make banana flour. This flour was sprinkled with specified quantity of hot water to make dough and papads were made by adding other ingredients. From the study, the papad recovery was found as 74.8% and 77.5% for Monthan and Naadu, respectively. There was no correlation between oil absorption capacity and their water activity. Oil absorption capacity was low in microwave cooked skinned banana papad (0.36 ml) in Monthan and immersion cooked skinned banana papad (0.30 ml) in Naadu. Overall acceptability of papads were evaluated with respect to colour, texture, taste and flavor. For Monthan and Naadu, microwave cooking with peel got the highest score (9.0 & 9.0) followed by steaming with peel (8.9 & 8.8) and immersion cooking without peel (8.3 & 8.4).



efficiency. It consists of four numbers of vertical slit type furrow openers, inclined plate metering mechanism, a pair of transport-cum-depth adjustment wheels. There are four numbers of flexible furrow covering devices fixed behind the furrow openers for covering of soil on the furrows following the drilling of seeds in the furrow. The actual field capacity of seed drill is 0.12 ha/h with 62.6% field efficiency for sowing of finger millet at 1.8 km/h forward speed. The draft and power requirement are 378 N and 0.19 kW, respectively, which are within the draughtability limit of medium pair of bullocks. The cost of seed drill is Rs. 22,000/- and cost of operation is Rs. 176/- per hectare.

RESEARCH & DEVELOPMENT/ MoU/ IPR

New External Funded Projects

Title of the Project	Budget (Rs in lakhs)	Funded by
Study on determining storage losses of pulses stored in warehouses and to recommend norms for loss/gain during long term storage (Lead Centre: ICAR-CIPHET, Ludhiana)	87.12	Department of Consumer Affairs, Govt. of India
Development of smart foods, bio-composites, green packaging and bio-energy from agro-residues (Lead Centre: ICAR-NRCB, Trichy)	30.00	NASF

MoU Signed

An MoU was signed between National Institute of Technical Teachers' Training and Research (NITTTR), Bhopal and Central Institute Agricultural Engineering, Bhopal, on 5 July, 2023 for resource sharing, undertaking joint initiatives in the areas of common interest with an objective to promote research, development, training and innovation in the field of engineering and related disciplines.

Patents granted

Process technology for Soy-butter (Patent number- 440382)

Soy-butter is rich in protein (37%), cholesterol free and trans-fat free with a long shelf life (3 months under ambient conditions). People suffering from hypercholesterolemia, high blood pressure, diabetes, lactose intolerance and peanut allergy can eat it. It is tasty, easy to transport and consume and takes care of a large percentage of the recommended dietary allowance of nutrients for Indians. The product has been commercialized to three manufacturers. Cost of production is Rs 189/kg (at an output of 100 kg/day) and approximate sale price is Rs. 300/ kg.

Process Technology for Pro-Biotic Soya Cheese Spread (Patent number-435233)

The product contains about 17% protein, 25% fat, high antioxidant activity (53 %) and higher probiotic culture viability. It can be utilized as a spread with bread/chapatti/paratha/biscuits as a main meal or a meal supplement. The technology is nutritionally rich product having probiotic characteristics.

TECHNOLOGY TRANSFER/ TRAINING

License Agreements Signed

License agreements with manufactures were signed for commercial production of following technologies, developed by the Institute.

Technology	Manufacturer	Date of license
Process technology for soya chaap	M/s Perfect Business Solutions, Indore	7 July, 2023
Process for millets and sprouted legume based beverages	M/s Mahavir Beverages Pvt. Ltd., Visakhapatnam	1 August, 2023

Trainings Organized

Sponsored training programmes for officials of Odisha State Government

Two sponsored training programmes for 29 officials of Odisha State Government working in Water Resources Department were organized. The first training on 'Micro Irrigation Systems Planning (MIS) and Practices' was conducted during 11-13 September, 2023 covering basic concept of MIS, their selection, layout, design, operation and maintenance etc. Hands-on experience classes were also organized for the trainees. The second training on IoT based on-farm water management practices was organized during 14-16 September, 2023. The concepts of IoT, sensors, precision farming instrumentation, controller programming etc. were taught to the participants. The trainees were taken to field visits to understand the on-farm irrigation water management practices prevalent in Madhya Pradesh state.

Entrepreneurship development on soybean processing

Entrepreneurship development training on "Soy-food" was organized during 7-11 August, 2023, in which 3 trainees participated from Bihar and Maharashtra states. The training covered various topics viz., different soy-based food products, preparation of soy milk and tofu, introduction to soy processing equipment, project planning, storage and packaging, quality standards, and marketing of soy products. The health benefits of soybeans, as well as their nutraceutical properties, were also discussed. A guest lecture on financial support was also arranged. The training module mainly comprised practical demonstration and hands-on training supported by the theoretical aspects.

Entrepreneurship development in agro-processing

Training on entrepreneurship development in Agro-Processing was organized during 25–29 September, 2023. Two participants from Varanasi (Uttar Pradesh) and Budni (Madhya Pradesh) attended the training. Technologies such as primary processing equipment (fruit graders, washers, packaging), minimal processing of fruits and vegetables, ripening chamber, storage structures for agro-commodities, chemical-free raisin

TRAINING/ TECHNOLOGY TRANSFER

Participation in 95th ICAR Foundation Day-cum-Technology Day

ICAR-CIAE, Bhopal participated in 95th ICAR Foundation Day-cum-Technology Day organized at NASC Complex, New Delhi during 16-18 July 2023. Some of the prominent technologies developed by CIAE were displayed in the exhibitions in the form of posters, videos and some small smart gadgets were demonstrated to Shri. Narendra Singh Tomar, Hon'ble Minister, Agriculture and Farmers Welfare, Gov. of India, Shri. Purushottam Rupala, Union Minister of Fisheries, Animal Husbandry, Dairying & Senior Vice President of ICAR society, Dr. Himanshu Pathak, DG ICAR and other visitors including industry personnel, farmers and students.

An industry interaction session was held on 17 July, 2023 to showcase the technologies and discuss the issues of entrepreneurs. Dr. C.R. Mehta, Director, ICAR-CIAE presented technologies developed by Agricultural Engineering Division on Pre-production agricultural mechanization. Two scientists of the Institute Dr. BM Nandede and Dr. Chetan Sawant received a certificate by Shri Purushottam Rupala and Shri Kailash Choudhary, Minister of State Agriculture & Farmers Welfare for their developed technologies.

processing, onion storage and paste making, millet processing, agro-processing center, tomato processing, spice processing, and the development of novel food products were demonstrated to the participants during the training. An industrial visit to M/s Snowline Cold storage in Bhopal was also arranged.

SCSP Programme

A programme on demonstration-cum-distribution of spiral grader and maize seed for SC-BPL beneficiaries was organized at selected villages of Ujjain district. The programme was organized at four clusters of villages viz. Narwar and Kadchali-Dahukhedi on 10 August 2023 and at Khemasa-Buchakhedi and Kadacha-Shilarkhedi-Hanskhedi on 11 August 2023. The spiral graders were demonstrated to the beneficiaries with its testing on soybean. The information was provided to the beneficiaries on the operation, use and maintenance of the spiral grader. Total 174 spiral graders (1 per beneficiary) and 696 kg of maize seed (4 kg per beneficiary) were distributed to the beneficiaries. The demonstration-cum-distribution programme was carried out in presence of Sarpanch and Sachivs of the respective villages.

Another demonstration cum distribution programme of spiral grader and maize seed was organized at ICAR-CIAE, Bhopal on 12-13 September 2023. Total 84 spiral grader and 772 kg of maize seed were distributed to 193 numbers of beneficiaries covering 7 villages namely

Tarawali Kalan, Bhains Kheda, Purachindwada, Mugaliyahat, Karondiya, Bandikhedi, Sagoni Jora. A spiral grader was demonstrated to the beneficiaries for cleaning-cum-grading of soybean and chick pea. Information was also provided on the operation, adjustments and repair maintenance of the spiral grader. Some of the beneficiaries also operated the spiral grader and learned information about the spiral grader.

KVK News

Training/ Exposure visit organized

KVK organized orientation training for B.Sc. (Ag) VII Semester (Final) year students (54 Nos.) under RAWE (Rural Agricultural Work Experience) course from LNCT University Bhopal and SSSUTMS, Sehore during 20 September – 05 October, 2023.

Exposure visits (12 Nos.) to KVK were arranged for 316 farmers (69 farmers in July, 103 farmers in August and 144 farmers in September 2023) from states of Madhya Pradesh and Gujarat and farmers interacted with scientists. Farmers were exposed to scientific cultivation of crops and vegetables and improved tools and equipment used for mechanized cultivation of crops.

Sl. No.	Technologies demonstrated	Village	Area (ha)	Yield (q/ha)
1	Tractor operated bund former machine for sowing of maize	Parwaliya sani	0.6	30.83
2	Tractor operated bund former for sugarcane crop	Gondar-mau	0.4	-

Zonal Workshop of KVKs

ICAR-ATARI, Jabalpur and KVK, ICAR-CIAE, Bhopal organized 30th Zonal Workshop of KVKs (Madhya Pradesh and Chhattisgarh) at ICAR-CIAE Bhopal during August 19-21, 2023. Dr. Himanshu Pathak, Hon'ble Secretary DARE and DG, ICAR, New Delhi graced the

function as Chief Guest. Dr. U.S. Gautam, DDG (Agri. Extension), Dr. S.N. Jha, DDG (Ag. Eng), Dr. S.K. Chaudhary, DDG (NRM) participated as special guests.

Dr. Himanshu Pathak, Hon'ble Secretary DARE and DG, ICAR, in his address congratulated KVKs for their remarkable contribution. He also quoted that KVK is the face and mirror of Indian agricultural development. He further said that developed India cannot be possible without development of agriculture and developed agriculture cannot be possible without development of KVKs.

The Zonal Workshop has five technical sessions covering topics such as sensitizing KVK personnel on emerging extension approaches related to climate and nutrition, insights into KVKs' functioning, field application of ICAR technologies, attracting and retaining youth in agriculture (ARYA), ensuring nutritional security through Nutri-SMART villages, promoting natural farming by KVKs, tribal-focused activities, CFLD pulses and oilseed, CBBO functioning and progress, and secondary agriculture. All KVKs under ICAR-ATARI Jabalpur presented their achievements in mandated activities and flagship programs during the workshop. The event also witnessed the presence of eminent personalities such as Dr. Anupam Mishra, Vice Chancellor, CAU Imphal, Dr. P.K. Mishra, Vice Chancellor, JNKVV, Jabalpur, Dr. Girish Chandel, Vice Chancellor, IGKV, Raipur, Dr. P. Das, Former DDG (Agril. Extn.), Dr. C.R. Mehta, Director, ICAR-CIAE Bhopal, Dr. Ranjay Kumar Singh, ADG (Ag. Extn), ICAR, Dr. S. R. K. Singh, Director, ICAR-ATARI Jabalpur, Dr. J.S. Mishra, Director, DWR Jabalpur, Directors of Extension Services from RVSKVV Gwalior, JNKV Jabalpur, and IJKV Raipur, along with Project Coordinators and Heads of Divisions of ICAR-CIAE Bhopal.

TECHNOLOGY TRANSFER

Participation in Electronic Media

Scientist	Topic	Media	Date
Dr. Dipika Agrahar Murugkar Principal Scientist	Millets for good health	Doordarshan Kendra, Bhopal	4 July 2023
	Importance of millets for health and nutrition	All India Radio, Bhopal	9 July 2023
	Nutrition-sensitive agriculture	All India Radio, Bhopal	7 August 2023
Dr. Syed Imran S Scientist	Unmanned rice transplanter	Dinamalar Media Channel	11 July, 2023
Dr. T Senthilkumar Principal Scientist	Tractor operated raised bed former cum onion set planter	Dinamalar Media Channel	12 July, 2023
	Battery operated banana injector	Dinamalar Media Channel	14 July, 2023
M.P. Singh ACTO/ Farm manager	कृषकों को फसल प्रदर्शन इकाई में लगी श्रीअन्न अन्तर्गत फसलों की विस्तृत जानकारी	Doordarshan Kendra, Delhi	23 August, 2023
Dr. UR Badegaonkar Principal Scientist	खरीफ फसलों की कटाई हेतु उन्नत कृषि यन्त्र	All India Radio, Bhopal	26 August, 2023
	उन्नत कृषि हेतु आधुनिक कृषि यन्त्र	All India Radio, Bhopal	20 September, 2023
Dr. Deepak Singh PS & Head KVK	कृषकों को केन्द्रीय कृषि अभियांत्रिकी संस्थान भोपाल द्वारा विकसित किये गये उन्नत कृषि यंत्रों की जानकारी	Doordarshan Kendra ,Delhi	23 August, 2023
	सोयाबीन में लगने वाले रोग एवं कीटों का प्रबंधन	All India Radio, Bhopal	3 September, 2023

Participation in Exhibitions

Exhibition	Venue	Date(s)
Agri Intex 2023	CODISSIA Trade Fair Complex, Coimbatore	14-17 July, 2023
Mega Agriculture Expo 2023 & Velan Sa ngamam	Care Engineering College, Trichy	27-29 July, 2023
		27-29, July 2023
Bhopal Vigyan Mela & Arogya Expo 2023	Govindpura Industrial Area, Bhopal	15-18 September, 2023

AWARDS & RECOGNITIONS

Awards & Recognitions

Name & Designation	Award	Occasion
Dr. Ramesh Kumar Sahni, Scientist	1st prize in oral presentation entitled 'Fixed spray system for efficient agrochemical application in high-density apple orchard'	35th National Convention of Agricultural Engineers & National Seminar on 'Emerging Technologies for Advances in Agriculture & Horticulture' held at College of Agricultural Engineering, JNKVV, Jabalpur during 12-13 September, 2023
Dr. CS Sahay, Principal Scientist	2nd prize in poster presentation on Advancements in Grape Production System: Machinery and Tools for Improved Efficiency	
Dr. Ramesh Kumar Sahni, Scientist	Young Scientist Award (Farm Machinery and Power)	2nd International Conference on 'Prospects and Challenges of Environment and Biological Sciences in Food Production System for Livelihood Security of Farmers (ICFPLS -2023)", held at ICAR-CIARI, Port Blair, Andaman Nicobar Islands during 18-20 September, 2023
Dr. Vijay Kumar, Scientist	Best book award for book entitled "Objective Type Questions on Farm Machinery & Power and General Agriculture"	
	1st prize in oral presentation entitled "Study of advanced techniques to predict the soil properties" (online)	
	1 Prize in Poster presentation entitled 'Application of Robots for Harvesting Horticultural Crop' (online)	
Dr. Vijay Kumar & Er. Sweeti Kumari, Scientists	First prize in Oral Presentation entitled 'Farm mechanization for drudgery reduction: Ergonomic lightweight multi-crop Thresher'	
Dr. Ravindra Naik, Principal Scientist	STAI Silver Medal for the work "Mechanized priming of planting material with physical, chemical and bio-control agents for the management of biotic and abiotic stresses in sugarcane"	81st STAI Annual Convention and International Sugar Expo, held at Trivandrum during 6 -8 September, 2023
Dr. C.K. Saxena, Senior Scientist	Certificate of Excellence in Reviewing by the International Journal of Plant & Soil Science (Certificate No: SDI/HQ/PR/Cert/103941/DRC)	-
	Certificate of Excellence in Reviewing by the International Journal of Environment and Climate Change (Certificate No: SDI/HQ/PR/Cert/105000/DRC)	-

HRD

Human Resource Development

Name	Course Title	Duration	Organizer
Dr. Shashi Rawat	Navigating Cyber Security Challenges in the Era of Digital Transformation organized by National Cyber Security Coordinator, PMO, Govt. of India	20 July 2023	CIAE, Bhopal (Online)
	Building Machine Learning Algorithms from Probabilities organized by IISER, Pune	11 August, 2023	CIAE, Bhopal (Online)
Dr. R Senthil Kumar	Short Course on 'Recent Advances in Millets Crop Production, Processing, Value Addition and Marketing'	16-25 August, 2023	ICAR-IIMR, Hyderbad (Online)
Dr. Satya Prakash Kumar Dr. Ramesh Kumar Sahni	Drone OEM and Pix4D	23-25 August, 2023	IoTech World Avigati Pvt. Ltd., Gurugram
Dr. Vijay Kumar Er. Sweeti Kumari Dr Abhishek M. Waghaye Dr Ravindra D Randhe	Data Science in Agriculture	4-15 September 2023	ICAR-IASRI, New Delhi (Online)
Dr. M Mohan Er. G Muruganandam Shri Abadhesh Sainy Mrs. Jolly John	Training program on Motivation, Positive Thinking and Communication Skills for Technical Officers (T-5 to T-9) of ICAR	11-15 September, 2023	ICAR-NAARM, Hyderabad.
Dr. Ravindra Naik	Training for Technical Committee Members of BIS	25 September, 2023	National Institute of Training for Standardization, Noida
Dr. RK Singh	Training for Technical Committee Members of BIS	27 September, 2023	National Institute of Training for Standardization, Noida

Ph.D. Awarded

Er. Ankur Nagori, Scientist was awarded Ph.D. on 8 August, 2023 for his thesis 'Design, development and performance evaluation of refrigeration waste heat assisted solar drying system for preservation of vegetables'. He did his Ph.D. from School of Energy and Environmental Studies, Devi Ahilya Vishvavidyalaya, Indore under the guidance of Dr. Rubina Chaudhary, Professor.

Er. Harsha Wakudkar, Scientist was awarded Ph.D. on 25 August, 2023 for her thesis 'Design and development of slow pyrolysis system for the production of biochar from crop residues'. She did her Ph.D. under the guidance of Dr. Sudhir Jain, Retd Professor, College of Technology and Engineering, Maharana Pratap University of Agriculture & Technology, Udaipur.

HRD/ PUBLICATIONS

Er. Prabhat Kumar Guru, Scientist was awarded Ph.D. on 25 August, 2023 for his thesis 'Design and development of precision seeder with fertilizer deep placement applicator for rice'. He did his Ph.D. under the guidance of Dr. Atul Kumar Shrivastava, Dean, Faculty of Agricultural Engineering, Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur.

Foreign Deputations

Dr. Dipika Agrahar Murugkar, Principal Scientist attended Regional consultation meeting on 'Promoting nutrition-sensitive agriculture for improving nutrition security and health of smallholders in South Asia' organized by SAARC Agriculture Centre and held at Kathmandu, Nepal during 11-13 July 2023. Dr Dipika participated as a panelist in the round on "Recommend policies on strengthening nutrition-sensitive agriculture to contribute in improving the nutritional security and health of the smallholders in the region" and presented the country paper for India and the changes required in the system to bring about nutrition-sensitive agriculture.

Dr. Dilip Jat and Dr. R.R. Potdar, scientists, attended Training of Trainers of the Asian and Pacific Network for Testing of Agriculture Machinery (ANTAM) at Kasetsart University, Kamphaeng Saen, Thailand during 4-8 September, 2023. The training was organized by the Centre for Sustainable Agricultural Mechanization of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP-CSAM) together with the Thailand National Agricultural Machinery Centre (NAMC) at Kasetsart University and the Japan Institute of Agricultural Machinery, National Agriculture and Food

Research Organization (IAM-NARO). Representatives of 15 countries in the Asia-Pacific region attended this training programme. The purpose of training programme was to support member countries' efforts in establishing new testing stations for agricultural machinery, becoming acquainted with the 2022 version of the ANTAM Codes.

Publications

Book

Chaudhary VP, Sundar J, Verma N, Nirmal Bohra P, Singh PK, Kumar Vijay, Kumari Sweeti, Prasad G. (Eds.). 2023. Prospects and challenges of environment and biological sciences in food production system for livelihood security of farmers (ICFPLS–2023), 18-20 September, 2023, Port Blair, Andaman & Nicobar Islands, India. pp: 01-288. ISSN no. 978-81-966536-1-3.

Rao KVR, Trivedi Ayushi, Gupta Ajita, Yadav Deepika and Rajwade YA. 2023. Drip Sichaye Pranali. NIPA Publishers, New Delhi. ISBN is: 978-81-19002-32-0. 1- 162.

Book Chapters

Gupta M and Wakudkar H. 2023. Microalgae harvesting strategies for biofuel production. In: Energy Harvesting Trends for Low Power Compact Electronic Devices. Nella A, Bhowmick A, Kumar C, Rajagopal M. (eds). EAI/Springer Innovations in Communication and Computing. Springer, Cham. https://doi.org/10.1007/978-3-031-35965-1_8.

Kumar N, Upadhyay G, Chhetri KB, Harsha BR, Malik GK, Kumar R, Jasrotia P, Samota SR, Kumar N, Chhokar RS and Gill SC. 2023. Pre-and post-harvest management of

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EVENTS

27th Meeting of ICAR Regional Committee No. VII

The 27th meeting of ICAR Regional Committee No. VII was organized by ICAR-CIAE, Bhopal on 18 August, 2023 to identify issues related to agriculture, horticulture, animal husbandry and fisheries sector in the states of Madhya Pradesh, Maharashtra, Chhattisgarh and Goa, and to provide solutions for those issues.

Secretary, DARE and Director General, ICAR, New Delhi, Dr. Himanshu Pathak inaugurated the meeting in the presence of Shri Ashok Barnwal, Additional Chief Secretary, Government of Madhya Pradesh and the Deputy Director Generals of ICAR. Departmental Secretaries and other senior officers of Agriculture, Horticulture, Animal Husbandry & Fisheries Departments from the states of Chhattisgarh, Goa, Madhya Pradesh and Maharashtra participated in the meeting. The meeting was also attended by the Vice-chancellors of State Agricultural Universities, Governing Body Members of ICAR, Directors of ICAR institutes and ATARIs of the region.

The inaugural session started with welcome address by Dr. SN Jha, Deputy Director General (Agricultural Engineering) & Nodal Officer, ICAR Regional Committee-VII. Dr. Jha explained the background of constituting Regional Committees of ICAR in different regions. In this session, Dr. SK Chaudhary, DDG (NRM), Dr. TR Sharma, DDG (Crop Science), Dr. RC Agrawal, DDG (Agricultural Education), Dr. JK Jena, DDG (Fisheries Science) and Dr. US Gautam, DDG (Agricultural Extension) also highlighted the achievements of ICAR in different fields for the region.

Dr. Himanshu Pathak, Director General, ICAR in his address briefed about the objectives and importance of the regional committee meeting. He explained that the meeting is an occasion where senior officials from central government and state government meet and arrive at solutions to the problems in agriculture and allied sectors in the region. He presented a brief report on achievement and status of the four states in agriculture, horticulture, animal husbandry and fisheries. He also pointed out scopes for further development in crop, livestock and fisheries productions, and challenges to agricultural development in these four states.

Shri Ashok Barnwal, Additional Chief Secretary, Government of Madhya Pradesh in his address stressed the need to sustain the growth in agriculture in coming years in spite of many challenges. He expressed concern about less number of variety development in horticultural crops as compared to cereals and other food-grains. He informed the house that some suitable short duration crops may be suggested for Madhya Pradesh for summer cultivation as an alternative to moong bean. There is also a need to develop standards for natural farming products and to encourage trading of such products.

Dr CR Mehta presented the action taken report (ATR) on issues raised in 26th meeting during the technical session under the chairmanship of Dr. Himanshu Pathak. It had 55 issues out of which 46 were completed and nine were partially completed. The partially completed issues were further discussed for possible solutions.

The ATR presentation was followed by interactive sessions with senior officers from state government Departments of agriculture, horticulture, animal husbandry and fisheries. Commissioner of Agriculture, Farmers Welfare and Agriculture Development, Govt. of Madhya Pradesh, Directors from the Departments of Agriculture, Fisheries, Animal Husbandry & Dairying, Horticulture and Agricultural Engineering, Bhopal participated in the session and raised various issues of Madhya Pradesh, Maharashtra, Goa and Chhattisgarh states. Dr. Pathak pointed out that these issues to be given top priority and necessary action may be taken by concerned institutes/SMD. Dr. KP Singh, Assistant Director General (Farm engineering) proposed the vote of thanks at the end of the meeting.



EVENTS

DG, ICAR inaugurates laboratories

Drone Systems Laboratory

The Drone Systems Laboratory has facility to conduct the basic study, design, and testing of drone application technologies. The laboratory is equipped with cutting edge instruments, simulation platform, patternator and drone system with spraying, broadcasting, and RGB- multispectral camera. The laboratory is led by a team of scientists having an experience in drone technology and approved as pilot and instructor from DGCA certified institutes. The multidisciplinary team of researchers is engaged in various projects in frontier areas that aim to enhance the capabilities and potential of drones in different applications in agriculture.

Storage Engineering Laboratory

The Storage Engineering Laboratory has facilities for carrying out storage studies of biological materials. This facility is meant for augmenting the post-graduate and faculty research in the area of storage. This laboratory houses equipment/instruments for the shelf life evaluation of biological materials. Oxitest equipment measures the oxidative stability of oil-containing food products/ plant materials through oxidation and indicates the shelf life of products. In the "Environmental chamber" the materials can be stored under different relative humidity and temperature conditions. Through the bacteriological incubator, BOD incubators, the microbial (bacteria, fungi) and insect growth studies, in plant materials /grains during storage can be carried out. A tray dryer is available for preconditioning the material as per requirement. The laboratory is also equipped with a (-20 °C) freezer, freezer cum refrigerator and refrigerators for storage of samples, chemicals and microbial cultures. A small facility for microbial analysis (aflatoxin, pathogenic bacteria and fungi), which included a laminar hood, automatic autoclave, sonicator, homogenizer, double distillation unit for distilled water production and microbalances, is also available. Sensor rod for insect infestation detection in grains and the e-nose developed for detecting rancidity in pear millet is also housed in this facility.


EVENTS

Inauguration of Training Centre of CNH Industrial (India) Private Limited at Institute

Training Centre for Human Resource Development in the field of Farm Mechanization, under MoU between ICAR-CIAE, Bhopal and CNH Industrial (India) Private Limited (Formerly New Holland Fiat India Pvt. Limited) New Delhi was inaugurated on 10 August, 2023. Dr. CR Mehta, Director, ICAR-CIAE and Shri Rajender Chaudhary, Director, Parts & Service, CNH Industrial inaugurated the facility. The training centre has facilities to display new products, cut section, models, sub-assemblies, tools, charts etc. of tractors and farm machinery for training purpose and upkeep of the facility inline to the industry practices. It is estimated that about 300 industrial participants will be benefited every year from this facility.

Workshop on Constraints of FPCs/FPOs in India

ICAR-CIAE Bhopal and Kerala Agricultural University jointly organized two workshops on "Constraints of FPCs/FPOs in India" as part of the KAU-ICAR-NAHEP sub-project on Profile Analysis of Farmer Producer Companies in India. These workshops were held at KVK Raipur and KVK Kanker in Chhattisgarh on 7 August, 2023 and 8 August, 2023, respectively. The workshops aimed to provide a platform for representatives from various farmer-producer companies in the Chhattisgarh to discuss the challenges and opportunities faced by FPOs in India. Dr. Vivek Kumar Tripathi, Director of Research Services at IGKV, inaugurated the workshop at KVK Raipur, and Dr. NK Rastogi, Dean College of Agriculture Kanker, inaugurated the workshop at KVK Kanker. The workshops included different technical sessions and panel discussions to address the challenges

and opportunities encountered by FPOs. Dr Ajesh Kumar V delivered a lecture on various processing techniques and equipment developed at ICAR-CIAE Bhopal that are suitable for FPOs. Representatives from more than 50 FPOs attended the program.

Interaction Meeting with Agricultural Machinery Manufacturers' Association

An interaction meeting cum visit of members of Agricultural Machinery Manufacturers' Association was held at ICAR-CIAE, Bhopal on 25 September, 2023. The meeting was attended by 65 manufacturers from various states of the country viz Karnataka, Gujarat, Tamil Nadu, Madhya Pradesh, Rajasthan, Chhattisgarh, Haryana, Maharashtra, Uttar Pradesh, Bihar, NCR, etc. Dr CR Mehta, Director of the Institute presented a brief about the modern machinery/technologies developed by the institute. Dr KP Singh, ADG (Farm Engineering), ICAR, New Delhi discussed with manufacturer about the Council's interest and expectations about public-private

partnership for R&D. He also requested the manufacturers to take advantage of their visit to a premier Institute in Agricultural Engineering.

The live demonstrations of new and modern technology developed by the Institute were arranged. Manufacturers have shown in keen interest in newly developed technologies namely Drone spraying system, Robotic transplanter, tractor-operated plastic mulch layer-cum-planter, garlic dibbler, pneumatic dibbler-cum transplanter, garlic weeder, pruner and drainage trencher for laying sub-surface pipe, high clearance vehicle etc. In addition to these machines, manufacturer visited millet processing machinery, food-processing and grain processing laboratories, onion storage structures, briquetting technology etc. The testing facility of agricultural machinery was also a focal point of the visit for the manufacturers to know about the various instruments and techniques used for commercial testing of farm machinery. Dr Surendra Singh, Technical Advisor of the AMMA-India proposed vote of thanks to ICAR-CIAE and Council for arrangement of the visit.

Brainstorming session with DG, MPCST and Post-harvest group scientists

A brainstorming session with MPCST, and post-harvest group scientists of ICAR-CIAE Bhopal was organized on 5 July, 2023. During the programme, Dr. CR Mehta, Director, ICAR-CIAE, Bhopal, extended a warm welcome to all the dignitaries in his welcome address and briefed them about the activities and technologies developed by ICAR-CIAE, Bhopal. The programme was organised by Dr. S. Mangaraj, Head, APPD.

A presentation was made by Dr. Punit Chandra, Incharge Head, Centre of Excellence in Soybean Processing and Utilisation, on research achievements and the future prospects of the center. Dr. S. Mangaraj, Head, Agro-Produce Processing Division, presented the technologies developed, different activities, and thrust areas for future research of the division.

Guest of honour, Dr. Keshav Duboliya, Incharge, Self-Reliant Campaign India, appreciated the technology development of CIAE. He urged scientists to work for the overall development of society, especially the unemployed youth. He assured that the Self-Reliant Campaign India will help in the transfer of technologies to appropriate stakeholders. Dr. SP Datta, Director, ICAR-IISS, Bhopal, highlighted need to reduce post-harvest losses and the development of nutritious health products. Chief Guest of the Session, Dr. Anil Kothari, DG MPCST, emphasized on the development of need-based technologies. He also highlighted that the technologies developed should be customized and economically viable. The points like utilization of indigenous knowledge in technology development, entrepreneurship development, and some of the government initiatives such as startups were narrated by DG MPCST. He also assured the support of MPCST to CIAE and agreed to sign a Memorandum of Understanding (MOU) between MPCST and CIAE for future collaborations in research and development activities. A laboratory visit was also arranged for showcasing the different technologies developed by the agro processing group.

हिन्दी पखवाड़ा का आयोजन

केन्द्रीय कृषि अभियांत्रिकी संस्थान, भोपाल के द्वारा भारतीय कृषि अनुसंधान परिषद, कृषि भवन मुख्यालय, नई दिल्ली के निर्देशानुसार संस्थान में दिनांक 14 से 28 सितंबर 2023 तक हिन्दी पखवाड़ा का आयोजन किया गया। हिन्दी दिवस के अवसर पर संस्थान के निदेशक डा. सी. आर. मेहता की अध्यक्षता में हिन्दी पखवाड़ा उद्घाटन कार्यक्रम का आयोजन किया गया। हिन्दी पखवाड़े के दौरान संस्थान के वैज्ञानिकों, प्रशासन एवं वित्त से जुड़े अधिकारियों एवं कर्मचारियों, तकनीकी श्रेणी के अधिकारियों एवं कर्मचारियों, प्रोजेक्टकर्मियों, विद्यार्थियों के लिए 7 प्रतियोगिताएं–प्रश्न मंच प्रतियोगिता, तकनीकी श्रेणी सामान्य ज्ञान प्रतियोगिता, हिन्दी आशुभाषण प्रतियोगिता, हिन्दी नोटिंग/ड्राफ्टिंग प्रतियोगिता, अहिन्दीभाषी हिन्दी सरल हिन्दी ज्ञान प्रतियोगिता, हिन्दी ई–शोधपत्र पोस्टर प्रदर्शन प्रतियोगिता

EVENTS/ NEWS FROM PERSONNEL

एवं महिलाओं के लिए सामान्य ज्ञान प्रतियोगिता का आयोजन किया गया।

संस्थान के निदेशक डा. सी. आर. मेहता की अध्यक्षता तथा डा. डॉ. सुनील कुमार गुप्ता, कुलपति, राजीव गांधी प्रौद्योगिकी विश्वविद्यालय (आर.जी.पी.वी.), भोपाल के मुख्य आतिथ्य में दिनांक 29.09.2023 को संस्थान के रजत जयंती सभागार में राजभाषा पुरस्कार वितरण समारोह आयोजन किया गया जिसमें पखवाड़े के दौरान आयोजित की गई प्रतियोगिताओं के विजेताओं को प्रमाणपत्र से सम्मानित कर सरकारी कामकाज में हिन्दी के प्रयोग, प्रचार, प्रसार एवं कार्यान्वयन के लिए प्रोत्साहित किया गया।

Swachhata hi Sewa

'Swachhata hi Sewa' was organized during 15 September to 2 October 2023. A pledge was taken by the employees of the institute for observance of swachhta and against the use of single use plastic. Day-wise activities were undertaken during this period including '*Shramdan*' by the institute employees. Cleanliness of the office premises besides residential campus and farm area were taken up by the institute personnel every week. Target and achievements against swachhta campaigns conducted during the month, scrap and garbage disposal etc. undertaken were the main activities under this campaign. Report on these aspects were compiled and sent to Subject Matter Division (SMD) on weekly basis.

Joining of Head/ PC at the Institute

Dr. VK Bhargava
Project Coordinator,
AICRP on Energy in Agriculture and Agro-based Industries (EAAI)
wef 5 July, 2023

Dr. KN Agrawal
Project Coordinator,
AICRP on Farm Implements and Machinery (FIM)
wef 13 July, 2023

Dr. KVR Rao
Head,
Irrigation & Drainage Engineering Division (IDED)
wef 14 July, 2023

Staff Promoted

Shri Ashish Sahu
AAO
wef 1 August, 2023

Shri RK Yadav
Tecnical Officer
wef 22 October, 2022

Shri RS Rajput
Senior Technical Assistant
wef 15 January, 2023

ICAR-CIAE NEWSLETTER
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NEWS FROM PERSONNEL

Deputation

Dr. Nanded Balaji Murhari, Senior Scientist was relieved on 4 August, 2023 to join as Director, Southern Region Farm Machinery Training and Testing Institute, Department of Agriculture and Farmers Welfare), Ministry of Agriculture and Farmers Welfare, Government of India (on deputation).

Staff Superannuated

Shri BP Vishwakarma
AAO
31 July, 2023

Shri ML Sahu
SSS
31 July, 2023

Dr Punit Chandra
Principal Scientist
31 August, 2023

Shri LBS Thakur
Technical Officer
31 August, 2023

Shri PN Sahu
SSS
30 September, 2023

Shri Prakash Patil
AAO
1 September, 2023
(Voluntary Retirement)

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Editors: Dr. Ashutosh Pandirwar, Dr. Mukesh Kumar, Dr. Syed S Imran, Dr. Harsha Wakudkar and Dr. Pravitha M
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