

ICAR-CIAE NEWSLETTER

Vol. 32, No. 2
April-June, 2022

Sardar Patel Outstanding ICAR Institution 2020

https://ciae.icar.gov.in

From the Director's Desk

The production of major agricultural crops in the country has been estimated at a record 315 million tonnes during 2021-22. The record production is estimated for rice, maize, pulses, oilseeds, gram, rapeseed, mustard, and sugarcane. It is a fact that a substantial amount of the produce is lost after harvest due to lack of modern and adequate storage and processing facilities in our country. Losses could be in terms of the quantity and quality of grain, both of which significantly reduce the value. The average range of losses for food-grains, oilseeds, fruits and vegetables are in the range from 4.7% to 15.9%. Thus, the problem today is not the scarcity but that of managing the surplus production. Therefore, post-harvest handling, storage and transportation of agriculture produces need to be given equal importance as given to agricultural production.

Storage plays a central role into the crops supply chain. The food storage losses are accounted mainly due to the changing environmental conditions and improper infrastructure facilities. Among many different factors that affect losses, moisture content and temperature are the most critical ones. India currently lacks the necessary storage facilities at the farm level, leading to the damage of grains by pests and insects. Furthermore, the grain storage facilities in the country are unsuitable for long-term storage. The warehouses or godowns lack the necessary conditions like proper monitoring and management of temperature, relative humidity, oxygen and carbon dioxide levels.

In order to reduce storage losses, it is thus necessary to develop and modernize the infrastructure for integrated bulk handling, storage and transportation of agro produces. IoT is an emerging technology that can provide excellent control and monitoring of any existing systems with the help of various sensors and interactive platforms. With the help of IoT and a few other technologies such as cloud storage, smart GPS, web integration, the storage and transportation system can be changed to enhance the productivity with least efforts and without any enormous change in the existing infrastructure. It is need of the hour to design IoT based smart storage structures and monitoring system that can monitor the various things inside such storage structures.

ICAR-CIAE Bhopal has reoriented the R&D programmes on storage for development of sensor and IoT based systems for different agro-commodities. The institute has developed sensor based modular storage structures for onions and potatoes with encouraging results, and is actively involved in transferring these technologies for commercial adoption. Another project on development of IoT enabled mini silo storage system for wheat has been initiated.

DIGEST

This issue of the newsletter focuses on research and development of farm and processing machinery like Unmanned rice transplanter, Induction-based air assisted electro-static sprayer, Mechanization package for garlic cultivation on broad beds, Tractor operated two row forward--reverse rotavator for sugarcane crop, SPAD Meter 2.0, Small scale portable biochar kiln, Sensor enabled potato storage system, IoT-enabled digital flume for open channel flow measurement, etc.

The Institute has commercialized eight technologies through licensing during this period. To commemorate 'Azadi ka Amrit Mahotsav', a national seminar on 'Role of Artificial Intelligence and Internet of Things to Agricultural Engineering' was organized. Two new colleagues joined the Institute, seven scientific and technical staff members were promoted, and three employees retired on attaining the age of superannuation during this period.

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

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Unmanned rice transplanter

A remote-controlled electronic system has been developed for ride-on rice transplanter to reduce human drudgery. It is gender-friendly and easy to use by unskilled person to perform the rice transplanting operation in puddled paddy field. It consists of remote-controlled system to control the on/off, steering, direction, speed, brake, transplanting function (transplanting tray raising/ lowering and planting arm engage/ disengage) and emergency stop of the machine with the help of programmed electronic control unit (ECU). Electronic control unit consists of ten channel remote controllers with transmitter module to transmit the signal from the remote to the receiver, receiver module in the machine to transfer the channel signal to the controller and motor drive modules. Motor drive modules have been used to actuate the actuator (wiper motor and linear actuator) to perform different driving control during operation with micro-controller unit (Arduino Nano) in the system to remote-start the machine at a distance of 500 m. An emergency stop system has been developed using Arduino Nano to stop the vehicle while detecting the obstacle in front of the vehicle with the help of ultrasonic sensor and relay. It is easy to attach/detach the remote controlled system to a commercially available ride-on-type rice transplanter. The developed system has been evaluated in puddled paddy field at Paddy Breeding Station, TNAU, Coimbatore. It was remotely operated by operator standing out of field at a distance of 200 m. The mean deviation from the travel path was observed as 0.13 ± 0.05 m for the remote controlled ride-on-type transplanter as compared to 0.11 ± 0.03 m, for manually operated ride-on-type transplanter. It indicates that the developed remote-controlled system on commercial rice transplanter has good control in the puddled paddy field. The field capacity, field efficiency and fuel consumption of the developed remote-controlled ride-on-rice transplanter have been 0.24 ha/h, 71% and 3.1 l/ha, respectively at forward speed of 1.61 km/h at slip rate of 12%.

Induction-based air assisted electro-static sprayer

Air assisted electro-static sprayer is used to spray pesticides on crops and orchards. It reduces pesticide use and pollution while increasing efficiency and bio-efficacy. The developed air-assisted nozzle has a flow rate of 120 ml/min and high voltage DC to DC charging system to charge the electrode up to 10 kV. The electro-static system consists of base frame, petrol engine (0.75 kW), air compressor, spray tank, air filter, air moisture separator and spray gun with electrostatic nozzle. The spray lance can operate up to a distance of 10 m. The performance of electrostatic sprayer has been optimized at 1.0 km/h forward speed for 0.55 m height of application. The electrostatic sprayer has 85% bio-efficacy on cotton aphids and 92% bio-efficacy on jassids for LN90 dosages of 0.15 ml/l. The developed system can save 75% fuel, 30% pesticide and costs 20% less per hectare. The cost of developed electrostatic sprayer is ₹ 70,000/-. The operating cost, break-even point (BEP) and payback period of the sprayer are ₹ 2564/ha, 78 h/year and 365 h, respectively.

Mechanization package for garlic cultivation on broad beds

In garlic cultivation, farmers adopt tractor-drawn equipment like mould board plough, cultivator and rotavator for land preparation, but the labour-intensive

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operations like planting, weeding and harvesting are being done with manual power. To address this problem, a tractor operated eight-row garlic clove dibbler has been developed for precise dibbling on broad beds. The machine can dibble garlic cloves at seed- to- seed and row- to- row spacing of 100 and 150 mm, respectively. The machine has been evaluated in the field for dibbling of garlic cloves in eight rows on broad beds. The depth of sowing was maintained at 40 mm during the operation. The field capacity and field efficiency of the planter are 0.22 ha/h and 73.6%, respectively at 2 km/h forward speed of operation. The missing and multiple of the machine are 3.5 and 8.5%, respectively.

Weeds are the major problem for low productivity of garlic which compete with garlic crop for soil nutrients. A tractor drawn garlic weeder has been developed for weeding in garlic crop sown on broad beds. The row- to- row spacing of the developed unit can be adjusted from 100 to 150 mm. The effective field capacity and weeding

efficiency of the weeder are 0.13 ha/h and 63%, respectively at forward speed of 1.1 km/h and 20-25% soil moisture content.

Harvesting is one of the most laborious and time-consuming operation in garlic production. To overcome the problem, a tractor operated garlic harvester has been developed for harvesting of garlic crop on raised beds. The garlic harvester has been evaluated in the garlic crop sown at 100 mm row- to- row and plant- to-plant spacing. The machine was operated at forward speed and working depth of 1.9 km/h and 60-80 mm, respectively. The effective field capacity of machine is 0.21 with field efficiency of 72%. The harvesting efficiency and bulb damage during the operation are 97 and <0.5%, respectively. The development of garlic dibbler, weeder and harvester along with the adoption of existing tillage and spraying equipment practised by farmers provides a complete package of mechanization for garlic cultivation on broad beds. This mechanization package can save 34-40% cost, 75% labour and 30-35% seeds as compared to the traditional practice.

Tractor operated two row forward-reverse rotavator for sugarcane crop

Tractor operated two-row forward-reverse rotavator is particularly suitable for inter-culture operation in sugarcane crop. Hence, a tractor operated two row forward-reverse rotavator for sugarcane crop has been developed. The machine consists of main frame, primary gear box, secondary gear box, rotary blades etc. It is also useful for making deep furrows for sugarcane planting

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operation. In forward direction, it is used for weeding, however, in reverse direction, earthing up is performed in sugarcane crop. Field coverage is usually less in such type of forward–reverse rotavator particularly for making deep furrows for sugarcane planting and for inter-culture operation in sugarcane crop during initial growth period of the crop. The field trials were conducted in sugarcane fields in Kagal, district Kolhapur and CAAST project field at Mahatma Phule Krishi Vidyapeeth, Rahuri. The total area covered is 33.4 ha with 81% field efficiency. This machine is very useful for saving time, money and reducing drudgery over conventional method.

SPAD Meter 2.0

The SPAD meter is a portable device that is commonly used to measure leaf chlorophyll concentrations in a quick, precise, and non-destructive manner to optimize the timing and quantity of fertilizer that leads to improved crop yields. ICAR-CIAE has developed a low-cost alternative i.e., the ICAR-CIAE SPAD meter 2.0. It measures the optical density difference at two wavelengths of 655 nm and 950 nm to calculate SPAD values for crops such as rice, wheat, maize, etc. with leaves up to 1 mm thickness. The SPAD values, measured with the device, can be used to generate recommendations for top-dressing of nitrogen fertilizer dose. The electronic components of the CIAE SPAD meter 2.0 are integrated and housed in a plastic casing having an overall length of 185 mm, width of 90 mm and height of 70 mm. The measured SPAD values of the leaves are displayed on the screen of the M5 stack board. The readings of the SPAD values can be recorded in the memory card provided in the memory slot of the board. The developed SPAD meter 2.0 has comparable accuracy to that of a commercially available SPAD meter and is of low cost.

Time-motion analysis on manual material handling in rice mills

AICRP on ESA (NERIST, Nirjuli centre) has conducted time-motion analysis on manual material handling in four rice mills of Dhemaji district of Assam. In first step, postural analysis has been conducted with still photographs and videos of each subjects from different views during manual material handling. Theses photographs and videos have been captured from a distance of 3 m from the mid-point of the walkway. Anterior and posterior views have been captured and analyzed using Kinovea software. The time motion study has been conducted for tasks i.e., unloading of paddy bags from the vehicle and loading of paddy bags in the vehicle. During unloading of paddy bags, the worker has to walk above the stack of paddy bags. A study has been conducted with three workers performing the task from each rice mill. The task starts as soon as worker puts the bag on their back or head and tasks ends once the worker unloads the bag in the godown. The time taken to carry the load from the tailgate of the vehicle to point of storage has been defined as load carrying time and time taken to return back after placing the bag in godown till the tailgate of the vehicle without the load is defined as returned time. It has been observed that during unloading of paddy bags, a worker carries minimum 20 bags while unloading from a Mahindra pick up vehicle having four axles, maximum 150 bags are carried. During unloading of paddy bags, the average walking speed with load and without load is 0.64 and

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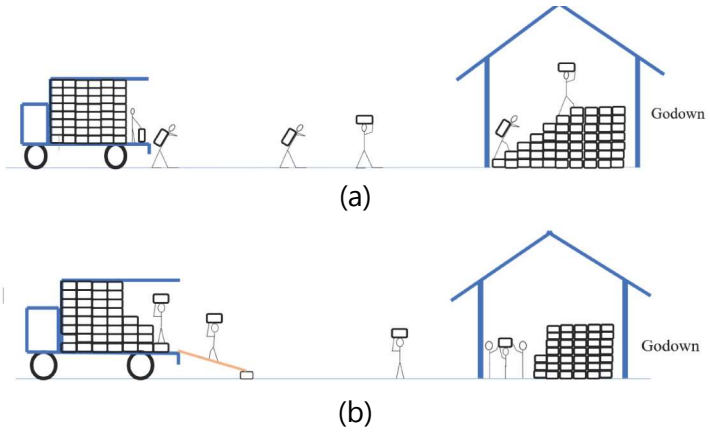
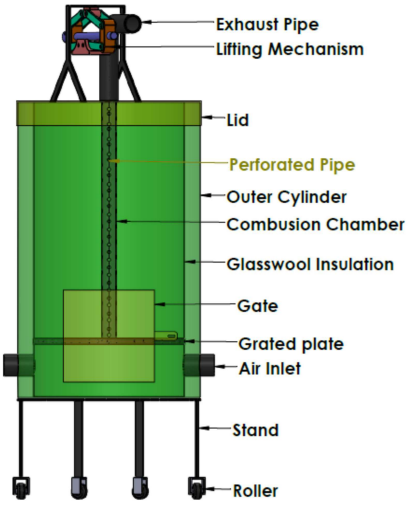


Load carryng task in rice mill.
(a) unloadng of paddy from the vehicle
(b) loading of rice/barn/husk bag in the vehicle

0.70 m/s, respectively. The most dominating mode of load carrying is on back. While loading of rice bags, the minimum and maximum number of bags lifted are 27 and 200, respectively. The variation in number of bags lifted is due to the variation in the size of the vehicle.

Small scale portable biochar kiln for biochar production from agricultural residue

AICRP on EAAI (BAU, Ranchi centre) developed a small scale portable biochar kiln for biochar production from agricultural residue. The biochar kiln consists of components such as inner cylinder, outer cylinder, ash removal chamber, gate, grated plate, perforated pipe, cover, air intake pipe, lifting mechanism, frame and rollers. Total weight of the developed kiln is 62.5 kg and total cost for fabrication is approx ₹ 10,000 /-. The input capacity of developed biochar kiln for wheat husk, maize stalk, maize cob and rice husk is 5, 4, 15 and 7 kg, respectively. The conversion efficiency of the biochar kiln is 42% for wheat husk, 41% for maize cob, 34% for maize stalk and 35% for rice husk residues. Total operating time required for carbonization of selected crop residues ranges from 84 to 104 min. The average operating temperature of the biochar kiln is 296, 254, 269 and 256 °C for wheat husk, maize stalk, maize cob and rice husk, respectively. Biochar produced from wheat husk in the biochar kiln has available nitrogen (5.8 g/kg), available phosphorus (3.5 g/kg), available potassium (92.2 g/kg), phosphorus (10.7 g/kg), cation exchange capacity (78 cmol/kg), water holding capacity (71 %) and bulk density (0.55 g/cm^3). The operational cost of biochar production by the biochar kiln is 78 for wheat husk, 100 for maize stalk, 54 for maize cob, and 77 ₹/kg for rice husk.



Sensor enabled potato storage system with horizontal pipe ducting aeration system

The storage of perishable commodity like potato is a challenging task in temperate region. The storage of the potatoes in the cold storage may not be an economical option in Indian context. Therefore, a sensor enabled storage system of 1 tonne capacity has been developed for potato storage under ambient condition. The developed system is equipped with a horizontal perforated pipe based ducting system for appropriate aeration and humidification, which controls the temperature and RH in the storage micro-environment and is operated through sensor based control system. Cooling efficiency of the developed system has been evaluated under different conditions like aeration without humidification (10-12%), aeration with humidification (32-35%) and aeration with humidification

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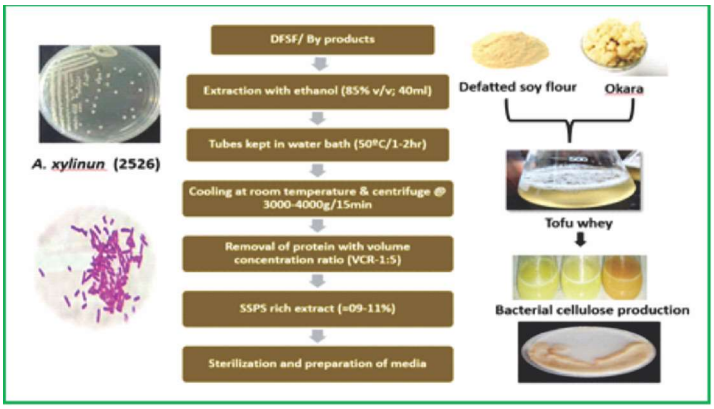
through cooling pads (50-55%). The system operated under the condition of aeration with humidification through cooling pads has reported optimum cooling efficiency. Therefore, the storage study in the developed system with humidification and cooling pad arrangement has been conducted and compared with traditional heap storage method. The storage study data reveal that the developed structure is more effective than traditional storage system in reducing weight loss, rotting, colour changes, and textural variation in stored tubers. The analysis of reducing sugar reveals a higher increase in its reducing sugar content (51.5 ± 0.34 mg/100 g of FW) than the treated samples (15.1±0.69 mg/100 g of FW) at the end of 5 weeks storage period for the potato stored at ambient condition. The visible appearance of solanine and shrinkage in the stored samples at traditional heap storage indicate that the samples are not suitable for consumption after 4 weeks of storage.

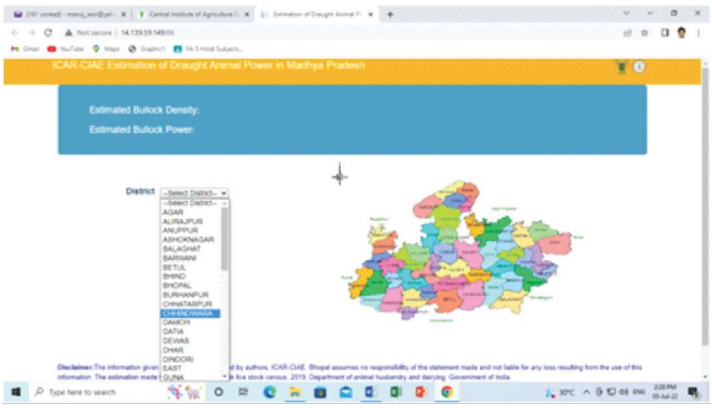
Edible bacterial cellulose (EBC) production process by utilizing soy industry by-products

A biopolymer based bacterial cellulose obtained from *Acetobacter* species has unique properties and hence is considered a better option over plant-based polymers. An attempt has been made to reduce the cost of media preparation for *Acetobacter* xylinum NCIM 2526 growth and bacterial cellulose production. A carbohydrate-rich fraction was extracted from the soy processing waste products (i.e. Tofu whey, soymilk okra, and deffated soy flour), and these fractions have been used for the replacement of sugar in the standard medium (Hestrin schramn) composition. *Acetobacter xylinum* (NCIM 2526) has been cultured in the developed medium and a process has been developed for maximum yield of bacterial cellulose. The optimum process conditions include inoculum level of 8.5%, incubation temperature of 29°C and a soluble carbohydrate rich fraction of 90% (conc.) in dilution form. The yield of bacterial cellulose has been observed as 4.7 g/100 ml in medium at the optimum process parameters.



Web app for draught animal density and power availability in Madhya Pradesh

Draught animal power availability plays an important role in assessing required number of bullock-operated implements based on command area per pair of bullocks. This helps in performing farm operations on time. Keeping in view the importance of draught animals, a Webapp has been developed to estimate district wise draught animal density and power availability in Madhya Pradesh. This app has been hosted on CIAE website [https://ciae.icar.gov.in/services]. The user needs to select district from drop down list and can get draught animal density (numbers/000ha) and draught animal power availability (kW/ha). This app has been developed using ASP.Net (2015) platform in SQL



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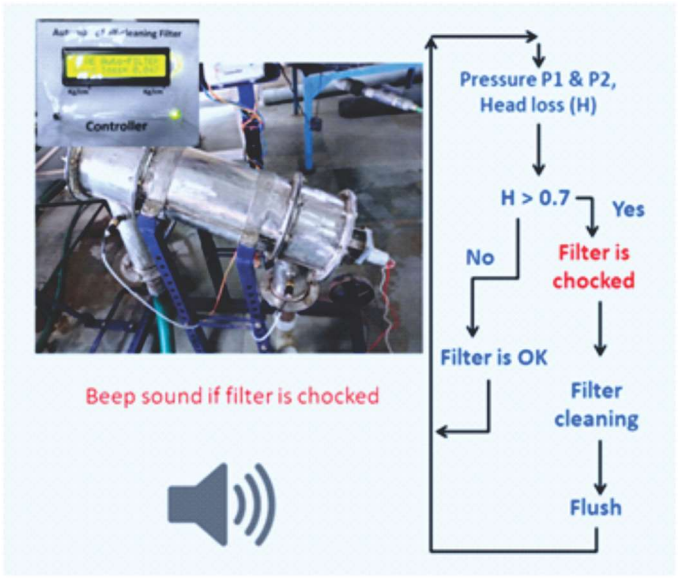
Server (2012) database using C# language. The study will also enable policy maker to implement community level bio-methanation plant and promotion of natural farming.

IoT-enabled digital flume for open channel flow measurement

More than 85% of India's irrigated land is irrigated using surface irrigation techniques, although their application efficiency in the field is only between 35 - 50%. Generally, farmers are unable to estimate the amount of irrigation water at the field level due to unavailability of cost-effective measurement devices at the canal outlets and field channels. To reduce deep percolation, runoff losses and over-irrigation in the field, real-time flow monitoring in flow measurement systems is required. Therefore, a digital flume with the Internet of Things (IoT) connectivity has been developed and tested to continuously measure the flow rates in open channels. The process was developed using an ESP8266 microcontroller board, and the depth of flow was measured using an ultrasonic sensor, which allowed the discharge to be estimated using the flume's discharge equation. Utilizing the IoT, the developed digital flume measures the discharge and transmits data wirelessly for storage on cloud (ThingSpeak). It was tested in the field under varying discharge conditions in the field channel. The R^2 value for the actual flow rate and flow rate measured through the developed digital flume is 0.97. It can be utilized for irrigation water measurement in the field channel for management of available irrigation water.

Self-cleaning filter for micro-irrigation system

Filter is very important in any micro-irrigation system. Periodic service and maintenance of filters are required to ensure continuous trouble-free operation of the system. Manual cleaning of micro-irrigation filter is labour intensive and needs alertness. An automatic self-cleaning filter with simple cleaning mechanism has been developed for micro-irrigation system. A controller has been developed to monitor the filter during its operation through its pressure transmitters installed at at inlet and outlet of the filter. The controller has been programmed to detect the chocking stage as per BIS norm (70 kPa) and to clean it without human interventions. Controller flushes out the dirty materials from the filter after cleaning is performed. It was operated by a 1.50 kW centrifugal pump having a maximum flow rate of 20 m^3/h. The filter was tested at 1500 and 2000 ppm TSS loads . The flow rate decreased from 20 m^3/h to 15 m^3/h with a pressure drop upto 70 kPa as chocking increased gradually. The filtration efficiency (%) has been obtained between 22-25% and 24-28% at TSS load of 1500 and 2000 ppm, respectively.



IPR/ EXTENSION ACTIVITIES

Patent applications

Sl. No.	Application Number	Title of Invention	Application Status
1.	201621001885	Process technology for production of pro-biotic soya cheese spread	Hearing notice reply filed on 13/05/2022
2.	201821027270	A split cell type metering mechanism for automatic transplanting of vegetable seedlings and the like	FER E filed through Docket No. 37940 dated 28/06/2022

Technologies Licensed

The following CIAE technologies were commercialized through licensing:

Sl. No.	Technology	Licensed to	Date of license
1.	Animal lifting device for bullock and equines	Vasundhara Krishi Yantra, Bhopal, Madhya Pradesh	17.05.2022
2.	Process technology for soya chaap	Soyaagri Enterprises, Thane, Maharashtra	26.05.2022
3.	1. Tractor operated six row drum type pneumatic planter 2. Tractor drawn pre-emergence herbicide strip applicator-cum- planter 3. Manually operated pull type three row planter for millets-multi-crops (Model I-Inclined Plate Type) 4. Manually operated pull type three row planter for millets- multi- crops (Model II-Vertical Plate Type) 5. Hand held vegetable transplanter (Model-I Single row) 6. Hand held vegetable transplanter (Model-II Two row)	Dharti Agro Engineering, Rajkot, Gujarat	03.06.2022

SCSP Programme

A field-day-cum distribution programme was organized to identify SC below poverty line beneficiaries under SCSP on 10 May, 2022. Sprayer pumps and irrigation pipes were distributed to 100 beneficiaries of five villages (Nipaniya Sukha, Gurariya, Kardai, Raipur and Kanera) in the presence of Berasia MLA Shri Vishnu Khatri and SCSP chairman and members.

EXTENSION ACTIVITIES

Soya Mahakumbh 2022

ICAR-CIAE participated in the three-day Soya Mahakumbh 2022 organized by ICAR-Indian Soybean Research Institute, Indore during 29-31 May, 2022. Visitors were given information about the process of making soy flour, soy milk, tofu, soy nuts, soy chaap, etc. on the institute stall put up in the event and were encouraged to establish soya based enterprises. Dignitaries visited the institute stall include the Union Minister of State for Agriculture, Shri Kailash Choudhary, the State Agriculture Minister, Shri Kamal Patel, and Secretary (DARE) & Director General, ICAR, Dr. Trilochan Mohapatra. The stall put up by the institute got the second position in the Soya Mahakumbh.

Participation in Electronic Media Programmes

Name	Topic	Date	Media
Dr. C R Mehta, Director	खेती में उन्नत कृषि यंत्रो का महत्व	4 April, 2022	DDK, Bhopal
	सीआईएई का कृषि मशीनीकरण में योगदान	5 April, 2022	AIR, Bhopal
	कृषि में ड्रोन तकनीक	16 June, 2022	DDK, Bhopal
Dr. T.Senthilkumar, Principal Scientist	Advancement in farm mechanization	21 April, 2022	All India Radio, Coimbatore
	Farmers question and answer on farm mechanization About MGMG program	4 May, 2022 18 May, 2022	AIR, Kodaikanal FM AIR, Coimbatore
Er. D K Dwivedi, CTO	कृषि को लाभ का व्यवसाय बनाने में यंत्रो की भमिका	19 April, 2022	AIR, Bhopal
Dr. Deepak Singh, Head, KVK	Integrated diseases management in soybean crop	2 June, 2022	AIR, Bhopal

TRAINING/ EXTENSION ACTIVITIES

Trainings organized

Sl. No.	Title of the training	Date	No of participants
1.	Agricultural engineering equipment and machineries for higher productivity, value addition and income generation	21-23 June and 28-30 June 2022	54
2.	Soy food training programme for upcoming entrepreneurs	18-23 April and 20-25 June 2022	10
3.	Vocational training on ICM in banana and value	27 April 2022	64
4.	Practical training for students from five different Agricultural engineering Colleges of Jabalpur, Junagadh, Navsari, Rahuri and Akola	2-30 June, 2022	37

Field exposure visit of APSCS&T officials

The officials from Centre of Excellence for Bio-resource and Sustainable Development (Department of Biotechnology, Govt of India), Arunachal Pradesh State Council for Science & Technology (APSCS&T), Kimin visited Regional Centre, Coimbatore on 11 May, 2022. As a part of establishment of banana fibre extraction and processing units in selected districts of Arunachal Pradesh, the officials interacted with manufacturers and stakeholders (M/s Jothi Banana Fibre Unit, M/s Rope Production Centre, at Madurai, Tamil Nadu) to have first-hand information about various value added products from rope obtained from outer sheath of banana pseudostem.

Training on minimal processing of banana centre core

Hands on training on 'Generation of wealth from banana pseudo-stem' was organized by the Agricultural Engineering Department, Chennai, Tamil Nadu in collaboration with Regional Centre, Coimbatore at Agricultural Machinery Information Data Centre (SAMIDC), Agricultural Engineering Department Complex, Chennai on 14 June, 2022. About 50 farmers from Chengalpet, Tamil Nadu benefitted from this training.

Another training- cum- demonstration of 'Machinery for banana processing' was organized by the Agricultural Engineering Department, Chennai at ICAR-NRC Banana, Trichy in collaboration with Regional Centre, Coimbatore on 17 June, 2022. Presidential address was given by Dr. S Uma, Director, ICAR NRCB. Ms. Vimala Kirubaharan, DDH, Trichy explained Government role in boosting entrepreneurship. Engineering schemes for banana processing, role of FPO in banana processing, value addition and processing of banana and by-product utilization in banana were explained by various speakers. Machineries for banana processing were explained by Dr. Ravindra Naik, Principal Scientist of the Regional Centre. About 75 famers and 25 staff members of AED Chennai and Trichy attended and benefitted.

KVK NEWS

On Farm Testing (OFT) and Cluster Frontline Demonstration (CFD)

The KVK completed OFT on "Assessment the performance of various wheat sowing machine". The wheat variety HI-8759 was selected for OFT. The farmers were selected from the KVK adopted villages namely Kachhi Barkheda, Bhairopura, Khamkheda, and Islam Nagar for the programmes. The performance of machinery is as follows:

Sowing machinery	No. of farmers	Area (ha)	105-110 Day after sowing			Yield (q/ha)		% Increase yield
			Plant Germination/ linear meter	Plant population/ Sq. m	Plant height in cm	Demo	Local	
Happy seeder	02	0.8	91	457	76.7	44.1	23.75	46.14
Super seeder	01	0.4	86	514	81.0	53.9	23.75	55.93
Broad bed seed drill	07	2.8	84	419	78.7	49.0	23.75	51.53

Crop sown by Happy Seeder

Crop sown by Super Seeder

Crop sown by Broad Bed Seed Drill

Performance of tested tomato varieties in location specific condition

Tomato varieties	Percent Disease Severity (%)				Plant height (cm)	Maturity in days	Yield (q/ha)
	Leaf Curl Virus (LCV)	Bacterial Wilt (BW)	Late Blight (LB)	Early Blight (EB)			
Arka Rakshak	5.34	5.12	12.56	5.12	87.4	140	283.87
Arka Smart	1.26	2.82	15.98	3.12	76.7	145	302.80
Arka Abbed	2.34	3.21	8.54	2.51	95.7	143	298.96
Arka Apeksha	10.12	8.34	17.83	12.78	90.9	145	274.62
SW 1508 (FP)	80.12	36.23	27.63	32.76	95.9	150	104.83

KVK NEWS

Demonstration of Groundnut Decorticator

No. of Demonstrations	Quantity (kg)	Duration	Villages benefitted
10	880 kg	24 May - 14 June 2022	Parwaliya sani, Chanderi, Arawaliya, Acharpura, Beenapur, Vishankhedi, Nandni

Trainings organized

Sl. No.	Training Title	Date	No. of participants
1	Seed production, organized in association with National Seed Corporation, Bhopal	27 April, 2022	50 farmers
2	Capacity building of FPOs	23-25 May, 2022	60
3	Crop residue management and balanced dose of fertilizers	3 June, 2022	42 (farmers of village Manikhedi, Berasia, Bhopal)

Other events organized by KVK

Sl. No.	Event	Date	No. of Participants farmersand other stakeholders)
1	Azadi Ka Amrit Mahotsav – Kisan Bhagidari Prathmikta Hamari Campaign	26 April, 2022	278
2	Kisan Mela – किसान भागीदारी प्रथमिकता हमारी	27 April, 2022	75
3	कृषक संगोष्ठी – विकास खंड स्तरीय नैनो यूरिया का आयोजन , बैरसिया, जिला भोपाल	26 May, 2022	175
4	प्रधानमंत्री किसान सम्मान निधि योजना पर कृषि विज्ञान केन्द्र में सीधा प्रसारण	31 May, 2022	91

AWARDS/ HRD/ PUBLICATIONS

Awards and Recognitions

Dr. MK Tripathi, Principal Scientist	Associate Member, NASI, National Academy of Science India 2022
	Editor Frontiers Journal of Horticulture, Switzerland
Dr. V Bhushana Babu, Senior Scientist	Best oral presentation award for the paper entitled 'Ergonomics and safety and some considerations in agriculture', in International Conference on Recent Advances and Innovations in Biological and Applied Sciences at SGT University, Gurugram, Haryana
Dr. Manish Kumar, Scientist	Certificate of excellence for reviewing from the Current Journal of Applied Science and Technology
	Certificate of excellence for reviewing from the International Journal of Environment and Climate Change
	Editor, Farm Machinery and Power Engineering section of Pantnagar Journal of Research.

Human Resource Development

Name and Designation	Course Title	Duration	Organizer
Dr Satya Prakash Kumar Scientist	Ground School Drone Training	6-8 June, 2022	IGRUAA-Drone destination, Manesar (Haryana), (Online)
	Practical drone flying training	24-27 June, 2022	IGRUAA-Drone destination, Manesar (Haryana)
	Drones for Agricultural Development	11-15 July, 2022	MANAGE Hyderabad (Online)
Dr Bikram Jyoti Scientist	International Training-cum-Certificate Course on agricultural drones	21 May 10 June, 2022	Agri Meet Foundation & Aviana HV Bioscience Pvt. Ltd., (Online)
Dr Ravindra Naik Principal Scientist	Training for Technical committee members	23-24 June, 2022	National Institute for training for standardization, Noida (Online)

Publications

Research Papers

Ajesh V, Hasan M, Mangaraj S, Pravitha M, Verma DK and Srivastav PP. 2022. Trends in edible packaging films and its prospective future in food: A Review. Applied Food Research, 2 (1): 100118.

Chakraborty S, Patel SK, Chakraborty SK and Nyma R. 2022. Dried garlic to garlic powder: Effect of different drying techniques and packaging materials. The Indian Journal of Agricultural Sciences, 92 (5): 50-54.

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Khadatkar A, Agarwal KN, Gite LP and Kot L. 2022. Work-related injuries among farm workers engaged in agricultural operations in India: a cross-sectional study. Injury Prevention, 1-7. DOI:10.1136/injuryprev-2022-044541

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Lohan SK, Narang MK, Javed M, Kumar V, Majumder A and Raghuvirsinh P. 2022. Optimization and evaluation of machine–field parameters of remotely controlled two wheel paddy transplanter. Journal of Field Robotics, 1–15. DOI:10.1002/rob.22080.

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Saxena CK, Kumar M and Singh RK. 2022. Satat krishi hetu shunya budget prakrtik kheti: Ek samiksha. Bhartiya Krishi Anusandhan Patrika. 10.18805/BKAP482. 1-9.

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Book Chapter

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Tiwari PS, Kumar M, Rajwade Y and Gautam M. 2022. Research highlights of Consortia Research Platform on Precision Farming and Micro Irrigation Systems 2021-22. Technical Bulletin No. CIAE/CRP-PF&MIS/TB/2022/329.

पुनीत चंद्र, वी.के. भार्गव, आशुतोष पंदिरवार, स्वप्नजा के. जाधव, रवीन्द्र रांधे, आदिनाथ काटे, विक्रम ज्योति (2020). सीआईएई 2022, स्मारिका–तकनीकी संग्रह, कृत्रिम बुद्विमत्ता एवं इंटरनेट ऑफ थिंग्स का कृषि अभियांत्रिकी में योगदान, विषय पर राष्ट्रीय अधिवेशन, मई 26–27, 2022, भा.कृ.अनु.प.–केन्द्रीय कृषि अभियांत्रिकी संस्थान, भोपाल

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Imran S, Senthilkumar T, Natraj B, Manikandan G and Pandi MD, 2022. Balers a boon for straw management. Trends in Agriculture Science, 1(1):27-30.

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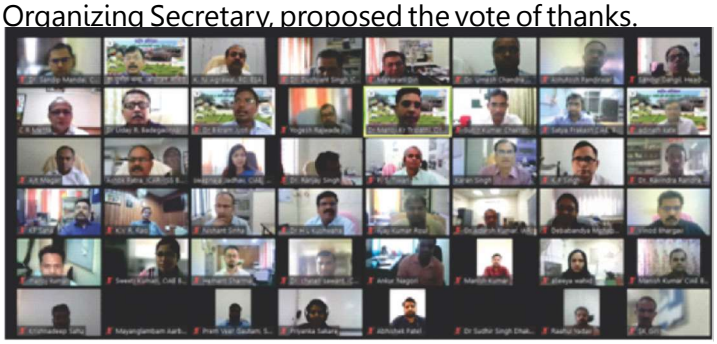
National Convention on Role of Artificial Intelligence

A two-day online national convention on 'Role of Artificial Intelligence and Internet of Things to Agricultural Engineering" in Hindi was organized on 26-27 May 2022 to mark the occasion of Amrit Mahotsav of the 75th anniversary of Independence. Dr. Trilochan Mohapatra, Secretary, DARE, Government of India and Director General, ICAR, New Delhi, was the Chief Guest at the inaugural function. He emphasized the use of Artificial Intelligence (AI) and the Internet of Things (IoT) in agriculture to improve the productivity and production of food grains. Dr. CR Mehta, Director CIAE, while highlighting the main objective of organizing the national convention, said that in order to keep the agriculture sector self-reliant and to face the practical challenges, there is a need to develop state-of-the-art technology in the areas of AI and IoT. In this two-day national convention 213 participants registered and 87 research papers were presented in five scientific sessions. Dr. AK Patra, Director, Indian Institute of Soil Science, Bhopal, was the Chief Guest at the concluding session of this National Convention. Dr. Punit Chandra, Organizing Secretary, proposed the vote of thanks.



EVENTS/ NEWS FROM PERSONNEL

International Yoga Day-2022

The 8th International Yoga Day (IYD) was celebrated at ICAR-CIAE, Bhopal on 21 June, 2022. The theme of this year's IYD was "Yoga for Humanity". In the beginning of the event, Dr. Manoj Kumar Tripathi, the Nodal Officer of IYD of the institute, welcomed everyone present in the programme and gave detailed information of various programmes to be organized during the day. The programme was inaugurated with great enthusiasm and joy under the Chairmanship of Dr. CR Mehta Director, CIAE. During his address, he threw light on importance of yoga and mentioned that yoga affects person's physical and mental development and also emphasized that all should work together to spread awareness of yoga everywhere. In the event, Yoga Guru Shri Mahesh Agarwal threw light on the practice of Yoga and its importance in day-to-day life. In this event, the officers, employees and students of the institute participated and practised yoga during the session along with Shri Mahesh Agarwal. On this occasion, a quiz competition was also organized which was conducted by scientists Ajay Yadav and Harsha Wakudkar. The employees and students of the institute participated in this quiz competition in which the winning participants were awarded.

IRC Meeting

The 108th IRC was held during 30-31 May and 13 June, 2022. In this IRC, 12 new research projects were approved and final reports of the 21 completed projects were adopted. In addition to these, RPF-II of ongoing research projects were also discussed. Dr. CR Mehta, Director, CIAE & Chairman, IRC advised the scientists to develop expertise in one or two major fields and plan project from the specialized areas. He also stressed on the need to develop good linkages with industry.

Visit of Faculty Members from IIT Indore

Prof. Suhas S. Joshi, Director, IIT, Indore along with a delegation of faculty members visited the institute on 8 April, 2022 to discuss the possible collaboration opportunities between IIT Indore and ICAR-CIAE, Bhopal. During the interaction meeting, the faculty members from IIT described their research areas which included water resource management, irrigation and drainage engineering, bioprocess engineering, ergonomics, noise and vibration management, sustainable construction, structural analysis, soft materials including hydrogels, real time sensing technologies, unsaturated soil mechanics, waste and agricultural residue management, rural technologies, and systems analysis. A visit to the workshops and research facilities of the institute was organized to appraise the IIT Indore team of the various research efforts brought to fruition by the CIAE scientists over the years.

Our New Colleagues

Dr. Mukund Narayan joined as Assistant Chief Technical Officer (T-7-8) on 9 May, 2022, on transfer from ICAR-CIPHET, Ludhiana.

Ms. Sarita joined as Senior Technical Officer (T-6) on 28 June, 2022.

ICAR-CIAE NEWSLETTER
Modernizing agriculture through engineering interventions
Vol. 32, No. 2
April-June, 2022

NEWS FROM PERSONNEL

Staff Promoted

Dr. R. Senthil Kumar
Senior Scientist
(Veterinary Extension)
Grade Pay of Rs.9000/-
wef 21 April, 2021

Er. Ankur Nagori
Scientist (Mechanical Engineering)
Grade Pay of Rs.8000/-
wef 15 December, 2020

Shri Ajay Yadav
Scientist (Food Technology)
Grade Pay of Rs.7000/-
wef 1 January, 2020

Dr. Mukesh Kumar
Scientist (Land & Water
Management Engineering)
Grade Pay of Rs.7000/-
wef 1 January, 2020

Dr. Rajwade Yogesh Anand
Scientist (Land & Water
Management Engineering)
Grade Pay of Rs.7000/-
wef 5 July, 2020

Dr. Randhe Ravindra Dhondibhau
Scientist (Land & Water
Management Engineering)
Grade Pay of Rs.7000/-
wef 1 January, 2021

Er. Waghaye Abhishek Mitaram
Scientist (Land & Water
Management Engineering)
Grade Pay of Rs.7000/-
wef 1 January, 2021

Shri Dhanraj Wagadre
Senior Technical Officer (T-6)
wef 1 January, 2020

Shri Amal Kumar Mondal
Assistant
wef 1 January, 2020

Staff Superannuated

Shri RN Patil
Technical Officer (T-5)
31 May, 2022

Er. DK Dwivedi
Chief Technical Officer (T-9)
30 June, 2022

Shri Ajay Singh Bisht
Skilled Support Staff
30 June, 2022

Chief Editor: Dr. RK Singh, Principal Scientist **Editors:** Dr. Aleksha Kudos, Principal Scientist; Dr. PC Jena, Senior Scientist; Dr. Ashutosh Pandirwar, Dr. Adinath Kate and Dr. Mukesh Kumar, Scientists **Word Processing:** K. Shankar
Photography: M/s SS Bagde & Kalyan Singh
Publisher: Director, ICAR-Central Institute of Agricultural Engineering, Nabi Bagh, Berasia Road, Bhopal - 462 038
Phone: 91-755-2737191 **Email:** director.ciae@icar.gov.in, directorciae@gmail.com **Web:** https://ciae.icar.gov.in