



ICAR-CIAE NEWSLETTER

Vol. 32, No. 1
January-March, 2022

Sardar Patel Outstanding ICAR Institution 2020



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From the Director's Desk



Smart farming is more data-centric and enables farmers to take strategic decisions on agriculture operations from sowing to harvesting. Drone technology has been revolutionizing the agriculture sector for the past few years by offering cost saving, improved input use efficiency, and more profitability. Further, with advancements in technology, drones have started playing a crucial role in precision farming. Prior to drone usage, the agriculture sector was relying on satellite imaging for monitoring vast crop areas. Drone-assisted technology has started reshaping the traditional remote sensing approaches by providing images with better resolution, information content, and efficiency.

The manual data collection process is now being automated with agriculture drones equipped with smart sensors. This data can be further used for estimating soil conditions and even for determining crop planting patterns. Drones are fitted with a wide array of multi-purpose sensors, making them a flexible option for several agriculture operations such as crop scouting, yield estimation, spraying, livestock monitoring, etc. Amalgamating drone-based aerial intelligence into agriculture practices leads to robust data-driven decision support systems. Agriculture drones, equipped with sprayers and advanced sensors, can detect and measure targets with utmost precision, resulting in reduction in input use.

The use of thermal, multi-spectral, and hyper-spectral sensors is quite useful in detecting the crops affected with pests and weeds. Coupling advanced image processing with data collected can further assist in deciding the exact amount of chemicals required to fight the infestations along with targeted spraying. Multi-spectral image data from drones can reveal chlorophyll content, and field variability, often invisible to the human eye, helping in early disease identification and improving crop yield.

The ever-growing good quality food supply and increased food requirement will compel farmers to adopt precision farming on a large scale and in turn, this will enhance the use of agriculture drones at a faster pace. Agriculture automation through information and communication technologies stemming from the lack of skilled labour crisis will also proliferate the demand for agriculture drone in the coming years.

Keeping an eye on the cutting edge drone technology, ICAR-CIAE has already shifted its focus on developing innovative drone-based agriculture solutions. In this regard, the institute has initiated several research and development activities covering a wide spectrum of solutions including irrigation scheduling, droplet deposition characteristics on drone-based spraying, yield estimation, etc. Many of these researches being carried out by the institute are coupled with deep learning and advanced image processing, imparting intelligence to the traditional agriculture tasks.

The patent has been granted to Process technology for gluten-free eggless cake, developed by the Institute. This issue of the newsletter focuses on research and development of Tractor operated drip lateral and plastic mulch layer-cum-planter, Tractor operated planter for multiplier onions, Self-propelled maize harvester, Remote controlled site specific chemical applicator for field crops, Improved animal housing structure for draught and milch animals, Chitosan coated bags for storage of selected food-grains, Process technologies for soy-based milk chocolates, etc.

License for commercial manufacturing of four technologies were given to private manufacturers. Three Winter Schools and a National Campaign on Farm Mechanization were organized. Large number of farmers visited Technology Demonstration Mela, organized in different parts of the country. Dr SN Jha, DDG (Agril. Engg.) made a maiden visit to the Institute. Institute celebrated its 47th Foundation Day. Two news colleagues joined the Institute, 23 scientists and 2 technical personnel were promoted and eight employees retired on attaining the age of superannuation.

As Director, ICAR-CIAE, I am happy to share this issue of Newsletter.

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RESEARCH & DEVELOPMENT

Tractor operated drip lateral and plastic mulch layer-cum-planter

Manual operations of raised bed forming, drip lateral and plastic mulch laying, and planting seeds in a plastic mulch are drudgery prone, time consuming and laborious activities, which requires about 29 man-days/ha. Therefore, a tractor operated drip lateral and plastic mulch layer-cum-planter has been developed to perform various field operations such as raised bed formation, drip lateral and plastic mulch laying and placing metered seed in plastic mulch in single pass of the tractor. It forms raised bed by variable width raised bed former followed by laying of drip lateral and plastic mulch and punching hole in plastic mulch. The pneumatic punch planting unit consists of pneumatic seed metering mechanism, eccentric slider crank mechanism, duckbill mechanism, aspirator blower, hydraulic system and chain-sprocket transmission system. The tractor's hydraulic system is used to operate eccentric slider crank mechanism with the help of hydraulic motor (385 Nm) and chain and sprocket transmission system, whereas the vacuum is created in housing of the seed metering mechanism through aspirator blower operated by tractor PTO. The eccentric slider crank mechanism transmits the rotary motion of driving disc into vertical motion of slider crank through connecting link and keeps the "D" profile at the end of duckbill mechanism, which opens in the soil. The pneumatic seed metering plate and eccentric metering mechanism are synchronized in such a way that the seed picked by pneumatic metering plate gets dropped in duckbill mechanism. The duckbill mechanism remains closed by holding seed and opens after entering into the plastic mulch by means of slider crank mechanism. The



effective field capacity and field efficiency of equipment are 0.2 ha/h and 74%, respectively at forward speed of 1.7 km/h and operational width of 1 m. The total cost and operational cost of equipment are Rs. 300,000/- and Rs. 1500/h, respectively. The payback period of equipment is 1.9 years (444 h) and break-even point is 70 h/year. The provision is given in the equipment to match row-to-row and plant-to-plant spacing from 0.5 to 0.9 m and from 0.2 to 0.6 m, respectively by mechanical means. It helps in labour saving of 26 man-days/ha and reduces cost of operation by Rs.6,600/ha as compared to existing drip lateral-cum-plastic mulch laying machine.

Tractor operated raised bed former cum planter for multiplier onions

Multiplier onion bulbs are planted at very close spacing which requires about 80 - 100 man-days to plant one ha, leading to higher cost of cultivation. Presently no planter is available for planting onion bulbs. Therefore, a tractor operated raised bed former cum onion bulb planter has been developed for planting multiplier onions and consists of a main frame, raised bed former, seed metering mechanism, seed hopper, ground wheel, furrow opener and standard three point hitch. The main frame supports the ridger with raised bed former, leveller, standard three point hitch and onion planting unit. The raised bed former makes two raised beds of 70 cm width and three furrows. In onion bulb planter, chain and cup feed has been employed as metering mechanism. Six cups have been provided with each seed metering chain for planting onion bulbs in eight rows on two raised beds. The drive to the metering unit is derived from the ground wheel. A shoe type furrow opener is fitted to the planting frame in front of onion bulb delivery tube. The shank is fitted to the planting frame



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by clamps. The seed onion delivery tubes are welded at the back side of the shoe so that the furrows are kept open till the seed onions are placed in the furrow. A funnel shaped box is fitted at the bottom of the seed delivery tube to prevent spillage of the onion bulb outside the furrow. This ensures an uninterrupted free fall of the onion bulb from metering disc to furrow. The furrow opener assembly is mounted independent to the planter unit and hence it can be positioned as required to ensure proper row spacing. The effective field capacity of the machine is 0.3 ha/h with field efficiency of 75%.

Self-propelled maize harvester

AICRP on FIM (TNAU, Coimbatore centre) has developed a self-propelled walk-behind maize harvester for snapping the maize cobs from the maize plants and simultaneously cutting the plants. The harvester consists of a pair of spiral lugged rollers, two horizontal rotary blades, two star wheels, plant guide rods, cob collection box, two depth control wheels and a prime mover. The rollers are mounted at different levels to collect the harvested cobs in the box provided at the side of the rollers. Two star wheels are mounted at the front of the unit at different heights above the rollers. While the harvester moves forward, the star wheels and the guide rods, guide the plants in between the rollers. The rollers grab the maize stalks and pull them between the snapping bars, meanwhile maize cobs which cannot pass through the spacing between the snapping bars are sheared off from the plants. A horizontal rotary cutting blade provided at the bottom of the harvester cuts the maize stalks at the ground level. The drive for the snapping rollers and the rotary blade is provided by an 11 hp diesel engine. A collection box of 15-20 kg



capacity is provided at the side of the machine to collect the cobs. Two wheels are provided at the front to facilitate the movement of the harvester in the furrows. The effective field capacity of the harvester is 0.2 ha/h and the cost of operation of the maize harvester is Rs. 2850/ha. The saving in cost of operation, time and labour are 25, 96 and 91%, respectively as compared to manual harvesting.

Remote controlled sensor based site specific chemical applicator for field crops

Crop protection chemicals play a vital role in protecting the crop from insects, fungus, viruses, and weeds. AICRP on FIM (ANGRAU, Bapatla centre) has developed a remote control sensor based site specific chemical applicator. The remote control unit helps to operate the chemical applicator without entering into the field, whereas the sensors are used to spray chemicals precisely on the target (plant canopy) and avoid the space between the plants. The average forward speed of the chemical applicator is 2.2 km/h. The average discharge of the boom is 0.65 l/min. It was observed that the machine can be operated continuously for about 105 min with one charge of battery. It takes nearly 360 min to charge the discharged batteries.

The effective field capacity and field efficiency of the chemical applicator are 0.263 ha/h and 61.73%, respectively. The cost of operation of the chemical applicator for chilli crop is 125 Rs/h. The developed remote control unit works satisfactorily in reducing the risk of exposure to harmful chemicals during spraying by the operator. The unit also prevents excess use of chemicals and contamination of environment.



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Object detection model for fruit detection and yield estimation in orchards

Yield estimation in orchards is vital for effective planning of storage and post-harvest activities. A study has been conducted to address the challenge of yield estimation using deep learning based computer vision approach. The main objectives of the study is to develop an intelligent image processing methodology to detect, to count mandarin oranges on the tree and to estimate the yield. The focus is on detecting the harvest-ready and unripe fruits through Faster-RCNN and YOLOv4 object detection models, replicating human vision through convolutional neural networks. The data collection has been performed using unmanned aerial vehicle (UAV - DJI Phantom-4) from the mandarin orange orchards of Khamkheda village near Bhopal. The trees have been harvested manually, and the total yield per tree has been measured to compare the performance of the developed system. The results indicate that the developed models work well in detecting both harvest-ready and unripe mandarin oranges. Detection accuracy and speed of both the models viz YOLOv4 and Faster-RCNN have been evaluated. The mean average precision metric in detecting the mandarin oranges per tree by YOLOv4 and



Faster RCNN is 80 and 76%, respectively. The manually counted and the YOLOv4 based detection resulted in a standard error (SE) of 12%.

Improved animal housing structure for optimum environment for draught and milch animals

AICRP on UAE (UAS, Raichur centre) has installed solar power assisted air cooling system with fogger inside the animal housing structure to provide comfort to animals. Solar panel of 36 W has been installed to operate DC pump with automatic time controlled switch at discharge rate of 5.5 l/h. The environmental parameters such as air temperature and relative humidity were optimised and the physiological parameters of animals such as body temperature, pulse rate and respiration rate were monitored. The time controlled switch installed inside the animal housing structure was set at 10 min in 'on' position and 10 min in 'off' position for creating cooling effect using fogger assembly. Twenty-six foggers were operated with solar powered DC pump at an operating pressure of 4.0 Pa to form mist of 65 micron in size. Water droplets were not allowed to fall on the ground surface. The air temperature inside the animal housing structure was 4°C less compared to the outside the air temperature and relative humidity was 59%. The air cooling system was found effective in providing comfort to the animals.

**Chitosan coated bags for storage of selected food-grains**

Post-harvest losses of food grains are very high during storage due to infestation by insects. Chitosan, the root word of which is a chitin meaning tunic or envelope in Greek, has numerous applications in various industries. Food grains namely sorghum and pearl millet have been

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selected for the purpose of determining the effectiveness of Chitosan coating on insect infestation during storage.

Dip and pad cure method has been employed for Chitosan coating of packaging materials. The optimized Chitosan concentration and viscosity used for coating were 2% Chitosan in 2% glacial acetic acid



solution and 0.078 ± 0.0003 Pa-s, respectively. Packaging materials used were Hessian jute fabric, cotton cloth and jute laminated PP fabric. The optimized coating parameters were the speed of the coating drum of 1.00 m/min, squeezing bar pressure of 600 kPa and curing temperatures of 105°C and 81.4°C . Due to the coating of Chitosan, the thickness of jute fabric increased from 0.81 to 1.37 mm, Jute laminated PP increased from 0.77 to 1.07 mm and cotton fabric increased from 0.13 to 0.36 mm. It has also been observed that the coated bags had lower water vapor permeability, good mechanical property and improved gas barrier properties. The tensile strength of Chitosan coated Jute laminated PP (257 ± 12 N/mm) was higher as compared to Chitosan coated jute fabric (247 ± 36 N/mm).

Sorghum and pearl millet were stored in coated and uncoated bags of 500 g capacity. The insect cultures of grain borer and the rice weevil procured from Seed Centre, TNAU, Coimbatore and reared at CIAE RC were used for the storage study. Five insects (two weeks old) from each species were released into coated and uncoated packages containing sorghum and pearl millet and food-grains were stored for 90 days. In sorghum and pearl millet, the highest cumulative grain damage (10.94% and 5.23%), weight loss (6.84 and 1.58%) and

powder residue (3.74 and 2.73%) have been observed for uncoated cloth bags. The study indicated that Chitosan Jute coated bags can prevent storage losses in infested sorghum and pearl millet without the use of insecticide, with physio-chemical stability.

Process technologies for soy-based prebiotic, probiotic and synbiotic milk chocolates

Chocolate is a luxury food product universally popular among all age groups. It is relished by children as well as by adults, with females showing a stronger liking for it. Process technology for five varieties of soymilk-based chocolates has been developed for chocolate confectionery, including prebiotic (two prebiotic varieties), probiotic (two probiotic varieties), and synbiotic (one variety). These chocolates are composed

of soymilk, skim milk, cocoa butter, cocoa powder, table sugar or sucrose, inulin (conc. 0.5-2.0%) as a prebiotic and pro-iotic (10^6 - 10^8 cfu/g) culture of lactobacillus. The ingredients have been optimized using response surface methodology (RSM) on the basis of the rheological properties of chocolates. The composition of these chocolates is formulated in such a way that it is acceptable or liked in sensory evaluation. The overall acceptability scores of the deve-



Prebiotic



Synbiotic



Probiotic

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veloped chocolates have been more than 7.5 on the hedonic scale, and also the sensory scores are comparable with standard commercial chocolate. The shelf life of all the varieties of chocolates is more than three months in refrigerated conditions when packed in aluminum foil packets. These chocolates are free from milk fat and contain soymilk, which makes them nutritionally rich.

Android application for agri accidents survey and analysis software

A multilingual android application (English, Hindi, Odia, Tamil, Punjabi and Marathi) has been developed to collect data on agricultural accidents throughout country and to develop a national agricultural accidents database under AICRP on ESA. The developed app is easy and user friendly, has multi-level security and can be operated by any android based mobile phone. The app has provision to enter data, upload photographs and ability to record the GPS coordinates from where the data have been collected. The information of village, accident incidences and victims can be fed through the app separately. The app has a provision to edit/store data locally on mobile before submission to the server. At present, this app is being used to collect accidents data from centres of AICRP on ESA located in the states of Madhya Pradesh, Sikkim, West Bengal, Arunachal Pradesh, Assam, Odisha, Tamil Nadu, Rajasthan, Haryana, Punjab, Himachal Pradesh and Maharashtra.

An agricultural accidents analysis software has been developed to analyse accidents and estimate economic

loss at village, district, state and national level. The software can be accessed through the link <http://14.139.59.149:8090/AccidentSurvey/LoginServlet> from any location through internet. It can generate tables and reports as per the access authentication. The analysis includes accidents type and nature, total number, farm machinery related, hand-tools related and other accidents. It provides classification of accidents according to source, operation, nature of injury and severity. The results of analysis and reports of victims based on occupational status-wise, age-wise, gender-wise and educational status-wise can be generated.



AgriAccidents
Survey



RESEARCH & DEVELOPMENT/ IPR

Success Story

Tractor operated seeder for mat type paddy nursery

During the year 2019-20, rice crop was cultivated in 3.1 Mha area in Punjab with paddy production of 18.9 Mt. However, paddy transplanting is still done manually which is highly laborious and requires 180-250 man-h/ha. During the rice transplanting season, the labour scarcity for transplanting is a major problem in Punjab. To overcome this difficulty of farmers, State government in collaboration with Department of Agriculture and Farmer Welfare, Punjab and Punjab Agricultural University (PAU), Ludhiana introduced paddy transplanters in Punjab. The mechanical paddy transplanters



use mat type nursery for transplanting paddy seedlings. About 100-140 paddy nursery mats are required for transplanting 0.4 ha area depending on type of transplanter. This mat type nursery is raised in the open field. To reduce labour requirement for raising mat type paddy nursery, the AICRP on FIM (PAU, Ludhiana centre) has developed a tractor operated seeder for mat type paddy nursery. The developed machine consists of two cutting units, soil conveying unit, sieving unit, soil metering unit, seed metering unit, supporting roller and wheel assembly etc. For mechanically raised mat type nursery, seed spread, mat bed thickness, nursery density and nursery height were 91%, 29 mm, 11 plants/sq. inch and 173 mm, respectively. There was cost saving of 64-68% and labour saving of 93.8-94.4% with the developed mat type nursery seeder as compared to conventional manual method of mat type nursery sowing.

Patent Granted

**Process technology for gluten-free eggless cake (Patent No: 393566)**

The novel cake formulation consists of malted ragi, amaranth and sprouted soybean forming gluten free flour, banana and yoghurt as egg replacer complex and cholesterol free vegetable oil instead of saturated fat which makes it rich in protein (5 g), minerals (1.4 g), iron (4.5 mg) with good antioxidant activity for 100 g of cake. People who avoid eggs and those who have gluten allergy can celebrate their happy moment with this nutritious eggless gluten free cake. No addition of artificial colour or preservatives and high nutritive

value provide it a special place among cakes. Cost of production is Rs. 128/kg (at an output of 100 kg/day) and expected price on sale is Rs. 500/ kg.

MoU Signed

ICAR-CIAE, Bhopal and Bhansali Agro Tech, Ahmednagar, signed MoU on 17 March, 2022 for 'Development of canopy volume based spraying system for pomegranate orchard'.

TECHNOLOGY TRANSFER/ IPR/ TRAINING

Technologies Licensed

The following CIAE technologies were commercialized through licensing:

Technologies	Firm	Date of Licensing
SPAD meter	M/s Next Gen Agro, Nagpur	29/12/2022
Manual palmyra endosperm remover	M/s Hydro Kraft, Coimbatore	14/01/2022
Process technology of soy chap	M/s Mohite Agro Farm, Kolhapur	22/02/2022
Portable rotating charring kiln drum	M/s Shri Manak Industries, Bhopal	22/03/2022

Copyright applications filed

SL No.	Filing No. / Date	Title
1	20874/2021-CO/SW	Software for relative chlorophyll measurement system
2	24883/2021-CO/SW	Graphic user interface for estimating the freshness of white button mushrooms

Media Activities

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participants got an opportunity to deliberate mainly on mechanization aspect related to conservation of natural resources and efficiency enhancement of agricultural inputs. Dr. UR Badegaonkar, PS & I/c TTD was the Course-Director of this Winter School and Co-Directors were Dr. Manish Kumar, Scientist, AMD and Dr. Mukesh Kumar, Scientist, IDED.

Winter School on Recent Advances in Electronic Devices, Artificial Intelligence and Machine Learning for Precision Agriculture

Winter school on "Recent Advances in Electronic Devices, Artificial Intelligence and Machine Learning for Precision Agriculture" was organized during 1-21 February, 2022 in virtual mode, attended by 44 participants to recognize the importance and need of precise and optimum use of agricultural inputs to reduce cost of cultivation along with conservation of our natural resources. Dr SN Jha, DDG (AE), ICAR inaugurated the programme. He advised the participants to use the knowledge gained during this training programme for further development of their expertise in the area of precision farming and help the Indian farmers in reducing cost of cultivation. Dr. KK Singh, ADG (FE), ICAR, New Delhi in his inaugural address highlighted the



importance of precision agriculture in production and post-production agriculture to ensure precise input applications using advance tools and techniques.

The programme was designed to update the skills and knowledge of the researchers/ teachers/ extension specialists involved in the field of design, development and extension activities related to electronic devices, artificial intelligence, machine learning, deep learning and algorithm development. The Course Director of this Winter School was Dr. PS Tiwari, Head (AMD) and Dr. NS Chandel, Scientist was the Course Co-Director.

Winter School on Crop Residues Utilization and Management for Clean Energy and Environment

Winter School on 'Crop Residues Utilization and Management for Clean Energy and Environment' was organized during 23 February-15 March, 2022 attended by 34 participants in hybrid mode. A total of 43 lectures, 9 demonstrations and 2 field visits were organized during this training. Resource persons from ICAR, IITs, SAUs, Central University, NGO and State University delivered lectures during this training. The Course Director of this Winter School was Dr. VK Bhargav, Principal Scientist, AEP and Co-Directors were Dr PC Jena, Scientist and Dr Sandip Mandal, Senior Scientist, AEP.



Technology Outreach and Agricultural Engineering Interventions for Improving the Rural Livelihoods of SC BPL beneficiary of selected villages of Madhya Pradesh and Tamil Nadu

A project is being implemented at institute under Scheduled Caste Sub Plan (SCSP) component scheme for the livelihood support of SC-BPL beneficiaries of Madhya Pradesh and Tamil Nadu through the promo-

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tion/ adoption of agricultural engineering technologies. Under this project, two training programmes, one awareness programme and one field day-cum-distribution programme were organized during January to March, 2022, attended by 257 SC-BPL beneficiaries of selected villages viz., Raipur, Kanera, Kardai, Guradiya, Nipaniya Sukha and Parwaliya Sadak. The participants were sensitized on various agricultural engineering technologies including farm machinery, food processing, energy and irrigation aspects highlighting the benefits of use of technologies and use of these technologies for livelihood support and income generation. Livelihood support through Direct Benefit Transfer by distribution of tools/equipment is also one of the activities of SCSP programme. Total 191 tools/equipment (Groundnut decorticator, Manual Double Screen Grain Cleaner, Maize sheller, and domestic scale soya processing equipment such as Stainless-steel storage tank and Wet grinder) were distributed to 100 beneficiaries.

KVK News

On Farm Testing and Cluster Frontline Demonstration

On Farm Testing of following technologies were conducted by KVK in adopted villages of Kachhi Berkheda, Khamkheda, Bhaironpura and Islam nagar during rabi season (2021-22). The performance of the sowing machineries are mentioned below:

Sowing machinery	Villages & Targeted Farmers	No. of farmers	Area (ha)	35 - 40 Days After Sowing		
				Plant germination/ m	Plant population/ sq. m	Plant height, cm
Happy seeder	Kachhi Berkheda Khamkheda	02	0.8	102	508	37.7
Super seeder	Bhaironpura	01	0.4	108	646	42.0
Broad Bed Seeder	Kachhi Berkheda Islam nagar	07	2.8	86.4	428	40.8

Training Organized by KVK

KVK, Bhopal organized following training programmes during the quarter, attended by 197 beneficiaries/ participants.

- Natural Farming
- Rapid Transfer of Technology, sponsored by BAMETI, Bihar for ATM and BTM working under ATMA.

Technology Demonstration at Farmer's Field

Sl. No.	Technology demonstrated	Village(s)	No. of farmers benefitted	Area/ ha	Yield (q/ha)
1	Semiautomatic potato planter	Fathehpur, Khejda, Murlikhedi	3	4.8	122
2	Broad bed seed drill for sowing Gram variety : RVG-202	Kachhi Barkheda and Sagoniya	3	1.2	12
3	Tractor operator mini rice mill	Kachhi Barkheda	4	-	68

National Campaign on Farm Mechanization

National Campaign on Farm Mechanization, celebrated by Indian Council of Agricultural Research, New Delhi was organized at ICAR-CIAE during 28 March - 4 April, 2022. Under this campaign, a Training-cum-Technology Demonstration Meet on agricultural machinery was organized on 28 March 2022 to highlight the importance and utilization of agricultural tools, equipment and machinery. The modern technology and machinery were live demonstrated to the farmers on fields. More than 450 farmers, scientists and officers participated in the programme. The drone technology suitable for agricultural work was also demonstrated, besides creating awareness among the farmers about agricultural machinery suitable for crop residue management. In the inaugural session, Dr. CR Mehta, Director, ICAR-CIAE, Bhopal highlighted the importance

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of newly developed agricultural machinery and technology to enhance the production and productivity and also emphasized the benefits of natural farming and agricultural entrepreneurship. Shri Vishnu Khatri, Hon'ble MLA, Berasia constituency graced the occasion as a Special Guest. He distributed agricultural tools to trainee farmers under Schedule Caste Sub Plan (SCSP Scheme).

Technology and Machinery Demonstration Mela

The Technology and Machinery Demonstration Mela was jointly organised by CIAE, AICRPs on Farm Implements and Machinery, Ergonomics and Safety in Agriculture and Post Harvest Technology and Agricultural Machinery Manufacturers in different parts of the country in March 2021. More than 1.50 lakh farmers participated at different centres. More than 1.25 lakh farmers witnessed display of more than 40 different types of farm machinery such as sub-soiler, offset rotavator, laser land leveller, inclined plate planter, pneumatic planter, aeroblast sprayers, electrostatic sprayer, SRI power weeder, groundnut thresher, maize thresher, various safety tools and maize combine header etc. and live demonstration of potato planter, raised bed planter, inclined plate planter, self-propelled rice transplanter and potato digger at different centres of FIM. The Technology and



Machinery Demonstration Mela was widely covered by media representatives of newspapers and TV channels at different institutes and centres of AICRPs in different states of country.



PAU, Ludhiana



IGKV, Raipur



CCSHAU, Hisar



ICAR-CIAE, Bhopal

AWARDS & RECOGNITIONS/ HRD

Awards and Recognitions

Name and Designation	Awards/ Recognitions
Er. Subeesh A Scientist	'Young Scientist Award' in 37 th M.P Young Scientist Congress during March 14-17, 2022 organized by Madhya Pradesh Council of Science and Technology.
	Best article from Agriculture & Food: eNewsletter for the article entitled 'Artificial Intelligence: A modern computer vision based approach for yield estimation orchard crops'
Dr. Manoj Kumar Scientist (FMP)	Certificate of Excellence in reviewing from the Current Journal of Applied Science and Technology
Dr. Abhijit Khadatkar Scientist	Guest editor of a special issue on "Textural Mechanics and Damage of Fresh Fruits" for the journal Phyton-International Journal of Experimental Botany
	Editorial board member of NASS Journal of Agricultural Sciences
Dr. MK Tripathi Principal Scientist	SAAR Distinguished Scientist Award in Crop Science -20 by Society for Agriculture and Allied Research, India
	Life member of Society for Agriculture & Allied Research, India
	Science IN Award for Appreciation -2021 by Journal Chemical Biology Letters, The Science-In Publication

Human Resource Development

Name and Designation	Course Title	Duration	Organizer
Dr. Subeesh A Scientist	Block chain technology and applications	3-8 January, 2022	Electronics and ICT Academies and PDPM IITDM, Jabalpur.
PP Ambalkar CTO	Winter School on "Farm Mechanization for Facilitating Conservation Agriculture & Climate Smart Technology Adoption"	4-24 January, 2022	ICAR-CIAE, Bhopal
Ajay Yadav Scientist	Improving research writing using grammarly software	5 January, 2022	NIFTEM, Sonapat
Sweeti Kumari Scientist	Analysis of experimental data	17-22 January, 2022	ICAR-NAARM, Hyderabad
V. Bhushana Babu Senior Scientist	Winter School on Artificial intelligence in agriculture	15 February-7 March, 2022	ICAR-IASRI, New Delhi
Samlesh Kumari Scientist	CAFT training on Opportunities of naturally occurring nutraceuticals as potent alternate medicines of future	5-14 March, 2022	SKUAST-K, Kashmir
LBS Thakur Technical Officer	Strengthening capacities for nutrition sensitive agriculture and systems for field level staff	7-11 March, 2022	MANAGE, Hyderabad

PUBLICATIONS

Ph.D. Awarded



Er. Ravindra D Randhe, Scientist has been awarded Ph.D. degree in Agricultural Engineering (Soil and Water Conservation Engineering) for his thesis entitled 'Conditional controller based fertigation system for water and nutrient management in soilless cultivation' by Indian Agricultural Research Institute, New Delhi on 31 January, 2022 under the guidance of Dr. Murtaza Hasan, Principal Scientist, Centre for Protected Cultivation Technology, ICAR-Indian Agricultural Research Institute, New Delhi.

Publications

Research Papers

Ajesh Kumar V, Srivastav PP, Pravitha M, Hasan M, Mangaraj S and Verma DK. 2022. Comparative study on the optimization and characterization of soybean aqueous extract-based composite film using response surface methodology (RSM) and artificial neural network (ANN). *Food Packaging and Shelf Life*, 31, 100778. <https://doi.org/10.1016/j.fpsl.2021.100778>.

Ghosh TK, Das S, Ray H, Mohapatra D, Modhera B, Ghosh D, Parua S, Pal S, Tiwari S, Kate A, Tripathi MK, Bhattacharyya N and Bandyopadhyay R. 2022. Development of electronic nose for early spoilage detection of potato and onion during post-harvest storage. *Journal of Materials Nano Science*, 9 (2): 101-114.

Jyoti B, Karthirvel K, Divakar D and Senthilkumar T. 2021. Specific cutting energy characteristics of cassava stem with varying blade parameters using impact type pendulum test rig. *Agricultural Mechanization in Asia, Africa and Latin America*, 52 (4): 15-23.

Jyoti B, Thorat DS, Singh KP, Kumar M, Magar AP and Parmar BS. 2022. Design and development of site specific grape vineyard fertilizer applicator prototype. *Journal of Scientific & Industrial Research*, 81: 402-407.

Khadatkar A, Mathur SM, Dubey K and Magar AP. 2021. Automatic ejection of plug-type seedlings using embedded system for use in automatic vegetable transplanter. *Journal of Scientific and Industrial Research*, 80: 1042-1048.

Khadatkar A, Mehta CR and Sawant CP. 2022. Application of robotics in changing the future of agriculture. *Journal of Eco-Friendly Agriculture*, 17 (1): 48-51.

Kosariya YK, Jogdand SV and Victor VM. 2021. Some physic-mechanical characteristics of potato tubers used as seed for development of potato planter. *Indian Journal of Pure & Applied Biosciences*, 9 (3): 305-308.

Kumar SP, Jat D, Rao SBN, Chandrasekharaiah M, Mehta CR, Singh KP and Nandeha N. 2021. On-the-go urea spraying system of baler for enhancing the nutritional quality of paddy straw. *Range Management & Agroforestry*, 42 (2): 328-333.

Lamo C, Bargale PC, Gangil S, Chakraborty SK, Tripathi MK, Kotwaliwale N and Modhera B. 2022. High crystalline cellulose extracted from chickpea husk using alkali treatment. *Biomass Conversion and Biorefinery*, DOI: 10.1007/s13399-022-02331-5.

Magar AP, Nalawade SM, Walunj AA, Bhangare SC, Bhalekar MN and Nimbalkar CA. 2021. Feeding performance and challenges in use of semi-automatic vegetable seedling. *Multilogic in Science*. 11: 1933-1937.

Magar AP, Nandede BM, Chilur R, Gaikwad BB and Khadatkar A. 2021. Optimization of growing media and pot size for vegetable seedlings grown in cylindrical paper pots using response surface methodology. *Journal of Plant Nutrition*, 1-10.

Mahanti NK, Kothakota A, Ishwarya P, Chakraborty SK, Kumar M and Cozzolino D. 2021. Emerging non-destructive techniques for fruit damage detection - A comprehensive review. *Trends in Food Science & Technology*, DOI:10.1016/j.tifs.2021.12.021

PUBLICATIONS

Managraj S, Thakur R, Yadav A. 2022. Development and characterization of PLA and cassava starch-based novel biodegradable film used for food packaging application. *Journal of Food Processing and Preservation*. e16314. DOI:10.1111/jfpp.16314.

Pagare V, Din M, Mehta CR, Nandede BM and Kumar M. 2022. Morphological and mechanical characteristics of onion seedlings insight to mechanized transplantation. *Indian Journal of Agricultural Research*, DOI: <https://doi.org/10.18805/IJARE>.

Pagare V, Din M, Nandede BM, Yadav D, Mehta CR, Kumar M and Singh K. 2022. A comparative study on onion seedling growth under different climatic conditions with aspect to mechanical transplanting, *Journal of Applied Horticulture*, DOI: <https://doi.org/10.37855/jah.2022.v24i01.07>.

Pandiselvam R, Kailappan R, Syed Imran S, Anjineyulu K and Sruthi NU. 2022. Development and performance evaluation of thresher for onion umbels. *Journal of Food Process Engineering*, DOI:10.1111/jfpe.14051.

Pravitha M, Manikantan MR, Ajesh Kumar V, Shameena Beegum PP and Pandiselvam R. 2022. Comparison of drying behavior and product quality of coconut chips treated with different osmotic agents. *LWT*, 162, 113432. <https://doi.org/10.1016/j.lwt.2022.113432>

Roul AK and Singh D. 2022. Development and stability analysis of a self-propelled high clearance multi-utility vehicle. *Journal of Agricultural Engineering*, 59 (1): 18-30.

Roul AK, Pandey HS, Jyoti B, Mandal S and Parmar BS. 2022. Development and evaluation of automated slip and draft control system for tractor. *Journal of Scientific & Industrial Research*, 81(3): 254-261.

Santhosh S, Sudagar IP, Rajkumar P, Naik R. 2021. Mechanical properties of palmyrah (*Borassus flabelifer*) leaf base. *The Pharma Innovation Journal*, 10 (10): 2407-2411.

Sethi S, Joshi A, Seth K, Bhardwaj R, Yadav A and Grover M. 2022. Phytonutrient content, antioxidant potential and acceptability of muffins functionalized with soy and citrus industry waste. *Journal of Food Processing and Preservation*, e16606. Doi: 10.1111/jfpp.16606

Shelake P, Mohapatra D, Tripathi MK and Giri SK. 2022. Explicating the effect of the ozonation on quality parameters of onion (*Allium cepa L.*) in terms of pungency, phenolics, antioxidant activity, colour, and microstructure, *Ozone: Science & Engineering*, DOI: 10.1080/01919512.2022.2037404

Shukla P, Mehta CR, Agrawal KN, Potdar RR, Kumar M and Singh K. 2022. Approach for ergonomic assessment of self-propelled combine harvester seats based on anthropometric body dimensions, *International Journal of Occupational Safety and Ergonomics*, DOI: 10.1080/10803548.2022.2038460.

Shukla P, Potdar RR and Jyoti B. 2022. Actuating forces of frequently operated controls on Indian agricultural tractors. *Journal of AgriSearch*, 9 (1): 69-73.

Singh J, Din M, Agrawal KN, Jyoti B, Roul AK, Kumar M and Singh K. 2022. Estimation of leaf area and leaf area density for design optimization of a recycling tunnel sprayer. *Journal of Scientific & Industrial Research*, 81 (2): 173-179.

Subeesh A, Bhole S, Singh K, Chandel NS, Rajwade YA, Rao KVR, Kumar SP and Jat D. 2022. Deep convolutional neural network models for weed detection in polyhouse grown bell peppers. *Artificial Intelligence in Agriculture*, 6: 47-54, DOI: 10.1016/j.aiaa.2022.01.002

Thakur RR, Mangaraj S, Tripathi MK, Singh KP and Jadhav ML. 2022. Design of a modified atmosphere storage system for shelf-life enhancement of mango (*Mangifera indica*, cv. Amrapali). *Journal of Food Processing and Preservation*, e16600, DOI: 10.1111/jfpp.16600

Tiwari S, Goswami U, Kate A, Modhera B, Tripathi MK and Mohapatra D. 2022. Biological relevance of VOCs emanating from red onions infected with *Erwinia (Pectobacterium) carotovora* under different storage

PUBLICATIONS

conditions. *Postharvest Biology & Technology*, 184, 111761 DOI:10.1016/j.postharvbio.2021.111761

Vinass JP, Sudagar IP, Sudha P, Boomiraj K and Naik R. 2021. Influence of sugarcane bagasse fibres from the rind and pith on selected properties of bio-composite material. *The Pharma Innovation Journal*, 10 (10): 2417-2422.

Yadav A, Kumar N, Upadhyay A, Fawole A, Mahawar A, Jalgaonkar K, Chandran D, Zengin G, Kumar M and Mekhemar M. 2022. Recent advances in novel packaging technologies for shelf-life extension of guava fruits for retaining health benefits. *Plants*, 11 (4):547. DOI: 10.3390/plants11040547

Yadav A, Tripathi MK and Jadam RS. 2022. Edible coating from food processing by-products for packaging of fruits and vegetable. *Octa Journal of Biosciences*, 9 (2): 91-98.

Books

Mehta CR, Kumar A, Gite LP and Agrawal KN. 2022. *Textbook of Ergonomics and Safety in Agriculture*. Directorate of Knowledge Management in Agriculture, Indian Council of Agricultural Research, New Delhi. 155.

Tripathi MK, Mangaraj S. and Ali N. 2022. *Hand Book of Food, Nutrition and Health: Quality diet, Food Processing, Health & Longevity*. International Books and Periodicals Supply Services, Satish Serial Publishing House, New Delhi. Vol-I and II, Pages 390, ISBN: 978-93-90425-09-9, E-ISBN: 978-93-90425-10-5.

Book Chapters

Ambrose DCP. 2022. Peeling. In: Seid Mahdi Jafari (eds), *Postharvest and Post-mortem Processing of Raw Food Materials*. Elsevier Woodhead Publishing, U.K. pp:105-115.

Kumari S, Dixit A, Mangaraj S, Sen M and Tiwari A. 2022. Soybean Processing For Health Specific Designer Foods. In *Advances in Plant Science volume II*. Bhumi Publishing, Kolhapur, ISBN:978-93-91768-50-8. Pp: 103-110.

Meena BP, Shirale AO, Biswas AK, Lakaria BL, Meena VD, Gurav PP, Lal B, Pandirwar AP, Das H and Patra AK. 2021. Recent advances in enhancing nutrient use efficiency for higher crop productivity. In Singh U and Chandra SP (Eds) *Nutrient use efficiency through next generation fertilizers*. Brillion Publishing, New Delhi. ISBN: 978-93-90757-74-9; pp: 343-382.

Uma S, Mayil Vaganan M and Agrawal A (Eds.) *Bananas & Plantains: Leading-Edge Research and Developments. Vol-2: Production, Processing and Protection*. Angkor Publishers (P) Ltd., ISBN Number 978-81-945318-1-4.

1. Mohapatra D and Giri SK. 2022. *Post-Harvest Management Practices for Banana*.
2. Naik R and Karur NS. 2022. *Generation of Wealth from Banana Pseudostem by Developing Fibre Products and Health Drink*
3. Senthilkumar T and Naik R. 2022. *Machinery for Pre and Post-Production of Banana*

Wakudkar H and Jain S. 2022. A holistic overview on corn cob biochar: A mini-review. *Waste Management and Research*, <https://doi.org/10.1177/0734242X211069741>

Popular Articles

Sadvatha RH, Ravindra Naik and Sivashankari, M. 2022. Importance of post-harvest in strawberry. *Agro India*, February, 20-22.

Senthilkumar T, Sankaranarayanan K, Syed Imran S and Manikandan G. 2022. Package of machinery for high density cotton cultivation. *Agro India*, February, 17-19.

Thorat DS, Jyoti B and Khadatkhar A. 2022. Falodhano me kitnashi chidkav ke liye fasal suraksha upkaran. *Pragatishil Kheti*, 1: 20-24.

Thorat DS, Pandirwar AP and Dev, M. 2022. Kapas ki fasal mein samuchit urwark prayog ke liye spot fertilizer applicator. *Kheti*, February: 52-54.

Tripathi MK, Mohapatra D, Deshpande S and Anil Kumar. 2021. Millets processing and value addition: Status, scope and challenges. *Krishi Jiwan*, 3 (1): 20-24.

Yadav A and Tripathi MK. 2022. Essential oils: Bioactive agent for active packaging of food. *Scientific India*, 10 (1): 28-32.

EVENTS

Foundation Day Celebrations

The Institute celebrated its 47th foundation day on 15 February, 2022 under the chairmanship of Dr. SN Jha, Deputy Director General (Agricultural Engineering), ICAR. On this occasion, Shri Shailendra Shukla, former chairman of the Chhattisgarh State Power Companies was invited to deliver Prof. AC Pandya Memorial Lecture. In his address he spoke about his contribution in establishment of solar energy plants, solar module manufacturing, production of bio fuel from inedible seeds and establishment of bio diesel plants. While welcoming the distinguished guests, Dr. CR Mehta, Director, ICAR-CIAE explained the utility of various agricultural engineering technologies and their role in nation building. He gave a description of various machines and technologies developed by the Institute in the past few years.



Dr Jha in his address said that the nation could become independent in food grains through modernization of agriculture with the contribution of ICAR-CIAE technologies. He underlined the need for publicizing the developed technologies. Later, he inaugurated the Testing Centre of of the Regional Centre, Coimbatore through online mode. Dr. Kanchan Kumar Singh, ADG (Farm Engineering) ICAR New Delhi explained the importance of agricultural engineering inputs for enhancing the efficiency of resource utilization. The Directors of ICAR-CIPHET, Ludhiana, ICAR-NINFET, Kolkata, ICAR-IINRG, Ranchi, ICAR-NISHAD, Bhopal and ICAR-CIRCOT Mumbai were also present on the occasion.

In the afternoon, the corona warriors who played Important role in providing essential testing, vaccination and treatment during the covid period were honored. Institute staff who completed 25 years of service were also felicitated. Shri Rajeev Choudhary, Director, Directorate of Agricultural Engineering Directorate, Government of Madhya Pradesh was the Chief Guest in the afternoon function.



EVENTS

National webinar on "Nutraceuticals and Dietary Supplements: Applications in Health Improvement and Disease Management"

The webinar was organized on 8 March, 2022. Dr. CR Mehta, Director, ICAR-CIAE, Bhopal chaired the webinar, briefed about the activities of CIAE and elaborated the aim of the webinar during his introductory remarks. He also highlighted the importance of nutraceuticals and dietary supplements and their applications in health improvement and disease management. More than 100 officials and post graduate students having academic and scientific backgrounds from ICAR institutes, SAUs, NIT, Central Universities from different regions of the country participated in the webinar.



Dr. Manoj K Pandey, Associate Professor, Cooper Medical School of Rowan University, USA and Dr. Ashok Kumar, Associate Professor, AIIMS, Bhopal, India were invited speakers in this national webinar. Dr. Manoj K Pandey, delivered his lecture on role of nutraceuticals in cure for inflammation and cancer. He highlighted the importance of food components in prevention of chronic diseases. He said that nutraceuticals are food or part of food and play significant role in maintaining well-being, enhancing health, modulating immunity and thereby preventing as well as treating chronic diseases. It also provides physiological health benefits as well as medicinal implications. Dr. Ashok Kumar delivered his lecture on functional foods and its role in wellness and disease prevention. He also highlighted that how these food components will help in combating some of the major health problems of the century such as obesity, cardiovascular diseases, cancer, osteoporosis, arthritis, diabetes, cholesterol etc. During the webinar, discussions on many useful issues, challenges and the importance of food ingredients in relation to health

management in the current situation has been done. The programme concluded with the vote of thanks proposed by Dr. MK Tripathi, PS and Convener of webinar.

WORKSHOP OF AICRPs**AICRP on UAE**

The XXI Workshop of ICAR-All India Coordinated Research Project on Increased utilization of animal energy with enhanced system efficiency (UAE) was held on 17 January, 2022 through virtual mode under the Chairmanship of Dr. SN Jha, DDG (AE), ICAR, New Delhi. Dr. KK Singh, ADG (FE), ICAR, New Delhi and Dr. CR Mehta, Director, ICAR-CIAE, Bhopal were Co-Chairmen. Dr. BS Prakash, Former ADG, ANP and Dr. G S Tiwari, Former Director, Extension Education, MPUAT, Udaipur were the experts. Shri RK Paliwal, IRS, Retd. Principal Chief Commissioner Income Tax MP & Chhattisgarh and National coordinator for Healthy and Wealthy Village Mission was the special dignitary. The workshop was also attended by Dr. PL Singh, PS, ICAR, New Delhi, Project Coordinators of AICRP on EAAI and ESA, Research Engineers, Co-Investigators and other research staff of nine centres of the AICRP on UAE. It was suggested that the mechanization of animal drawn operations in hilly areas and tribal region should be focussed because utility of other major power sources such as tractor and power tiller has limitation in these areas. More focus should be given on commercialization of developed equipment under the scheme. Animal housing and hygienic environment is important aspect for future R & D work under the scheme. Scheme should be strengthened in the field of mechanization of animal husbandry. On this occasion 10 publications prepared by different centres were released.



EVENTS

AICRP on ESA

The XIII Annual Workshop of the ICAR-AICRP on Ergonomics and Safety in Agriculture (ESA) was organized during 2-3 February, 2022 in virtual mode. The workshop was inaugurated by Dr. SN Jha, DDG (AE), ICAR, New Delhi, as Chairman on this occasion. The session was co-chaired by Dr. KK Singh, ADG (FE), ICAR, New Delhi, and Dr. CR Mehta, Director, ICAR-CIAE, Bhopal. The experts, Dr. LP Gite, Ex-Scientist Emeritus, ICAR-CIAE, Bhopal, Dr. PK Nag, Former Director, NIOH, Ahmedabad, and Dr. N Kotwaliwale, Director, ICAR-CIPHET, Ludhiana, also graced the occasion. During the two-day deliberations, one technical session, one business session, and one plenary session were held. The achievements and progress of twelve centres for 2021–22 were reviewed. The research engineers of different centres presented the future programmes for the years 2022-23. On this occasion, one research highlight, two software applications (android-based application on Agricultural Accidents Survey and web-based Backend Agricultural Accidents Survey Software) along with six success stories were released.

**AICRP on FIM**

The 36th Workshop of ICAR-AICRP on Farm Implements and Machinery was organized on the virtual platform during 22-24 February 2022 to provide a platform for interaction amongst researchers and policy makers and was attended by around 100 participants from different SAUs, ICAR institutes and other organizations.

The inaugural session of the workshop was held on February 22, 2022 under the Chairmanship of Dr. SN Jha, DDG (AE), ICAR, New Delhi and Dr. C Divaker Durairaj, Former Dean, AEC&RI, TNAU, Coimbatore was the Guest



of Honour during the session. Dr. UR Badegaonkar, I/c TTD & PS (FIM Scheme), ICAR-CIAE Bhopal welcomed the participants to the workshop and highlighted that this is one of the most important AICRP functioning in the area of agricultural mechanization followed by PC's Report. Dr. CR Mehta, Project Coordinator, AICRP on FIM presented Project Coordinator's Report on progress of work done by different centres of the scheme. While commenting on PC's report, Dr. C Divaker Durairaj, Guest of Honour spoke on the significant contribution in the field of farm mechanization towards development of Indian agriculture. Dr. KK Singh, ADG (FE), ICAR, New Delhi stressed upon the development of AI and robotics based machineries by the centres. Thereafter, the release of the publications from different centre was carried out in virtual mode.

Dr. SN Jha, DDG (AE), ICAR, New Delhi appreciated the PC report presentation and work done under AICRP on FIM. He emphasized on adoption of advanced technologies such as IoT, AI, Robotics, drone etc. He also emphasized the use of various social media platforms for popularizing the technologies and urged that the centres should also focus on revenue generation. Technical Sessions were conducted during February 22-24, 2022 to review the progress of 25 centres engaged in Research & Development (R&D), Prototype Manufacturing Workshop (PMW), Prototype Feasibility Testing (PFT) and Front Line Demonstration (FLD) activities. In these technical sessions, new programmes to be taken up during 2022-23 were also discussed.

Testing Centre building inaugurated

The Farm Machinery and Post-Harvest Equipment & Machinery Testing Centre building at Regional Centre, Coimbatore was inaugurated by Dr. SN Jha, DDG (AE) on 15 February, 2022 through virtual mode.

DISTINGUISHED VISITOR/ NEWS FROM PERSONNEL

Visit of DDG (AE), ICAR

Dr. SN Jha, DDG (AE), ICAR visited the Institute during 8-10 March, 2022 for the first time since assuming the charge of DDG. During his three-days visit he had separate meetings with PCs, HoDs, Scientists, Administrative and Finance staff and Ph.D. students. He reviewed the institute's ongoing research activities and visited different laboratories/ facilities of the Institute. He urged the scientists to take up more externally funded projects alongside the collaborative projects with industry and other institutions. He reiterated the importance of improving the institute's visibility at the global level. He addressed all the staff members of the institute and motivated them to work hard and produce tangible results.



Study Leave granted



Er. Swapnaja Jadhav was granted study leave for a period of three years wef 12 January, 2022 to pursue Ph.D. from IARI, New Delhi.

Our New Colleagues



Shri Mangal Singh Suryavanshi joined as T-2 on 23 February, 2022 on transfer from ICAR Research Complex for NEH Region, Umiam, Meghalaya.



Shri Abhishek Yadav joined as CAO on 31 March, 2022 on promotion. He was previously working as SAO at ICAR-IGFRI, Jhansi.

Transfer



Shri Kumar Rajesh, CAO was relieved on 21 March, 2022 to join as Director, Agricultural Education Division, ICAR, New Delhi.

Promotions



Shri PK Das
Asstt. Chief
Tech. Officer
wef:
01.01.2021



Mrs. Nidhi Agrawal
Asstt. Chief
Tech. Officer
wef: 22.03.2021

The following scientists were promoted to the Grade Pay of Rs. 7000/-.



Dr. Manoj Kumar
Scientist (FMP)
wef: 12.05.2015



Dr. AP Pandirwar
Scientist (FMP)
wef: 01.01.2019



Dr. CP Sawant
Scientist (FMP)
wef: 01.01.2019



Er. Swapnaja Jadhav
Scientist (FMP)
wef: 01.01.2020

NEWS FROM PERSONNEL



Er. DS Thorat
Scientist (FMP)
wef: 01.01.2020



Ms. Sweeti Kumari
Scientist (FMP)
wef: 01.01.2020



Er. HS Pandey
Scientist (FMP)
wef: 01.01.2020



Dr. DA Pawar
Scientist (AS&PE)
wef: 01.01.2020



Dr. AE Kate
Scientist (AS&PE)
wef: 01.01.2020



Dr. Dilip Jat
Scientist (FMP)
wef: 05.07.2020



Dr. Syed Imran S
Scientist (FMP)
wef: 05.07.2020



Dr. SP Kumar
Scientist (FMP)
wef: 01.01.2021



Er Ajesh Kumar
Scientist (AS&PE)
wef: 01.01.2021



Dr. Bikram Jyoti
Scientist (FMP)
wef: 05.01.2021

The following scientists were promoted to the post of Senior Scientist to the Grade Pay of Rs.8000/-.



Dr. VB Babu
Scientist (Agri. Statistics)
wef: 21.06.2013



Dr. AK Roul
Scientist (FMP)
wef: 26.07.2019



Dr. Manoj Kumar
Scientist (Agri. Statistics)
wef: 04.11.2019



Dr. RR Potdar
Scientist (FMP)
wef: 15.12.2019



Dr. PC Jena
Scientist (FMP)
wef: 15.09.2020



Dr. Manish Kumar
Scientist (FMP)
wef: 15.09.2021



Dr. Abhijit Khadatkar
Scientist (FMP)
wef: 15.09.2021



Dr. NS Chandel
Scientist (FMP)
wef: 15.09.2021

STAFF SUPERANNUATED



Shri MS Uikey
Skilled Support Staff
31.01.2022



Dr. KC Pandey
Principal Scientist
31.01.2022



Smt. Ragini Choudhary
Technician
28.02.2022



Shri JK Sahu
Technical Officer
28.02.2022



Shri PS Pawar
Lower Division Clerk
28.02.2022



Shri Zafar Mohd
Technical Officer
28.02.2022



Shri Dayanand Sharma
Skilled Support Staff
31.03.2022



Shri SK Bagde
Senior Technician
31.03.2022

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

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