



# ICAR-CIAE

# NEWSLETTER

Modernizing agriculture through engineering interventions

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## From the Director's Desk



Harvest and post-harvest losses of major agricultural produces in India are estimated at around Rs 92,650 crore per year. While post-harvest losses vary depending on crops, agricultural practices, climate, etc., improper storage is one among the major reasons of losses in most cases. Harvested grains, fruits and vegetables etc. are stored in traditional structures, which cannot protect the commodities against pests and decay. As a result, a bulk of stored commodities are lost to insect infestation, rotting and mould growth.

Technical intervention through improved storage structures, cold chains and logistics can reduce post-harvest losses and increase farmers' revenues. It will also maintain freshness of fruits and vegetables, and retain the quality. India currently has a total cold storage capacity of 320 lakh tonne as against the required capacity of 350 lakh tonne.

The Prime Minister of India recently launched a financing facility of Rs. 1 lakh crore under the **Agriculture Infrastructure Fund** as part of 'Atmanirbhar Bharat' to make farmers self-reliant. The scheme provide a medium to long-term debt financing facility for investment in viable projects for post-harvest management infrastructure and community farming assets through interest subvention and financial support. The funds will be provided to Primary Agricultural Credit Societies (PACS), Marketing Cooperative Societies, Farmer Producers Organizations (FPOs), Self Help Group (SHG), Farmers, Joint Liability Groups (JLG), Multi-purpose Cooperative Societies, Agri-entrepreneurs and Central/State agencies or Local Bodies sponsored by Public Private Partnership Projects for setting up of cold stores and chains, warehousing, silos, assaying, grading and packaging units, e-marketing points linked to e-trading platforms and ripening chambers, etc.

CIAE Bhopal with an expertise in processing and storage of agricultural commodities is contributing to the scheme by providing technical guidance to the Department of Cooperation, Govt. of Madhya Pradesh for utilization of agricultural infrastructure fund. The Institute has developed technologies related to solar power operated cold storage for transient storage of horticultural produces, ripening chamber for fruits, sensor based control and monitoring system for grain storage, machinery for cleaning, grading, sorting, milling etc., and is actively involved in transferring these technologies for commercial adoption.

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This issue of the newsletter focuses on research and development of farm equipment and machinery like high pressure spraying system for locust control, smart sprayer for orchards, tractor operated single row corn cob picker, self-propelled adjustable platform for green houses, natural ventilator based modular onion storage system, gravity drip irrigation system for small landholder, etc. Technologies like CIAE-Millet Mill and CIAE-Dal Mill were commercialized through licensing to M/s KPMC Limited, Indore in this quarter. ICAR-CIAE organized a webshop on 'Impact of COVID-19 on agricultural machinery manufacturing sector in India'. Business meet on post-harvest processing technologies and brainstorming seminar on adoption of zero-till machinery in South India were organized during the quarter. In this quarter, mid-term review of AICRPs on FIM, UAE, ESA and EAAI were also held. Independence Day celebration, 150<sup>th</sup> birth anniversary of Mahatma Gandhi and *Hindi Pakhwada* were also organized virtually by the Institute. 104<sup>th</sup> Institute Research Council was also held online during 2-3 July, 2020.

In this quarter, two staff members were transferred and four colleagues superannuated. As Director, ICAR-CIAE, I am happy to share this Newsletter for this quarter.

## RESEARCH &amp; DEVELOPMENT

**High pressure spraying system for locust control**

Locust swarms are infamous for voraciously feeding on agricultural crops, trees, and other plants and can devastate crops and grasses grown for people and livestock, causing famine and starvation in communities that depend on their crops for survival. Presently, there are no indigenous mechanized high pressure spraying systems to control locusts in the country. A prototype of high pressure and variable height sprayer has been developed at ICAR-CIAE to control hopper and adult locusts. It consists of a spray gun (15 m range), UV stabilized HDPE PVC tank (1 m<sup>3</sup> capacity), diaphragm type pump, pressure regulator, automated spraying unit with braided flexible pipe, DC motor (72 W), speed controller driver (20 A, 12 V DC), battery (12 V, 42 Ah) and regulator to control the direction of spray gun. The automated spraying unit is mounted on a telescopic frame 5 m in height. The DC motor and spray gun are fitted on the MS plate and their linkage converts the rotational output of the DC motor into back-and-forth motion of the spray gun. The back-and-forth mechanism is used to rotate the spray gun at an angle of 120°. The unit can be retrofitted on any tractor operated sprayer. The high pressure sprayer was tested at the rated engine speed of 1500 rpm and operating pressure of 2942-3923 kPa. The spray droplets of 200 - 500 µm size can reach up to 18 m height. Large size of droplets ensures minimum drift and high volume spraying suitable to kill hopper and adult locust resting on a tree. The field capacity and field efficiency of the sprayer are 80-115 plants/h and 80%, respectively at a forward speed of 2.50 km/h. Results revealed that percent coverage,



spray deposits per square meter and volumetric spray deposition are 11%, 302 deposits/m<sup>2</sup> and 0.55 µl/cm<sup>2</sup>, respectively. The approximate cost of the retrofitted spraying system is ₹ 18,000/-.

**Smart sprayer for orchards**

An orchard sprayer that can identify the presence of plants may provide efficient utilization and significant reduction in losses of the agro-chemicals. A sprayer embedded with sonar system has been designed to control pests in small orchards. The sonar sensor has a range of 3 m for canopy detection. An IR sensor has been used to detect the rpm of the rotor that actuates the solenoid valve. Two 12 V DC solenoid valves (0-69 kPa) have been used to close and open the nozzles during the operation. The unit was integrated on the Arduino UNO platform. The system comprises of four Tee jet TXA8002VK (Hollow cone-jet) nozzles mounted on both sides of the sprayer system. It produces evenly sized droplets of 150 - 300 µm for an efficient spraying at a pressure of 41 kPa. The system is supported by a 300 litre tank, in-line filter and pump mounted steel framework that supports sprayer mast. The nozzle produced a discharge of 0.003-0.01 l/s at an operating pressure of 441-558 kPa at mast height of 1.5 m. The deposition studies have resulted in the VMD, percent coverage, deposits per square centimeter, deposition and coefficient of variation (CV) of 195 µm, 15%, 2032, 0.62 µl/cm<sup>2</sup> and 15%, respectively. The field capacity and field efficiency of the developed sprayer are 0.36 ha/h and 75%, respectively at a forward speed of 1.50 km/h. The developed system can be retrofitted on any tractor based spraying system.



## RESEARCH &amp; DEVELOPMENT

**Tractor operated single row corn cob picker**

Harvesting of corn cobs is a tedious, labour intensive, drudgery prone and time consuming operation. Therefore, tractor operated single row corn cob picker has been developed by AICRP on FIM (TNAU, Coimbatore centre). It consists of picking head, elevating conveyor and collection-cum-loading bin. The equipment can be mounted on a small tractor. Picking head is side mounted to the tractor. The corn cob conveyor is designed to operate at a linear speed of 0.94 km/h and transport the cobs to the collection box. It can hold 260 kg of cobs (0.93 m<sup>3</sup> volume of bin). The cobs are snapped and delivered at the rear of the picking head. The effective field capacity of the machinery is 0.16 ha/h at 3.0 km/h forward speed of operation. The unit price of the machinery is approximately ₹ 2.5 lakh and cost of harvesting is ₹ 5,000/ha.

**Self-propelled adjustable platform for green houses**

The working above the head height and horizontal distances in green houses increase physiological and postural stresses on agricultural workers. Green house operations like pruning and harvesting are being done at overhead height using ladders besides other existing systems, which result in greater muscle loading, increase discomfort, reduce performance due to restrictions on posture and difficulty in moving the system forward and backward. Therefore, AICRP on ESA (ICAR-IARI centre) has developed a self-propelled adjustable height platform suitable for pruning and harvesting operations in green houses. The system is powered by a rechargeable battery



power pack and has provision of moving forward, backward and height adjustment using a hydraulic system. The force and energy required to move the platform is 59 N and 600 Nm, respectively at a forward speed of 0.54 km/h. The energy required to lift platform for change of stage (0.4 m) is 400 Nm. It has gear ratio of 1:9, lifting per stroke of 0.15 m with a total lift of 1.2 m.

**Natural ventilator based modular onion storage system**

Proper ventilation is the key to control the losses in stored onions both in forced and natural ventilated storage systems. The natural air driven ventilators can be effective for onion storage. A roof top natural air driven ventilator system has been developed which is having FRP material based modular onion storage structure of 1 tonne capacity. A provision of UV resistive polycarbonate sheet based roof with sufficient overhang is also provided to the structure which protects the filled onion from rain and direct sunlight. The ventilator has lower open ring of 75 mm diameter and fitted exactly at the middle of the structure roof. During operation, ventilator takes the air inside the stored onions and pushes it out via the outer flexible blades. The exited air removes the respiratory heat generated by the

## RESEARCH &amp; DEVELOPMENT



stored onions. The removal of air creates pressure differential inside the storage structure. Due to this pressure difference, fresh air enters into the storage structure from the sides and bottom and fills the space of air exhausted by ventilator. This process continues till the ventilator keeps rotating. A UV resistive polyethylene film covering is provided to protect the stored onion from high humidity and splash of rain water. To maintain the ventilated condition, sufficient space between the cover and outer wall of the storage structure has been ensured during covering of structure. The storage study of the onions for 4 months during May to August 2020 (including monsoon season) indicated 18% physiological weight loss, 5.5% rotting and 0.2% sprouting losses of stored onions. Previous studies of onion storage under automatically controlled forced ventilated system and natural ventilated system have shown the physiological weight loss, rotting loss and sprouting loss of 10.0, 1.7, 0.2 % and 27.0, 14.2 and 6.0%, respectively. It shows that total losses of onions are about 49% higher in the naturally ventilated based onion storage system as compared to forced ventilation system during 120 days of storage.

### Wheat crop under different irrigation methods for enhanced water productivity

To assess the effect of water stress on yield and water productivity of wheat crop under different irrigation methods and levels, a field experiment

on wheat crop (Var. HI 1544) was laid in strip plot design with two irrigation methods (Flood and sprinkler) and four irrigation levels (25, 50, 75 and 100% of crop evapotranspiration) with three replications during 2018-19 and 2019-20 (November to April). Under sprinkler irrigation, higher yield (5.7 t/ha) was recorded over flood irrigation (4.9 t/ha). Similarly, water productivity was higher by 93-118% in sprinkler irrigation over flood irrigation. Under sprinkler irrigation method, maximum wheat yield of 6.2 t/ha was recorded at irrigation level at 100% of crop evapotranspiration and followed by 6.12 t/ha irrigation level at 75% evapotranspiration. The results show that similar yield can be achieved under sprinkler irrigation with 25% less water application. Thus, farmers may irrigate wheat crop using micro-sprinklers at 75% of crop evapotranspiration to achieve optimal yield and water productivity.



### Gravity drip irrigation system for small landholder

High initial investment of commercially available conventional drip irrigation system makes it unaffordable to majority of smallholder farmers. Gravity based drip irrigation is very simple, affordable and low pressure technique having easy installation, operation and maintenance. Due to absence of design parameters of gravity drip irrigation under varying head conditions, the gravity drip irrigation was evaluated under constant and falling head conditions of water level in the storage tank at ICAR-CIAE farm. The water storage tank of 1000 litre capacity was installed at 1.5 m height above ground for gravity drip irrigation. Tape and round laterals were laid

## RESEARCH &amp; DEVELOPMENT/ SUCCESS STORY



out in 500 m<sup>2</sup> area each with laterals and emitting point spacing of 1.0 m and 0.3 m, respectively.

The uniformity of water distribution in tape and round lateral gravity drip irrigation systems was evaluated under variable head conditions. Under falling head condition, coefficient of uniformity was 83 and 87% in round and tape lateral, respectively. The uniformity coefficient of 94 and 96% in round and tape lateral, respectively, indicated that maintaining the constant head in the water storage tank is helpful to achieve higher irrigation efficiency in gravity drip irrigation system.

## SUCCESS STORY

**Two row tractor drawn planter for sugarcane bud chip settlings**

Sugarcane bud settling planting is a new method of sugarcane planting and is gaining popularity. In this technique, the bud along with a portion of the node region is chipped off and planted in raised bed nurseries/portrays/polybags filled with FYM or press mud, soil and sand in 1:1:1 proportion. Seed material required under this technique is only 1.0 to 1.5 t/ha and the remaining cane after taking bud chips can be sent for milling/jaggery. It also facilitates easy handling and transportation. A two-row tractor drawn planter for sugarcane bud chip settlings raised in portrays has been developed by ICAR-CIAE Regional Centre, Coimbatore in collaboration with ICAR-Sugarcane Breeding Institute, Coimbatore. The equipment consists of a main frame attached to standard three point hitch of a 30 kW tractor and has an adjustable arrangement for altering row to row spacing of 0.9, 1.2 and 1.5 m. The bud chip settlings are dropped through the metering mechanism by two operators seated behind the equipment with adjustable plant to plant spacing of 300, 450 and 600 mm. The furrow openers open the furrow and the settlings are planted through an adjustable depth of planting from 20 to 60 mm. The same furrow is used for irrigation after the settlings have been planted for better establishment. The furrow closer closes the soil thereby giving stability to the settling plants. The field capacity of the equipment is 0.30 ha/h at a forward speed of 1.4 km/h. The plant establishment with the planter is more than 95% with missing of 3-4%.



This planter has been licensed to three manufacturers for commercial manufacturing at Pune, Coimbatore and Haridwar. The licensed manufacturers have sold 40 units across the country. Out of forty units, M/s. Magnificent Engineers, Coimbatore has supplied 30 units to the Department of Agricultural Engineering, Government of Tamil Nadu for promotion of custom hiring of sugarcane bud chip settlings planting in Tamil Nadu state under Government of Tamil Nadu Agricultural Mechanization programme.

## RESEARCH &amp; DEVELOPMENT/ TECHNOLOGY TRANSFER/ HRD

**External Funded Projects**

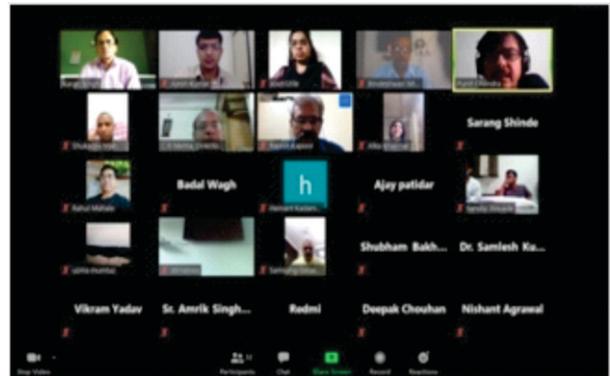
The project 'Design and development of air assisted recycling tunnel sprayer for horticultural crops' with a budget of Rs.36.18 lakh has been approved by Department of Science and Technology, Government of India, New Delhi. The scientists associated in this project are Dr. Bikram Jyoti, Principal Investigator and Dr. Ajay K Roul and Dr. Manoj Kumar as Co-Principal Investigators.

**Technologies licensed**

Technologies of CIAE Millet Mill and CIAE Dal Mill were licensed to M/s KPMC Limited, Indore.

**Awareness Programme on Soybean**

Three webinars on "Awareness Programme on Entrepreneurship Development in Soybean Processing with special reference to Soy milk and Tofu" were organized during the quarter with an aim to create awareness about soybean and its uses. Each webinar had four sessions that covered various aspects of soybean processing that included information about different soy based food products, preparation of soy milk and tofu, introduction to soy processing equipment, project planning, storage and packaging, marketing aspects of soy products and health benefits of soybean. Total 103 people from



different parts of the country attended the webinars, which was coordinated by Dr Punit Chandra, Principal Scientist.

**SCSP Activities**

A survey was carried out to identify the SC beneficiaries under BPL category from selected villages in Bhopal district. As per the benchmark survey, the tools, equipment and other materials were distributed under direct benefit transfer (DBT) to 386 SC-BPL beneficiaries of Kurana, Balampur, Barodi, Nipaniya Jat, Sukaliya and Kacchi Barkheda villages for their economic development and for increased productivity and income generation to support their livelihood.

**Human Resource Development**

The following scientists attended online trainings organized by different Institutes:

Name	Course Title	Duration	Organized by
Dr. Mukesh Kumar and Er. Ajita Gupta	Remote Sensing & GIS Technology and Applications	13 June - 1 July, 2020	IIRS, Dehradun
Dr. Abhijit Khadatkhar, Dr. SP Kumar and Dr. Manoj Kumar	Automation and Robotics in Agriculture	22-31 July, 2020	PAU, Ludhiana
Dr. Manoj Kumar and Dr. AP Pandirwar	Analysis of Experimental Data using R	5-13 August, 2020	ICAR-NAARM, Hyderabad
Dr. AP Pandirwar, Dr. Abhijit Khadatkhar, Dr. Manoj Kumar, Dr. Bikram Jyoti and Er. SP Kumar	EDEM to simulate the various operations (Grain handling, soil-tool interaction, etc.) involved in Agricultural Engineering	1-24 August, 2020	CAEZEN Technologies, Bengaluru
Dr. SK Giri and Dr. NS Chandel	COVID-19 and its impact on small and medium on-farm and off-farm agro-based and cottage enterprises	17-28 August, 2020	Rural Development Academy, Bangladesh
Dr. Ravindra Naik	IP Valuation and Technology Management	1-5 September, 2020	ICAR-NAARM, Hyderabad

## TECHNOLOGY TRANSFER/ PUBLICATIONS

## KVK News

KVK organized following online trainings during the quarter, which were attended by 93 farmers.

- एकीकृत कीट प्रबंधन विषय पर प्रशिक्षण, 13 August, 2020 (in collaboration with Solidaridad Network)
- सोयबीन, धान, मक्का में एकीकृत कीट प्रबंधन पर प्रशिक्षण, 14 August, 2020 (in collaboration with KVK, Sehore)

## Kisan Mobile Advisory (KMA)

Discipline	Scientists visit at farmers' fields	Advisory services		
		KMA*	Advisory to farmers	Diagnostic services by visiting at farmers' field
Horticulture	07	01	85	01
Engineering	17	00	131	06
Home science	00	02	31	00
Govt. scheme information	02	00	32	00
Other	00	00	59	00
<b>Total</b>	<b>26</b>	<b>03</b>	<b>338</b>	<b>07</b>

\* Each KMA reaches to 65516 farmers of the district through SMS.

KVK also sent advisories on Health & Nutrition, Agricultural practices and Engineering/ Marketing Information through WhatsApp Groups. About 400 farmers of 6 different whatsapp groups were benefitted through these advisories.

## Publications

## Research Papers

Balasubramanian S, Deshpande SD and Bothe IR. 2020. Design, development and performance evaluation of CIAE millet mill. *Agricultural Mechanization in Asia, Africa & Latin America*, 52 (1): 42-48.

Banga KS, Kotwaliwale N, Mohapatra D, Babu VB, Giri SK and Bargale PC. 2020. Assessment of bruchids density through bioacoustic detection and artificial neural network (ANN) in bulk stored chickpea and green gram. *Journal of Stored Products Research*, 88, 101667. DOI: 10.1016/j.jspr.2020.101667.

Chandel NS, Chakraborty SK, Rajwade YA, Dubey K, Tiwari MK and Jat D. 2020. Identifying crop water stress using deep learning models. *Neural Computing and Applications*, DOI:10.1007/s00521-020-05325-4.

Giri SK, Sadvatha RH, Tripathi MK and Pawar, DA 2020. Enhancing shelf-life of fresh-cut carrot and cauliflower floret with combined ozone and ultraviolet-C radiation treatment. *Journal of Agricultural Engineering*, 57(3): 210-225.

Jat D, Chandel NS, Gurjar B and Jha A. 2020. Performance of pneumatic loader for loose straw handling on a farm yard. *Range Management and Agroforestry*, 41(1): 116-125.

Jat D, Rajwade YA, Chandel NS, Dubey K and Rao KVR. 2020. Embedded system for regulating abiotic parameters for capsicum cultivation in a polyhouse with comparison to open-field cultivation. *International Journal of Vegetable Science*, 26 (5): 487-497, DOI: 10.1080/19315260.2019.1654588.

Kate AE, Singh A, Shahi NC, Pandey JP and Prakash O. 2020. Modelling and kinetics of microwave assisted leaching based oil extraction from bhat. *Journal of Food Process Engineering*, DOI: 10.1111/jfpe.13503.

Kumar M, Pandey KP and Kumar SP. 2020. Design and development of vertical loading mechanism for indoor agricultural single tyre test carriage. *Pantnagar Journal of Research*, 18(1): 61-68.

Kumar S, Mohapatra D, Kotwaliwale N and Singh KK. 2020. Efficacy of sensor assisted vacuum hermetic storage against chemical fumigated wheat. *Journal of Stored Products Research*, DOI: 10.1016/j.jspr.2020.101640

Mahanti NK, Chakraborty SK, Kotwaliwale, N, Vishwakarma AK. 2020. Chemometric strategies for non-destructive and rapid assessment of nitrate content in harvested spinach using vis-NIR spectroscopy. *Journal of Food Science*, DOI:10.1111/1750-3841.15420.

Mahanti NK, Konga, U, Chakraborty SK and Babu VB. 2020. Non-destructive estimation of spinach

## PUBLICATIONS

leaf area : Image processing and artificial neural network based approach. *Current Journal of Applied Science and Technology*, 39(16): 146-153.

Mandal S. 2020. Beehive charcoal briquettes: clean cooking fuel for rural areas. *Current Science*, 118 (11):1641-1642.

Moharana PC, Raghuvanshi MS, Bhatt RK, Goyal RK, Singh RK, Meena HM, Kumar M and Landol S. 2020. Frost heaves in cold arid Leh-Ladakh region: Observations on their morphological variability and patterns as indicators of pasture land degradation. *Current Science*, 119 (5): 799-807.

Saxena CK and Vijay VK. 2020. Deterministic modeling of solar radiation for natural resource management in Udaipur region. *International Research Journal of Engineering and Technology*, 7(5): 6611-6615.

Sawant CP, Singh KP, Singh RS, Lakaria BL, Patel A, Gupta A, Khadatkar A and Kumar M. 2020. संरक्षण कृषि में मक्का बुवाई यंत्रों का मध्य भारत की काली मृदा में तुलनात्मक अध्ययन. *Bhartiya Krishi Anusandhan Patrika*, 35 (1-2): 39-44.

**Book Chapters**

Shaghaf K, John MH, Pravitha M, Sakhare P, Shivshankar S, Murthy GRRK and Naik R 2020. Approaches for managing post-harvest handling in climate disaster prone areas. In: Rao CS *et al.*, (Eds). *Climate change and Indian agriculture: challenges and adaptation strategies*, ICAR-National Academy of Agricultural Research Management, Hyderabad, Telangana, India. pp-385-396.

Thongam SD, Biswas S, Gaibimei P, Anarase DA, Tarafdar A, Murthy GRK, Naik R and Rao CS 2020. Climate Smart Post-harvest Agriculture and Food System In: Rao CS *et al.*, (Eds). *Climate change and Indian agriculture: challenges and adaptation strategies*, ICAR-National Academy of Agricultural Research Management, Hyderabad, Telangana, India. pp-359- 383.

**Popular Articles**

Badegaonkar UR and Mehta CR. 2020. Farm mechanization to combat labour crisis, *Agri News*

*Network*, 20 July. [http:// www. agrinews network.in/ann-article. php?id=25](http://www.agrinewsnetwork.in/ann-article.php?id=25).

Chakraborty L, Dubey S, Sharma B, Verma S, Mishra R and Bharati SK. 2020. SRI सघनता पद्धति, *Kheti*, July : 26-30.

Deshpande S, Tripathi MK, Kumar A, Mahapatra D and Nishad P. 2020. Millet production and business development, *Krishi Jiwan*, 1: 24-25.

Jena PC, Kumar S and Kushwaha N. 2020. सौर संचालित छिडकाव प्रणालियों का वर्गीकरण एवं उनका रखरखाव. *Krishak Doot*, 14-16 July: pp: 6 &11.

Kumari S, Yadav A and Thakur RR. 2020. An emerging technique for shelf life extension of fresh produce in India: Edible Coating I (5). *Mithai and Namkeen Times*. pp 28–32.

Maheshwari C and Hasan M. 2020. Photo-synthesis-deceptively simple but endlessly complicated. *Acta Scientific Nutritional Health*, 4 (8).

Mehta CR and Badegaonkar UR. 2020. कोरोना परिदृश्य में कृषि कार्यो हेतु कृषि यंत्रिकीकरण सम्बन्धी सलाह. On-line Publication on Hindi Portal-Krishi Alert of ANN, <https://www.krishialert.com/2020/07/31>.

Senthilkumar T and Annamalai SJK. 2020. Package of farm equipment for cassava cultivation. *Agro India*, July: 10-11.

Senthilkumar T and Suthakar B. 2020. *Mechanization solutions for 9 sowing and planting operations of rice cultivation in India*. *Agro India*, September: 10-11.

Senthilkumar T. 2020. Touch free hand wash system and automatic sanitizer (Tamil). *Kovai Vanigam*, 8 (92): 23.

Tripathi MK and Rana M. 2020. Opportunity in start-up for production and value addition in millet cereal, *Krishi Jiwan*, 1: 1-4.

Tripathi MK, Kumar A, Mahapatra D and Deshpande S. 2020. Mota Anaj; Nutraceutical value and business opportunities on in millet cereal, *Krishi Jiwan*, 1: 22-23.

## PUBLICATIONS/ EVENTS

**IRC Meeting**

The 104<sup>th</sup> Institute Research Council was held online during 2-3 July, 2020 for consideration of new research projects. Twenty three RPF-I's were presented, discussed and reviewed, out of which, 15 research projects were approved. In his remarks, Dr. C.R. Mehta, Director, CIAE & Chairman, IRC informed about the difficulties being faced by the agriculture sector due to the COVID-19 pandemic and responsibility of CIAE to mitigate this problem. Further, he advised the scientists to formulate research projects based on national need, government policies and initiatives and recommendations of major advisory committees. He suggested to the scientists to develop expertise in one or two major fields and plan project from the specialized areas. He stressed on the need to develop good linkages with industry. Some other agenda items were also discussed and finalized in the meeting. Dr. S. Mandal, Member-Secretary, IRC thanked



attended by about 100 stakeholders, besides around 500 playbacks on recorded live video streaming on social media platforms (<https://youtu.be/l-ZpzNEb7AY>).

Dr. C.R. Mehta, welcomed all the dignitaries and participants to the meeting. He informed that all the technologies being showcased in the business meet have been well tested and documented. He further informed that ICAR-CIAE is willing to partner with various stakeholders through technology licensing, consultancy, contract services, business incubation etc.



all the members for fruitful deliberations during the meeting.

**Business Meet on Post-harvest Processing Technologies**

An online business meet on the 'Post-harvest Processing Technologies' developed by ICAR-CIAE, Bhopal was held on 4 Aug, 2020. The meeting was convened to showcase recently developed technologies to the prospective stakeholders *viz.* food processors, entrepreneurs, start-ups, machinery manufacturers, farmers and rural youth. The meeting was

The meeting was inaugurated by Dr. K Alagusundaram, DDG (Agril. Engg.), ICAR. He emphasised the need of post-harvest technologies in general and product processing in particular, to help farmers as well as consumers. Dr. Kanchan K. Singh, ADG (FE), ICAR remarked that various government subsidy programmes were being targeted towards post-harvest processing and processing would play a vital role in doubling farmers' income by 2022. Dr. S.N. Jha, ADG (PE), ICAR lauded the efforts by ICAR-CIAE, Bhopal for conducting such business oriented meeting. He suggested that more such meetings may be held with selected small group of stakeholders wherein live demonstrations may be arranged.

Twenty eight different technologies, developed at ICAR-CIAE, Bhopal as well as at its Regional Centre, Coimbatore were presented during the meet. At the end, participants from different regions of India shared their feedback and

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expectations regarding products, machinery and technology dissemination process of the Institute. The programme was coordinated by Dr. Nachiket Kotwaliwale, Head, Agro Produce Processing Division, ICAR-CIAE, Bhopal.

### Interaction Meet on Possibility of Adoption of Technology in Arunachal Pradesh State

CIAE-RC, Coimbatore organised a brainstorming interaction meet to explore possibility of adoption of technology of generation of wealth from banana pseudo-stem in Arunachal Pradesh state in collaboration with Arunachal Pradesh State Council for Science and Technology (APSCS&T), Itanagar through virtual mode on 25 Sept, 2020. About 35 officers from APSCS&T, Itanagar and scientists of CIAE-RC participated in the brainstorming meeting. The programme was chaired by Dr. C.R. Mehta, Director, ICAR-CIAE Bhopal. Shri C.D. Mungyak, Director cum Member Secretary, APSCS&T and Dr. D. Mahanta, Project Director, DBT-APSCS&T centre were the Co-chairmen of the meet.

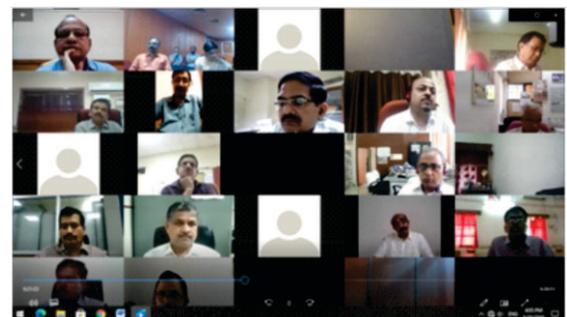
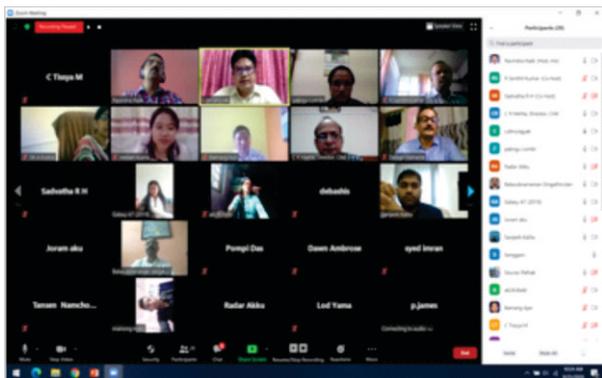
Dr. S. Bala-subramanian, Head, ICAR-CIAE RC, Coimbatore, welcomed the participants. Dr. C.R. Mehta, Director narrated the role of ICAR-CIAE in agri-cultural mechanization, with special reference to North Eastern states. Dr. R. Naik, Principal Scientist, ICAR-CIAE RC, Coimbatore delivered a detailed presentation on the role of post-harvest mechanization intervention in value addition and generation of wealth from banana pseudo-stem waste. This was followed by interaction/ discussion of possible adoption of

related technologies in North Eastern states in general and Arunachal Pradesh in particular.

### Brainstorming Seminar on Adoption of Zero-till Machinery in South India

ICAR-CIAE RC, Coimbatore organised a brainstorming seminar on 'Adoption of Zero-till machinery in South India' through online mode on 25 Aug, 2020. About 55 experts participated during the brainstorming meeting. The program was chaired by Dr. K. Alagusundaram, DDG (Engg), ICAR and Co-chaired by Dr. Kanchan. K. Singh, ADG (FE), ICAR and Dr. C.R. Mehta, Director, ICAR-CIAE Bhopal. In the inaugural session, Dr. S. Balasubramanian, Head, ICAR-CIAE-RC, Coimbatore, welcomed the participants and experts. Dr. M. Muthamil Selvan, Senior Scientist, ICAR CIAE-RC, Coimbatore briefed about the purpose of the meeting.

Dr. Alagusundaram briefed about the adoption of happy seeder, super seeder and informed that the adoption of zero tillage machinery will improve the pulse production in delta region of South India. Dr. Kanchan. K. Singh informed the group that the adoption of zero tillage machinery in Southern India is due for long time. Dr. C. R. Mehta highlighted the advantages of adoption of zero tillage machinery in Indo-Gangetic zone. Dr. R. Murugesan, Chief Engineer, Agricultural Engineering Division, Govt. of Tamil Nadu shared his experience of use of zero tillage machinery and their mass scale adoption in the state. Eight presentations were made by identified experts in two technical sessions. Dr. R. Naik, Principal



## EVENTS

**Webshop on Impact of COVID-19 on  
Agricultural Machinery Manufacturing Sector in India:  
Present Challenges and Future Strategies**

Webshop on "Impact of COVID-19 on Agricultural Machinery Manufacturing Sector in India: Present Challenges and Future Strategies" was organized on 10 July, 2020 to discuss the present challenges faced by tractors and farm machinery manufacturing sector of the country due to COVID-19 pandemic and to formulate strategies to sustain the mechanization goals of the country. The online workshop was attended by more than 500 tractor and farm machinery manufacturers from different states, Scientists from Department of Scientific and Industrial Research (DSIR), Principal Investigators of AICRPs on FIM, UAE, ESA and Scientists (Farm Machinery Group) from ICAR-CIAE, Bhopal. Dr. K. Alagusundaram, Deputy Director General (Agricultural Engineering), ICAR was the Chairman, and Dr. Kanchan K. Singh, ADG (FE) and Dr. S.N. Jha, ADG (PE) co-chaired the programme of the workshop.



Dr. C.R. Mehta, Director, ICAR-CIAE welcomed all the participants and highlighted the challenges faced by the tractor, power tillers and farm machinery manufacturing sector due to migration of labour and availability of raw material during the COVID-19 pandemic period. Dr. K. Alagusundaram in his address highlighted about the new norms experienced during last few months due to COVID-19 outbreak and the need of agricultural implement manufacturing industries to produce good quality machines, drones, residue management equipment, etc. Dr. Kanchan K. Singh stressed on the need to convert the challenges due to Covid-19 situation into opportunities. He suggested that skill development programmes should be taken up at a faster pace to generate employment for migratory workers which would support the contingency plan being brought out by the Government. Dr. Jha in his remark stressed that future research needs to be reoriented towards automations in agricultural operations using robotics, IoT, sensor networks etc. to mitigate the challenges due to COVID-19 pandemic. Total 18 invited speakers (17 from national and state farm manufacturers associations and one from DSIR) expressed their views through presentations in the workshop.

Mr. T. R. Kesavan, President, Tractor and Mechanization Association (TMA), presented on "Impact of COVID-19 on Tractor and Farm Machinery Industry" and Mr. S.V. Raju, Chairman, Agricultural Machinery Manufacturers Association (AMMA-India) presented on "Impact of COVID-19 on Farm Machinery Manufacturing Industry in India". Region wise presentations were also made by invited delegates. The zone-specific issues due to Covid-19 and strategies were discussed during these presentations and outline of guidelines were finalized for national and region-specific interventions. The workshop ended with vote of thanks proposed by Dr. Dushyant Singh, Principal Scientist, ICAR-CIAE, Bhopal.

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**Webinar Series-I**

ICAR-CIAE RC, Coimbatore organized the Webinar Series-I on different topics related to mechanization and processing of food crops. This webinar series-I was inaugurated by Dr. C.R. Mehta, Director, ICAR-CIAE, Bhopal on 28 August, 2020. The programme was convened by Dr. S. Balasubramanian, Head, ICAR-CIAE RC and coordinated by Dr. Dawn C.P. Ambrose, Principal Scientist and Dr. Syed Imran, Scientist of the centre. The following talks were delivered by the scientists of ICAR-CIAE Regional Centre from August to September 2020 at weekly interval. A total of 2710 participants across the country participated in these webinar lectures series. E-certificates were issued to the attendees.

- Response surface methodology - An introduction and its applications in research (Dr. S. Balasubramanian, Head, CIAE-RC)
- Farm fresh produce processing: Challenges and intervention (Dr. Dawn C.P. Ambrose, Principal Scientist)
- Drudgery reduction in rice cultivation operations through farm mechanisation (Dr. T. Senthilkumar, Principal Scientist)
- Mechanization in value addition of banana and generation of wealth from banana pseudo-stem waste (Dr. Ravindra Naik, Principal Scientist)
- Current opinion on horticultural mechanisation in India (Dr. M. Muthamil Selvan, Principal Scientist)



**Mid-term review of AICRPs**

Mid-term review of four AICRPs coordinated from ICAR-CIAE, Bhopal was conducted under the Chairmanship of Dr. K. Alagusundaram, DDG

(Agril. Engg), ICAR and co-chaired by Dr. Kanchan K. Singh, ADG (FE), ICAR. The Project Coordinators namely Dr. C. R. Mehta, PC, AICRP on FIM, M. Din, PC, AICRP on UAE, Dr. K. N. Agrawal, PC, AICRP on ESA and Dr. K. C. Pandey, PC, AICRP on EAAI coordinated review of respective AICRPs. Dr. K. Alagusundaram in his opening remarks highlighted the significance of the mid-term review meetings during COVID-19 period. Dr. Kanchan K. Singh remarked that more focus should be given on commercialization of developed equipment/technologies under the schemes. The discussions were held on the future programmes of the scheme and centre wise work plan for year 2020-21. Mid-course correction of the approved research projects with respect to various cooperating centres was also discussed. App on OUAT animal drawn implements was released in bilingual language e.g. English and Odia.

Sl. No.	AICRP	Review Date
1.	Utilization of Animal Energy	4 Sept, 2020
2.	Farm Implements and Machinery	8 Sept, 2020
3.	Energy in Agriculture and Agro-based Industries	15 Sept, 2020
4.	Ergonomics and Safety in Agriculture	22 Sept, 2020

**Independence Day Celebrations**

The 74<sup>th</sup> Independence Day of the nation was celebrated with pride and enthusiasm in which officers and employees of the Institute participated. After the flag hoisting, Dr. C.R. Mehta, Director, ICAR-CIAE remembered the



## EVENTS

martyrs who sacrificed their lives for the freedom of the nation and called upon all to work sincerely to make the country of their dreams. Further, he highlighted the current issues and challenges before the country at present in context to Indian agriculture and effect of COVID-19 pandemic on agriculture, in particular. He also briefed about major achievements of the Institute and staff of the Institute during last one year. To mark the occasion, saplings were planted by the Director along with other officials in the Institute campus. The SOPs related to COVID-19 were followed during the event.

### हिन्दी पखवाड़ा

केन्द्रीय कृषि अभियांत्रिकी संस्थान, भोपाल में हिन्दी पखवाड़ा 2020 कार्यक्रम 14 से 28 सितम्बर 2020 तक आयोजित किया गया। दिनांक 14.09.2020 को संस्थान के निदेशक डॉ. सी.आर. मेहता द्वारा पखवाड़े का औपचारिक उद्घाटन किया गया। हिन्दी पखवाड़ा का समापन कार्यक्रम 01 अक्टूबर को सम्पन्न हुआ। श्री प्रशान्त पथरबे, सहायक महानिदेशक, पत्र सूचना ब्यूरो, भोपाल कार्यक्रम के मुख्य अतिथि थे। कार्यक्रम में हिन्दी पखवाड़े के दौरान आयोजित विभिन्न प्रतियोगिताओं जैसे सामान्य हिन्दी प्रतियोगिता, हिन्दी कार्यक्रम (तकनीकी कर्मचारियों/अधिकारियों के लिए), महिलाओं के लिए हिन्दी प्रतियोगिता, वाद-विवाद प्रतियोगिता, निबंध लेखन प्रतियोगिता, वैज्ञानिक शोध पत्र व पोस्टर प्रदर्शन तथा अहिन्दी भाषी कर्मचारियों/अधिकारियों के लिए ऑनलाइन प्रतियोगिता इत्यादि के विजेताओं को पुरस्कार एवं प्रमाण पत्र प्रदान किये गये। इस अवसर पर श्री प्रशान्त पथरबे ने हिन्दी को आगे बढ़ाने हेतु किये जा रहे प्रयासों पर प्रकाश डाला और भविष्य में लक्ष्य पूर्वक हिन्दी के विकास हेतु प्रयास करने का आह्वान किया। संस्थान के कार्यवाहक निदेशक डॉ. के. एन. अग्रवाल ने हिन्दी के प्रचार प्रसार हेतु किये जा रहे प्रयासों पर चर्चा की तथा संस्थान में राजभाषा के प्रसार हेतु कार्य रूपरेखा

प्रस्तुत की। उन्होंने लोगों से हिन्दी में अधिकाधिक कार्य करने का आह्वान किया तथा कहा कि वैज्ञानिक हिन्दी में बुलेटिन प्रकाशित करें तथा दूरदर्शन व समाचार पत्र के माध्यम से कृषि यंत्रों की जानकारी किसान भाइयों तक पहुंचायें जिससे किसान लाभान्वित हों तथा कृषि का विकास हो सके। इस अवसर पर मुख्य प्रशा. अधिकारी श्री कुमार राजेश ने भी अपने विचार व्यक्त किए। कार्यक्रम का संयोजन डॉ. एम.दीन., परियोजना समन्वयक, पशु ऊर्जा का उपयोग एवं संचालन डॉ. एस.पी.सिंह, अध्यक्ष, राजभाषा प्रकोष्ठ ने किया। धन्यवाद प्रस्ताव राजभाषा प्रकोष्ठ के श्री राजेश तिवारी द्वारा किया गया। पखवाड़े के उद्घाटन व समापन सहित अधिकांश कार्यक्रम ऑनलाइन आयोजित किए गए।

### Celebration of 150<sup>th</sup> Birth Anniversary of Mahatma Gandhi

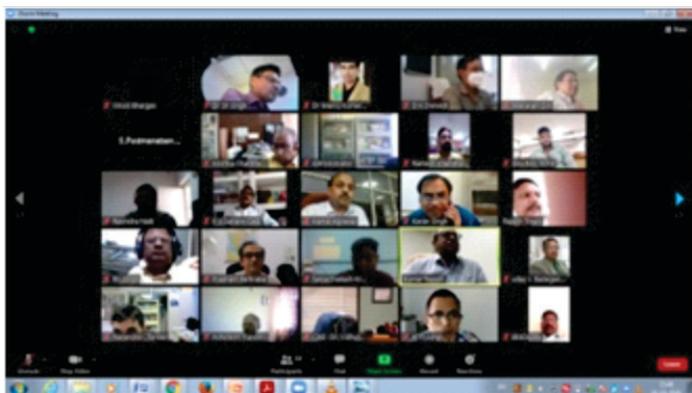
A week long programme was organized at ICAR-CIAE, Bhopal from 26 September to 2 October, 2020 to celebrate 150<sup>th</sup> birth anniversary of our 'Father of Nation', Mahatma Gandhi.



The 150<sup>th</sup> anniversary week celebration was conceived to motivate and galvanise Indian citizens from all walks of life to achieve Maha-

tmahatma Gandhi's dream of a clean India. During the week, a number of activities were organized starting from short film based on Mahatma Gandhi, extempore, debate, and plantation in Institute campus. All above events were organized online except tree plantation.

Dr Akhilesh Kumar Pandey, Honorable Vice-Chancellor, Vikram University, Ujjain, M.P delivered special lecture on Gandhi's Philosophy on Science and Technology. The closing ceremony was organized on October 2, 2020. Dr. C.R. Mehta, Director, CIAE highlighted the role of Mahatma Gandhi in society and nation building and his vision for *Atma Nirbhar Bharat*. Dr. M.K.Tripathi, Convener of the function briefed about the events. The winners of different competitions were awarded on this occasion.



## EVENTS/ NEWS FROM PERSONNEL

**National Nutrition Month**

National Nutrition Month was observed during September, 2020. Four off-campus and on-campus meets-cum-trainings were organized during the month in which 165 male and female farmers participated.

**Obituary**

Smt. SK Bharti, Assistant Chief Technical Officer left for heavenly abode on 25 August, 2020. CIAE fraternity mourns the untimely demise of Smt. Bharti.

**Transfer**

Shri. Dharmendra Singh, Technical Assistant was transferred to ICAR-IINRG, Ranchi and relieved on 12 August, 2020.



Smt. Ritu Dalal, Administrative Officer was promoted to Senior Administrative Officer and was relieved from the Institute on 28 August, 2020 to join at ICAR-IIMR, Hyderabad

**Staff Superannuated**

Following staff superannuated from the Council's service during this quarter.



**Dr. R.K. Tiwari**  
Chief Technical Officer  
31 July, 2020



**Shri R.D. Soni**  
Senior Technical Officer  
31 July, 2020



**Shri H.S. Srivas**  
Technical Officer  
31 July, 2020



**Shri S.N. Saroj**  
Technical Officer  
31 August, 2020

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