



# CIAE



Modernizing agriculture through engineering interventions

# NEWS

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Volume 27 No. 3

July-September, 2017

## From the Director's Desk



Indian agriculture depends mostly on commercial energy for different farm operations. This dependency not only emits harmful emissions but also negatively affects the economy. Hence, alleviation from this negative consequence is of utmost importance. Utilization of crop residue could be an answer as an economical and environment friendly fuel. About 600 million tonnes of agricultural residues and agro-industrial waste are available in India. These can be conveniently and efficiently used to generate thermal or electrical energy. The surplus residues can be collected in sufficient quantities to sustain power generation at a competitive cost using the biomass-based power generation technology. Hence, the bio-energy technologies for the production of bio-oil, bio-char,

biogas, biomass briquettes and cogeneration are promising roots for use of crop residue. Crop residue has a potential to fulfill 50% of its total energy requirement in agriculture sector. Crop residues can produce both gaseous and liquid fuels through thermo-chemical route for heat and electricity applications. Bio-oils from crop residues could act as feedstock for producing hydrocarbons that may be readily integrated into existing refineries to produce fuels and valuable chemical by-products. The

Institute has developed a pilot plant (20 kg/h) based fluidized bed reactor to produce bio-oil from crop residue and enhance the bio-oil recovery. The conversion of agricultural crop residues to produce bio-char using the pyrolysis process is one of the viable options that can enhance carbon sequestration in the soil, reduce farm waste and improve the soil quality for which a pilot plant (300-600 kg per batch) has been developed by the Institute. Other development include pilot plant for biodiesel (50 l/batch) and bio-ethanol production plant (5 l/batch) to produce liquid biofuels from different non-edible oil and crop residue, respectively. These are quite reliable options for production of liquid fuel from different crop residues. The technologies for renewable sources of energy will go a long way in generation of energy while protecting the environment.

This issue of the newsletter also includes some of the important technologies in machinery development, process technologies; technologies for women workers etc. CIAE is very proud to have licensed technologies for manufacturing of agricultural equipment.

In this quarter, apart from an important training on 'Design and manufacturing of agro processing machines', a Summer School on 'Analytical, instrumental and imaging techniques relevant to food safety management' was organized. These trainings were aimed at imparting 'State of the Art' knowledge on the technologies in the field to fellow researchers and scientists.

Some of our colleagues received promotions and many superannuated. It is my proud privilege to present this volume of CIAE Newsletter.

### DIGEST

Variable rate vertical boom type air-assisted sprayer.....	2
Energetics of soybean crop in Hoshangabad district.....	3
CAFT Centre in Food Processing at ICAR-CIAE.....	4
Training for Technical Officers of ICAR Institutes.....	5
Nutrition Mela .....	6
News from KVK.....	7
Ph.D. awarded.....	8
Rafi Ahmed Kidwai Award to Dr. K.K. Singh, Director.....	9
Hindi Pakhwada.....	10
Swachhta Pakhwada.....	11
Distinguished visitors.....	12
Publications.....	13-14
Personnel News.....	15-16

## RESEARCH AND DEVELOPMENT

### Variable rate vertical boom type air-assisted sprayer

The vertical boom type air-assisted sprayer with sensor attachment delivers the precise amount of chemicals to match the tree configurations and to reduce pesticide use (AICRP on FIM - Udaipur centre). It consists of an electronic control system with two ultrasonic sensors, a micro-controller board and two proportional solenoid valves, spray and air delivery systems. The spray delivery system consists of a pesticide tank, HTP pump, and nozzles. The air delivery system consists of a centrifugal blower and air delivery hoses. During operation, an ultrasonic sensor detects the tree and determines its distance from the tip of the sensor. After receiving a signal from micro-controller board, the proportional valve opens and flow of pesticide is allowed to the nozzles and thus spraying is completed. The signal from the sensor is sent to micro-controller only after detection of the tree; thus nozzle remains shut down whenever there is absence of tree canopy. It has been observed that spraying with variable rate control sprayer significantly reduces the quantity of sprayed liquid by 21, 33 and 31% for two and three-year pomegranate and six-year guava orchards, respectively. These savings could be doubled, if spraying is done on both sides of trees.



### Paddy weeder as an attachment to existing 6-row self-propelled paddy transplanter

The traditional practice of manual weeding in paddy requires about 300 man-h/ha, making it labour and cost intensive in addition to human drudgery. In order to address these problems, a five row paddy weeder attachment consisting of five flanges with four number of L-shaped blades on each flange has been developed (AICRP on FIM - Hyderabad centre). The length of each blade has been kept at 110 mm. The drive for each flange has been provided through chain and sprocket mechanism. The number of teeth on the drive and driven sprockets are 15 and 22, respectively. Springs have been connected between the flange shaft and supporting shaft to maintain the effective depth of weeding. Test trials after 15, 30 and 45 days of transplanting have shown that the operating speed, width and depth of cut are



0.9 km/h, 220 mm and 50 mm, respectively. The fuel consumption has been observed as 1.5 l/h with the effective field capacity, field efficiency and weeding efficiency of 0.1 ha/h, 76% and 78%, respectively.

### Bullock drawn turmeric and ginger digger for raised bed planting

A bullock drawn digger has been developed for digging of turmeric and ginger cultivated on raised beds (AICRP on AES - Parbhani centre). The developed digger has been evaluated in field having row spacing of 300 mm and bed width of 1500 mm between two ridges. The average depth of operation has been found to be 18 mm for turmeric and 17 mm for ginger. The average actual field capacity and field efficiency has been observed to be 0.2 ha/h and 81% for turmeric and 0.2 ha/h and 84% for ginger, respectively. The saving in cost of turmeric and ginger digging with newly developed digger has been estimated to be 55 and 39% over traditional ploughing digging method.



### Fluidized bed reactor system for bio-oil production

Bio-oil produced from pyrolysis of crop residues are used as fuel oil in boilers and furnaces. Fluidized bed reactor design is most suitable for higher recovery of bio-oil from crop residues. A fluidized

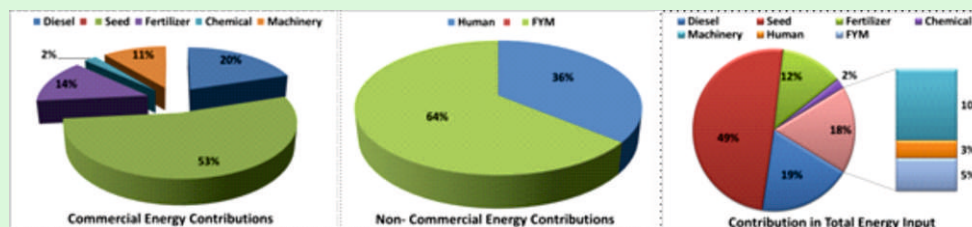
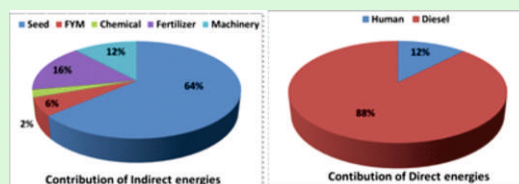


bed reactor has been developed for 20 kg/h capacity of biomass for fast pyrolysis that comprises of mainly reactor unit, free board, cyclone, quencher, recycling unit and feeding unit. Heating coil is wrapped on the outer periphery of main reactor to raise the temperature of bed material up to 600°C and the temperature is controlled with the help of a micro-controller. A screw type feeding system has been provided to feed ground biomass inside the reactor and feed rate is controlled by varying speed by using variable frequency drives. A regenerative blower has been used to fluidize the bed of alumina and biomass inside the reactor, and nitrogen gas used for initial fluidization of bed materials followed by subsequent fluidization using non-condensable pyrolysis vapour. A two-stage quencher has been used to condense the pyrolysis vapour into bio-oil. The system has been evaluated with ground soybean straw and jute stick (particle size of 2 mm). The bio oil recovery has been found to be 37 and 41 % for soybean straw and jute sticks, respectively. During the four month storage stability study, pH of the bio-oil from soybean straw has been found to slightly decrease, while viscosity increases from 1.43 to 1.74 mPaS. Methanol has been found to be better solvent in enhancing storage life than ethanol. Bio-oil from the fast pyrolysis has also been synthesized into bio-oil phenol formaldehyde (BPF) resin, a desirable resin for development of phenolic-based material.



## Energetics of soybean crop in Hoshangabad district

Energy assessment in crop production is essential to enhance the productivity with reduced input energy and cost of cultivation. Energy inputs for production of soybean in the Hoshangabad district has been analyzed based on human, machinery, fuel, seed, fertilizer and chemicals. The seed energy input has been found to be higher (3912 MJ/ha) followed by high-speed diesel (1778 MJ/ha), machinery (1421 MJ/ha), fertilizer (1355 MJ/ha), human (234 MJ/ha) and chemical energy (82 MJ/ha). The variation in fuel energy and machinery is due to use of various sizes of the tractor and capacity of implements. The direct, indirect energy, renewable and non-renewable energy contribution in the total energy matrix have been found to be 23.4, 76.5, 48.8 and 51.2%, respectively. The contribution of different energies in the energy matrix is shown in figures.



**Contribution of different energy sources in soybean crop production**

The analysis indicates gross production value, gross return, net return, benefit-cost ratio, cost of productivity, energy intensity cost, energy intensiveness value and energy ratio cost are Rs.13,355/ ha, Rs.6724/ ha, Rs.3170/ ha, 0.84, Rs.0.03/ha, Rs.29.85/kg, 0.69 MJ/Rs and 0.84, respectively.

### Package of safety gadgets/practices for women workers in cashew-nut processing

In cashew processing industry, shelling is one of the important operations. Traditionally shelling is done by hand cum foot operated desheller. The work is usually carried out in standing posture and continuous work leads to discomfort in body parts such as legs, knees and feet. It also leads to increasing stress in lower back as well as in the shoulders and clavicles.



Therefore, the existing cutter has been modified and provided with seat for women worker and cup type feeding mechanism. The deshelling capacity, deshelling efficiency, whole kernel efficiency and broken per cent for the modified desheller has been observed as 6.3 kg/h, 92, 88 and 12, respectively. The deshelling efficiency and whole kernel recovery increases by 5%, as compared to traditional hand cum foot operated desheller.

### Kodo rice based ready to cook mixes

Kodo millet (*Paspalum scrobiculatum*), one of the rich sources of nutrients has a very good shelf life in whole or undecorticated form. However, on decortication, its shelf life decreases drastically, characterized by darker colour and off-flavour development. In the most kodo consuming community, it is consumed in the rice form, where the whole

grain is decorticated and used to prepare various products. Fermentation is one of the ways to increase the shelf life of grains; therefore ready to cook kheer and halwa mixes have been developed using decorticated and fermented kodo rice. Kodo kheer mix contains about 4% fat, 10% protein, 2% minerals, 0.12% crude fiber, 81% carbohydrate and has an energy value of 396 kcal/100g raw mix. Kodo halwa mix contains about 11% fat, 9% protein, 2% minerals, 0.2% crude fiber, 78% carbohydrate and has an energy value of 441 kcal/100g raw mix. The shelf life of the Kodo kheer and halwa mix is about 3 to 6 months, when packed in 100 micron thick LDPE sealed pouches, and stored at 25°C.



### New externally funded projects

National Medicinal Plant Board, Ministry of Ayush has sanctioned a project entitled 'Post-Harvest Management Practices for Medicinal Tuber Crops' with a budget cost of Rs.64.26 lakhs.

## TRAINING

### Summer School

ICAR sponsored Summer school on “Analytical, Instrumental and Imaging Techniques Relevant to Food Safety Management” was organized during 6-26 July 2017. 23 scientists/ assistant professors from different ICAR institutes, SAUs, KVKs belonging to 9 states of varied disciplines (agricultural processing, food science and technology, microbiology, entomology and nutrition) participated in this program. Some of the major topics covered during the training programme were quality evaluation of food and agricultural products, various imaging techniques for food quality and safety evaluation, VOC sensors and their application, mycotoxin control strategies for agricultural commodities, novel non thermal technologies for food safety, nanotechnology and food safety, sensory evaluation techniques, application of e-nose for food quality and safety evaluation, application of e-tongue and e-vision for food quality analysis, molecular biological techniques in food toxin/quality determination, anti-nutritional factor analysis in food, microbial evaluation of food, hyperspectral imaging technique for aflatoxin determination, traceability in food chain, food laws and regulation in India, near Infrared Spectroscopy-theory: instrument design and its application in food analysis.



### CAFT training on Design and Manufacturing of Agro Processing Machines

Centre for Advanced Faculty Training in the area of Food Processing has been sanctioned to ICAR-CIAE for capacity building of faculty and scientists of NARES in the cutting edge areas of agricultural processing. Following three CAFT training modules have been approved by the Council for the year 2017-18:

- Design and Manufacturing of Agro Processing Machines (1-21 August, 2017)
- Improved nutritional outcomes through integrated approach processing (28 November to 18 December, 2017)
- Advanced storage and packaging technologies for durable and perishable food (4-24 January, 2018)

These training aims at updating the professional skills of teachers, researchers and extension specialists in the latest knowledge and techniques in the field of their specialization related to food processing to bring about the desired qualitative improvement and necessary orientation to contemporary problems to make research and education more relevant.

The first training i.e. Design and Manufacturing of Agro Processing Machines was organized during 1-21 August, 2017. The participants of the programme were from ICAR institutes and SAUs belonging to 9 different states having engineering and technology background. Some of the major topics covered during the training programme were; basic properties required for machine design, model development and their simulation, design consideration and methodologies of cleaner, grader, separators, dryers, material handling equipment, pulse milling and millet milling machinery, expellers and extractors etc. Also the integration of sensors and controllers with prototype, basics of image processing, application of CAD and FEM in quality manufacturing of machines, advanced materials for food processing machines, material testing, BIS standards for selection of materials, applications of ergonomics for safe and proper design of machines, IPR of design and prototype of food processing machines. Various practical classes were conducted on software-based designing of components, image processing, sensor interface with software programs, advanced manufacturing process like CNC, EDM, plastic manufacturing etc., prototype drawings in Pro-E, measurement of ergonomic parameters required for machine design.



### Training on Manufacturing of Processing Machinery for manufactures of Rajasthan

Training on “Manufacturing of Processing Machinery” for seventeen small-scale manufactures of agricultural machinery from Rajasthan was organized during 24-29 July 2017. Manufactures were updated in understanding CAD drawings, measuring systems, marking, manufacturing aids and material selection. They were provided inclusive hands-on training in fabrication of tubular maize sheller, power operated grain cleaner, fruit grader, power operated dall mill, manually operated cleaner, sack holder, pedal operated



## TRAINING

potato peeler and slicer, manually operated groundnut decorticator, vegetable dryer, soybean dehuller, cottage scale soy paneer plant, manually operated paneer pressing device using latest manufacturing technologies. Beside this, live demonstration of processing machinery was also arranged at the Agro-Processing Center. The manufactures interacted with faculty members on various issues from time to time.



### Training for Technical Officers of ICAR Institutes

A ten-days training programme on “Selection, adjustment, operation and maintenance of agricultural implements for field and horticultural crops” was conducted during 1-10 August 2017, participated by 30 technical officers from fifteen ICAR institutes and one from State Agricultural University participated in this training programme. The training programme consisted of lectures, laboratory visits and field demonstration, hands-on practical training as well as group discussions on improved farm machinery for conducting all major agricultural and horticultural operations including conservation agriculture, post-production technology, efficient energy utilization, modern irrigation and drainage technology, protected cultivation technology, testing of agricultural implements for quality control and custom hiring of agricultural machinery. The participants had the opportunity to visit *e-Chaupal* of ITC Ltd. for understanding strategies of marketing and agri-business, CFMT&TI, Budni for understanding testing and evaluation of tractors, power tillers, combine harvesters and other self-propelled machinery and Eicher Tractors Ltd., Mandideep, Bhopal for observing assembly of the tractor. They also visited ICAR-IISS, Bhopal to understand the basics of soil testing and nutrients deficiency symptoms in plants.



### Hands-on Training for Farmers on Improved Agricultural Implements and Machinery

Hands-on Training for Farmers on Improved Agricultural Implements and Machinery was organized during 21-23 September 2017. About 48 farmers from three states (28 farmers from Uttar Pradesh, 01 farmer from Bihar and 19 farmers from Madhya Pradesh) participated in the training. During the training, participants were briefed on updates of technologies on farm mechanization and agro-processing. They were given hands-on training including demonstrations of improved agricultural technologies, necessary adjustments as well as visits to different laboratories to get exposure to different available agricultural technologies. Demonstration of operation-wise implements required for seed bed preparation, sowing/planting and transplanting, spraying, interculture as well as harvesting and threshing were given. Women-friendly tools/ implements, conservation agriculture machinery, and bullock drawn machinery were also demonstrated. Covered cultivation techniques for crop production were also demonstrated.



### Training on protected cultivation of horticultural crops

Training programmes on the protected cultivation of horticultural crops were organized in three different batches (17-18 August; 23-24 August; and on 24 August) in which theoretical classes covering a selection of protected cultivation structures, quality nursery raising, MIS selection and Maintenance, crop management under protected cultivation were covered. Hands on experience on the class room lectures were also provided under actual field conditions to the participants. 78 farmers from different districts of Madhya Pradesh participated in the programme. An awareness cum training programme for farmers of Jharkhand, Sehore and Vidisha Districts was organized on 26 August 2017. Class room lectures, field demonstrations, and hands-on experience of drip Irrigation, mulching and fertigation were covered during the training. 51 farmers participated in the programme.



## TRAINING

### HRD Training program for Drivers of ICAR Institutes

Two five-day training programmes on *Automobile Maintenance, Road Safety and Behavioural Skills* were organized for regular drivers in technical grades of ICAR institutes/HQ in two batches during 18-22 July, 2017 (31 participants) and 19-23 September, 2017 (30 participants).

The resource persons for different sessions of the training program were Dr. AK Mandloi, Associate Professor, Maulana Azad National Institute of Technology on road safety and traffic management; Mr. RP Dixit, Development Officer (New India Insurance Co. Ltd.) on Insurance claim guidelines; Er. Rana M. Maurya, Asstt. Prof. (LNCT) and Lt. Col. (Retd) P.K. Prasad, HoD (Automobile Engineering, OIST) on effective maintenance of motor vehicles; Dr Ambar Chaturvedi and Dr S Mishra (Faculty Member, CRISP) on effective behavioural and communication skills for vehicle drivers; Mr. Samir Yadav, Addl. Sp (Traffic) and Mr. Ajay Bajpayee, DSP (Traffic), Bhopal on general traffic rules, road safety guidelines and motor vehicles act, Er. Uday Paradkar, AGM (Service), CI Hyundai, Bhopal, on periodical and preventive maintenance of vehicles; Er. KP Joshi (Automobile Expert), on breakdown diagnostic management during outside running of vehicles; Er. DK Dwivedi, CTO (ICAR-CIAE, Bhopal), on management of vehicle section with logbook, indent and route management; Apart from above expert lectures, representatives from TATA Motors, Hyundai Motors, Exide Industries Limited and Mahindra Automobiles located in Bhopal visited CIAE along with their respective vehicles to provide on-the-field knowledge about the vehicles. Educational trips were also organized for the trainees at CFMTTI, Budni and Eicher Tractors Plant, Mandideep with hands-on training sessions at local workshops of Hyundai Motors, Tata Motors, and Mahindra Automobiles Ltd. One special invitee, Mr. Bhim Singh, Staff Car Driver (Spl. Grade), ICAR also interacted with the trainees on 21 September, 2017.



### Other Trainings

Sl. No.	Title	Duration	No. of participants
1.	Entrepreneurship development for custom hiring of agricultural machinery	4-9 September, 2017	27
2.	Preparation of soymilk and tofu	31 July to 5 August, 2017	43

### Training organized by CIAE Regional Centre

CIAE Regional Centre, Coimbatore organized MANAGE Refresher Training Program (RTP) on 'Farm Mechanization for Established Agripreneurs' in collaboration with National Institute of Agricultural Extension Management (MANAGE), Government of India, Hyderabad during 28 June to 1 July, 2017 for the established Agripreneurs under Agri-Clinics & Agri-Business Centres Scheme (AC&ABC). About 25 established Agripreneurs from various parts of the country actively participated in the four days training programme. The Centre organised training for a tribal group of Nagara

taluk of Shimoga district of Karnataka on use of mechanization package for juice concentration from *Garcinia combogia* on 11 July 2017 at M/s VB Food Products, Hakatur Village of Madikere, Karnataka. About fifteen participants comprising of rural youth, rural SHG, women participated.

### Nutrition Mela in Hoshangabad, Madhya Pradesh

Despite being number one producer of protein-rich soybean, Madhya Pradesh is under focus for malnutrition among children and women. In order to create a mass awareness among various stakeholders of nutrition-related programmes of Government of Madhya Pradesh, ICAR-CIAE, Bhopal organized a nutritional mela on 11 August 2017 at Government Home Science PG College, Hoshangabad. Around 400 participants including officials of Women and Child Development Department, Integrated Child Development Scheme, officials from KVK, Non-Government Organizations, College of Home Science, volunteers of Atal Bal Palak Scheme (Doctors, Advocates, businessman, Janpratinidhi, social workers), members of self-help groups and college students attended this programme. During the mela,



## TECHNOLOGY TRANSFER

scientists of ICAR-CIAE delivered lectures, demonstrated products and processes and had one-to-one discussion with different stakeholders. The lecture and demonstration were themed at improving nutritional status through the use of soybean and different food grains to address to various type of malnutrition among children and women.



### Participation in Exhibitions

CIAE-Regional Centre participated in AGRI INTEX 2017 at CODISSIA Complex, Coimbatore during 14-17 July 2017. About 1 lakh people visited the stall.



The Centre participated in the National Banana Festival organized by Confederation of Indian Industries with the support of Govt. of Tamil Nadu, ICAR-NRC for Banana and TNAU during 21-23, July 2017.

The Centre also participated in the 24<sup>th</sup> Foundation Day of ICAR NRC Banana, Trichy and farmer's day on 21 August, 2017. The center displayed package equipment for minimal processing of banana pseudostem and package of equipment for rope making from outer sheath of Banana



pseudostem. Scientists from the International Institute of Tropical Agriculture from Belgium, Tanzania, and Uganda were briefed about the technologies for generating wealth from Banana pseudostem waste. More than 1,000 farmers, entrepreneurs, a senior official, scientists visited the stall.

### Prototype Production Supply

CIAE prototypes (941 Nos.) worth Rs.8.70 lakhs were supplied to various stakeholders.

## News from KVK

### Trainings Organized

KVK, ICAR-CIAE organized following training programmes. About 500 farmers attended these training programmes.

- Agronomic practices and improved technology of soybean & maize crops
- Cropping system based nutrient management and role of balance nutrition on soil health management, crop production and quality of produces under rice-wheat cropping system
- Improved agriculture and farm machinery
- Improved production technology of soybean and urd (black gram) crops
- Kharif crop management techniques and field crops inspections
- Plant protection techniques in soybean
- Role of soil testing in soil fertility management with practical
- Seed treatment, sowing techniques and weed control of soybean and maize crop
- Soybean and maize production technologies
- Soybean production technologies and mechanized sowing of soybean on raised bed system
- Weeds and pest control in soybean crop



### Demonstrations at farmers field

Demonstration of tractor operated raised bed planter, jointly with Directorate of Agricultural Engineering, Government of Madhya Pradesh, Bhopal in an area of 0.040 ha each in village Tarawali kala and Hirankhedi (Berasia).

Demonstration of tractor operated inclined plate planter for sowing of maize (variety JM-216) in an area of 1.00 ha in village Dautalpur Thikaria (Phanda).

## TECHNOLOGY TRANSFER/ REPORT

### Cluster demonstration Kharif 2017-18

Sl. No.	Cluster Demonstration on	No. of Demonstration	Area (ha)	Village
1.	Oilseed crop-Soybean JS-95-60	15	5.0	Hirankhedi, Chakkheda, Nipania Jat, Bagroda, Dangroli
2.	Oilseed crop-Soybean JS- 97-52	39	15.60	Undrai, Bhaurasa, Hirankhedi, Dhamarra, Borkhedi, Berkhedi Abdulla, Chanderi, Bagroda
3.	Oilseed crop-Soybean RVS 2001-4	18	7.20	Karondia, Kachnaria, Rampura Balachone, Undrai

### Organization of Krishi Sanghoshties

KVK organized following Krishi Sanghoshties:

- Improving the nutrition status for smart village at Prempura on 10 July, 2017 and at Kararia on 11 July, 2017.
- Eradication of parthenium at Hirankhedi on 19 August, 2017.
- Awareness and demonstration programme of soybean in village Prempura on 8 September, 2017 and at village Kararia on 11 September, 2017.

### Copyright Application

Copyright application for “Software for capturing the image, shape and size features of plant part” was filed on 28 July, 2017.

### Licensing of Technologies

Licensing for manufacturing of some of the CIAE technologies (multipurpose grain mill, pedal cum power operated grain cleaner cum grader, dal mill, pedal operated potato peeler and slicer, solar cabinet dryer, groundnut/sunflower decorticator and maize sheller) was given to M/s Maa Durga Plastic Products, Akola for mass manufacturing.

### Human Resource Development

Er. Bikram Jyoti, Scientist underwent Professional Attachment Training on ‘Biosensors and Instrumentation’ at CSIR-NPL, New Delhi during 22 May, 2017 to 21 August, 2017.

Mrs. Samlesh Kumari, Scientist attended Summer School on ‘Analytical, Instrumental and Imaging Techniques relevant to Food Safety Management’ at ICAR-CIAE, Bhopal during 6-26 July, 2017.

Er. Ajit Kumar Nayak, Scientist attended training on ‘Advanced remote sensing and GIS application in Integrated land resource management’ at ICAR-NBSS&LUP, Nagpur during 17-19 July, 2017.

Er. Sweeti Kumari and Er. Swapnaja Jadhav, Scientist attended CAFT training on ‘Design and manufacturing of Agro-processing Machines’ at ICAR-CIAE, Bhopal during 1-21 August, 2017.

Er. Harsha Wakudkar, Scientist attended Summer School on ‘Production of Bio-CNG and organic manure through anaerobic agro waste decomposition technique’ at Dryland Farming Research Station (RRS), Bhilwara, Rajasthan during 10-30 August, 2017.

Dr. Mukesh Kumar, Scientist attended training on ‘Advances in Nutrient dynamics for improving nutrient and water use efficiency of crops’ at ICAR-IISS, Bhopal during 5-14 September, 2017.

Dr. AP Pandirwar, Scientist attended training on ‘Experimental designs and statistical data analysis’ at IASRI, New Delhi during 11-20 September, 2017.

### Foreign Deputation

Dr. Ravindra Naik, Principal Scientist, and Dr. N.S. Chandel, Scientist were deputed to Nanjing, China to participate in the 3<sup>rd</sup> regional training of trainers of Asian and Pacific Network for Testing of Agril. Machinery (ANTAM) held during 11-16 September 2017.



### Ph.D. Awarded



Er. NS Chandel, Scientist was awarded Ph.D. by Indian Institute of Technology, Kharagpur for his thesis entitled “Electronic control unit and digital nutrient integrated variable rate fertilizer application technology”. He did his Ph.D. under the guidance of Prof. V K Tewari, Professor & Head Agricultural and Food Engineering Department, IIT, Kharagpur.



Er. Adinath Kate, Scientist was awarded Ph.D. by G. B. Pant University of Agriculture and Technology, Pantnagar for his thesis entitled “Development of microwave assisted leaching based integrated oil and protein extraction technology and its kinetics for black soybean”. He did his Ph.D. under the guidance of Dr. Anupama Singh, Head, Department of Post-harvest Process and Food Engineering, GBPUA&T, Pantnagar.



### Rafi Ahmed Kidwai Award to Dr K.K. Singh, Director

Dr. K.K. Singh, Director of the Institute has been awarded Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences for the year 2016 for Natural Resource Management & Agricultural Engineering. He has made original contributions on the application of cryogenics in food processing for retention of aroma in spice grinding establishing an internationally recognized school of thought in CRYOGENIC GRINDING OF SPICES, an area little explored until now in India or abroad. Based on basic theory of heat and mass transfer and properties of the spices, he developed a design concept as well as a physical model of cryogenic grinding system for spices. He characterized cryogenic grinding parameters for two commercially important spices, cumin and clove. He developed protocols for nutritionally rich extruded products, flaxseed dehulling, thermal processing model to predict cooking index, screw pressing of dehulled kernel and functional energy bar, peanut based dairy analogues and puffed potato cubes. He developed a number of need based food processing machines like, small capacity dryer for fruits and vegetables, potato peeler and slicer, power operated peanut sheller, expanding pitch type fruit grader, potato pulper for extraction of potato starch, and solar supplemented pulse dryer for small entrepreneurs/ farmers. These machines have been helpful in reducing the drudgery and enhancing efficiency of operations, and some of these machines have been adopted by the small scale processors/ farmers.



### Events Organized

#### Manufacturer's Meet

Manufacturers' Meet with the manufacturers of Madhya Pradesh was organized on 2 August 2017 in collaboration with Directorate of Agricultural Engineering, Government of Madhya Pradesh, Bhopal. Over 250 delegates including 150 manufacturers, officials from Directorate of Agricultural Engineering and Scientists from the CIAE participated. Shri Rajiv Choudhary, Director, Agricultural Engineering, Govt. of MP was the Chief Guest and Dr. Nachiket Kotwaliwale, Director-Incharge presided over the function.



#### “Sankalp Se Siddhi : New India Manthan”

Krishi Vigyan Kendra, ICAR-CIAE organized “Sankalp Se Siddhi : New India Manthan (2017-2022)” programme on 29 August 2017. Shri Alok Sanjar, Hon'ble Member of Parliament, Bhopal Constituency graced the occasion as *Chief Guest*. Shri Manmohan Nagar, President, Jila Panchayat, Bhopal attended the function as Guest of Honour. Dr. O.P. Choudhary, Joint Secretary, Department of

Animal Husbandry-Dairy & Fisheries, Government of India India also participated in the programme as a special guest. Shri Rajeev Choudhary, Director, Directorate of Agricultural Engineering, MP and Dr. H.S. Yadav, Former DRS, RVSKVV, Gwalior were present as Experts for delivering a talk for doubling the income.

The programme was attended by about 800 farmers from different villages of Bhopal district, besides more than 100 participants from State Government, Private organizations, Non-Government and press and media.

An exhibition for the farmers was also organized at this occasion, where agriculture, agricultural engineering, veterinary and horticulture department of State Government also displayed various technologies and details of different programmes and schemes of Government and provided the leaflets/folders of those schemes to a large number of farmers. Overall the programme was successfully organized for a big gathering of farmers.



### स्वतंत्रता दिवस का आयोजन

संस्थान द्वारा स्वतंत्रता दिवस दिनांक 15 अगस्त, 2017 को हर्ष एवं उल्लास से मनाया गया। कार्यक्रम का प्रारम्भ निर्देशक, डॉ. के. के. सिंह द्वारा ध्वजारोहण से किया गया। इस अवसर पर संस्थान के सभी अधिकारी एवं कर्मचारी उपस्थित थे। ध्वजारोहण के उपरान्त निर्देशक ने सभी को स्वतंत्रता दिवस की शुभकामनाएं दी। इस परिपेक्ष में संस्थान की कई महत्वपूर्ण उपलब्धियां जो देश के विकास में अग्रिम भूमिका निभा रही हैं का उल्लेख निर्देशक द्वारा किया गया। सभा की शुरुवात में संस्थान के मनोरंजन क्लब के अध्यक्ष डॉ. पूनीत चन्द्रा ने इस तत्वाधान में होने वाले कार्यक्रम की रूप रेखा प्रस्तुत की। संस्थान में इस अवसर पर वृक्षारोपण कार्यक्रम का आयोजन किया गया एवं पर्यावरण संरक्षण में वृक्ष की भूमिका पर प्रकाश डाला गया। इस अवसर पर विभिन्न खेल एवं प्रतियोगिताओं का आयोजन किया गया जिसका संचालन डॉ. एस. पी. सिंह एवं उनके सहयोगियों ने किया। सांस्कृतिक कार्यक्रम का भी आयोजन किया गया जिसका संचालन डॉ. एम. के. त्रिपाठी ने किया।

संचालित सभी प्रतियोगिताओं एवं सांस्कृतिक कार्यक्रम में संस्थान के सभी अधिकारी, कर्मचारी, उनके परिवार के सदस्य एवं स्नातकोत्तर विद्यार्थी उत्साह के साथ सम्मिलित हुए। कार्यक्रम में भाग लेने वाले सभी प्रतिभागियों को उपहार एवं स्मृति चिन्ह प्रदान किये गये। सभा का समापन धन्यवाद प्रस्ताव द्वारा किया गया।



### हिंदी पखवाडा का आयोजन

संस्थान में दिनांक 14 से 28 सितम्बर 2017 तक हिन्दी पखवाडा का आयोजन किया गया। प्रथम दिन पखवाडे के उद्घाटन के अवसर पर बोलते हुए संस्थान के निर्देशक डॉ. के. के. सिंह ने कहा विश्व में सर्वाधिक बोली जाने वाली भाषा चीनी है जबकि दूसरे स्थान पर स्पेनिश भाषा का प्रयोग किया जाता है। हिन्दी विश्व की चौथी सर्वाधिक प्रयोग किये जाने वाली भाषा है जिसे देश के शिक्षित प्रदेशवासी कामकाज के तौर पर प्रयोग करते हैं। कृषि तथा कृषि संबंधी कार्यलयीन कार्यों में हिन्दी का प्रयोग निरन्तर किया जा रहा है, अतः कृषि संबंधी अधिकाधिक लोकप्रिय लेख, शोध पत्र व अन्य साहित्य हिन्दी में अनुवाद कर तैयार किया जाना चाहिए।

दिनांक 14/09/2017 को उद्घाटन कार्यक्रम के साथ ही प्रश्न मंच प्रतियोगिता का आयोजन किया गया जिसमें संस्थान के सभी अधिकारियों एवं कर्मचारियों द्वारा उत्साहपूर्वक भाग लिया गया। इसके पश्चात् पूरे पखवाडे के दौरान अलग-अलग दिनों में विभिन्न प्रतियोगिताओं जैसे सामान्य हिन्दी (लिखित प्रतियोगिता), वाद-विवाद, तात्कालिक भाषण प्रतियोगिता, तकनीकी अधिकारियों व कर्मचारियों के लिए हिन्दी प्रतियोगिता, अहिन्दी भाषियों के लिए श्रुतिलेख, महिला कर्मचारियों के लिए हिन्दी प्रतियोगिता तथा हिन्दी शोध पत्र एवं पोस्टर प्रदर्शन प्रतियोगिताओं का आयोजन किया गया। इस उपर्युक्त सभी प्रतियोगिताओं में संस्थान के अधिकारियों एवं कर्मचारियों ने बढ़चढ़कर हिस्सा लिया। दिनांक 28/09/2017 को पुरुस्कार वितरण समारोह के साथ हिन्दी पखवाडे का समापन हुआ।





## Swachhta Pakhwada observed successfully

A host of cleanliness activities/programmes were organised during the 'Swachhta Pakhwada' from 15 September to 2 October, 2017, both within the Institute and in the surrounding areas. Some of the major activities undertaken the fortnight within the Institute included cleanliness drives, tree plantation program, seminar, solar writing competition on 'Importance of cleanliness in human life and its role in national perspective' and visit of Shri Upendra A Kavishwar, former Commissioner of Madhya Pradesh Housing Board; Shri Rodmal Nagar, Hon'ble Member of Parliament from Rajgarh and MLA's from Biaora, Rajgarh, and Khilchipur. As part of the program, the staff of CIAE left the campus of the Institute to participate in cleanliness drives in nearby government school, police station, tourist spot and CIAE adopted village of Prempura.

On the concluding day, a valedictory function was organized on 2 October and prizes and commendation were given away to winners and participants of different function. During this pakhwada, staff took an oath to keep their environment clean.



## DISTINGUISHED VISITORS

### Visit of Senior Authorities from ICAR

Shri SK Singh, Additional Secretary & Financial Advisor (DARE/ICAR) reviewed financial status and other activities of the ICAR institutes located in Bhopal. Shri Singh convened a meeting of the senior officials of the three institutes viz. ICAR-CIAE, ICAR-IISS, and ICAR-NIHSAD at ICAR-CIAE, Bhopal on 29 July, 2017. Besides reviewing the expenditure status of the three institutes he delineated the importance of financial prudence and the changes foreseen in financial management of ICAR, in general. He also replied to queries of different officials on the financial management issues.



Shri Chhabilendra Roul, Additional Secretary (DARE) and Secretary (ICAR) conducted a meeting of administrative, finance and vigilance officers of selected ICAR institutes on 18 August, 2017 at ICAR-CIAE, Bhopal. During the visit, he addressed staff of ICAR institutes and visited facilities of the three institutes viz. ICAR-CIAE, ICAR-IISS, and ICAR-NIHSAD.



### Other Distinguished Visitors

Er. Amitava Akuli, Principal Engineer, C-DAC, Kolkata delivered a lecture on "E- Tongue and Machine Vision" on 21 July 2017.

Mr. P. Nageshwar Rao, Chief Technology Officer, R&D CoE; Mr. M. Suresh, Principal Member, R&D and Mr. S. Manikandan, Sr. Member, R&D, Tractor and Farm Equipment (TAFE) Ltd., Chennai visited Institute on 24 July 2017 to discuss the Precision Farming Technologies/equipment developed by CIAE, Bhopal.

Dr. Lalit Verma, Arkansas University, USA, interacted with the scientists on 25 July 2017.

Mr. Vishal Gupta of Mendeley delivered a lecture on Research Management using Mendeley and Scopus website on 4 August, 2017.

Dr. Shaikh Mohammed Bokhtiyar, Director and Dr. Tayan Raj Gurung, Senior Programme Specialist (NRM), SAARC Agriculture Centre (SAC) visited CIAE on 6 August, 2017 and had discussions with Director and Heads/Project Coordinators regarding publication of a book on Agricultural Mechanization and organization of a Seminar as part of Commemoration of SAARC Charter Day on 10 December, 2017 in Dhaka, Bangladesh.

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### Popular Articles

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### Media Talk

Sl. No.	Channel	Subject	Date	Person
1.	ETV	Weed control and nutrient management in groundnut	3 July	Shri R.D. Soni
2.	ETV	Fertilizer, weed, irrigation and pest management in tomato and brinjal	7 July	Shri R.D. Soni
3.	Live-Conferencing	Video conferencing of SMS with farmers on kharif crop management	19 July	Dr. U.R. Badegaonkar Shri R.D. Soni
4.	ETV	Weeds, insects, diseases and water managements in sesamun(Til), black gram crop	24 July	Shri R.D. Soni
5.	DD MP	Protected cultivation technologies for vegetable cultivation	7 Sep	Dr. KVR Rao

### Promotion of Staff



**Shri D.K. Jain**  
Chief Technical Officer  
wef 1 January 2017



**Shri Ravindra Singh**  
Chief Technical Officer  
wef 1 January 2017



## PERSONNEL NEWS

### Our New Colleagues



**Shri Mahesh Kumar Mulani**  
Finance & Accounts Officer  
7 July, 2017



**Shri Ashish Sahu**  
Assistant  
11 August, 2017



**Ms. Swati Singh**  
Assistant  
16 August, 2017



**Shri Kumar Gaurav**  
Assistant  
19 August, 2017



**Smt. Suruchi Bhagchandani**  
Assistant  
24 August, 2017

### CIAE bids adieu to superannuating staff

The following staff superannuated from the Council's service. They were given warm farewell. CIAE fraternity wishes them and their families a healthy and prosperous future.

#### **31 July, 2017**

Shri Madanlal, T-1-3  
Shri S.C. Malviya, Technical Officer  
Shri H.N. Sen, Skilled Support Staff  
Shri R.C. Siyote, Skilled Support Staff



Shri Madanlal



Shri S.C. Malviya

#### **31 August, 2017**

Dr S.J.K. Annamalai, Principal Scientist  
Shri Ram Vilas, T-1 Technician



Shri H.N. Sen



Shri R.C. Siyote

#### **29 September, 2017**

Shri S.K. Deshmukh, T-7-8  
Shri M.S. Khan, T-7-8  
Smt. Dayarani Chellani, T-5



Shri Ram Vilas



Shri S.K. Deshmukh



Shri M.S. Khan



Smt. Dayarani Chellani

## PERSONNEL NEWS

### Dr. Annamalai will be remembered for his outstanding contributions and unblemished service

Dr. SJK Annamalai, Principal Scientist & Head, Regional Centre of ICAR- Central Institute of Agricultural Engineering superannuated from the Council's service on 31 August 2017 after rendering unblemished service of 38 years, 11 months and 27 days to the nation. Ever since his joining RC-Coimbatore on 2 February, 1987, as Scientist S-2, the Centre has been progressing incredibly, bringing out a number of farmer-friendly technologies and has marked the presence of CIAE in the southern region of this country. Under his dynamic leadership, the Centre has progressed multi-fold and the proof of its spectacular testimony is the technologies developed, both for production and post-production agriculture, besides moving to its own premises. The efforts taken by Dr. Annamalai in disseminating transfer of technology to the end users is clearly visible from the adoption of technology, both by farmers and agricultural machinery manufacturers located in and around Coimbatore and other southern states of the country. A scientist with vast practical exposure and vision for mechanizing agriculture, Dr. Annamalai will always be remembered for his innumerable contribution to the nation through ICAR-CIAE Regional Centre, Coimbatore.

A farewell ceremony was arranged in his honor at different occasions - CIAE, Bhopal on 23 and 24 August, 2017; Tamil Nadu Agricultural Machinery Manufacturers Association on 29 August, 2017; ISAE Coimbatore Chapter on 30 August; ARS Forum, Coimbatore Chapter on 30 August, 2017 and CIAE Regional Centre, Coimbatore on 31 August, 2017.



**Chief Editor:** Dr Dipika Agrahar-Murugkar, Incharge-PME Cell; **Editor:** Dr Debabandya Mohapatra, Senior Scientist  
**Word Processing:** K. Shankar; **Photography:** M/s SS Bagde and Kalyan Singh  
**Publisher:** Director, ICAR-Central Institute of Agricultural Engineering, Nabi Bagh, Berasia Road, Bhopal - 462 038  
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