



# CIAE



Modernizing agriculture through engineering interventions

# NEWS

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## From the Director's Desk



Water is the most important natural finite resource; therefore, efficient utilization of available water resources is of great significance to the overall development of country. At the time of Independence the per capita availability of water in India was 6008 cubic metres (m<sup>3</sup>) a year. In 2011 the per capita water availability reduced drastically to 1545 m<sup>3</sup> per year. By 2025, the per capita water availability will further drop down to 1341 m<sup>3</sup> and to 1140 m<sup>3</sup> in 2050. When the sector wise water consumption is analysed the major consumption of water accounts for agriculture (83%) and related activities followed by industrial production (12%) and domestic purposes (5%) etc. The major share of water available in India for agriculture and allied activities is being utilized without sound on-farm water management practices as well as without planning for future needs. The cultivation of high water demanding cash crops like sugarcane and rice (under ponding conditions) are the cause of concern when the water tables are depleting year after the year. **“More**

**crop per drop of water”** is not just a fanciful slogan; it is a dire necessity. To achieve the goal of more crop per drop, it is imperative to conserve water received through rains and snow melting and prevent its wastage. This will help to irrigate more area with available water. The newly launched Pradhan Mantri Krishi Sinchayee Yojana has this as one of its objectives. An efficient method of irrigation in the form of micro irrigation (MI) was introduced in India, way back in early eighties, but its application is mostly being adopted in horticultural crops but not in major agricultural crops viz., rice and wheat. Recently, Government of India has taken a decision to promote the application of MI systems in all the field crops through various schemes by providing subsidies to the farmers all across the country. Some of the experimental investigations carried out at Institutes of Indian Council of Agricultural Research indicated potential savings of inputs (water, electricity, seed and labour) when drip irrigation systems (DIS) are adopted in these crops. In order to produce one kg of rice with conventional cultivation practices, it is estimated that about 3500-5000 litres of water is required, similarly for wheat production about 800 – 1000 litres of water, but with the adoption of DIS, the water savings to the tune of 50 – 75 per cent was observed in the research studies. When drip irrigation

is adopted in rice crop, there is no need of water for puddling and no loss of water through seepage or evaporation and water is applied in small quantities at the root zone of the plant. The same DIS can be used for irrigating subsequent crops. This will not only help the farmer for the round the year use of DIS, but also saves the precious natural resource i.e., water to produce more crop from drop of water. To achieve this goal, the Institute has under taken experimental trials on application of DIS not only in horticultural crops but also in major field crops like rice, wheat, pigeon pea.

In this issue, we not only have research work on several important areas but also have technologies ready for commercialization and success stories. Several trainings both research oriented as well as under HRD have been conducted. Important events like Swachhtha Pakhwada and International Yoga Day were organized. I congratulate the young new entrants in CIAE and wish the best of luck to our superannuated staff.

### Revised Mandate of the Institute

The 87th AGM of ICAR held on 4 February 2016 amended the mandate of the Institute. The revised mandate of the Institute is:

- Research on agricultural mechanization, post-harvest food processing, and energy management in agriculture.
- Human resource development and capacity building through outreach and training programs; commercialization and utilization of agricultural engineering technologies.

### DIGEST

Bed former-cum-planter for zero tillage sowing.....	2
Technologies ready for commercialization.....	3-4
Success Stories.....	5
Training.....	5-6
Meetings.....	7-8
International Yoga Day.....	9
Publications.....	10
Personnel news.....	11

It is with great pleasure to present the second volume of CIAE News Letter for 2016.

## RESEARCH AND DEVELOPMENT

### Bed former-cum-planter for zero tillage sowing under maize-wheat cropping system

The tractor drawn five row bed former-cum-planter (1500×2270×1130 mm) weighing 400 kg has a field capacity of 0.45 ha/h at forward speed of 3.4 km/h. It has unique ability of making both broad and narrow beds as per requirement. The modular seed and fertilizer boxes can be utilized for sowing different seeds and fertilizer in one run especially under inter-cropping system. The cost of operation of the machine is Rs 700/h. Maximum wheat yield (4500 kg/ha) was observed in 6-row broad bed with seed rate of 80 kg/ha followed by 4-rows broad bed with seed rate of 53 kg/ha (4200 kg/ha), 3-rows each on twin narrow beds with seed rate of 80 kg/ha (4000 kg/ha) and 2-rows each on twin narrow beds with seed rate of 53 kg/ha (3600 kg/ha).



### Power operated garlic stem and root cutter

The power operated garlic stem and root cutter equipped with 0.75 kW electric motor consists of a main frame, feeding unit, clamping unit, cutting unit, power transmission unit and garlic bulb dropping chute (AICRP on FIM - Udaipur Centre). Feeding unit consists of two feeder boxes on opposite sides of the machine to feed the garlic for the cutting stem and root. The clamping unit is provided inside the feeder box to hold the garlic bulb and stem. The cutting unit consists of four pairs of counter rotating root and stem cutters below each of the feeder box. The garlic bulb dropping chute is provided just below the cutting unit in such a way that when the root and stem is cut, the garlic bulb falls and passes through a chute in the collecting tray. The mean output capacity with plain type cutter only for one side of the feeder box has been observed as 33.9 kg/h while with serrated type cutter it is 31.2 kg/h. The mean cutting efficiency is 99.2, 99.1 and 99% for small, medium and large size bulbs, respectively.



### Pedal cum power operated arecanut dehusker

An ergonomically designed pedal cum power operated arecanut dehusker has been developed by AICRP on ESA (Dr. BSKVV Dapoli centre). In case of pedal operation, two workers are needed for its operation, one for pedaling the unit

and the other one for feeding the arecanuts. Mean value of the heart rate of male workers operating the unit was 127 beats/min indicating that the unit could be operated comfortably by workers over a longer time. The mean values for dehusking efficiency, kernel breakage and dehusking capacity are 97%, 7% and 15 kg/h, respectively. While operated by a 0.5 kW single phase electric motor, dehusking efficiency, kernel breakage and dehusking capacity are 98%, 10% and 20kg/h, respectively. The weight of the unit is 110 kg and it is mounted on wheels for mobility. The approximate cost of the unit is Rs. 26,000/- .



### “On-the-go” Soil Electrical Conductivity meter

Soil electrical conductivity (EC) is a measurement that correlates with soil properties which affect crop productivity, including soil texture, cation exchange capacity, soil salinity, organic matter and subsoil characteristics. With field verification soil EC can be related to specific properties that affect crop yield. An instrument and a sensor array comprising of four disc electrodes has been developed to measure and record soil electrical conductivity in field with GPS information. As the sensor array is pulled in the field by a tractor, a known current is injected into soil by one pair of electrodes, while voltage drop is measured across other pair of electrodes. The voltage drop is converted in soil EC data by data logger software and stored in its internal memory as soil EC value with date and time stamp. The spacing between electrodes can be adjusted between 20-35 cm for measurement of soil EC at these depths. The soil EC data stored in data logger's memory can be downloaded to a PC for analysis and preparation of soil map.



## Technologies Ready for Commercialization

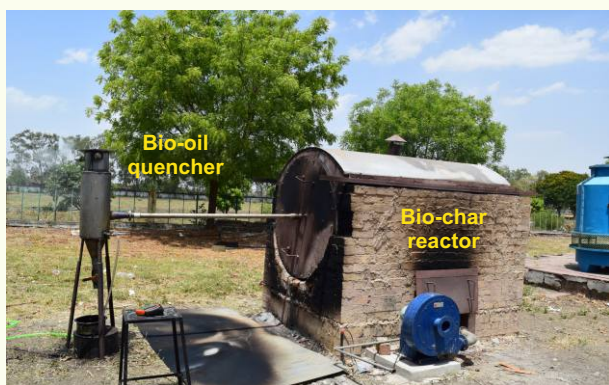
### Seed-cum-ferti drill with two stage fertilizer placement system

A tractor drawn five-row seed-cum-ferti drill applies the fertilizer at seed depth of 50 mm below the seed in single pass for wheat and soybean. The cost of the machine is Rs. 45000/- (approx.) with a cost of operation being Rs. 600/h. **This machine has potential to increase the wheat yield up to 15% and soybean yield up to 22% as compared to traditional practices with same fertilizer dose.**



### Quencher for bio-oil recovery

Bio-oil is produced by sudden cooling or quenching of vapours coming out from pyrolysis of biomass. The pyrolysis vapour is a very complex mixture of organic compounds hence a quencher is required to condense the vapour into oil. The newly developed quenching unit consists of cylindrical pyrolysis gas accumulation unit, gas inlet and outlet arrangements and outer water jacket for chilled water recirculation. The performance of quencher was evaluated by coupling it with biochar reactor. Chilled water at 8°C is recirculated in the outer water jacket of quencher for condensation of pyrolysis vapour and the recovery of bio-oil has been observed as 20-25%. The physicochemical properties such as pH, conductivity, total soluble solid and total dissolved solid of bio-oil has been observed as 2.7, 3.6 mS, 28 % brix and 1.8 g/l, respectively whereas viscosity has been observed to be 1.4 mPaS at 31 °C.



### Cauliflower floret cutter

A hand operated cauliflower floret cutter has been developed to cut and separate the florets from cauliflower heads. It consists of a cutting assembly fitted in a frame, a plunger to push the whole cauliflower into the cutting section and a collection tray. The cutting assembly consists of a circular section (180 mm dia) with 8 wedge shaped stainless steel blades mounted radially. To operate it, the cauliflower head is kept over the cutting assembly with its stalk facing down. The plunger is pushed downwards that cuts and separates

the florets. The florets fall in the collection tray located below. The cutter can cut around 250 numbers (~ 150 kg) of cauliflowers per hour. The loss in the form of small particle (< 5 mm) has been observed in the range of 5- 6% of the weight of cut florets. The cutter will be useful to processing industries dealing with cut vegetables, restaurants, hostels, and community kitchens.



### Drip irrigation system in wheat crop under plastic mulch condition

A study has been conducted to evaluate effect of plastic mulching and drip irrigation in wheat crop (HI1544 variety). Four treatments viz., conventional cultivation practices, system of wheat intensification (SWI) irrigated with drip system, SWI irrigated with micro-sprinkler irrigation and SWI irrigated with drip system under plastic mulch conditions have been undertaken in the study. Under SWI, single seed is sown at a spacing of 25x25 cm. Results indicates the superior performance of wheat crop irrigated with drip irrigation under plastic mulching conditions (6.7 t/ ha) not only in terms of morphological parameters but also in terms of yield (27 % more over conventional, 4.88 t/ ha) indicating technical feasibility of adopting plastic mulching conditions for wheat cultivation under drip irrigation system.



### Technologies Ready for Commercialization

#### **Spectral reflectance based prototype of variable rate urea application system for top dressing in rice and wheat crops**

For mid-season top dressing urea on rice and wheat crops, an on-the-go variable rate urea application system, integrated with spectral reflectance based sensor (Greenseeker) has been developed. The applicator can be mounted on back of operator and covers swath width of 4m. The applicator consists of two Greenseeker sensors which sense the crop health. A "Variable Rate Controller" app has been developed to control the applicator. The applicator is capable of metering 8.5-30 kg/ha N (18.5-65 kg of urea/ha) at 2 km/h forward speed with 25 mm wide fluted roller.

**An estimated 8-15% savings in urea fertilizer can be achieved with use of NDVI based variable rate fertilizer applicator in wheat and rice crops in areas with spatial nitrogen variation.**



#### **Planting system for small seeds and mechanization package for production of kodo and little millet**

Based on two selected metering mechanisms viz., vertical rotor type and inclined plate type, six different configurations of seed planters have been developed. These are; manually operated single row, bullock drawn three-row (two prototypes with different metering devices) and tractor drawn six-row machine (two prototypes with different metering devices) and an attachment to power tiller. These equipment are suitable for sowing of small seed such as Kodo millet, Little millet, Porso millet, Foxtail millet, Barnyard millet, Finger millet, Porso millet, Mustard, Jute, etc. **Use of the multi millet seed cum fertilizer planters can save upto 90% seeds as compared to broadcasting and 70% seeds as compared to drilling by traditional methods.**



### HRD

#### **Hands-on Training on Improved Agricultural Machinery & Implements for Farmers**

Hands-on professional training on 'Improved Agricultural Machinery and Implements' under Consortia Research Platform on Farm Mechanization and Precision Farming (CRP on FMPF) was organized during 24-26 May, 2016. About 117 farmers (including four women farmers) from Madhya Pradesh (55), Gujarat (37), Maharashtra (17) and



Chhattisgarh (8) participated in the training. The participants were given hands on training, demonstrations of improved agricultural technologies along with visits to different laboratories to get exposure of different available agricultural technologies. Demonstration of operation-wise implements required for seed bed preparation, sowing/planting and transplanting, spraying, interculture, harvesting and threshing, women friendly tools/implements, conservation agriculture machinery and bullock drawn machinery were covered. A study tour was also arranged to manufacturing facilities available in local area.

#### **Training on Millet Bread Technology**

One day training on "Development of Millet Bread" was conducted at the Tribal Bakery of Madhya Pradesh Vigyan Sabha (MPVS) at Harshdiwari village in Tamia block of Chhindwara (M.P.) on 18 June 2016. Around forty tribal farmers and entrepreneur's attended the training. Millets like Kodo and kutki are grown extensively in the tribal belt of M.P. and training was an outreach effort undertaken to demonstrate the Millet bread technology developed at CIAE in the production catchment of the raw material. During the

### SUCCESS STORIES

#### Entrepreneurship on Agricultural Machinery Custom Hiring

Shri Rahul Dhoot a resident of village Berkheda Hassan, of Sehore district owned only 1.25 ha land. To augment his net income, he decided to enter into custom hiring business of agricultural machinery and undertook training from CIAE, Bhopal in January 2014 after enrolling in Entrepreneurship Development Programme (EDP) of Directorate of Agricultural Engineering (DAE), Govt of MP which is funded by Department of Agriculture, Cooperation and Farmers' Welfare, Govt of India. After successful completion of the training, he established his custom hiring business centre 'Balaji Custom Hiring Centre' in April 2014, with an investment of Rs. 21.5 lakhs. Initially he bought two tractors (50 & 55 hp) along with one reversible MB plough (2 bottom), front dozer blade, rotavator (1.8 m) cultivator (9 tynes), seed drill (11 rows), multi-crop thresher (35 hp), straw reaper (56") and trolley (2 wheel) and rented it out to around 100 farmers from his village and also surrounding villages for cultivation of field crops like soybean, wheat, chickpea as well as vegetables like onion, garlic, chilli etc. He generated an additional income of around 8.0 lakhs in a year with a net profit of about Rs. 2.5 lakhs. Later he has added a combine harvester and bhusa shifting pump. He is now successfully running his center and plans to further expand the business.



M/s Renu Tomar a resident of village Sayar, of Vidisha district became interested in custom hiring business of agricultural machinery in her village after completion of her post-graduation in chemistry. She enrolled in same program as Shri Rahul Dhoot and after successful completion of the training; she established her custom hiring business centre 'Renu Custom Hiring Centre' in April 2013, with an investment of Rs. 18.0 lakhs out of which Rs. 9 lakhs was given to her as subsidy from the Government. Initially she bought a tractor of 55 hp along with one reversible MB plough (2 bottoms), front dozer blade (6 feet), rotavator (1.2 m) cultivator (7tynes), seed drill (11 rows), multi-crop thresher (25 hp), straw reaper, spray pump (700 l) and trolley (2 wheels) and rented out these machines to many farmers in 2013-14 and 2014-15 of her village and also surrounding villages for cultivation of field crops like soybean, wheat, chickpea as well as vegetable crops. The custom hiring centre generated an annual net profit of about Rs. 5 lakhs in 2013-14 and Rs. 7.87 lakhs in 2014-15. Gradually, a few more machines have been added to her inventory like bhusa shifting pump, winnower, spiral grader etc. with the surplus profit made from custom hiring centre and two small tractors of 15 & 18 hp for horticultural works with 50% subsidy provided by Department of Horticulture, Government of Madhya Pradesh. She runs the custom hiring centre successfully and plans to further expand her business in this sector.



training, the benefits of consumption of minor millets were explained to the participants and hands on training on the technology of bread production were demonstrated. The prepared bread was distributed to the gathering which included the entrepreneurs attending the training as well as their accompanying children.



#### Training Programme for Skilled Supporting Staff

A 3-day training programme for Skilled Supporting staff (SSS) was organized at ICAR-Central Institute of Agricultural Engineering, Bhopal during 17-19 May 2016. Twenty-three SSS and three office assistants successfully completed the training out of which eight SSS were from ICAR-Indian Institute of Soil Science, Bhopal and three SSS were from



## TRAINING/ TECHNOLOGY TRANSFER

**ICAR-National Institute of High Security Animal Disease, Bhopal.** The different sessions of the training programme were conducted at Agricultural Knowledge Management Unit (AKMU) of ICAR-CIAE by Dr. Karan Singh (PS and I/c AKMU), Er. A. Bhole (Technical Officer) and Mr. Neeraj Vishwakarma (Young Professional-II) from CIAE, on basic computing skills (hardware, peripherals and software for personal computers), components of MS-Office (MS-Word, MS-Excel and MS-Powerpoint) and ICAR-ERP (FMS / MIS) modules. The training also focused on demonstration and hands on activities for the participants

### Training on Computer Aided Designing

Forty-five students from various agricultural engineering colleges of the country attended one month training on Computer Aided Designing during 1-30 June 2016. The students were from Dr DY Patil College of Agricultural Engg. & Technology, Kolhapur; College of Agricultural Engineering & Technology, Buldhana; Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad (UP); College of Agricultural Engineering and Post-Harvest Technology, Ranipool, (Sikkim); Technocrats Institute of Technology & Science, Bhopal; and Choudhary Charan Singh Haryana Agricultural University, Hisar, Haryana.



### Training on Post-Harvest Management

Training on *post-harvest management* was organized for 17 farmers of different districts of Madhya Pradesh during 23-28 May 2016. The participants were provided training on production of various products like wheat flour, maida, suji, soymilk and paneer, fruit juice, aonla candy, potato chips, tomato ketchup, sauce, jelly, fruit jam, fruit bar, squash, etc. The participants were also given necessary training to set up industries at the cottage level. During the training, the participants were taken to a dal mill, flour mill and papad manufacturing facilities.



### Training on Soybean Processing

Training on production of soy milk and soy paneer was organized for 45 participants during 25-30 April 2016; 23-28 May 2016; and 20-25 June 2016.

### Practical training for students

During the quarter, 91 students from various agricultural engineering colleges underwent practical training at the Institute:

Sl. No.	Name of University/ College	No. of Students
1	College of Agricultural Engineering, JNKVV Jabalpur	14 (B.Tech students )
2	Sher -E-Kashmir University of Agricultural Sciences and Technology of Kashmir, Srinagar	19 (B.Tech students)
3	College of Agricultural Engineering, Vasantrya Naik Marathwada Krishi Vidyapeeth, Parbhani	10 (B.Tech students)
4		02 (B.Tech students)
5	College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur	01 (M.Tech/PFE students)
6		09 (B.Tech students)
7	College of Agricultural Engineering & Technology, JAU, Junagadh	10 (B.Tech students)
8	College of Agricultural Engineering & Technology, AAU, Godhra	07 (B.Tech students)
9	College of Agricultural Engineering, Anantapur	04 (B.Tech students)
10	College of Agricultural Engineering and Technology, Dr BSKKV, Dapoli	06 (B.Tech students)
11	College of Agricultural Engineering and Technology, Dr PDKV, Akola	09 (B.Tech students)

### Prototype Production and Supply

CIAE supplied 1520 prototypes worth Rs. 14.70 lakhs to various stakeholders.

### Commercial Testing of Equipment

Test reports of the following equipment have been provided to the manufacturers

Sl. No.	Name of Manufacturer	Name of Implements
1	M/s. RPM Metals Pvt. Ltd.	Prakash Battery operated Knapsack Sprayer
2	M/s. SuntechAgri Equipment India Pvt. Ltd.	HTP Power Sprayer (GKPS-230)
3	M/s. Gayatri Industries	Tractor Operated Cultivator
4	M/s RPM Metals Pvt. Ttd.	Battery Operated Sprayer
5	Battery Operated Sprayer	M/S Ratnagiri Impex Pvt. Limited,
6	M/S Modern Agriculture Equipment	Maize Thresher

## Meetings

### Meeting of the IRC

The 97<sup>th</sup> meeting of the IRC was held during 26-28 April 2016. Some of the new projects approved are:



- Development of seed metering mechanism for high speed seeding or planting
- Development of real time uniform rate spraying system for field crops/
- Development of integrated system for harvesting and conveying of bunch crops
- Development of portable system for loading/unloading of grains
- Assessment of farm mechanization status in India
- Smart sprayers for pomegranate young orchards.
- Development of site specific fertilizer applicator for cotton crops.
- Design and development of a garlic harvester cum de-topper
- Development of light weight multi-crop thresher for Uttarakhand hills
- Model farm machinery package for different agro-climatic zones of India
- Development of tractor operated drip lateral and plastic mulch layer cum planter for raised bed.
- Gender friendly tractor operator's work place layout for Indian workers
- Development of Hyperspectral imaging protocol for rapid and non-destructive detection of aflatoxin on maize and groundnut
- Development of Pelletizing techniques on small seeds for mechanized sowing
- Development of tractor operated minor millet harvester
- Development of Quinoa pearler
- Development of technology package for processing and preservation of Palmyra tender fruit
- Design and development of sugarcane rind removing equipment for hygienic juice extraction and bottling (in collaboration with SBI, Coimbatore, TN)

### Zonal workshop cum interaction meet on ICAR-NAIF

Zonal workshop cum interaction meet on ICAR-NAIF and Incubation Projects of Agricultural Engineering institutes (CIAE Bhopal; CIPHET Ludhiana; CIRCOT Mumbai; IINRG Ranchi and NIRJAFT Kolata) was organized during 11-12 April 2016. Dr Sanjeev Saxena, ADG (IP&TM), ICAR inaugurated the NAIF-ZTMC, Zonal Workshop and deliberated on the importance of developing agri business in



the ICAR set up covering innovation and incubation under the umbrella of Intellectual Property Rights.

### District level Extension Officials interactive meeting at Regional Centre, Coimbatore

Deputy Director (Agriculture) and twelve Assistant Directors of Agriculture from Coimbatore District of Tamil Nadu state Dept. of Agriculture visited CIAE Regional Centre, Coimbatore on 23 May 2016 for interactive meeting on farm mechanization and processing. The Extension officials showed keen interest on the technologies demonstrated especially the Inclined plate planter, Sugarcane doublehead bud chipper, Moringa and Curry leaf stripper, Manually guided power-weeder, Millet mill and Package of equipment for value addition of Banana pseudostem. The field problems in mechanized operations, repair and maintenance of farm equipment, climbing and harvesting machines for coconut and arecanut crops, State and Central government schemes on Agricultural Mechanization, Entrepreneurship opportunities in Custom hiring services and agro-processing etc. were also discussed in the meeting.



### Study Mission of FAO Representative

Ms. Flores Rojas Mayling, Junior Professional Agricultural Systems Mechanisation Officer, FAO-Regional Office for Asia and the Pacific, Bangkok visited CIAE Bhopal on a Study Mission during 8-14 May 2016. The mission was to consolidate data and information on use of agricultural mechanization in value chains for inclusion in the network on mechanization designed to service the needs of small farmers and agricultural producers of the region. Visits were organized to kachibarkhedha village and Babai farm to get her acquainted with the machines being used by the farmers. A visit was also organized to Eicher Tractors Ltd. and local agricultural machinery manufacturers.



## REPORTS

### Academia-Industry Interaction Meet on Agricultural Mechanization

**Pune on 3 May 2016**

Academia-Industry Interaction Meet on Agril. Mech. in association with MPKV, Rahuri, AIAMMA, Pune and MSAIDC, Mumbai was organized at the CoA, MPKV, Pune on 3 May 2016 to create a common platform for various ICAR Institutes, Agricultural Universities and leading agricultural machinery manufacturers in Maharashtra to discuss the innovative technologies and mechanisation needs in the state. Over 60 agricultural machinery manufacturers and their representatives actively participated in the meet. In addition to Director, CIAE, Bhopal, the leading participants included three directors of ICAR Institutes, from Floriculture, Onion and Garlic and Grapes, and 33 academia representatives from MPKV, Rahuri, Department of Agriculture, Govt of Maharashtra, Maharashtra State Agro Industrial Development Corporation, Mumbai. Dr KP Vishvanatha, Vice Chancellor, MPKV, Rahuri was the chief guest of the meet. In his address, he highlighted challenges to provide cost effective and timely solutions to labour problems faced by the farming community to achieve higher production and income. Dr KK Singh, Director, CIAE, Bhopal expressed his satisfaction in the gesture of the manufacturers from Maharashtra being present in considerable numbers to make the meet a success. He informed the house that CIAE, Bhopal is capable of extending all supports in providing training, technical expertise in production development and also testing of farm machinery. Increase of women labour in the Agricultural Sector requires a rethink from the manufacturers to develop simple, gender-friendly and ergonomic tools and machinery. Shri DK Suryagan, Dy General Manager, MAIDC, Mumbai explained the procurement of agricultural machinery under the subsidy programme of the Govt of Maharashtra.

Some of the salient recommendations which emerged after the active interaction of academia and industry are:

- Development of high capacity power operated machinery to be taken up by CIAE, Bhopal in collaboration with manufacturers.
- Several issues related to testing of agricultural machinery such as testing fee, time taken for testing etc need to be addressed.
- Creation of custom-hiring hubs for easy availability of high capacity machines
- Establishment of skill development centres for fabrication and operation, maintenance and repair of agricultural machinery.



**Patna on 28 June 2016**

Another meet was organized in collaboration with ICAR-RCER, Patna and All Agricultural Machinery Manufacturers Association India (AIAMMA) meet at ICAR Research Complex for Eastern Region, Patna on 28 June 2016. The meet aimed to bring academia and industry at a common platform to chalk out strategies towards development and commercialization of farm machinery in the Eastern Region of the country. A total of 70 delegates comprising of R&D institutions, Academia, State development agencies and manufactures from Bihar, Jharkhand, Orissa and West Bengal participated in the meet.

Before the meet, an Agricultural Machinery Resource Centre, displaying 18 types of CIAE prototypes numbering 565, was inaugurated by Shri Radha Mohan Singh, Hon'ble Union Agriculture & Farmers' welfare Minister, Govt of India. The centre aimed to promote popularization of new machines and skill up gradation training in operation and maintenance of agricultural machinery. The centre has been established under Consortium Research Project on Farm Mechanization and Precision Farming (CRP on FM & PF) housed at ICAR-CIAE, Bhopal.

Inaugurating the academia- Industry interaction, Union Agriculture & Farmers' Welfare Minister & Chief Guest, Hon'ble Shri Radha Mohan Singh in his speech, emphasised on increasing agricultural mechanization to enhance the production and productivity of agricultural produce so that the income of the farmers could be doubled by 2022. He showed his concern on below average farm power availability (1.1 kW/ha compared to national average of 1.85 kW/ha) in Eastern Regions of the country.

The Honorable Minister stated that the problem of unemployment increasing by farm mechanization is a myth and mentioned that the cost of human energy is Rs 125 per unit whereas cost of energy from tractors and power tiller is lesser than Rs 10 per Unit. The state wherein farm





## REPORTS

mechanization is the highest among Eastern states employs 7 lakh labours every year for agricultural activities. He also emphasized the need for skill development of youth for production, repair, maintenance and operation of farm tools and implements which will provide opportunities for employment. He also stressed that a higher use of machines for post-harvest processing and value addition activities.

The Hon'ble minister appealed to researchers, extension workers and manufacturers to accelerate their efforts for development and application of farm tools and implements in Eastern states especially use of solar energy technology in irrigation.

A CIAE publication entitled "New dimension in Agricultural Engineering research and development under changing National scenario" in Hindi by RS Singh, KN Agrawal and KP Singh was also released on this occasion by Union Agriculture & Farmers' welfare Minister.

Dr KK Singh, Director CIAE, Bhopal briefed the distinguished participants about the objectives of the meet and stressed that Farm Mechanization will have significant role in achieving second green revolution in the country.

Mr. Vijoy Prakash, Agricultural Production Commissioner, Govt. of Bihar stressed on the need of skill development of rural youth in repair and maintenance; development of women friendly machines to tackle the male migration to other states; incubation support to entrepreneurs in manufacturing and value addition; and project based subsidy for custom hiring. Dr RC Srivastava, Vice Chancellor, Rajendra Agricultural University, Pusa informed the house that the cost of cultivation could be reduced by 33-45% in cereals if mechanization in crop production is adopted.

Specific deliberations from academia, development agencies and industry were done in two technical sessions and useful recommendations emerged from it.

### Events

#### Swachhta Pakhwara

"Swachhta Pakhwara" was organized at the Institute and at Regional Centre, Coimbatore under the aegis of "Swachh Bharat Abhiyan" during 16-30 May 2016. All the scientific, technical, administrative, supporting, and contractual staff took active part in the successful endeavour. The "Pakhwara" began with the Swachhta Pledge, which was administered by the Director to all the staff at CIAE and by Dr SJK Annamalai, Head at Regional Centre, Coimbatore. Cleanliness drive was carried out by cleaning of office premises, laboratories, workshops, administrative building etc. A guest-lecture by eminent expert on environment issues, Shri Sudhir Kumar, IFS and OSD, Prashasan Academy, Govt. of MP was a major event that attracted one and all. Major competitive events like "Slogan competition", Essay competitions on "Cleanliness India" and Debates were organized on related subjects. In a major drive towards keeping the adopted village "Lambakhera" and Ward No.79, clean and green contact



programmes were organized with the Parshad, Shri Bablesh Rajput and the local populace. A signature campaign was organized wherein all the employees redeemed their pledge of keeping the area clean and green. Talks regarding clean and environment friendly bio-fuel sources, grading of wastes and their eco-friendly disposal were held by the eminent faculty of the Institute. The Director of the Institute took the keen initiative by advocating, enthusing and propagating the essence of keeping the environment clean and green. He also addressed a gathering of members of the CIAE -Staff quarters. The programme ended on 30 May 2016 with an "address of commitment" by the Parshad, Shri Bablesh Rajput, Special Guest and the concluding remarks of the Director at Bhopal. SJK Annamalai, Head RC distributed prizes for the winners of the essay competition and gave his closing remarks at RC, Coimbatore.

#### International Yoga Day

The second **International Yoga Day** was celebrated with great enthusiasm and fervour on 21 June 2016. On this occasion a special program was organised at CIAE for all of staff of the institute and residents of CIAE colony. Prominent yoga experts from Bharatiya Yog Sansthaan Shri GP Patel and Smt Gayatri Sharma were the Chief guests of the occasion. The celebration began with lighting the traditional lamp by the guests, Director CIAE and members of the Committee for the **International Yoga Day**. In his introductory speech in the program organised, Dr. KK Singh, Director CIAE emphasized the importance of internal



## REPORTS

cleanliness, which can be achieved through yoga and meditation. He said that a healthy body and healthy mind is very essential for quality output and work as well as in life. Shri GP Patel presented a talk on the importance of yoga for combating life style diseases like hypertension, diabetics, weight gain etc. He also demonstrated some easy asanas which are beneficial and can be done daily. More than 150 officials and residents of CIAE colony participated in this program and performed the asanas that were demonstrated by Mrs. Gayatri Sharma and Dr Debabandya Mohapatra, Senior Scientist CIAE. Dr VK Bhargav, Senior Scientist conducted the program and the vote of thanks was proposed by Shri Kumar Vivek, Senior Administrative Officer.

### PUBLICATIONS

#### Paper Published

Agrahar-Murugkar D, Zaidi A, Gupta C. 2016. Quality evaluation of composite flour laddoo containing sprouted and malted ingredients. *Nutrition & Food Science*. 46(4).

Ambrose DCP, Daunty AL and Naik R. 2016. Modelling and quality assessment of *Moringa oleifera* leaves under different drying conditions. *Applied Biological Research*. 18(1): 8-15.

Balasubramanian S, Roselin P, Singh KK, John Z and Saxena SN. 2016. Postharvest processing and benefits of black pepper, coriander, cinnamon, fenugreek, and turmeric spices. *Critical Reviews in Food Science and Nutrition*. 56:1585-1607.

Hijam JS, Singh MK, Chandel NS and Singh KP. 2016. Development and production of agricultural machinery using computer aided design. *Indian Farming*. 66(1): 28-30.

Saxena AC, Ganesan S, Singh D, Singh A and Bisen M. 2016. Production refinement of potato peeler and slicer for ease of manufacturing. *Agricultural Engineering Today*. 40(2): 17-23.

Singh PL, Deshpande SD and Jena PC. 2015. Thermal performance of packed bed heat storage system for solar air heaters. *Energy for Sustainable Development*. 29: 112-117.

Singh D, Saha KP, Naik R, Bhushana Babu V, Prasad MV, Singh TV. 2016. Selection of material and heat treatment cycle for water reduction in oil palm (*Elaeis guineensis*) harvesting knives. *Agricultural Engineering*. 41(1): 69-78.

Singh KP, Saha KP, Singh D, Singh CD, Singh RC, Tripathi H and Bhushana Babu V. 2016. Performance evaluation of tractor operated raised bed former-cum-seeder for maize-chickpea cropping sequence. *Journal of Agricultural Engineering*. 53(1):1-8.

Tripathi H, Chandel NS, Tripathi A and Mishra P. 2015. Energy use and economical analysis of pea production. *The Madras Agricultural Journal*. 102(4-6): 196-200.

#### Popular Articles

Singh PL, Jena PC, Giri SK, Golap BS and Kushwah OP. 2016. Solar PV powered cold storage system for improving storage quality and reducing wastage of horticultural produce. *Akshay Urja*. 9(4): 37-39.

Nandede BM, Chandel NS, Senthilkumar T and Solanke KR. 2016. *Bahu kaddan fasalon ke liye tractor chalet chaha katariya beej thatha khaad buvai yantra*. *Krishak Jagat*. Bhopal. 29 Feb-6 Mar. Pp 7.

Kumar M, Verma DK. 2016. *Sanrakshit kheti kam carbon utsarjan ka ek vikalp*. *Krishak Jagat*, Bhopal. 7-13 Mar. Pp 5.

#### Awards & Recognition



Dr KVR Rao, Principal Scientist received Krishi Vigyan Gaurav Award from Bhartiya Krishi Anusandhan Samiti, Karnal for his contribution in Bhartiya Krishi Anusandhan Patrika and promotion of Hindi Language.

#### Foreign Deputation



Dr CR Mehta, Project Coordinator, AICRP on FIM visited Kunming, China to participate in the Asia Pacific Workshop on Whole Process Mechanization of Potato Production during 27-28 June 2016.

#### Staff Transferred



Dr Pannalal Singh, Principal Scientist (FMP) has been transferred to Agricultural Engineering Division of ICAR on 17 May 2016

## PERSONNEL NEWS

### Staff Promoted

The following staff were promoted to the next higher grade:



**Dr UR Badegaonkar**  
Principal Scientist (FMP)  
w.e.f. 14 Nov 2014



**Dr SK Giri**  
Principal Scientist (AS&PE)  
w.e.f. 15 Nov 2014



**Shri PK Das**  
Sr Technical Officer  
w.e.f. 1 Jan 2016



**Shri Rajan Thomas**  
Sr Technical Officer  
w.e.f. 1 Jan 2016



**Smt Nidhi Agrawal**  
Sr Technical Officer  
w.e.f. 22 March 2016



**Shri RC Malviya**  
Technical Officer  
w.e.f. 14 March 2016



**Shri Zafar M Khan**  
Technical Officer  
w.e.f. 14 March 2016



**Shri B Mistry**  
Technical Officer  
w.e.f. 14 March 2016



**Shri GR Potphode**  
Technical Officer  
w.e.f. 14 March 2016



**Shri RS Uikey**  
Technical Officer  
w.e.f. 14 March 2016

### Our New Colleagues

Following scientists joined CIAE on 11 April 2016:



**Er Vijay Kumar**  
Scientist (FMP)



**Er SP Kumar**  
Scientist (FMP)



**Er RK Sahni**  
Scientist (FMP)



**Er RR Dhondibhau**  
Scientist (L&WME)



**Er Mukesh Kumar**  
Scientist (L&WME)



**Er AM Waghaye**  
Scientist (L&WME)



**Er Ajesh Kumar**  
Scientist (AS&PE)



**Er AE Kate**  
Scientist (AS&PE)



**Er DA Pawar**  
Scientist (AS&PE)

### CIAE bids adieu to superannuating staff

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

- Shri AS Uikey, Technician T-1 on 31 May 2016
- Shri Hari Prasad, SSS (Beldar) on 31 May 2016
- Shri AP Tirkey, AAO on 30 June 2016
- Shri Ghanshyam, SSS (Beldar) on 30 June 2016



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