



# CIAE

# NEWSLETTER

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Modernizing agriculture through engineering interventions



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## From the Director's Desk



Agricultural engineering in coming decades is poised for fundamental changes in the scope of its agenda and would in all likelihood embrace biological, environmental, food and nutrition engineering for comprehensive and holistic solutions. Agricultural engineering would not only be involved in problem solving but would be playing important role in policy formulation and social engineering. Modern engineering interventions in agriculture that we aim at, are to provide right timing and right sizing of the mechanical inputs, to improve input use efficiencies, to reduce cost of cultivation, to provide better control over the pre and post-harvest operations, to reduce post-harvest losses, to add value to produce, to harness

energy through clean sources, to prevent burden on environment, manpower and animal power, and to make agricultural operation safer, more comfortable and gender neutral.

Precision farming, automation of unit operations, robotics, machine learning, artificial intelligence, internet of things, autonomous farm vehicles, smart packaging, mobile based applications for farm machinery, irrigation and storage management are some of the areas that we aspire to put our thrust in the development of indigenous, cost effective, faster and reliable machinery, tools and applications for the prosperity of farmers and agri-businesses. This institute has been instrumental in mechanization of Indian agriculture since inception. The need of small and medium farmers as well as entrepreneurs has remained a matter of concern. In last five years the institute has licensed around 40 technologies. The economic impact of some of our selected technologies has been estimated as Rs. 4400 Crore per year. Our efforts have also resulted in progress of agricultural machine manufacturing industry and related businesses. For example, there are around 1000 agri-machinery custom hiring centers operating in the Madhya Pradesh who have been trained by us, there are around 200 soy processing entrepreneurs across the country to whom we have imparted required training and around 100 farmers have adopted protected cultivation due to our efforts.

This issue of the newsletter focuses on equipment involved for pigeon pea culture like the Tractor drawn battery operated drum type pneumatic precision dibbler/ planter, Tractor front mounted hydraulically operated two-row

pigeon pea harvester, Tractor operated single row cassava harvester cum lifter, Vertical cup type vegetable transplanter for cell feed nursery etc. Apart from these, few other equipment like Tractor operated auger plough for green manuring and straw incorporation, Water level indicator for rice fields, Banana sucker paring device, Power operated carrot harvester cum detopper for hilly region are also being presented in this issue.

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In this quarter, a couple of ICAR sponsored Winter Schools were organized besides Skill Development Training and Training on Entrepreneurship Development Programme etc. On the occasion of the 44<sup>th</sup> Foundation day of the Institute, Agri-Tech-Expo was organized which had events like Kisan Mela and Academia-Industry Interaction meet. Above 2000 farmers and around 50 manufacturers participated in the event. Other major events of the quarter include Research Advisory Committee and Institute Management Committee meetings, celebration of International Women Day, National Seminar on 'Role of Indian Standards in Testing, Quality Control and Safety of Agricultural Machinery'. I also take this opportunity to wish best of luck to our superannuated staff, and congratulate our colleagues who got promoted during this quarter. It is my proud privilege and pleasure to present this volume of the CIAE Newsletter.

## RESEARCH & DEVELOPMENT

### Boom sprayer for small tractor

Small tractors of less than 20 hp are getting popular for orchards management as well as for field crops in small farms. A boom spraying system suitable for field and orchard crops was developed for small tractor mounted on three point linkage has been developed. The system consists of a tank of 300 l capacity, three cylinder axial piston pump, boom fitted with hollow cone nozzles, solenoid valve, non-return valve and solenoid valve control system. The pump has been fixed over the drawbar and driven by the PTO of the tractor by belt pulley arrangement. A tank was fitted on the ROPS of the tractor. The total length of the boom has been kept as 7 m. Flexible type hinges have been fabricated to five folds the booms easily. The fold system has been arranged in such a way that, the spray boom could be fixed in horizontal as well as in vertical position according to the need of orchard crop canopy geometry.

Three point linkage system has been developed to mount the nozzles boom in variable height according to crop height. Normally open (NO) type solenoid valve fitted in the delivery line stops the discharge at the head land during turning by activation of a switch mounted at the dashboard. Performance of the developed spraying system was evaluated in *rabi* maize sown at 450 mm row spacing. The effective field capacity of the sprayer has been observed as 1.8 ha/h at forward speed of 2.8 km/h.



### Pneumatic precision dibbler/ planter for pigeon pea

A tractor drawn battery operated two-row drum type pneumatic precision dibbler/planter has been developed for pigeon pea. It consists of an aspirator, cylindrical drum as metering device, seed ejector, seed delivery tube, shoe type furrow openers, pair of ground wheels and chain sprocket type power transmission system. It is suitable for sowing of single and two seeds of pigeon pea per hill. The planter can be adjusted to plant the seeds at row spacing of 75 and 90 cm and plant spacing of 10-90 cm. Metering mechanism consists of 90 mm diameter PVC pipe. About 10 orifices of size 4 mm at desired row spacing have been provided. The metering unit is powered by a ground wheel. Seed boxes have kept inclined to ease the seed flow. Laboratory results at the forward speed of 1.0 km/h at 1.5 kPa operating pressure with 4 mm orifice size gave 88-90% picking of two seeds as desired, 6-7 % three seeds and 4-5% single seeds with the variation in set plant spacing of  $\pm 1-3$  cm. The same unit of two-row drum type pneumatic planter was evaluated in the field and it was observed that it could successfully be operated up to the forward speed of 4-6 km/h at operating pressure of 2-3 kPa and orifice size of 4 mm. Similar results have been obtained in the field as well as in the laboratory conditions. The field capacity of the developed machine varied from 0.5-0.6 ha/h with field efficiency of 80%. The approximate cost of the developed machine is about Rs. 50,000/- and the cost of the operation has been estimated as Rs. 1000-1200/ha.



## RESEARCH &amp; DEVELOPMENT

## Technical specifications of tractor operated two-row pigeon pea pneumatic planter

Parameter of planter	Details
Overall frame dimensions, mm	1000 x1250 x350
Seed type	Pigeon pea
Type of metering mechanism	Pneumatic type
Suction unit	Blower (Make: Makita, Model: DUB362)
Power source for blower	Two rechargeable batteries (Capacity: 5Ah; 18V)
Working pressure, kPa	1.2
Orifice diameter, mm	4
Number of rows	2
Number of Seed boxes	2
Number of ground wheels	1 or 2
Diameter of ground wheels, mm	450
Seed box dimensions, mm	250×130×90
Number of furrow openers	2
Field capacity, ha/h	0.5-0.6
Field efficiency,%	80 %
Approximate cost of machine, Rs.	50,000/-
Cost of operation, Rs/ha	1000-1200

**Pigeon pea harvester**

Traditionally harvesting of pigeon pea is done manually with sickle, which demands considerable amount of labour, drudgery and time to harvest. A suitable tractor operated machine for harvesting of pigeon pea crop has been an immediate need which can remove drudgery, reduce losses and increase productivity, reduce turn about time in two crop season, avoid weather risk, achieve low cost of harvesting and derive benefit from early marketing of produces.

A tractor front mounted hydraulically operated two-row pigeon pea harvester has been developed. It consists of two cutter blades mounted over front hydraulic platform and a row divider fitted between these two blades for dividing crop rows during harvesting. Hydraulic system developed for operating blades at high speed and setting the cutting height with the help of hydraulic platform over which blades move up and down. The hydraulic system is powered by PTO rotating at 540 rpm. Oil sump has been provided at rear of the tractor for stability purpose. High speed of blades with high torque is

obtained by using hydraulic gear motors in the blade assembly. Due to high speed of blades rotating in opposite direction the crop cuts and falls down outside in a row. The machine can cut the pigeon pea crop at 10-15 cm above the ground level.

The field capacity of the developed harvester has been observed as 0.5-0.6 ha/h with field efficiency of 83%. The approximate cost of the developed harvester is Rs. 40,000/- and cost of the operation is Rs. 1800-2000/ha. It can help to save the manual labour to the tune of 96% in harvesting operation.



## RESEARCH &amp; DEVELOPMENT

## Technical specifications of tractor operated two-row pigeon pea harvester

Parameter of Harvester	Details
Overall dimensions, cm	520×110×100
Type of cutting mechanism	Rotating blades
Blade dia., mm	400
Blade revolution speed, rpm	1000-1500
Power unit	PTO (540rpm)
Power source for blades	Developed Hydraulic system
Vertical adjustment, mm	250-350
Horizontal adjustment, mm	150-200
Suitable for Row spacing, mm	700-900
Number of blades	2
Oil sump dimension, mm	610×310×530
Row Divider front angle	60°
Number of rows	2
Material used: main frame, hydraulic system	Mild steel
Blades	High carbon steel
Hydraulic pipes	Rubber
Propelling unit	20 hp tractor
Power transmission system	Hydraulic

### Impact assessment of custom hiring centres and high-tech machinery hubs in Madhya Pradesh

Conducted a survey of 51 CHCs and high tech agricultural machinery hubs in three districts namely Jabalpur, Katni and Narsinghpur during the quarter. Custom hiring centres with average investment of Rs.20-25 lakhs of are equipped with two tractors, rotavator, reversible plough, cultivator, seed drill, raised bed planter and other equipment as per requirement and are earning average annual profit in the range of Rs. 1.5-3.5 lakhs with an average turnover of 4.5 to 9.0 lakhs with saving in time and critical inputs. High tech agricultural machinery hubs of sugarcane have also been set up which include sugarcane harvester, tractors, infielders and trolleys with a total investment of about Rs.150 lakhs are harvesting sugarcane crop in the range of 6000-10000 tonnes per season.

### Power operated carrot harvester cum detopper for hilly region

Harvesting is the one of the critical operation for carrots and can be harvested when they are about an inch in diameter. For digging and pulling out one hectare area of carrots, on an average, about 350 – 450 man-hours are required which is

very costly for farmers. The operator has to stoop forward while digging/pulling carrot from the bed and also during picking up. Stooping posture results in a lot of bio-mechanical stresses in the back and has higher energy consumption as compared to other working positions. Continuous use of bare hands for pulling out carrots may cause bruises on hands leading to infection. Due to this, the crop is cultivated on small scale and is one of the main bottlenecks in increasing the area under the carrot cultivation. The large scale diversification and reduction in cost of cultivation in carrot crop is possible through mechanization of carrot sowing and digging process. Carrot cultivated in hilly regions requires specially designed small power operated equipment for harvesting. To cater the above need, a self-propelled carrot harvester has been developed.



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The developed power operated carrot harvester consists of the following units say, 1. Digging unit 2. Conveying unit 3. De-topping unit 4. Collecting unit 5. Main frame 6. Prime mover with Power transmission system. The digging unit consists of two circular blades placed vertically before the conveying unit. The conveying unit consists of two endless belt rotating in opposite direction, which is able to hold the carrot crop, lift and conveyed to the end of conveying unit. The developed unit is self-propelled type with 6 hp petrol engine. The detopping unit consists of circular blade to detop the crop canopy from the carrot root. From the field test data the digging efficiency, conveying efficiency, detopping efficiency and carrot damage was observed as 92.16, 97.14, 97.84 and 7.35 per cent respectively. The actual field capacity of the unit is 0.028 ha h<sup>-1</sup>.

### Banana sucker paring device

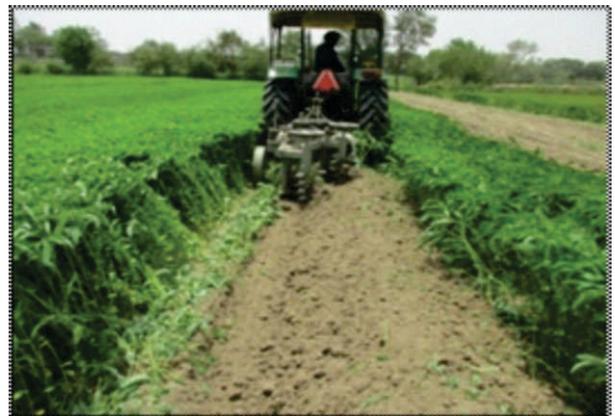
Before planting, banana rhizomes need to be trimmed and treated with fungicides, bio-control agents or hot water for control of nematodes. It is traditionally done by knife or sickle which is a tedious operation. To mechanize this operation, a banana sucker paring equipment with rotating grating blade mechanism has been developed in collaboration with ICAR-National Research Centre for Banana, Trichy, Tamil Nadu. The equipment consists a grating blade that rotates in vertical plane operated by 1 HP motor. The banana sucker to be trimmed is held against the rotating grating blade (300 mm) and adjusted as per the area and the depth of the banana sucker. A variable speed motor is attached to the unit to adjust the operating speed. To clean the grating blade, it is rotated in the opposite direction while a cleaning brush is held against the metallic



grating area to be cleaned. The capacity of the equipment is 90 suckers/hour at an efficiency of 70%.

### Auger plough for green manuring and straw incorporation

In traditional practice, the green manuring and straw incorporation involve high labour requirement and cost. The green manure and straw need to be cut effectively and incorporated in single pass for well preparation seedbed. To address the problem of incorporation of green manure and straw by farmers of Punjab, a tractor operated two bottom auger plough has been developed by PAU Ludhiana centre of AICRP on FIM. The machine is a combination of cutting unit, truncated/shortened mould board and vertical rotating clod-crusher/soil-ripper. The cutting unit cuts the crop mass into small pieces. The share of MB plough cuts the furrow slice and the shortened mould board lifts it. Finally, the vertical rotating auger behind each bottom pulverizes the furrow slice and buries the crop biomass. Initial field trials were conducted to incorporate green manure crop dhaincha (*Sesbania bispinosa*) at two stages of crop growth viz 36 days and 50 days with biomass density of 15.4 and 22.5 t/ha, respectively. The average depth of operation of auger plough ranges 175-179 mm. During tests the effective field capacity and fuel consumption for auger plough have ranged between 0.25-0.28 ha/h and 6.68-8.22 l/h, respectively at the forward speed of 3.5 km/h. The soil pulverization index with the machine has varied from 5.60 to 10.40 mm. The density index of soil ranged 27.95-31.03%. The





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seed cum fertilizer drill. The field capacity of the seed drill was found to be 0.13 ha/h with 62.4% field efficiency. The OUAT bullock drawn fertilizer applicator cum ridger was operated for simultaneous application of fertilizer and ridging in two rows which had the actual field capacity of 0.04 ha/h with 61.5% field efficiency. A bullock operated maize dehusker cum sheller has been developed and its output has been found to be 150 kg/h with 95% shelling efficiency. These packages have been demonstrated to tribal farmers and they have used in 22.6 ha. It saved 15-20% time in sowing and 25-30% labour cost in weeding as compared to the traditional practice.

### Fish dressing platform for women workers

Fish dressing and peeling process is mostly carried out in sitting postures by farm women in Dapoli region. These women workers use inverted crates and sit in squatting posture. The prolonged use of crates and squatting posture causes discomfort (leg/ back pain, etc.) problems which not only reduces the work efficiency and capacity but also aggravate health issues for the worker. Therefore, a fish dressing platform has been developed by BSKKV, Dapoli Centre of AICRP on ESA. The optimum hand reach envelope and relevant anthropometric body dimensions have been considered for proper workplace layout (placement of raw material, finished product and cutting blade) for fish dressing operation. The total length and width of dressing table is 1100 and 660 mm, respectively. The height has been kept adjustable between 630 to 700 mm and the cutting has been blade located at 405 mm from SRP.



### Cassava harvester cum lifter

Cassava harvesting and lifting it from field has been very tedious and drudgery involved operation. Tractor operated single row cassava harvester cum lifter has been designed at RC, Coimbatore. It consists of a main frame, digging unit, lifting and conveying unit and transmission system. The main frame has been designed on a tubular structure to provide sufficient strength under torsional stresses. The main frame size of 2000 x 100 mm provided for mounting the digger bottoms, the hitch frame and conveying system with a beam with two parallel channel sections of size 75 mm x 40 mm x 6 mm separated by a distance of 150 mm between the two centers. The conveying system consisted of two parallel endless belts fitted in the rectangular frame of size 1500x40 cm with guide pulleys, tensioning pulleys, and a set of counter rotating rubber wheels. Equipment is attached to a 50-60 hp tractor to dig the tubers from the ground, lift the tubers from the ground and convey and collect the tubers in the end. The actual field capacity of the planter is 0.22 ha h<sup>-1</sup>.

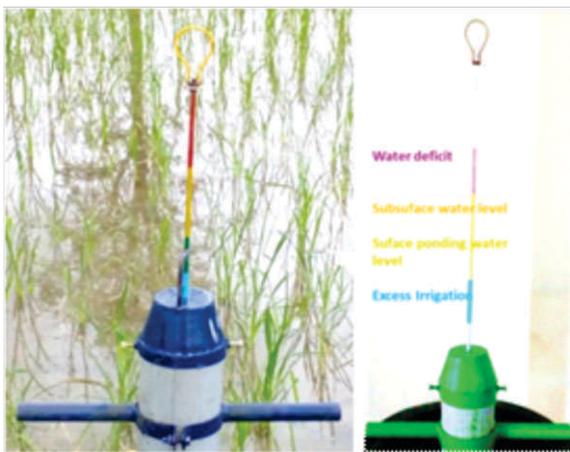


### Water level indicator for rice

Rice being the water intensive crop commonly cultivated under submerged condition and remains under ponding water for almost 80% of its cropping duration. A water level indicator for rice field has been developed to monitor field water level above and below the soil surface which can help in maintaining desired depth of standing water. The system has been designed considering mainly the alternate wetting and drying (AWD) method of irrigation. It shows the water levels with the help of colour codes marked

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on the indicator stick. Farmers can monitor the status of water level at their rice field by the colour codes and can operate the pump accordingly. Such a manual water level indicator has been designed and installed at ICAR-CIAE farm. Using this indicator the irrigation water has been applied following the alternate wetting and drying method which gave a water saving of upto 35% as compared to the continuous ponding method of irrigation in rice.



### Water balance simulation model for assessment of reliability of rain water harvesting system

The rainwater harvesting (RWH) could be an effective solution against the current and future problems of over population, industrialization, pollution, water scarcity under changing climatic scenario. A GUI based Water Balance Simulation Model (WBSM) has been developed to simulate the performance of RWH system in different climatic regions. The model considers daily rainfall, losses due to leakage, spillage and evaporation, roof area, tank capacity, daily water demand, spillage losses as input parameters. WBSM computes the optimal tank size and analyze the reliability and water saving efficiency of rain water harvesting system. It also estimates various parameters such as inflow volume, storage, release, spillage (tank overflow), deficit, cumulative deficit, cumulative demand and deficit rate. The combination of different roof sizes, demand and tank sizes are important to consider for planning, design and implementation of RWH system in a different climatic conditions. The model inputs could be

manually entered on-screen as well as through digital files. Similarly the output could also be obtained in both on-screen as well as text files. The developed model could be utilized to make the recommendations for design and prioritize the regions where rain water harvesting system adaption which may lead to water saving and water security.



### Testing and evaluation facilities for aeroblast sprayers

The spray distribution, droplet size and wind velocity at different heights are the important parameters for testing and assessing the performance of aeroblast sprayers. The vertical patternator (for spray distribution measurement) and platform (for droplet size and wind velocity measurement) has been developed at Farm Machinery Testing Centre, CIAE Bhopal. The overall dimension of vertical patternator is 5181×2255×2140 mm. The setup evaluates the vertical liquid distribution of aeroblast sprayers at different pressures, discharges and heights. Four tractor operated aeroblast sprayers have been tested so far at the developed set up. The water

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sensitive paper (WSP) is attached to the grid of 250×250 mm for measurement of droplet size on the platform and tested at different forward speed during commercial testing of sprayers. The wind velocity can be measured at the centre of each grid by placing a hand held anemometre at the centre of each grid and data is recorded.

### Sprinkler performance evaluation set up

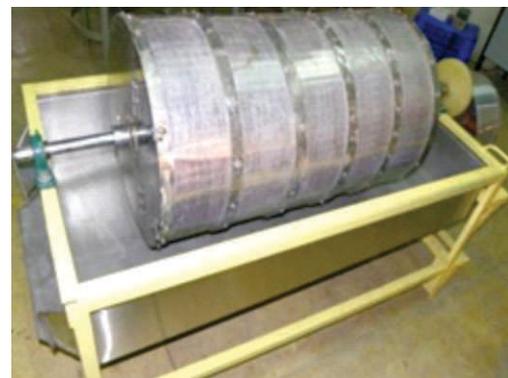
The testing of different types of sprinkler nozzles is inevitable to characterize the water distribution and application uniformity of the irrigation system. For this purpose a test set up has been established at the experimental field of PFDC, ICAR-CIAE, Bhopal. Design and operational parameters such as sprinkler type, nozzle diameter, sprinkler spacing, working pressure, time of irrigation and wind speed were considered. Irrigation uniformity and wind drift evaporation losses are the two important parameters used to define the performance of sprinkler irrigation system. The performance of brass and plastic sprinkler nozzles of different sizes at various working pressures (2 to 4



kg/cm<sup>2</sup>) have been initially tested using the developed set up. Performance evaluation and data analysis would be helpful to choose the most suitable combination as design parameters for optimal uniformity and efficiency of the irrigation system for varying field conditions.

### Abrasive pre-treatment machine for grape berries to produce raisins

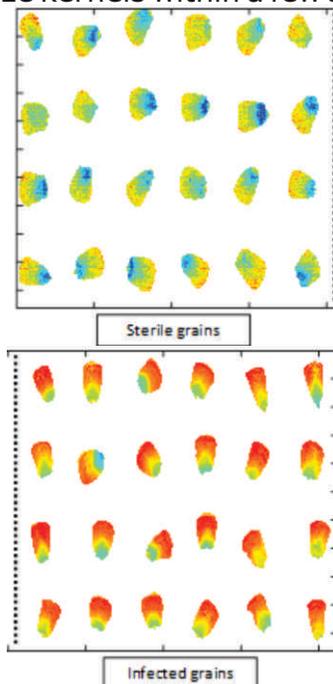
The conventional practice of raisin production uses heavy amount of chemicals and large quantity of water, yet the drying time is very high which leads to quantitative and quality loss, fungal contamination, etc. A novel abrasive pre-treatment system has been developed for grape berries for the production of chemical free (organic) raisins. The system consists of a rotating drum of stainless steel with inside abrasive surface. The detached grape berries are fed inside the drum and is rotated at low speed. The protrusions of abrasion have been designed in a such as way that it provide superficial abrasion with removal of waxy (cuticle) layer of grape berries that makes hurdle in drying. The machine has a capacity of about 150 kg/h and is operated by a 0.5 hp electric motor. The rotational speed of 15-20 rpm and treatment time of 2-4 min was found to be suitable for the preparation of raisins. The drying time for different varieties has been found to be reduced to 4 to 7 days in solar tunnel dryer and 2 to 3 days in hot air drying (Temp. 50°C) compared to the existing method that requires around 15 to 20 days for preparation of good quality raisins. Now a day conscious consumers are demanding safe and organic food. Developed machine has potential applications for the preparation of organic raisins.



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**Classification of maize kernels based on aflatoxin concentration using Vis-NIR hyperspectral imaging**

Presence of aflatoxins in crops like maize, groundnut is a serious threat to food safety. Current acceptable methods for detection of aflatoxin concentration on food products are laboratory based and require high time, skilled personnel and hence expensive. In order to develop a rapid and easy method of aflatoxin detection, Vis-NIR hyperspectral imaging system with wavelength between 400-1000 nm was successfully used to classify the maize kernels based on the concentration of aflatoxin. Aflatoxin was deposited on maize kernels in six different concentrations 25, 40, 70, 200, 300 and 500 ppb. Total number samples for this study was 240 (40 samples for each treatment). The spectral data was pre-processed using four pre-processing techniques to reduce the spectral noise and light scattering. The raw and pre-processed data was classified using PLS-DA and k-NN. It was observed that at 508 nm and 580 nm, maize kernels can be distinguished between healthy and infected. The highest classification rate was observed for raw data using k-NN (95%) with an error rate of 0.05. The lowest classification rate was observed for spectral data pre-processed with second derivative using k-NN (61%) with an error rate of 0.39. Application of defined protocol could enable detection of aflatoxin infected maize kernels within a few seconds.

**Model farm machinery package for different agro-climatic zones of India**

Selection of appropriate farm machinery, their availability, suitability for different crops in different agro-climatic zones is an arduous task. Although, the data regarding farming and machinery are available from many sources like printed media, audio and visual aids, newspaper, TV, internet, mobile etc. But, since the formats and structures of data are dissimilar, it is very difficult for farmers or even non-engineering professionals to get and understand the information in correct context. Further, many market elements, wherever available cause confusion and mislead the users/ stake holders due to which the appropriate mechanization technology is not reaching to many users.

To support the cause of agricultural mechanization in India, ICAR-CIAE has developed a software that helps in selection of appropriate machinery package for various cropping center in different agro-climatic zones of India. The software is useful for farmers, advisory services, government agencies, NOGs and planners in the sector of agriculture. The software has database of small to large agri-machinery manufacturers, so that procurement after machinery selection becomes easy. It also has economic parameters such as machine cost, per hour operating cost, hiring rate, total annual cost and net return, break-even analysis, payback period, machine specifications and available manufacturers for different agro-climatic zones of India. The developed software has practical application in popularization of various agricultural engineering technologies developed at various locations of the country. The software provide agro-climatic zone-wise package of machinery recommended by agricultural engineering experts. It also gives the detailed economic important calculations related to selected machinery as well as manufacturers of the machinery. The screen-wise navigation and presentation of information has been organized. ICAR-CIAE has launched this software on its website ([www.ciae.nic.in](http://www.ciae.nic.in)).

**External Funded Project**

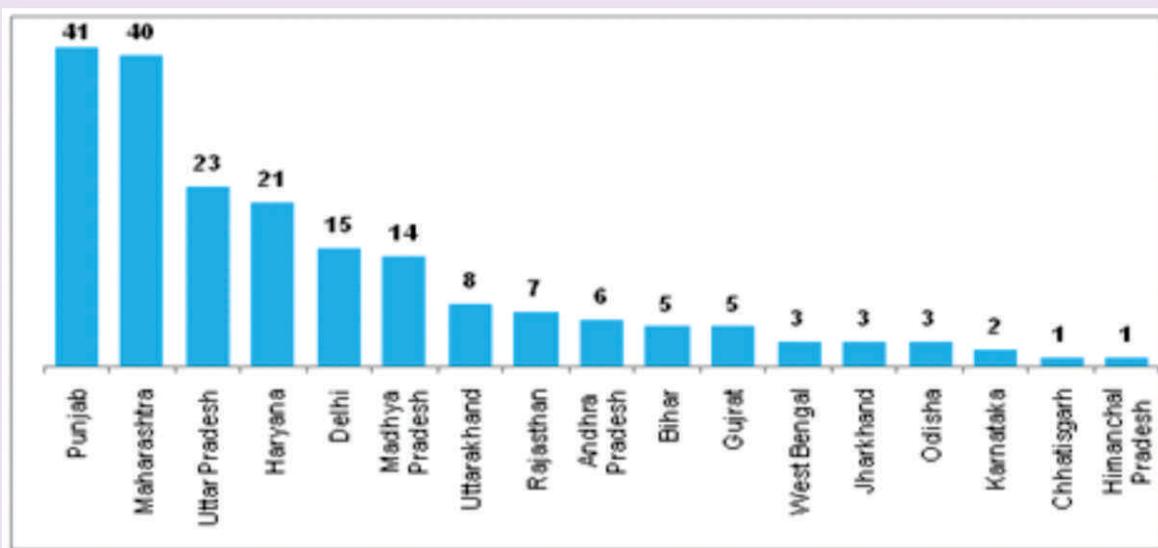
Project entitled 'Studies on thermal degradation of crop residues for kinetics, bio-polymeric transitions and value added products' has been approved under NASF with a total budget of Rs.142.70 lakhs.



## SUCCESS STORY

### Impact of Entrepreneurship Development Programme

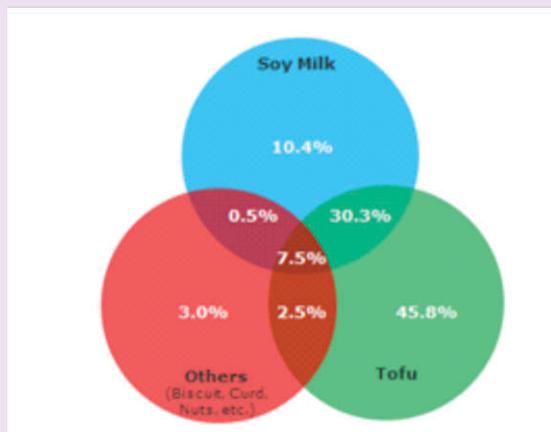
An assessment of impact of the entrepreneurship training programme was carried out that included initially telephonic contact with the trainees and followed by personal visits of selected production clusters (Madhya Pradesh, Maharashtra, Punjab, Uttar Pradesh, Delhi, Haryana, Uttarakhand, Gujarat, Rajasthan, Bihar and West Bengal) across the country. One hundred ninety eight soybean processing units are currently operational. The units are distributed in different parts of country and includes 17 states, however, maximum 41 unit are located in Punjab followed by Maharashtra (40 unit), Uttar Pradesh (23 unit), Haryana (21 unit), Delhi (15 unit) and Madhya Pradesh (14 unit). The establishment of units geared up mostly after 2010. Out of total working unit only 36 were established before 2010. More than 166 units have been established after 2010. Number of trainees also increased after 2008.



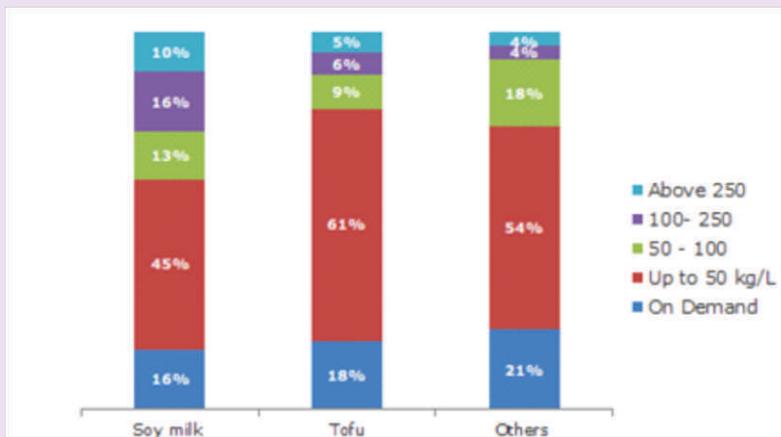
State-wise distribution of units on soybean processing

There have been some cases of closure of soy processing units, 14% trainees established the enterprises but closed it at the later stage due to marketing constraints.

Distribution of soy products manufacturing across working units indicates that 10.4% trainees are involved only in soy milk production only whereas 46% are engaged only in Tofu production. 30% are producing both soy milk and tofu. Only 3% trainees are involved in producing products other than soy milk and tofu that includes soy curd, soy nuts and soy flour.



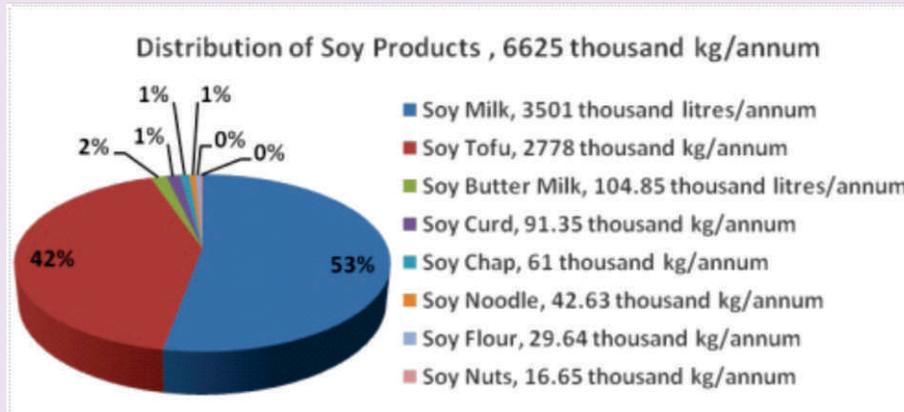
Production of Soy based food products by different trainees



Quantity of product produced (%) by different trainees

## SUCCESS STORY

Around 50 % trainees are producing around 50 litres of soy milk or 50 kg tofu per day. Most of the trainees producing products more than 250 kg are located in Punjab and Maharashtra. Around 15 percent of trainees manufacture soy milk or tofu on demand especially in marriage season. Annual production of different soy products manufactured by trainees is presented below.



**Annual production of soy products**

Based on the information collected the average annual production of Tofu and soy milk is 2700 ton and 3400 kilolitres, respectively. Total protein content in tofu and soy milk is 14 and 3.5 percent, respectively.

### Economic impact

Soybean is processed by 198 entrepreneurs across the country to make different products like milk, tofu, flours, nuts, curd, biscuits, kabab, chaap and halwa etc. Annual working days of these units are 203 while labour employment was analyzed 4.73/unit. These entrepreneurs are generating employment to the tune of 1.90 lakh man days/annum and provide the monetary benefits of 5.70 crores to the 936 workers engaged in running 198 soybean processing units. Annual gross return is Rs 28.18 lakh/entrepreneur with an annual gross expenditure of Rs 17.00 lakh/entrepreneur. Thus, annual net return realized to the extent of Rs 11.20 lakh/entrepreneur with a BCR of 1.66. Annual gross monetary benefit has been generated from 198 entrepreneurs is about Rs 56 crores. One hundred ninety eight units of soybean processing established across the country are generating employment of more than 1.78 lakh man-days/annum. Total monetary benefit from 198 entrepreneurs is about Rs 51 crore/ annum.

### Sum-up

The soy food based entrepreneurship development training programme organized by ICAR-CIAE since 1995 has enabled establishment of 198 successful enterprises which are significantly contributing to nation's economy as well in combating malnutrition by adding 768 tons of low cost edible protein every year. The economic impact due to these enterprises is presently about Rs. 56 crore per annum and increasing with popularity of soy based food products. Soy based food processing industries operating at cottage to small scale level has been a successful venture in generating income and employment.

## TRAINING

### Training Organized

#### Winter School on Micro-irrigation

Winter school on "Recent Advances in Micro-Irrigation and Fertigation Systems for Improved Input Use Efficiency of Open and Covered Cultivation through Engineering Interventions" sponsored by ICAR was conducted during 03 to 23 January 2019 at IDED, ICAR-CIAE Bhopal. Twenty Three participants from 12 different states participated in the program. A wide range of topics have been covered mainly related to micro-irrigation and protected cultivation. Starting from the preliminary considerations like that of design and site selection of drip irrigation system to advanced topics such as IoT based irrigation systems, soil less cultivation were covered in 21 days. The course content was designed with balanced theoretical, practical sessions and educational/ industrial visits. In the winter school, 04 candidates were from ICAR institutes and 19 from the State Agricultural Universities had participated. Participants of the winter school in their feedback appreciated thematic and in-depth presentations made by various speakers. The knowledge of these high input use efficiency techniques would be helpful in fulfilling 'More crop per drop' agenda of the government. The training was inaugurated by Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal and Dr. G. Singh, Ex. Deputy Director General, ICAR, New Delhi was the Chief Guest. Dr. C.K. Saxena was the Course Director, while Dr KVR Rao and Dr. Yogesh A Rajwade were the Course Coordinators of the winter school.



#### Winter School on Advanced Instrumentation and Hydraulics in Precision Agriculture

ICAR Sponsored Winter School on "Application of Advanced Instrumentation and Hydraulic Systems in Precision Agriculture for Crop and Environmental Sustainability" was organized at ICAR-CIAE for 21 days during 15 February to 07 March, 2019. Total 14 participants from various, ICAR Institute, KVKs and State Universities attended the Winter School. Under this programme participants were exposed to various advanced tools and techniques of precision agriculture and integration of hydraulic systems for development of precision farm machines for precise input application and its management to improve efficiency and efficacy of crop production systems. Lectures and hands-on-training on sensor based controllers, precise input applicators, variable rate applicators and their controllers, decision support system (DSS), telemetry and software infrastructure for variability assessment, data analysis and real time monitoring and design of hydraulic systems and circuits were covered during the Winter School. The training was inaugurated by Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal. Dr. P. S. Tiwari was the Course Director, while Dr AK Roul and Dr. NS Chandel were the Course Coordinators of the winter school.



#### Training program for Drivers of ICAR Institutes

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 16-22 January, 2019 (27 participants)





## TECHNOLOGY TRANSFER

### Participation in Exhibitions

CIAE technologies/ products were displayed in the following exhibitions:

- Agri-exhibition at Motihari, Bihar (9-11 February, 2019)
- Farmers Mela at Karunya Institute of Engineering, Science and Technology, Coimbatore (27 February, 2019)
- Agri Exhibition Smart Agro Tech at Raipur (1-2 March, 2019)
- Purvanchal Kisan Mela at Chaukmafi, Pepeganj, Gorakhpur (2-3 March, 2019)
- Coastal Agri Expo at Goa (2-4, March 2019)
- Krishi Vigyan Mela at IARI, New Delhi (5-7 March, 2019)
- Exhibitions organized by ICDS, Hoshanagabad and Govt. P. G. College, Pipariya for awareness of soyfood utilization to the Atal Bal Palaks, students and local population. Display of developed soy products in the exhibition was the attraction for students/ upcoming entrepreneurs/participants for creating small enterprise in the study area.



### Farmers Field Day cum Demonstration

Farmers Field Day cum Demonstration on Precision Irrigation Technologies for Small Farms (two programs) was organized on 25 February and 27 March, 2019. About 50 farmers from Chanderi and Guradiya village(s), block- Phanda, Bhopal District participated. Farmers were given an overview of different micro irrigation technologies and protected cultivation techniques which can enhance income by



improving input use efficiency. Demonstrations on low head (Gravity fed) drip irrigation system, pressurised drip irrigation system under different crops such as chickpea, maize were elaborated. Also, application of sprinkler irrigation for wheat cultivation of ongoing experiments at CIAE farm and recently developed automatic rice irrigation system were displayed. Different types of protected cultivation technologies such as natural and ventilated green houses, shade nets were explained at PFDC, ICAR-CIAE farm. Operation and maintenance of micro irrigation systems were elucidated on field. Farmers encouraged to adopt micro irrigation technologies for better production and productivity.

Demonstration on use of biomass briquetted fuel in rapid combustion system was organized for women of solidarabad on the occasion of womens week (1-8 March 2019) on 5 March, 2019. About 50 women participated.



## TECHNOLOGY TRANSFER

### KVK News

KVK organized following training programmes, attended by 119 farmers:

- Rabi crop management
- Oilseed crop production technology
- Crop management and post-harvest techniques of grains (cereals and pulses)
- Women friendly tools

### Field Day Organized

Field day-cum-demonstration on Small hand tools for agricultural operations was organized on 27 March, 2019 at Village-Guradiya of Block-Phanda, Bhopal.

About 50 farmers showed interest in small hand tools especially, hand ridger, tubular maize sheller, groundnut decorticator and naven dibbler.



### Kisan mobile advisory/through farmers' portal, advisory and diagnostic

Sl. No.	Discipline	Scientist visited at farmers / farm women field	Advisory services		
			KMA	Advisory to farmers	Diagnostic services by visiting at farmers field
1.	Agronomy	18	05	53	16
2.	Engineering	00	03	00	00
3.	Home science	03	08	43	06
<b>Total</b>		<b>21</b>	<b>16</b>	<b>96</b>	<b>22</b>

### MGMG Activities

Mera Gaon Mera Gaurav		Number	Beneficiaries (No.)		
			SC/ST	Others	Total
1	No. of Villages covered	19	23	182	224
2	No. of Visits made	12	3	98	113
3	No. of Demonstrations	29	11	121	161
4	No. of farmers' meeting	19	1	119	139
<b>Total</b>		<b>79</b>	<b>38</b>	<b>520</b>	<b>637</b>

Organized 2 Nutrition Melas at Itarsi and Pipariya. About 625 participants of ICDS, SHG, students benefitted.





## AWARDS & RECOGNITION

### ISAE Awards

Institute Scientists received following ISAE Award during 53<sup>rd</sup> ISAE Annual Convention, held at BHU, Varanasi during 28-30 January, 2019:

Ashutosh P Pandirwar received Best paper award for the paper entitled **Soil bin studies on plug and finger-type onion seedling transplanting mechanisms**. *Journal of Agricultural Engineering*, 55(1), 1-14; co-authored by Pandirwar, AP, Kumar A, Mani I, Gaikwad BB, Sawant CP and Bhoumik A.

Rudragouda Chilur received Best paper award for the paper entitled **"Auger conveyor type metering device for transplanting of vegetable seedlings raised in paper pot"**, published in *Agricultural Engineering Today*. 42(4):28-36; co-authored by Chilur Rudragouda, Nandede BM, Tiwari PS, Mehta CR.

SK Chakraborty received Best Paper Award for the paper entitled **'Processing and value addition of millets in tribal production catchment – A success story'** published in *Agricultural Engineering Today*, 42(3), 56-62; co-authored by Chakraborty SK, Raza RR, Ambrose DCRP, Kotwaliwale Nachiket, Azad SR, Dubey AK.

### Other Awards

Dr. R. Senthil Kumar received Best Book Award for contribution of Scientific Tamil Book by Agri. Scientific Tamil society, New Delhi from Tamil Nadu Chief Minister on 4 February, 2019.

### Paper Presentation Awards

Er. AP Magar received Best paper for oral presentation award for the paper entitled **"Seedling metering device for onion transplanter"** in "1<sup>st</sup> International symposium on edible alliums: Challenges and opportunities" held at YASHADA, Pune during 9-12 Feb 2019

Ravindra Naik, Principal Scientist received Best Poster Presentation award, presented in XIV Agricultural Science Congress, held at New Delhi during 20-23 February, 2019.

Er Swapnaja Jadhav received Best Paper Award for oral presentation of paper entitled 'Biomass Briquetting Plant: An opportunity of entrepreneurship for rural youth of India', presented in International Conference on Entrepreneurship in Agriculture and Renewable Energy Sector on 15-16 March, 2019 at Dr. PDKV, Akola.

### Recognition

ICAR-CIAE Bhopal and its Regional Centre, Coimbatore has been authorised to test the Post Harvesting Technology Equipment and Machinery by DoAC, Ministry of Agriculture and Farmers Welfare.

### Ph.D. Awarded



Er. Abhijit Khadatkhar was awarded Ph.D. for his thesis entitled 'Development of a Tractor Operated Vegetable Transplanter for Plug-type Seedlings' on 8 February, 2019. He completed his Ph.D. under the guidance of Dr. SM Mathur, Professor & Head (FMPE), CTAE, MPUAT, Udaipur.

### Foreign Deputation

Dr. Debandaya Mohapatra, Senior Scientist was deputed to Myanmar for teaching post graduate students under the programme of ACARE, Myanmar under bilateral agreement between DARE & MEA at YAU, Myanmar during 15 February, 2019 to 4 March, 2019.



## REPORT/ PUBLICATIONS

**Study Leave Granted**

Er. RD Randhe has proceeded on Study Leave for 2 years wef 1 April, 2019 to 28 October, 2021 to pursue Ph.D. in the discipline of AE/S&WCE at ICAR-IARI, New Delhi.

**PUBLICATIONS****Research Papers Published**

Ajesh KV, Pravitha M, Pare A. 2019. Optimization of composite protein- lipid film by ohmic heating using mixture design. *International Journal of Current Microbiology and Applied Sciences*, 8(3): 230-241.

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Chethan CR, Tewari VK, Nare B, Kumar SP. 2018. Transducers for measurement of draft and torque of tractor-implement system: A Review. *Agricultural Mechanization in Asia, Africa and Latin America*, 49(4): 81-87.

**Human Resource Development**

Name and Designation	Course Title	Duration	Venue
Shri Krishna Mairade Technical Officer	Gas tungsten Arc welding on stainless steel plate	07-11 January 2019	ATI, Mumbai
Shri Banmali Bhaskar Technical Officer	Bearing and lubrication	07-11 January 2019	ATI, Mumbai
Mukesh Kumar Abhishek M. Waghaye Ravindra D. Randhe Scientists	Winter School on Artificial Intelligence	18-21 January, 2019	IIT, Delhi
SK Bharti Assistant Chief Technical Officer	Information and Communication Technologies for Empowering Farm Women	1-6 February, 2019	ICAR-NAARM, Hyderabad
RK Sahni Scientist	Application of advanced instrumentation and hydraulic systems in precision agriculture for crop and environmental sustainability	2 February to 7 March, 2019	ICAR-CIAE, Bhopal
Sweeti Kumari Swapnaja Jadhav Scientists	Environmental leadership and life skills	11-15 February, 2019	IIFM, Bhopal
RK Sahni Bikram Jyoti Syed Imran S Scientists	IoT and its application	26-30 March, 2019	RGPV, Bhopal

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Mohapatra D, Patel AS, Kar A, Deshpande SS, Tripathi MK. 2019. Effect of different processing conditions on proximate composition, anti-oxidants, anti-nutrients and amino acid profile of grain sorghum. *Food Chemistry*, 271: 129-135.

Nare B, Tewari VK, Chandel AK, Kumar SP, Chethan CR. 2019. A mechatronically integrated autonomous seed material generation system for sugarcane: A crop of industrial significance. *Industrial Crops & Products*, 128: 1-12.

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Preethi P, Singh TV, Prasad MV, Ramajayam D, Ganesh NV, Mathur RK, Pandirwar AP. 2019. Chipping bucket – a new and feasible approach for fragmentation of oil palm trunk. *Current Science*, 116 (6): 1003-1008.

Rao KVR, Gangwar S. 2019. Energy assessment of wheat under conventional and drip irrigation systems. *International Journal of Chemical Studies*, 7(1): 664-669.

Rao KVR, Aherwar P, Gangwar S, Soni K, Yadav D. 2018. Growth, yield, economics, water use efficiency and microbial functions of pigeon pea crop influenced by drip irrigation with plastic mulch. *International Journal of Current Microbiology and Applied Sciences*, 7(12): 2284-2290.

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Charkaborty Laxmi, Dubey Swapnil, Bharti SK. 2019. कृषक महिलाओं के लिए रोजगार परक मशरूम उत्पादन एवं प्रसंस्करण. *Krishak Doot*, 12-18 March, pg12.

Jagdale M, Thorat DS. 2019. जमीन सपाटीकरण्यासाठी लेज़र लैंड लेवलर, सकाळ, अग्रो१ (Newspaper), Pune (main). pp 10.

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## EVENTS

**44<sup>th</sup> Foundation Day**

To commemorate its 44<sup>th</sup> foundation day, the Institute organized two-day Programme during Feb. 15-16, 2019.

On 15<sup>th</sup> February celebrations were held in attendance of all present and past employees of the institute. This programme was chaired by Dr. Panjab Singh, Chancellor, Rani Laxmibai Central Agricultural University, Jhansi and President, National Academy of Agricultural Science (NAAS), New Delhi; Dr. Nawab Ali, Former Deputy Director General, Engineering was the Guest-of-Honour.



The welcome address was delivered by Dr. K. K. Singh, Director, ICAR-CIAE wherein he shared greetings with all the dignitaries which also included a gallery of retired employees of the Institute and the huge gathering of Institute staff and students. Dr. Singh presented various achievements of the Institute in terms of contribution to development of farm machinery custom hiring centers, soy processing units, farm machinery testing facility and organization of training to farmers and trainers.

Prof. (Dr.) Panjab Singh focussed on the contribution of ICAR technologies in modernization of Indian agriculture and its effectiveness in bringing self-sufficiency in food thereby generating confidence to pass and adopt the ambitious "Food Security Act". He also narrated that future agricultural technologies will be an amalgamation of space, nano, robotics, precision farming and artificial intelligence while providing cost effective solutions for small and marginal farmers. Dr. Nawab Ali delivered the 'Foundation Day Lecture', wherein he deliberated upon the stage-wise development of the institute and future challenges.



Present on this occasion were Dr. A.K. Patra, Director, ICAR-IISS and Dr. V.P. Singh, Director, ICAR-NIHSAD. Both of them addressed the gathering by stating the significant contribution of their respective Institutes and the relevance of agricultural mechanization for holistic development of Indian agriculture.

Prizes and awards were bestowed for various annual events also the staff members serving for more than 25 years to the Institute were given recognition of service.

The programme culminated with the vote of thanks presented by Dr. Nachiket Kotwaliwale, Head, Agro Produce Processing Division.

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16 February, 2019 was celebrated by organizing 'Agri-Tech-Expo' themed at '*Farmers' Prosperity through Agricultural Mechanization*', Farmers' interaction meet and Academia-Industry Interaction Meet in the premises of the Institute. The Director, Dr. K.K. Singh stated in his inaugural speech about the progress made by Institute on development of new agricultural machines and its extension by showcasing new CIAE technologies. He emphasized that the forum of agricultural exhibition along with panel discussion help farmers to know about new agricultural machinery. The policy issues related to standardization of quality checks in agricultural machinery, constraints in testing of agricultural machinery, capacity building on advanced manufacturing technology and mechanism for sharing of information on recent technologies developed by the R&D institutes and industries were discussed.



Er. J.J.R. Narware, Director, CFMTTI, Budni was the chief guest. He stated that in addition to tractors country also needs matching good quality agricultural machines. Shri AbhayMalaiya, President, MP Krishi YantraNirmataSangh in his address advised farmers to use agricultural mechanization as effective substitute to expensive and dwindling agricultural labour requirement and take advantage from schemes of government of MP and India by making themselves aware with them. Shri P.S. Shyam from Joint Director, Directorate of Agricultural Engineering, Govt. of MP, Bhopal elaborated that there has been progress on use of new agricultural machines such as mulcher, shredder, straw combine and raised bed planter with increase in custom hiring centres in MP. He also described about various schemes run by the Govt. of MP for promotion and popularization of agricultural mechanization such as *YantraDoot* and *KissanSarathi* etc. The programme was coordinated by Dr. P.C. Bargale, Head, TTD who had also presented the vote of thanks.

One of most vibrant Machinery Expo 'Agri-Tech-Expo' was organized by the institute on this occasion, wherein around 40 manufacturers from the country participated. The participants included leading tractor and agricultural machinery manufacturers viz. M/s John Deere, Mahindra and Mahindra, Escorts, New Holland, Eicher, Swaraj, Kubota Maschio, Greaves Cotton Ltd., Shaktiman, LEMKEN India Agro equipment, Dasmesh, Amar Thresher, Jain Irrigation, NETAFIM Irrigation India Pvt. Ltd., Vadodara Premier Irrigation, etc. A large number of local manufacturers of agriculture and processing machinery and members of small farm machinery manufacturers association of the state of Madhya Pradesh also participated. A few Leading NGOs of leading Multinational firms including Reliance, Lupin Welfare & Research Foundation, Solidarid also showcased their activities.



The ICAR-CIAE also displayed and demonstrated the recently developed advanced technologies such as Mulcher cum planter for maize - wheat cropping system, Inter Intra row weeder, Uniform rate sprayer, T.O. Pre-emergence herbicide applicator, T.O. Rotary assisted broad bed former cum seeder, Power tiller or T.O. planter with fertilizer drill, high clearance vehicle and hydraulic platform for orchard management, automated packing line for spherical fruits, minimal processing of vegetables, millet milling, fermentation of millet flaking leading to product development, Pilot scale production of Comfo-Spread, Biomass utilization and micro irrigation related technologies.



## EVENTS

were the Guests of Honours during the session. Dr. CR Mehta, Project Coordinator, AICRP on FIM presented Project Coordinator's Report on progress of work done by different centres of the scheme. The Farm Machinery Exhibition was also organized at Dr. ASCAET, MPKV, Rahuri.

The "Research Highlights 2018" compiled by Coordinating Cell, one CD on "Khetibadi me Prayukt Hone Wali Urja Kushal Machinery", one technical bulletin, one directory of farm machinery manufacturers, three success stories and three leaflets were also released during the session. Dr. KK Singh, Director, CIAE, Bhopal in his address highlighted the importance of mechanization in present context and asked the PIs of the project to accelerate their efforts in delivery of technologies. Dr. Kanchan Kumar Singh, ADG (FE), ICAR informed the steps taken by subject matter division to strengthen mechanization related activities and present priorities of ICAR. Dr. KP Vishwanatha, Vice Chancellor, MPKV, Rahuri in his inaugural address emphasized the need of joining hands with scientists of other sister disciplines to deliver sustainable mechanization solution. He also stressed the need of promoting small tools and equipment to fulfill the immediate need of farm families.

### **National Seminar on Role of Indian Standards in Testing, Quality Control and Safety of Agricultural Machinery**

National Seminar on Role of Indian Standards in Testing, Quality Control and Safety of Agricultural Machinery was organized by Bureau of Indian Standards, New Delhi in collaboration with ICAR-Central Institute of Agricultural Engineering, Bhopal at ICAR-CIAE, Bhopal on 18 March, 2019. The seminar provided a platform for exchange of ideas and information on recent developments on various issues relating to the standardization of agricultural machinery and equipment, ensuring consumers get good quality products, besides creating awareness among stakeholders such as farmers, manufacturers, NGO, etc about the Indian standards for agricultural machinery and equipment.



Inaugural Session of the seminar started with welcome address by Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal. He briefed about major activities of the institute and highlighted contribution of the institute in establishment of farm machinery custom hiring centers, soy processing units, testing of farm machinery and organization of training to farmers and trainers. He also stated the objectives of the seminar to address the issues of testing, quality control and safety of agricultural machinery.

Dr. Sunil Kumar Gupta, Vice Chancellor, Rajiv Gandhi Technical University, Bhopal was the Chief Guest of the session. He focussed on the role of quality, safety and agricultural mechanization in respect to Indian farmers. He also highlighted the need for development of good quality matching agricultural implements and machinery. He also focussed on the contribution of modernization of equipment using Artificial Intelligence (AI), IoT and Electronics and their effectiveness in bringing self-sufficiency in food grains thereby generating confidence to pass and adopt the ambitious "Food Security Act".

Mr. P.Rajesh, Scientist E and Head (FAD), BIS, New Delhi in his address briefed about activities of Food and Agriculture Division of BIS. He also briefed about Agricultural Machinery and Equipment Sectional Committee, FAD 11 of BIS. He stated that FAD 11 of BIS formulated various

## EVENTS

Indian Standards on Tractors, Farm Machinery and Implements to guide the industry, testing institutes and farmers. These standards ensure that the farmers receive good quality product which enable them for sustainable crop cultivation.

Two technical sessions were held during the seminar, chaired by Shri JJR Narware, Director, Central Farm Machinery Testing and Training Institute, Budni and Dr. KK Singh, Director, ICAR-CIAE, Bhopal, respectively. In these technical sessions, seven speakers shared their views and exchanged information on recent developments on various issues relating to the Standardization of Agricultural Machinery and Equipment.

The seminar was attended by about 100 delegates representing various organizations of the country including manufacturers and farmers. The policy issues related to standardization of quality checks in agricultural machinery, constraints in testing of agricultural machinery, capacity building on advanced manufacturing technology and mechanism for sharing of information on recent technologies developed by the R&D institutes and industries were also discussed. The programme was coordinated by Dr. C.R. Mehta, Project Coordinator, AICRP on FIM, ICAR-CIAE, Bhopal.

### RAC Meeting

24<sup>th</sup> meeting of the Research Advisory Committee was held during 7-8 March, 2019. The Heads of the Divisions, Project Coordinators of AICRPs on FIM, EAAI, UAE and ESA and scientists of CIAE attended the meeting. Dr. KK Singh, Director CIAE welcomed the Chairman and the members of the Research Advisory Committee. In his welcome address, Dr. Singh highlighted some of the major achievements of the institute during recent years. Dr VM Mayande, Chairman RAC, stressed on need to plan and prioritize the R&D programmes to address challenges of Indian agriculture sector through effective engineering interventions so as to make Indian agriculture sustainable, profitable and climate friendly. Prof



Mayande, also made a presentation highlighting the areas in which ICAR-CIAE may focus in coming years. Dr. Kanchan K Singh, ADG (FE), ICAR stated that formulation of next plan has been initiated at Council and the ICAR-CIAE should formulate the new flagship programmes with focus on development of technologies for precision agriculture through application of electronic, instrumentation, artificial intelligence, robotics, IOT for agricultural mechanization. ICAR-CIAE may submit a proposal for creation of new Division to address these emerging areas of R&D. The other expert members of RAC who attended and provided valuable advice to CIAE scientists included Dr C Divakar Durairaj, Former Dean, College of Agricultural Engg., TNAU, Coimbatore, Dr. VVN Kishore, Former Head, Department of Energy & Environment, TATA Energy Research Institute University, Delhi, Dr. Debraj Behera, Prof & Head, Deptt of Farm Machinery & Power, Odisha University of Agriculture & Technology, (OUAT), Bhubaneswar also provided valuable advice to ICAR-CIAE scientists for undertaking their R&D programmes. The RAC members also saw demonstration of several new technologies developed by institute recently. Dr PC Bargale, Principal Scientist & Head TTD and Member Secretary proposed hearty vote of thanks to the members.

### IMC Meeting

52<sup>nd</sup> meeting of Institute Management Committee was held on 8 March, 2019 under the chairmanship of Dr KK Singh, Director. Other members present in the meeting include Dr Kanchan Kumar Singh, ADG (FE), ICAR; Dr HS Oberoi, Head, Division of Post-Harvest



## EVENTS/ PERSONNEL NEWS

The event witnessed an overwhelming participation of rural women and their family members from across the state which provided a platform for cross learning and encouraging rural women in agriculture. The occasion was also dedicated to felicitate women leaders, entrepreneurs who have created a niche place for themselves and set an example for others to emulate.

Deliberations by subject experts on nutritional health, importance of soy based diet, women leaders' role in decision making, financial inclusion, development programme and participation of women marked the daylong event. Women community leaders, service providers, elected women representatives shared their experiences of struggles and achievements in pursuit of their chosen paths. A series of panel discussions took place with the participation of women leaders, development practitioners, government officials and subject specialists like nutritionists and dieticians. Technical experts from CIAE shared knowledge on women friendly farm tools, soy nutrition and the potential it holds.

40 different participating organizations and rural entrepreneurs including KVK, ICAR-CIAE Bhopal displayed their products in the exhibition stalls. The event was organized under the tutelage of Resource Centre of Women in Agriculture (RCWIA).

The event facilitated development of common understanding on issues and challenges and derive strategic approaches and way forward towards "good farming- good food".

At ICAR-CIAE, Bhopal, live webcast program of Hon'ble Prime Minister, Shri Narendra Modi was arranged. Not only the women staff but also the male employees attended the webcast program. The success stories of women and the motivational speech of Hon'ble Prime Minister



has inspired the staff. Dr. Debandya Mohapatra, Chairperson, Women's cell coordinated the programme, which was attended by Heads of divisions, PCs, Incharges of various sections and all administrative and technical staff.

## Staff Promoted



**Dr VK Bhargav**  
Principal Scientist  
wef 24 June, 2017



**Dr PP Ambalkar**  
Chief Technical Officer  
wef 1 January, 2018

**PERSONNEL NEWS****Staff Superannuated**

Following staff superannuated from the Council's service and were given a warm farewell:



**Shri Nirbhay Singh**  
Skilled Supporting Staff  
31 January, 2019



**Shri BM Sharma**  
Asstt. Chief Technical Officer  
28 February, 2019



**Shri Ramcharan**  
Skilled Supporting Staff  
31 March, 2019

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