



CIAE



Modernizing agriculture through engineering interventions

NEWS

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From the Director's Desk



Time for Agricultural Start-ups

India today is emerging as a major start-up hub. Enterprising young entrepreneurs who have flooded urban India with start-ups in recent years, have unfortunately neglected the rural economy and the agricultural sector. Agro based industries can flourish in rural sectors where labour is abundant and labour cost is low. Developing entrepreneurs in agriculture can immensely benefit Indian economy by reducing the burden on agriculture, generating employment opportunities for rural youth, reducing the need for migration from rural to urban areas, thereby reducing pressure on urban cities and increasing the individual and national income in rural areas. Besides this, the entrepreneurship in agriculture can help in modernizing the farming techniques, bring in innovation to improve the crop productivity, reduce cost of production through enhanced input use efficiency employing mechanization and

precision farming techniques. Some of the sectors that can benefit hugely from entrepreneurial intervention are agricultural mechanization and agro produce processing and value addition. These programmes may provide requisite boost to enhance the farmers' income and rural economy.

ICAR-CIAE has also been emphasizing on conduct of entrepreneurship development programmes which lead to setting up of enterprises based on agricultural engineering technologies. Custom hiring of agricultural machinery as an enterprise is one such flagship programme of the institute. The programme, conducted in collaboration with Directorate of Agricultural Engineering, Govt of Madhya Pradesh has helped in establishment of about 1000 custom hiring centres across state of Madhya Pradesh. Setting up of these centres has multifaceted benefits. The entrepreneurs use these machines for own farms as well as earn annual income of about Rs. 3 to 4 lakhs, the small farmers get required machinery at required time at an affordable cost, with

enhanced mechanization, productivity is increased and cost of production is reduced, employment for 2-3 persons is generated per custom hiring centre. At ICAR-CIAE, these entrepreneurs are mandatorily trained prior to setting up of their custom hiring centres. This training helps these entrepreneurs to run their custom hiring centres professionally and profitably with appropriate selection of farm machinery and their management. The institute continues its subsequent technical advice and support to these entrepreneurs.

Institute also organizes a similar entrepreneurship development programme for processing and value addition to soybean for production of soy milk and soy paneer in which so far over 2500 entrepreneurs have been trained and more than 200 enterprises are operating successfully in 17 different states of the country. Besides generating employment, these units facilitate availability of healthy soy milk and soy paneer to consumers. Over 100 protected cultivation units have also been established in the state of Madhya Pradesh following training of the entrepreneurs at Precision Farming Development Centre [PFDC] of the institute. The Agri-Business Incubation Centre (ABIC) established recently at ICAR-CIAE extends training, technical support, hand holding and use of institute facility of Pilot Plants and Laboratories to the selected potential entrepreneurs at very nominal costs until the incubate business becomes self-sustainable. The institute would continue to focus on its entrepreneurship and agri-business development programmes as these help rural entrepreneurship, generate local employment, increase farmers' income and thereby help rural economy and make Indian agriculture more profitable.

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RESEARCH AND DEVELOPMENT

Potato cum sugarcane bud planter

A cost effective and time saving potato cum sugarcane bud planter suiting to the soil and varieties prevailing in Haryana has been developed by AICRP on FIM (CCSHAU Hisar centre). The machine consists of a seed box, fertilizer box, ridger, ground wheel, furrow opener, depth control wheel, cup belt, tyne and feeding chute. For sugarcane bud planting, the speed of operation, field capacity and field efficiency are 3.2 km/h, 0.49 ha/h and 75%, respectively. Similarly, for potato planting, the speed of operation, field capacity and field efficiency are 3.00 km/h, 0.47 ha/h and 75%, respectively. The developed potato cum sugarcane bud planter can result in a net saving of Rs. 5141/ha and Rs. 6433/ha for potato and sugarcane planting, respectively. The labour requirement with the developed planter is 3 man-h/ha as compared to 125 man-h/ha for manual potato planting and 150 man-h/ha for manual sugarcane planting saving time and labour.



Tractor operated grass seed harvester

The timing of seed harvest is one of the most crucial decisions that is made while harvesting grass seeds. To carry out the operation efficiently in time, a tractor drawn front mounted grass seed harvester suitable for harvesting seeds of Dinanath grass (*Pennisetum pedicellatum*) has been developed. It consists of a front mounting frame, seed bruising brush roller, seed collection chamber, hydraulic motor (to power bruising roller) and double acting hydraulic cylinder (to adjust machine height as per crop height). The working width of machine is 1902 mm. The machine operates satisfactorily at forward speeds ranging from 1.5 to 2 km/h depending on the crop conditions. Harvesting cost of grass seed with the newly developed machine could be as low as 1/10th of manual harvesting.



Bullock drawn multipurpose tool carrier

The multipurpose tool carrier facilitates the amalgamation or integration of improved implements to the animal based farming with added advantage of providing comfort to the animal and the operator (AICRP on AES, MAU, Parbhani). It has the provision of attachment of an inclined plate planter, sprayer and three tyne ferti-hoe. The average draft required for operating the planter-cum-sprayer with seed covering device is 620 N. The field capacity for the planter-cum-sprayer with seed covering device and three tyne hoe having two furrow



opener is 0.19 and 0.30 ha/h, respectively. The average discharge from each nozzle is in the range of 195.9 and 197.6 ml/min. The uniformity coefficient of the sprayer has been observed as 74% with weeding efficiency of 84% in soybean.

Subsurface drip lateral laying machine

Drip irrigation can be made more efficient for irrigating a wide range of agronomic, horticultural and fruit crops by installing the laterals below the soil surface, called subsurface drip irrigation (SDI). One of the important aspects of planning and management of the SDI system is laying the laterals in trenches, which are uniformly dug at a pre-decided and desirable depth. It is important to maintain a uniform depth of placement of lateral below the soil surface at given emitter spacing, crop and system pressure for delivering the required amount of water to the root zone. The newly developed tractor drawn machine is suitable for installation of drip laterals below the soil surface to irrigate wide range of agronomic, horticultural and fruit crops. Machine laid lateral pipes are placed rather uniformly at pre-decided depth, saves time and minimizes use of manual labour. It can be mounted on a 40 HP tractor or above and lay up to four sub-surface drip lateral pipes simultaneously to a coverage width of 1.8 m. The laying depth up to 30 cm can be achieved by the machine. The field capacity of the machine is assessed to be 0.2 ha/h. The average placement uniformity during tests has been observed to be about 90 per cent.



Micro-planning & management of a rural energy system

Micro-planning and management of rural energy system is a village level assessment of energy foot prints in available energy flow pathways to find and suggest the need of energy intervention. Saving in the energy consumption is the main aim of energy planning and management at micro level. The energy scenario of rural eco-system of village Ganiyari has been assessed and it has been found that the total energy consumption was 4TJ per annum, covering all four sectors, namely, crop production, livestock raising, domestic sector and post - harvest. The maximum energy consumption has been found in the domestic sector during cooking which consumes highest energy in the village. Fuel (53%) and dung cake (18%) are highest energy sources being used in the village. Planning



Fuelwood replacement (50-80 %) using briquettes for rural cooking gaining 20-25 % energy saving

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for energy management has been done and it has been finalized to partially replace the existing cooking fuels (fuelwood and dung cake) by alternate crop residues based binderless briquetted biofuel. Intervention has been done to 15 rural families and feedback has been monitored and analyzed. The briquettes are well accepted by rural families for domestic cooking. Renewable energy supplementation using briquettes has been estimated to be 60 ± 20 MJ/day/family. The replacement of 50-80 % of the fuelwood consumption for cooking by rural families has been achieved with energy saving of 20-25 %.

Power operated cauliflower floret cutter

Cutting of cauliflower florets is one of the arduous tasks that requires lot of human labour and time. Cut florets could be further processed and sold as minimally processed fresh-cut vegetables in urban markets. A power operated cauliflower cutter has been developed wherein florets of about 3-5 cm head diameter and 4-5 cm length are cut from the cauliflower head. The equipment has following major components: rotating blade assembly, feeding hopper, discharge chute, electric motor and power transmission assembly. The machine is operated by a 0.5 hp electric motor. The equipment operates at around 350 rpm and gives a capacity of around 5-6 cauliflowers/min (120-150 kg/h). One person is required to operate the machine and adequate measures have been provided for safety of the operator. All the parts of machine that come in contact with food material are made up of food grade stainless steel for appropriate hygiene. The equipment could be useful for a minimally processed fresh-cut vegetable enterprise and also for community kitchens and hotels/ restaurants.



Sorghum based ready to cook mixes

Grain sorghum (*Sorghum bicolor* L) is a rich source of nutrients and becoming popular as gluten free product and replacing wheat and rice as major cereals. However, due to high tannin content, the grain has poor protein digestibility and nutrient bioavailability when cooked in wet form, besides having lower shelf life, limited to only a fortnight. Agro produce processing division at ICAR-CIAE has developed processes for sorghum based ready to cook mixes for improving nutritional bioavailability of sorghum based products. Two such mixes namely masala sorghum and sorghum upma mix have been found highly acceptable by consumers.

Sorghum upma Mix

Sorghum upma mix has been developed using fermented, steamed and flaked sorghum grain that is dried and coarse ground, with addition of fat, chickpea flour, tamarind powder, spices and condiments. The shelf life of the ready mix is about 3 months, when packaged in 100 micron thick LDPE sealed pouches, and stored at 25°C. The uncooked sorghum upma mix contains about 3.2 g moisture, 8.3 g fat, 11.7 g protein, 6.8 g minerals, 2.3 g crude fibre, 67.8 g carbohydrate in 100 g ready mix and has an energy value of 393 kcal. The product has been well received by a sensory study conducted considering 83 consumers, having an overall sensory score of 7.8.



Masala sorghum mix

Masala sorghum dry mix has been prepared by mixing dried sorghum flakes, dried vegetables, skim milk powder, roasted defatted soybean flour,



Bio-acoustic detection system of insect sound spectra in stored food legumes

Detection of insect presence and estimating their density in grain mass is a challenge. Conventional methods of sampling or insect lures require time and trained manpower to accomplish this task. Acoustic detection method detects the hidden as well as moving insects by amplifying and filtering their mobility and feeding sounds. Crawling and feeding activities of two insects *Callosobruchus chinensis* and *Callosobruchus maculatus* have been detected by using an insect detection probe in an acoustically insulated bin filled with food legumes (chickpea - *Cicer arietinum* and mung bean - *Vigna radiata*). Two acoustic sensors (microphones) and one temperature and relative humidity sensor (DHT-22) are embedded in one module installed in polyvinyl chloride pipe (3.2 cm diameter and of 40 cm length).

Each acoustic sensor is mounted 10 cm away from the probe ends and the DHT-22 sensor is installed in the middle of the probe. Sensor probe is connected to the signal processing system, which is equipped with amplifier and filters. Programmable interface controller microcontroller along with recommended standard connector feeds the signal to computer. Protocol has been developed to process the bioacoustics signal by reducing noise, amplification and frequency level processing. The sensor system has been able to detect presence of insects at an insect density of 5 insects/100 g or more.



Acoustic insect detection system (a) Acoustic shielded bin, (b) Signal processing system and Sensor Probe, (c) Probe installation view

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and condiments. The sorghum flakes has been prepared using whole sorghum grain, which has undergone fermentation process, followed by steaming, flaking and drying. The shelf life of the ready mix is about 3 months, when packaged in 100 micron thick LDPE sealed pouches, and stored at 25°C with an FFA value of 0.073% at the end of storage. The uncooked masala sorghum contains about 6 g moisture, 1 g fat, 10.2 g protein, 5.5 g minerals, 3.2 g crude fibre, 74.2 g carbohydrate in 100 g ready mix and has an energy value of 346 kcal. The product has 21% antioxidant activity. The sensory studies conducted considering 112 consumers as well as sensory panel, shows that the product is well liked by both female and male respondents and liked as a health breakfast cereal with an overall sensory score more than 7.5.

International Training organized

An International Training of African-Asian Rural Development Organization (AARDO) on “Agricultural Engineering Technologies for Enhancing Productivity and Profitability in Agriculture Sector” was organized during October 24 to November 6, 2017. The training sponsored by AARDO and Ministry of Rural Development, GOI was attended by eight participants; one each from Bangladesh, Egypt, Lebanon, Malaysia, Palestine, Sri Lanka, Sudan and Zambia.



During these 14 days training programme, knowledge about technologies and equipment for agricultural production, irrigation and drainage, processing and value addition and renewable energy was imparted through lectures, presentations, practical sessions, hands-on experience and field visits.

The valedictory function of the training was held on November 6, 2017 under the chairmanship of Secretary General of African-Asian Rural Development Organization (AARDO) His Excellency Eng. Wassfi Hassan El Sreihin. Dr. KK Singh, Director, ICAR-Central Institute of Agricultural Engineering presided over the function.



The Secretary General said AARDO has been collaborating with ICAR-Central Institute of Agricultural Engineering (CIAE), Bhopal since 2010 and all its programmes have been highly effective in imparting appropriate technical know-how to the participants. He hoped this training shall help in countering challenges like post-harvest losses, seed viability and climate change in Africa and Asia. He elaborated that these challenges can be addressed by innovations in the area of Science and Mechanization.

During training, participants shared their experiences and expressed that they could gather a lot of new information which would prove very important for rural development in their respective countries. They also expressed that getting to know geographical and social framework of central India and relishing local cuisine has been a memorable experience for them. Dr. Nachiket Kotwaliwale presented a detailed report on the proceeding of 14-days training and Dr. PC Bargale presented vote of thanks to the sponsors, participants, training faculty and all the dignitaries.

Winter School

ICAR-Central Institute of Agricultural Engineering (CIAE), Bhopal organized a winter school on “Climate smart agricultural machinery for conservation agriculture” during November 6-26, 2017. Eighteen participants from disciplines such as Farm Machinery and Power, Soil and Water Conservation Engineering, Agronomy, Soil Science and Plant Physiology from SAUs, ICAR Institute and KVKs participated. Some of the major topics covered during the training programme were Conservation Agriculture and Residue Management, Climate Smart Agricultural Machinery, Conservation Agriculture and Climate Change, Introduction of No-tillage Technology in India, Watershed Management and Climate Resilient Sustainable Farming in Rainfed Agriculture of India, Climate Smart Integrated Farming Systems-Role of Water, Nutrients and Energy, Remote Sensing-Concepts and Application in Conservation Farming, Effect of Elevated CO₂ and Temperature on Productivity of Major Cropping Systems of Central India, Sensors and Instrumentation for Measurement of Performance Parameters of Equipment, Techniques for Management of Soil Fertility Quality for Conservation Agriculture, Decision Support and Expert System to Analyze Data and Make Decision for Conservation Farming, Biomass Management for Efficient Utilization of Surplus Crop Residue, Design of Field Experiments and Statistical Analysis of Data, and Field Demonstration of Climate Smart Agricultural Machinery. Dr KP Singh, Principal Scientist was the Course Director and Er. HS Pandey, Scientist was the Course Coordinator.



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National Refresher Training Program

CIAE-Regional Centre, Coimbatore organized Refresher Training Program on 'Farm Mechanization for Established Agripreneurs' in collaboration with National Institute of Agricultural Extension Management (MANAGE), Govt. of India, Hyderabad during November 6-9, 2017 for the established Agripreneurs under Agri-Clinics & Agri-Business Centres Scheme. About 27 established Agripreneurs from various parts of the country participated in the four days training programme. The training programme included lecture modules viz Advances in Farm Mechanization for Rural Prosperity, Status of Agricultural Mechanization, Machineries for the cultivation of Rice, Banana, Sugarcane, Horticulture, Millets and other field crops; Agro-processing, value addition, success stories of agro-processing centres, demo on CIAE-RC marketable technologies, TNAU & Industry visits, Protocols & Cost economics and business promotion of Custom Hiring operations and interaction session with Custom hiring operators and Manufacturers.



Model Training Courses

Model Training Courses for 38 participants from 14 different states on i) Advanced agricultural machinery for production and post production agriculture and ii) Women friendly technologies for agricultural production and processing operations, sponsored by Directorate of Extension Ministry of Agriculture, Govt. of India were organized during October 4-11, 2017 and December 15-22, 2017, respectively.



Training for Drivers of ICAR Institutes

Training programme on "Automobile Maintenance, Road Safety and Behavioural Skills" for regular drivers in technical grades from ICAR institutes/HQ, at ICAR-CIAE, Bhopal was conducted during November 27 to December 1, 2017. A total of 26 drivers in different technical positions from 25 ICAR institutes attended the training programme.

The resource persons for different sessions of the training programme were Mr. Sandip Sharma, Manager (Maruti Driving School, Bhopal), Dr. AK Mandloi, Professor (MANIT) on road safety and traffic management, Mr. RP Dixit, Senior Development Officer (New India Insurance Co. Ltd.) on insurance claim guidelines, Mr. Tushar Kant Tiwari, SRO (Petroleum Conservation Research Association, Bhopal) on fuel economy and conservation, Dr. S. K. Pathak, (Faculty Member, CRISP) on effective behavioural and communication skills for vehicle drivers, Er. Uday Paradkar, AGM (Service), CI Hyundai, Bhopal on periodical and preventive maintenance of vehicles, Er. Jitendra Rajput, Training Officer, Govt. ITI, Bhopal, Er. DK Dwivedi, CTO (ICAR-CIAE, Bhopal) on management of vehicle section with logbook, indent and route management and representatives from TATA Motors, Hyundai Motors, Mahindra Automobiles. Educational trips were also organized for the trainees at Eicher Tractor Plant with hands-on training sessions at local workshops of Hyundai Motors Limited, TATA Motors and Mahindra Automobiles Ltd. On behalf of HRM Unit at ICAR Headquarter, Dr. NK Jain, Principal Scientist also interacted with the trainees on December 1, 2017 and collected the feedback from them.



Training under Consortia Research Platform on Farm Mechanization and Precision Farming for farmers

Under CRP on FMPF, Hands-on Training for Farmers on Improved Agricultural Implements and Machinery was organized in five different batches. Total 201 farmers from the states - Madhya Pradesh, Bihar, Maharashtra and Uttar Pradesh participated in the training.



During the training, farmers were updated on new technologies on farm mechanization, precision agriculture and agro-processing. They were given hands on training on making critical adjustments of machinery, working with improved agricultural technologies, as well as visits to different

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laboratories to get exposure of different available agricultural engineering technologies. Operation-wise implements required for seed bed preparation, sowing/planting and transplanting, spraying, interculture as well as harvesting and threshing were demonstrated on field. Women friendly tools/implements, conservation agriculture machinery and bullock drawn machinery were also demonstrated. Farmers were also given demonstration and on-site exposure to covered cultivation techniques, renewable energy and soya-processing techniques.

At Regional Centre, Coimbatore, training on "Operation and Maintenance of Agricultural Machinery" was organized on 5-7 October, 2017. About 90 farmers/ custom hiring operators/ entrepreneurs of Coimbatore, Erode and Thirupur districts of Tamil Nadu participated.

Mahila Kisan Diwas

The Krishi Vigyan Kendra of the Institute organized "Mahila Kisan Diwas" on October 15, 2017 in Village-Karariya, Bersia, Bhopal. More than 100 women farmers from Karariya and adjacent villages participated in the event, which also included activities like Film show, Speech, Drawing competition & exhibition on the themes: Role of Women in Agriculture, Women Empowerment, and Nutrition and Income generation.



Girls from Govt School of Karariya prepared and displayed drawings showing different roles played by women in agriculture. Speeches were delivered and poem recitation was also done by girl students during the event, highlighting



the importance of women empowerment and girl child. Four women farmers from four different villages were also felicitated on this occasion for being the inspiration for other women with their contributions in the fields of agriculture and allied sectors, despite facing adverse conditions.

An exhibition on "Women Friendly Tools & Equipment" was also organized during the event and various agricultural implements adoptable by women farmers were displayed and demonstrated. Safety aspect was especially highlighted during the exhibition by demonstrating the use of safety gadgets during spraying of pesticides in particular.

Ms. Priyanka Goyal, Member-Jila Panchayat, Shri Chandra Prakash Namdeo, Sarpanch, Karariya and Shri Dhanveer Singh Rajput, Former Sarpanch also participated in the programme besides the staff of Krishi Vigyan Kendra, CIAE, Bhopal.

Activities under Mera Gaon Mera Gaurav

Under Mera Gaon Mera Gaurav programme, following activities were undertaken during the quarter:

	Number	Beneficiaries (No.)		
		SC/ST	Others	Total
No. of villages covered	27	29	235	264
No. of visits made	18	21	118	139
No. of demonstrations	31	11	101	112
No. of farmers' meeting	23	23	181	204
Total	99	84	719	719

Memorandum of Understanding (MoU)

MoU signed with	Purpose
Women and Child Development Department, Government of MP	Strengthening the quality of nutritional care provided to children
District Collector, Hoshangabad, Government of MP	To enhance the nutritional status of local population by setting-up soybean processing centres in MP
NRC Banana, Tiruchirapalli	Development of banana sucker paring equipment, pseudostem in harvester and pseudostem outer sheath plate making equipment

Other Trainings

Training Title	Dates	No of Participants
Custom hiring of agricultural machinery	October 3-9, 2017 November 6-11, 2017 December 18-23, 2017	97
Entrepreneurship development programmes on preparation of soymilk and tofu	October 23-28, 2017 December 11-16, 2017	28
Uses of soybean for nutrition enhancement for Aanganwadi workers	November 28-30, 2017	26
Awareness camp-cum-training on soybean processing and its utilization at village Sangakheda Kalan of Babai block, and Raipur village, Hoshangabad	November 22, 2017 December 20, 2017	186

TECHNOLOGY TRANSFER/ AWARDS & RECOGNITIONS

Recognition to Regional Centre, Coimbatore

The Centre has now been recognised as Farm machinery Testing Centre for ensuring supply of quality agricultural machinery and equipment under government programme. The Centre has now been registered under Food Safety and Standards Authority of India.

License Agreements

License Agreement has been signed with following manufacturers for manufacturing technologies namely Multipurpose Grain Mill, Solar cabinet dryer, Pedal operated potato peeler, Pedal operated potato slicer, Pedal cum power operated grain cleaner, Manual 4 row rice drum seeder, Manual hand ridger for women, Manual rotary dibbler, Manual twin wheel hoe weeder, Manual double screen grain cleaner, Cono weeder, Manual double screen grain cleaner and Sack holder

- M/s Shri Manak Industries, Bhopal
- M/s Pragat Akshya Urja Ltd. Indore
- M/s Hingloj Energy System Private Limited, Bhopal
- M/s Vasundhra Krishi Yantral, Bhopal
- M/s Swastik Agro Industries, Rajnandgaon, CG
- M/s Laxmi Steel Fabs., Sehore M.P
- M/s Chaurasia Agro Industries, Chhatarpur
- M/s Ganga Industries, Dewas, MP
- M/s MD Agro Engg. Indus., Indore

Participation in Exhibitions

Sl. No.	Exhibition	Place	Dates
1	National Agribusiness Summit 2017 for FPO & Agri-Startups (an innovation and collaboration meet at SIAET, Bhopal, krishi manthan	SIAET, Bhopal	December 9-10, 2017
2	EIMA Agrimach India exhibition cum conference	New Delhi	December 8, 2017
3	IITF	New Delhi	November 14-28, 2017
4	Exhibition and conference in World Food India	Vigyan Bhawan, New Delhi	November 3-4, 2017
5	Krishi Kumbh	GBPUAT Pantnagar	October 6-9, 2017
6	Exhibition Science-Fiesta 2017	Regional Science Centre, Bhopal	December 20-21, 2017
7	Agri Show	Pollachi, Tamil Nadu	December 15-17, 2017

Awards and Recognitions

Name	Award	Instituted by
Er Dilip Jat Scientist	Krishi Vigyan Gaurav Award	Agricultural Research Communication Centre and Bharatiya Krishi Anusandhan Samiti, Karnal.
Dr. MK Tripathi Principal Scientist	Lifetime Achievement Award	Innovative Research Developers and Publishers
Dr. MK Tripathi Principal Scientist	Best Scientist Award-2017	Education Expo Research Foundation
Dr. R. Senthil Kumar Scientist	Gold Medal	Agriculture Scientific Tamil Society, New Delhi
Er PP Ambalkar Senior Technical Officer	Krishi Bhushan award	ISEDS, Bhopal and Asian Consortium of Farmer Producer Company Ltd (ACFPCL)

Foreign Deputations

Dr CR Mehta, Project Coordinator, AI CRP on Farm Implements and Machinery participated in 5th Regional Forum on Sustainable Agricultural Mechanization in Asia and the Pacific on the theme of "Promoting Sustainable Agricultural Mechanization Strategy" and the Regional Workshop on Integrated Straw Management held at Kathmandu (Nepal) during December 12-14, 2017.



Dr. Debabandya Mohapatra, Sr. Scientist visited Yezin Agricultural University, Myanmar for teaching a course on "Basic principles on Food Engg. and Technology" during December 22, 2017 to January 22, 2018. Her visit was under bilateral agreement between DARE and MEA.



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Human Resource Deveopment

Name and Designation	Course Title	Place	Dates
Dilip Jat Scientist Syed Imran S Scientist	Winter School training on Climate smart agricultural machinery for conservation agriculture	ICAR-CIAE, Bhopal	November 6-26, 2017
NS Chandel Scientist	Winter School training on Advance statistical tools and techniques for modeling and forecasting of agricultural data	ICAR-IASRI, New Delhi	November 8-28, 2017
Adinath Kate Scientist	Short course on Innovative food processing and packaging technologies	NIT, Rourkela	December 4-9, 2017

Ph.D. Awarded



Er Dilip Jat was awarded for his Ph.D. thesis titled "Influence of different parameters of dual tyne on two stage fertilizer application for broad bed cultivation in vertisols" by College of Technology and Engineering, MPUAT, Udaipur, Rajasthan. He did his Ph.D. under the guidance, Dr. Ravi Mathur Professor, Department of Farm Machinery and Power Engineering, CTAE, MPUAT, Udaipur.

Meetings of Quinquennial Review Team

The Quinquennial Review Team (QRT) constituted by the council under Chairmanship of Dr. Gajendra Singh, Ex-Vice Chancellor, Doon University visited Hyderabad, Gangtok, Ludhiana and Bhopal. The QRT meeting was held at PJTSAU, Hyderabad during October 5-7, 2017 and reviewed the performance of 11 centres of different schemes including 4 centres of AICRP on FIM, 3 centres of AICRP on UAE, 2 centres of AICRP on EAAI, 1 centre of AICRP on ESA and 1 centre of CRP on FM &PF. The team visited nearby village and interacted with farmers and held discussion with farm machinery manufacturers and University officials. During October 13-15, 2017, the team visited College of Agricultural Engineering and Post-Harvest Technology, Ranipool, Gangtok. The QRT team visited the nearby villages and discussed with farmers issues related to farming system and problems in hill mechanization. Three centre(s) of AICRP of FIM, two centres of AICRP on ESA and one centre of AICRP on UAE and CRP and FMPF presented their achievements. The infrastructural limitations were major concern expressed by the QRT members. The next meeting of the QRT was



held at Punjab Agriculture University, Ludhiana during November 6-8, 2017. The research achievement during XII plan period was reviewed for twelve centres of four AICRP schemes. The QRT team also visited some leading farm machinery manufactures of Punjab and Farm for Borlaug Institute of South-east Asia, Ludhiana. During December 15-16, 2017, QRT met at CIAE, Bhopal and discussed various issues emerged during different visits with Head of Division(s) and Director, CIAE and Project Coordinators of different AICRPs. QRT team also interacted with institute scientists on various researchable and organizational management issues to crystalize its recommendations.

Brain Storming Session

Brain Storming Session on "Recent Advances in Biomass Energy Research and Management" was organized on November 9, 2017. The main objective of this Brain Storming Session was to identify researchable areas and technological interventions required for efficient utilization of crop residues for generation and utilization of biomass energy and thereby address the challenge of food, energy and environment security.



The programme was inaugurated by the Chief Guest Dr. Kanchan Kumar Singh, Assistant Director General, (Farm Engineering), ICAR, New Delhi and was chaired by Dr K. K. Singh, Director, ICAR-CIAE, Bhopal. In his remarks, Dr. Kanchan Kumar Singh stressed on urgency to find viable technological intervention to prevent mass scale burning of crop residue in the field by farmers as the burning of biomass causes environmental pollution and human health hazards besides adversely affecting the soil productivity. Dr. KK Singh,

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Director, ICAR-CIAE, Bhopal pointed out that about 81% of paddy straw and 48% of wheat straw are burnt in the farmers' field. Each tonne of straw (rice or wheat), on burning, releases 3 kg particulate matter, 60 kg CO, 1,460 kg CO₂, 199 kg ash and 2 kg SO₂. About 32-76% of the straw weight and 27-73% nitrogen are lost due to field burning. Hence, it is a challenge for scientists to provide suitable technological solution for efficient utilization of biomass for energy generation to mitigate the climate change.

The invited expert speakers Dr. D. K. Tuli, Director, CABR, Faridabad, Dr Suneel Dingra, TERI, New Delhi, Dr. M. Shyam, Ex Director and Dr. Gaurav Mishra, Director, SPRERI, Vallabh Vidya Nagar, Gujarat, Dr P. Subramanian, Dr. S. Puglendi and Dr. S Kartikeyan, TNAU, Coimbatore presented the status of biomass availability in India, field burning and its consequences on human health and appropriate existing technologies and process for its efficient utilization. Conversion of lignocelluloses biomass into bio-oil, bio-char and thermo / electricity generation and biomass energy interventions with a specific view on biomass management for future, were identified as the major researchable issues.

The presentations were followed by panel discussion with focus on adoption / adaptation of available technologies for efficient utilization of rice-wheat residues to mitigate the environmental problem which is highly prevalent in New Delhi, Punjab, Haryana, and several other states of India.

The major points that emerged from the session were need for creation of database on (i) assessment of availability and utilization of crop residues / biomass in India, (ii) collection, transportation and storage of crop residue, and (iii) status of technologies available for bio-oil refinement, bio-ethanol, briquetting and power generation.

The Brain Storming session was well attended by Experts from TERI, New Delhi, SPRERI, Vallabh Vidya Nagar, Gujarat, IIT Mumbai, Centre for Advanced Bio-energy Research, Indian Oil Corporation Limited, Faridabad as well as by Scientists from ICAR-CIAE, Bhopal, TNAU Coimbatore, MANIT, RGPV and IIFM, Bhopal.

The session ended with vote of thanks extended by Dr. R C Singh, Head, AEP Division.

Workshop of AICRPs

Thirty Second Workshop of AICRP on FIM

The 32nd Workshop of All India Coordinated Research Project on Farm Implements and Machinery which aims to provide a platform for interaction amongst researchers, tractor and farm machinery manufacturers and policy makers was held at UAS, Raichur during December 20-22, 2017. The inaugural session of the meeting was held on December 20, 2017 under the Chairmanship of Dr. Kanchan Kumar Singh, Assistant Director General (F. Engg.), ICAR and Dr. PM Salimath, Vice Chancellor, UAS, Raichur was the Chief Guest of the session. Dr. KK Singh, Director, ICAR-CIAE, Bhopal and Dr. C. Divaker Durairaj, Former Dean, AE&CRI, TNAU, Coimbatore were the guests of honour.



Dr. I Shanker Goud, Director Research, UAS, Raichur welcomed the participants to UAS, Raichur and highlighted that this is one of the most important AICRP functioning at the university. Dr. M Anantachar, Dean (Ag. Engg.) & PI (FIM Project), UAS, Raichur briefed about the activities of host institute. He stressed the participants role to bridge the mechanisation gaps in the country. Dr. CR Mehta, Project Coordinator, AICRP on FIM presented Project Coordinator's Report on progress of work done by different centres of the AICRP on FIM during last two years in the inaugural session. One ISO Certification, a CD on Technology released by UAS, Raichur, seven technical bulletins and three leaflets were released during the session. The technical bulletins on "Four Decades of Salient Achievements under AICRP on Farm Implements and Machinery" compiled by Coordinating Cell was also released during the session.

Dr. C Divaker Durairaj, Ex Dean, AEC&RI, TNAU, Coimbatore urged the need of bringing about changes in the approach of research in scheme with more focus on mechanization with sensor based application. 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 the delivery of technologies.

Dr. Kanchan Kumar Singh, ADG (FE) in his address informed about the steps taken by subject matter division to strengthen mechanization related activities and present priorities of Govt. He stressed the need to develop technologies which can change the life of people especially the people living in disadvantageous areas. Dr. PM Shailmath, Vice Chancellor, UAS, Raichur in his inaugural address emphasized the need of joining hands with scientists of other sister disciplines to deliver sustainable mechanization solution. He also stressed

REPORT

the need of promoting small tools and equipment in hills and small farms to fulfill the immediate need of farm families.

The progress under Research & Development (R&D), Prototype Manufacturing Workshop (PMW), Prototype Feasibility Testing (PFT) and Front Line Demonstration (FLD) activities under the scheme was presented by 25 centres of AICRP on FIM in three technical sessions during 20th to 22nd December, 2017 and chaired by Dr. Kanchan Kumar Singh, ADG (F. Engg.) and co-chaired by Dr. KK Singh, Director, ICAR-CIAE, Bhopal. The deliberations during the technical sessions were guided by Dr. C. Divaker Durairaj, Former Dean, AEC&RI, TNAU, Coimbatore. The meeting was attended by around 100 participants from Research & Development organisations from different SAUs and ICAR institutes, farm machinery manufacturers etc. In these technical sessions, the new technical programmes to be taken up under R&D, PMW, PFT and FLD during 2018-19 were also presented by centres of AICRP on FIM and finalized.

Ninth Workshop of ESA

The 9th Workshop of All India Coordinated Research Project on ESA was held at Indian Institute of Technology, Kharagpur during November 28-29, 2017. Dr. SK Bhattacharya, Dy. Director, Indian Institute of Technology, Kharagpur was the Chief Guest of the inaugural programme and Dr. Kanchan K Singh, Assistant Director General (Engg.), ICAR, New Delhi and Dr. P. K. Nag, Former Director, National Institute of Occupational Health, Ahmedabad were the Guests of Honour. In his inaugural address, Dr. SK Bhattacharya, Deputy Director, IIT, Kharagpur highlighted the importance of incorporating the ergonomical principles in engineering design. He stressed upon on highlighting the safety issues and take-up safety awareness programme at large scale for betterment of agricultural workers and rural households. Dr. Kanchan K Singh, Assistant Director General (Engg.), stressed that there is a need to assess the occupational health and safety issues of worker in agriculture. He emphasized that small and need based equipment need to be developed, which have direct impact on the life of farmers. He asked the research engineers to take the technologies to end users to improve visibility of the project. Dr. PK Nag in his address stressed the need to train the designers in ergonomical design guidelines. He appreciated the progress of the scheme and desired to go for in-depth studies in ergonomical aspects. Dr. KN Agrawal, Project Coordinator presented highlights of the achievements of the scheme for the year 2016-17.. Training and demonstration programmes taken up by centres on safety, women friendly tools and

ergonomically improved equipment were also presented. During two days, three technical sessions were held and Achievements and progress of eleven centres for 2016-17 as well as the future programmes for year 2017-18 were presented.

World Soil Day

World Soil Day was celebrated on December 5, 2017. The programme was attended by about 400 farmers and participants from State Government, Private organizations, ICAR Institutes, Non-Government organizations, press and media. Smt. Rachna Meena, Chairperson, Krishi Sthayi Samiti, Jila Panchayat, Bhopal was the Chief Guest and Dr. AK Patra, Director, IISS, Bhopal was the Guest of honour and Expert.



Shri MS Devake, DDA & PD, ATMA, Bhopal addressed the gathering and highlighted the schemes of Government about soil testing aspect in particular and for the welfare of the farmers in general. This was followed by distribution of Soil Health Cards to the beneficiary farmers by the Chief Guest. Dr. AK Patra, Director, ICAR-IISS in his address explained that how the soil testing can help the farmers in judicious use of fertilizers to decrease the cost of production and to maintain the soil health for improving the productivity of the soil. He also explained the recommendations based on interpretation of the details of micro and macro nutrients percentage given in the soil health card reports.



Some other meetings/ events held during the quarter

- Mid-term review meeting of ICAR Regional Committee No. VII was held on November 10, 2017 under the chairmanship of Dr K. Alagusundaram, DDG (Engg), ICAR.
- Dr Anwar Alam, former DDG (Engg), ICAR and former Vice Chancellor, SKUAS&T visited the institute on December 27, 2017 and interacted with Director, Head of Divisions and Project Coordinators.
- Meeting of the Scientific Advisory Committee of KVK, CIAE was held on October 31, 2017
- Ekta Diwas was celebrated on 31 October, 2017
- Vigilance Awareness Week was celebrated during October 30 to November 4, 2017



Central Zone Sports Meet -2017

The ICAR- CIAE, Bhopal successfully organized the Central Zone Sports Meet-2017 during November 10-13, 2017. The Meet was inaugurated at ICAR-Central Institute of Agricultural Engineering, Nabi Bagh, Bhopal by Dr. K Alagusundaram, Deputy Director General (Agril. Engg.), ICAR, New Delhi. Dr Kanchan Kumar Singh, ADG (Farm Engg.), ICAR was the Guest of Honour. Dr KK Singh, Director CIAE presided over the function. The ICAR-CIAE, Bhopal organized the events at its own campus for the first time. 536 sportspersons from 18 ICAR Institutes of ICAR Central Zone located in nine cities of the Central Zone including New Delhi, Ludhiana, Nagpur, Indore, Pune, Raipur, Jabalpur, Maunath, and Bhopal participated in individual as well as team events organized for men and women, including athletics, football, kabaddi, basketball, volleyball (shooting and smashing), badminton, table tennis, carrom, chess etc.

Other dignitaries present during the Inagural Function included Dr. T. Janakiram, ADG (Horticulture), Dr. SK Singh, Director, NBSSLUP, Nagpur, Dr. AS Panwar, Director, IIFSR, Modipuram, Dr. VP Singh, Director, NIHSAD, Bhopal, Dr. AK Patra, Director, IISS, Bhopal, Dr. SD Sawant, Director, NRC for Grapes, Pune, Dr. KV Prasad, Director, Directorate of Floriculture, Pune, Dr. Major Singh, Director, NRCOG, Pune and Mr. Devendra Kumar, Director (Finance), ICAR, New Delhi.

The Indian Agriculture Research Institute (IARI), New Delhi won the overall championship by winning the Men's events including Badminton, Basketball, Football, Table Tennis, Volleyball (smashing) and Women's Chess. The host team of Central Institute of Agricultural Engineering (CIAE) was the overall runnersup and it won the events in Men's Volleyball(shooting) and Women's Badminton, Carrom, Table Tennis events. Individual championship in Athletics for men and women also went to IARI with Mr Rajendra Singh Sirari and Ms. Shivani Vidhuri winning most of the athletics events.

The concluding function of the sports meet was held on November 13, 2017. Dr. Nawab Ali, Former Deputy Director General (Engg), ICAR was the Chief Guest, who distributed prizes to the winners. Dr. KK Singh, Director, CIAE, presided over the function and lauded all the teams for demonstrating great sportsmen spirit during the event.



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Staff Promoted



Dr KP Singh
Principal Scientist
wef June 24, 2016



Dr T Senthilkumar
Principal Scientist
wef September 27, 2016



Dr KP Saha
Principal Scientist
wef November 1, 2016



Dr Dushyant Singh
Principal Scientist
wef November 5, 2016



Shri Ashish Roy
Asstt. Admin. Officer
wef November 1, 2017



Shri Sanjay Kumar Singh
Asstt. Fin. & Accts Officer
wef December 18, 2017

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Study Leave Granted



Er Ankur Nagori has been granted Study Leave for a period of three years wef 1 December, 2017 for pursuing Ph.D. from School of Energy and Environmental Studies, Devi Ahilya University, Indore.

PERSONNEL NEWS

CIAE bids adieu to superannuating staff

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

31 October, 2017

Shri SK Dwivedi, Chief Technical Officer
Shri HS Rathore, Technical Officer
Shri GT Daniel, Assistant Administrative Officer
Shri R.C. Siyote, Skilled Support Staff

31 December, 2017

Shri MS Dahel, Technical Officer



Shri SK Dwivedi



Shri HS Rathore



Shri GT Daniel



Shri MS Dahel

OBITUARY



Shri BK Effa, Technical Officer left for heavenly abode on October 27, 2017.

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