

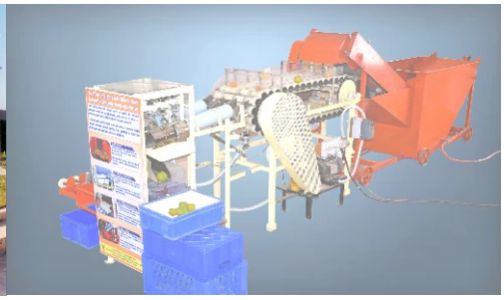

ICAR-CIAE NEWSLETTER

Modernizing agriculture through engineering interventions

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From the Director's Desk

Energy plays a key role in agricultural production and post-production activities, both directly as different forms of fuel for various purposes like operation of machinery, equipment, lighting etc, and indirectly for production of fertilizers and chemicals used in farm operations. India needs a secure, affordable and sustainable energy system to power effective economic growth. Currently the Indian energy system is majorly dependent on the use of non-renewable sources of energy like coal, oil and gas etc. The country faces a major challenge in meeting the energy requirements of Indian population especially those that involve in farm operations. These rural energy needs can be met using the local energy resources such as biomass energy which needs to be used effectively and efficiently using different technologies.

Renewable sources of energy (RES) are major components which will not only provide energy security but also reduce dependence on fast depleting fossil fuels with a positive environmental impact. Solar, wind, geo-thermal, bio-mass energy can fulfil around 33% of India's energy needs and 75% of the rural energy needs. According to the Central Electricity Authority of India, about 50% of the country's power supply will be generated by renewable energy sources by 2030. The nation needs effective use of renewable sources for enhanced energy use efficiency.

Solar energy can be used in rural India, especially for production agriculture. However, the fluctuating need of torque depending on the agricultural field conditions presents a major technical hitch. The use of batteries for storing and releasing power is another concern for long term use of solar photovoltaics (SPV) gadgets.

A GOI scheme on "Promotion of Agricultural Mechanization and Machinery for In-situ Management of Crop Residue" is being implemented in the states of Punjab, Haryana, Uttar Pradesh and NCT of Delhi from 2018-19 to 2020-21. Adding ex-situ management techniques would make these efforts more sustainable. Bio-CNG has emerged as an option for ex-situ management of crop residue. Bio-char generation, briquette production and conversion into bio-crude are three major options for value addition to crop residue. Bio-mass based electricity generation systems are already in use at national level. Thermo-chemical and bio-chemical conversion based electrical power routes are available and there is a need to promote these with better incentives.

ICAR-CIAE has developed gasification and pyrolysis systems, briquetting technologies, biomass based electricity generation systems etc. which effectively aid in the process of utilizing rural bio-mass and finally moving towards renewable energy self-sufficiency.

This issue of the newsletter focuses on research and development of farm equipment and machinery like integrated system for harvesting and conveying of bunch crops, induction based air assisted electro-static sprayer, girdling tool for litchi tree, tractor operated seeder for mat type paddy nursery, manual top opening system for small greenhouse, precision irrigation using sprinkler irrigation system etc. Seven technologies have been commercialized through licensing, while four patent and one copyright applications have been filed in this quarter.

ICAR CIAE organised a session on 'Automation of Farming System' under 'Precision Agriculture' in the Vaibhav Summit 2020 and KRITAGYA – A National Level Agtech Hackathon on Farm Mechanization. Vigilance Awareness Week and Swachhta Pakhwada were other important programs organised. In this quarter, 9 staff members were promoted in different categories and three colleagues superannuated.

As Director, ICAR-CIAE, I am happy to share this Newsletter for this quarter.

DIGEST

RESEARCH & DEVELOPMENT

Integrated system for harvesting and conveying of bunch crops

Harvesting of bunch crops (soybean, black gram, green gram etc.) is being carried out manually in some regions of country which require 18-25 man-days/ha. The manually harvested crops are collected at one point and threshed. Harvesting using conventional reaper or combine results in more losses due to the presence of pods close to the ground surface. Therefore, a tractor operated integrated harvesting-cum-conveying machine having cutter bar width of 2120 mm has been developed. It is a modified vertical conveyor reaper with an integrated conveying system for conveying cut crop to a collection box/trailer. The machine has been evaluated for harvesting of soybean, black gram and green gram crops. The average height of cut, effective field capacity and field efficiency of machine are 66-80 mm, 0.25 ha/h and 78 %, respectively at 1.5 km/h forward speed. The harvesting losses are 1.5 - 2.9 % for soybean, black-gram and green-gram crops. The approximate cost of the machine is ₹ 1.00 lakh and cost of operation is ₹ 711/h. The breakeven point (BEP) and payback period of machinery are 57 h/year and 1.7 years, respectively, when machine is operated at custom hiring rate of ₹ 1000/h for 200 h/year. The integrated harvesting-cum-conveying system can give economic benefit and time saving of 49 and 60 %, respectively in comparison to manual harvesting of bunch crops by sickle.

Induction based air assisted electro-static sprayer

Electro-static spraying reduces pesticide use by 50 % and enhances deposition efficiency as high

as seven times as compared to conventional method of spraying in row crops. It can even kill pests present on abaxial surface of the leaf imparting better pest control in the field. Therefore, an induction based air-assisted electro-static nozzle has been developed. It has a flow rate of 7.2 l/h and high voltage DC charging system to charge an electrode up to 10 kV. The air pressure of the nozzle is regulated at 300 kPa. The electro-static spraying system consists of base frame, petrol engine (0.75 kW), air compressor, spray tank, air filter, air moisture separator and spray gun with electro-static nozzle. The spray lance can be operated up to a distance of 10 m. The bio-efficacy of developed sprayer has been evaluated in cotton field for Aphids and Jassids. The bio-efficacy of an electro-static sprayer is 85 % for LN90 dosages of 0.15 ml/l on cotton Aphids and 92 % for LN90 dosage of 0.2 ml/l on Jassids. The percent coverage, VMD, spray deposits and volumetric spray deposition are 15 %, 159 micron, 67 deposits/cm^2 and 0.49 µl/cm^2, respectively.

Participatory promotion of climate smart agriculture machinery in selected village cluster of MP

Climate change affects crop production systems in many ways. In addition to this, old cultivation practices have exploited the limited natural resources like fertile soil, water and minerals. Thus, there is a need to promote climate smart agricultural machinery to overcome the adverse effect of climate change and degrading natural resources. In this context, a demonstration of climate resilient agricultural machinery was carried out to promote this system among

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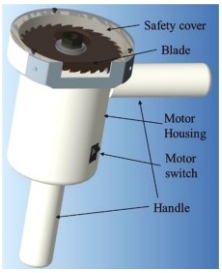
farmers. The identified climate smart machinery were roto-till-drill, broad-bed and furrow planter, laser land leveller, ridge and furrow planter and mole drainage technology. Roto-till drill has been demonstrated in rabi season, 2019 and BBF planter has been demonstrated in kharif season, 2020 for soybean crop. The energy uses efficiency (4.0) is higher for demonstration field using roto-till-drill in comparison to conventional field (3.6). The specific energy for roto-till drill and conventional farming systems are 5.5 and 6.1 MJ/kg of production, respectively. The total input energy in wheat production after adopting roto-till drill (21.1 GJ/ha) is about 39 % lower as compared to conventional practices (34.9 GJ/ha). The carbon emission in case of roto-till drill is 1670 kg of equivalent C/ha which is 9 % less in comparison to conventional practice (1834 kg of equivalent C/ha).



Girdling tool for litchi tree

Girdling is a selective wounding process that removes strips of bark of the litchi tree resulting in increased fruit size and yield of litchi. Traditionally, girdling is done with the help of simple

serrated knife or girdling knife and takes about 15 min to girdle a branch of litchi tree. Sometimes two to three branches of a litchi tree need to be girdled, requiring more time per tree. In order to mechanize this laborious process, a motorized girdling tool has been developed at ICAR-CIAE, Bhopal. It mainly consists of a circular blade to cut the wood bark from the tree, safety cover to protect the operator from rotating blade, handle and a 12 V battery-operated motor. The tool has been tested on litchi tree at ICAR-National Research Centre on Litchi, Muzaffarpur, Bihar. The observed girdling depth and width are 2-3 and 3-4 mm, respectively. The time taken to complete one girdling operation with the tool is 2-4 min as compared to 15 min with traditional knife. The motorised girdling tool saves time and reduces labour requirement and drudgery involved in girdling operation. It has also been demonstrated to litchi farmers in Muzaffarpur district for its popularization and adoption.

Tractor operated seeder for mat type paddy nursery

A tractor operated seeder for mat type paddy nursery has been developed by AICRP on FIM (PAU, Ludhiana centre). It lays polythene sheets on the field and prepares one meter wide soil bed with uniform seed placement in single pass of tractor. For placing soil over the polythene sheet, two soil cutting and conveying units are attached on both sides of the machinery. A screw conveyor is placed at the rear end of soil conveyors for conveying the soil over a sieving system, which is

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provided for removal of soil clods/foreign matter. The soil metering unit having fluted roller is attached below the sieving system. A seed metering box is fitted at the rear side of the machine to place seed over the soil mat. The power to rotating drives of the machine is provided from tractor PTO. The overall uniformity of seed spread and soil mat thickness with the tractor operated paddy nursery seeder are 92 and 89 %, respectively at a forward speed of 1.7 km/h. The effective field capacity of the machine for paddy seed nursery sowing is 0.11 ha/h. The machine has also been evaluated and demonstrated at farmers' fields.

Manual top opening system for small greenhouse

Greenhouses are used to grow crops under partial or fully controlled environmental conditions. It gives optimum growth and productivity during off-season cultivation of crops. During the summer season, opening and closing of top of the greenhouse is needed for maintaining proper temperature inside the greenhouse. For this purpose, a manually operated single point top opening system was

developed and installed in open-top greenhouse at the PFDC of institute. It consists of a winch machine with rope, pulley, movable unit and fixed stand. The fixed stand is mounted on the stable platform inside greenhouse. The movable unit is moved up and down on the fixed stand by using the winch machine and pulley. Other parts of the movable unit are attached to the top of greenhouse, so that top of the greenhouse is opened and closed. It is manually operated, low cost and low maintenance top opening system which is suitable for opening the top of greenhouse for ventilation. A person can open and close the top of greenhouse of 200 m^2 area from a single point using this system.

Precision irrigation using sprinkler irrigation system for wheat crop

Adoption of precision irrigation system is essential for expanding cultivable area and enhancing water use efficiency. Water management using precision irrigation is still in the developmental stage and requires lot of investigation. The field experiments with real time soil moisture sensor based sprinkler irrigation system were conducted for wheat crop at three irrigation depths (*i.e.* recommended irrigation depth (RID), 80% of RID and 120 % of RID) and varying bed elevations from 0 to 300 mm at an increment of 50 mm during three *Rabi* seasons (2017-18 to 2019-20). The study indicated a significant variation in average soil moisture values for the bed elevation of 100 mm or more as compared to control (normal bed level) at different physiological stages of crop

RESEARCH & DEVELOPMENT

under sprinkler irrigation in vertisols. The crop yield reduced significantly for bed elevation of more than 150 mm. Under sprinkler irrigation, the recommended irrigation water requirements (water depth/irrigation) with the system are 400 mm irrigation depth (ID) for flat bed, 476 mm ID for 200 mm bed elevation and 552 mm ID for 30 mm bed elevation to sustain the wheat crop yield under soil moisture variability in vertisols.

De-bunching tool for medicinal root crops

The roots of medicinal crops like *Safed Musli, Shatavari, Sarfaghandha* are in the form of bunch with its one end attached together. Separation of these roots into individual fingers is an important operation in their post-harvest handling and processing. In existing practice, the roots are separated by cutting with a straight knife and result in loss of useful part of roots. Therefore, a manual de-bunching tool has been developed. The tool consists of a platform and a cutting blade operated by handle provided with a hinge and spring arrangement. A cutting notch with adjustable guides is provided on the platform to hold the bunch. The curved C-type cutting blade with appropriate sharpness has been designed to minimize the loss of useful parts of roots. . The de-bunching capacity of the developed tool for *Safed musli* was 10.3 kg/h as compared to 5.1 kg/h for manual de-bunching without knife and 7.5 kg/h with knife. The percentage of separated roots and material loss were recorded as 84 and 16 %, respectively for de-bunching of *Safed musli* roots using the tool. The tool increases de-bunching capacity by 2.8 kg/h and reduces material loss by 4 % over traditional practice.

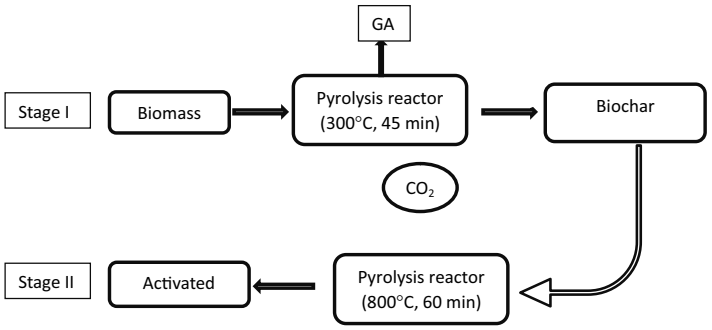
Manual grader for multiplier onion

Grading of agricultural produce according to their sizes adds value to the product and results in economic gain to the farmer during marketing. Grading is also a requisite of export market. The developed manual grader for multiplier onion consists of feed inlet, perforated drum, handle, shaft with bearing, collecting tray and supporting frame. The inlet for feeding the onion to the grader is at 30° slope. The length and width of the feed inlet are 350 and 50 mm, respectively. The grading drum is made of light weight transparent polycarbonate material of size 860 x 570 x 4 mm and provided with round holes of 25 and 40 mm diameter in size. A rotating handle is provided opposite to the feed inlet and attached to shaft mounted on bearings fastened on the main frame. The outlet of the grader is divided into three compartments at an inclination of 30° to achieve free flow of graded fraction. The capacity of grader is 200 kg/h with a grading efficiency of about 93 %. The cost of operation of the grader is ₹ 0.4/kg and results in saving of about 35 % compared to manual grading.

Process and protocol for activated charcoal from crop residue

To enhance the utility of crop residues, conversion of crop residues into value added products is being promoted at national level. One of these methods is to convert the crop

RESEARCH & DEVELOPMENT/ SUCCESS STORY



residues into activated charcoal. The crop residues generated from agricultural fields is a low cost material which can be used for production of activated carbon. Two step process and protocol to generate the activated charcoal from crop residues was developed at CIAE, Bhopal. The raw bio-material i.e. pigeon pea stalk was converted into valuable highly activated charcoal in two step process. In first step, the pigeon pea stalk was carbonized at 300 - 450° C and the carbon content was enhanced from 42-45 % (in raw material) to 71-80 % (char bio-materials). The volatile vapours were allowed to escape outside the reactor to enhance the absorbency. The carbonized pigeon pea stalk was then activated in second step under carbon dioxide environment at different temperature ranging from 600 to 900° C. The total carbon in the produced activated carbon (after second step) was in the range of 78 – 85%. The protocol for achieving best iodine and methylene blue values of 810 and 170 mg/g, respectively, was to execute the first step at 300° C and second step at 800° C. The methylene blue of produced activated charcoal was at par with that of commercial activated charcoal (180 mg/g). The production cost is ₹ 400-450/kg of charcoal which is 13-23 % cheaper than the laboratory grade granular (2.5 to 4.5 mm) activated charcoal (₹ 520/kg of charcoal).

SUCCESS STORY
Income generation through establishment of custom hiring Centres of Agricultural Machinery by farmers of Satna and Jhabua Districts of MP

Shri Pushpendra Bagri is a resident of village Unchehra in Satna district. He owns about 3.25 ha land. To augment his net income, he became interested in custom hiring business of agricultural machinery in his village and received training from ICAR-CIAE, Bhopal during March, 2020 after enrolling in entrepreneurship development programme with the Directorate of Agricultural Engineering, Government of MP. After completing the training successfully, he established the custom hiring business centre in April, 2020 with an investment of ₹ 23.0 lakh by taking loan from bank with 40% subsidy. In the beginning, he bought two tractors and a set of trolley, reversible MB plough, rotavator, raised bed planter, seed drill, straw reaper and cultivator. With active help from his family members, he is running day-to-day business of the custom hiring centre. He is renting out these machinery to farmers in his village and surrounding villages for cultivation of field crops like soybean, wheat, chickpea and other pulses. He has generated an income of about ₹ 7.0 lakh in a year with a net profit of about ₹ 3.5 lakh.

Similarly, Jitendra Rawat, a resident of village Navapada in Jhabua district, who owns about 3 ha land, received the same training from ICAR-CIAE, Bhopal. Subsequently, he also established his custom hiring business centre in April, 2020, with an investment of ₹ 13.8 lakh by availing loan facility from bank. He also purchased the same set of machinery as that of Shri Bagri of Satna district and started the business of the custom hiring centre by renting out these machinery among farmers in his village and surrounding villages for cultivation of field crops like soybean, wheat, chickpea and other pulses. He has generated an income of around 2.5 lakh in the year with a net profit of about ₹ 1.5 lakh.

TECHNOLOGY TRANSFER/ TRAINING

Patent Applications

Applications were filed for patenting of following four CIAE technologies:

- Plant detection based automatic fertilizer dispensing mechanism for spot fertilizer application suitable for widely spaced crops
- Straw cutting and handling mechanism for sowing/planting under combine harvested crop residue conditions
- Counter rotating cotton stalk puller cum chain conveyor with drum clearance adjustment mechanism
- OUAT black pepper thresher-cum-grader

Copyright Application

A copyright application for 'Software for Water Balance Simulation Model for Roof Water Harvesting' has been filed.

Soy-food Training Programmes for Upcoming Entrepreneurs

The Institute organized two 6-days soy-food training programmes for upcoming entrepreneurs (187th and 188th batch) during 23-28 November, 2020 and 28 December, 2020 - 2 January, 2021, attended by 27 participants. The training covered various aspects of soybean processing that included information on different soy based food products, preparation of soy milk and tofu, introduction to soy processing equipment, project planning, storage and packaging, marketing aspects of soy products and health benefits of soybean.

Technologies licensed

MOUs were signed for licensing of following 7 CIAE technologies

Name of Technology/ Know-How	Name of Contracting Party
1. ICAR -CIAE Tractor Operated Cassava Stake Cutter Planter	M/s Bhansali Agro Tech, Ahmednagar
2. ICAR -CIAE Nutri Bar	M/s DiTriRu, (Disabled, Tribal and Rural Manufacturer), Thane
3. CIAE Hand Held Vegetable Transplanter (Single row) 4. CIAE Hand Held Vegetable Transplanter (two row) 5. CIAE Manually Operated Portray Type Nursery Seeder 6. CIAE Manually Operated Pull Type Three Row Planter for Millets - Multi - Crops (Inclined Plate Type) 7. CIAE Manually Operated Pull Type Three Row Planter for Millets - Multi - Crops (Vertical Plate Type)	M/s Shree Ganesh Engineering Works, Kopargaon , Maharashtra

TRAINING/ TECHNOLOGY TRANSFER

KVK News

Trainings organized

KVK, Bhopal organized following training programmes during the quarter, participated by 279 participants.

- Training & demonstration of nursery raising on Soil Day programme at village Borkhedi (in collaboration with Reliance Foundation)
- Training programme for farm women on the occasion of Mahila Kisan Diwas (in collaboration with PD, ATMA, Solidaridad Network & FRS, Eintkhedi)
- Kishan Khet Pathshala, 2020 (rabi and summer): Training of Master Trainers (in collaboration with Zilla Panchayat & PD-ATMA, Bhopal)
- Training Programme for CEOs of FPOs from Bhopal and Sehore districts (in collaboration with Swami Vivekanand Shiksha Samiti (SVSS) and NABARD, Regional Office, Bhopal)
- Vermi-compost Production and Organic Farming for Women (in collaboration with NRLM, Bhopal)

On Farm Testing

On Farm Testing of following technologies were conducted at villages Sagonia and Kachhi Berkheda during *kharif/rabi* season (2020-21). The brief details are given below.

Crop/ Technology	Village	No. of OFT	Area (ha)	Yield (kg/ha)
Broad Bed Seed Drill for sowing of soybean at farmers' field (kharif season)	Sagonia	09	3.6	213
Strip Till Drill for sowing of wheat HI-1544 (rabi season)	Sagonia Kachhi-barkeda	05 06	4.4	-

Mahila Kisan Diwas

Mahila Kisan Diwas was celebrated on 15 October, 2020 at KVK, ICAR-CIAE, participated by 97 farm women from Kachhi Berkheda, Kham Kheda, Hinoti Sadak and Tilakhedi villages. Following short films were screened for the participants:

- Contribution of Women in Agriculture
- Role of Women in Processing of Fruit and Agricultural Produces
- Food and Nutritional Security for Farm Women

Kisan Diwas

National Farmers' Day (Kisan Diwas) was celebrated on 23rd December, 2020 to mark the birth anniversary of former Prime Minister of India, Late Shri Charan Singh by KVK, ICAR-CIAE. On this occasion, a programme was organized in which farmers and officials from various organizations like Solidaridad Network

TECHNOLOGY TRANSFER/ HRD

(NGO), NRLM Bhopal and IFFCO took part. Shri Sanjeev Singh, Area Manager, IFFCO was the Chief Guest of the programme. Shri Singh highlighted the necessity of cleanliness at farm level and judicious use of chemical fertilizer for crop production. He stressed on use of nano-fertilizers particularly nitrogen, zinc and copper for obtaining higher crop yield and improving soil biological health. On this occasion, two progressive organic farmers Shri Ashok Meena from Chandpur village and Shri Vishal Meena from village Karhaiya Shah were felicitated.

Live telecast of inauguration of Pradhan Mantri Kisan Samman Nidhi

The institute arranged live webcast/telecast of inauguration programme of Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) by Hon'ble Prime Minister Shri Narendra Modi for 110 farmers from Raipur, Sukaliya, Kachhi Berkheda, Bhairopura and Golkhedhi villages on 25 December, 2020. The programme was also attended online by institute staff members. On this occasion, IFFCO Nano-nitrogen was also distributed to the farmers.

Human Resource Development

Name	Training Title	Duration	Organized by
Adinath Kate	Green Perspectives in Food Processing Sectors	5-21 Oct, 2020	NIFTEM, Sonipat
SK Giri	MDP on "Priority Setting, Monitoring and Evaluation (PME) of Agricultural Research Projects"	12-17 Oct, 2020	ICAR-NAARM, Hyderabad
Subeesh A	FDP training on 'Artificial Intelligence'	23-27 Nov, 2020	AICTE Training and Learning Academy
D Agrahar Murugkar	General Management Programme for Women Scientists (DST sponsored)	23 Nov- 4 Dec, 2020	DST, New Delhi
B Jyoti	Nature inspired optimization techniques	1-10 Dec, 2020	IIT, Roorkee
R Naik	Management Development Programme on Leadership Development (a pre-RMP Programme)	8-19 Dec, 2020	ICAR-NAARM, Hyderabad
UR Badegaonkar	Climate Change: Challenges and Response	14-18 Dec, 2020	Lal Bahadur Shastri National Academy of Administration, Mussoorie
Ajita Gupta	DST training programme on "Internet of Things (IoT)" for Women Scientists and Technologists	14-18, Dec, 2020	ESCI, Hyderabad

AWARDS/ PUBLICATIONS

Awards/Recognitions

Dr. T. Senthilkumar, Principal Scientist, was awarded Leadership Award by Soil Conservation Society of India during the online conference held on 29 December, 2020.

Dr. R.K. Singh, Principal Scientist was appointed as the Subject Editor of Soil & Water Conservation Engineering by the Editorial Board of Pantnagar Journal of Research.

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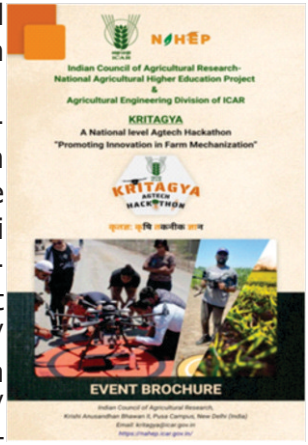
KRITAGYA - A National Level Agtech Hackathon on Farm Mechanization



Promoting farm mechanization has been emphasized by Hon'ble Prime Minister, Shri Narendra Modi for exploring young India's talent and innovation concepts/ ideas to provide them a platform for showing/ improving their ideas at large scale. The KRITAGYA **- A National Level Agtech Hackathon for "Promo-ting Innovation in Farm Mechanization"** was organized by NAHEP and Agricultural Engineering Division. ICAR-CIAE, Bhopal conceived the theme areas and problem statements and prepared draft brochure/guidelines. The institute organized the event as a member of National Steering Committee and Co-chairman of Central Zone Zonal Committee. The institute constituted organizing committee of Central Zone and evaluated 100 proposals by an expert panel in first phase and 17 in second phase and recommended 5 entries for final national level.

Vigilance Awareness Week

The Institute celebrated the Vigilance Awareness Week with the theme "*Satark Bharat, Samriddh Bharat* (Vigilant India-Prosperous India)" during 27 October to 2 November, 2020 with great

enthusiasm and active participation. Integrity pledge was administered to the staff of the Institute by the Vigilance Officer, Dr. R.S. Singh, Principal Scientist on 27 October, 2020 through online video-conferencing. To mark this week, posters and banners were placed at various important locations at the institute. As part of outreach activity, an online debate programme on the topic "*Satark Bharat, Samriddh Bharat*" was organized at M.K. Ponda College of Business & Management, Bhopal in which 10 students participated and five students were awarded. A debate programme was also organized for officials of the Institute on the same theme and winners were awarded. The institute had also taken up internal inspection of records of activities related to land and asset management, outsourcing of services, complaints handling mechanism, etc. The concluding programme was organized on 2 November, 2020. Shri Rajiv Kumar Rishi, Deputy Superintendent of Police, CBI Training Academy, Ghaziabad was the Chief Guest and delivered a talk on "Vigilance and Corruption" to sensitize institute staff about importance of vigilance for nation building. Dr. C.R. Mehta, Director, ICAR-CIAE in his address

EVENTS

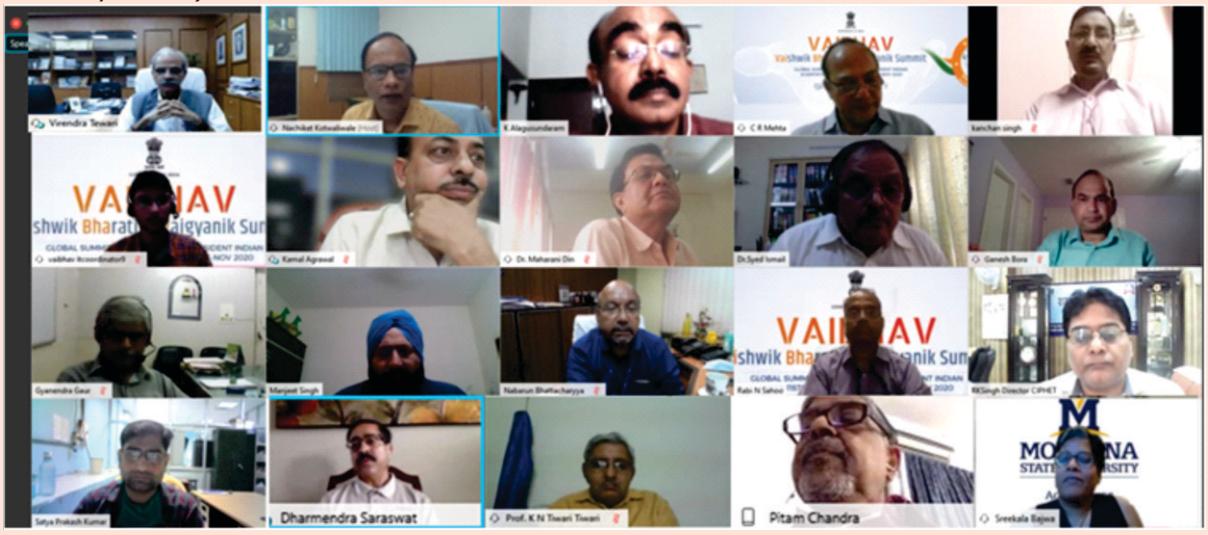
Vaibhav Summit 2020 - Automation of Farming System

VAIBHAV (Vaishwik Bharatiya Vaigyanik) **Summit** 2020 aims to give an impetus to the objectives of Atal Innovation Mission by leveraging the collaborative experience and deep expertise of International and Indian subject experts. In the VAIBHAV Summit - 2020, one of the major aim was to identify knowledge gap, futuristic research areas and possible collaboration under theme "Agro Economy & Food Security" for "Aatma Nirbhar Bharat".

A session on "Automation of Farming System" was organized under "Precision Agriculture" on 6 October, 2020 by ICAR-CIAE. The session was chaired by Dr. K. Alagusundaram, DDG (Engg.), ICAR; co-chaired by Dr. Kanchan K Singh, ADG (FE), ICAR and moderated by Dr. C.R. Mehta, Director, ICAR-CIAE, Bhopal. The presentations and deliberations were made by eminent scientists from India and overseas covering various important aspects of Automation of Farming System viz. robotics, drones, precision input management, protected cultivation, livestock management, artificial intelligence, IoT, etc. The event was attended by 856 participants including 33 panellists from India and abroad. The session was coordinated by Dr. Nachiket Kotwaliwale, ICAR-CIAE, Bhopal.

Different deliberations of the panellists and the session officials led to identification of following areas for possible collaboration and exchange for research, training etc.

- AI and IoT applications for livestock management (breeding, milking, phenomics, comfort)
- Drone in agriculture (development, application, regulations)
- Precise input management through VRT (map-based and sensor based)
- Artificial intelligence, big data management for affordable robotics application for small Indian farms
- Automation in covered cultivation especially for high value crops (vertical farming, hydroponics, integrated systems).



appealed all the staff to be vigilant in day to day official and personal activities and follow various Code of Conduct, which can eradicate corruption and lead to a prosperous India.

Mid-Term Review of AICRP on FIM

The second phase of Mid-Term Review Meeting of AICRP on FIM was conducted on 29 October, 2020 with a view to monitor the progress of cooperating centres of AICRP on FIM. The review meeting was conducted under Chairmanship of Dr. K Alagusundaram, DDG (Agril. Engg.), ICAR, New Delhi and Co-chairmanship of Dr. Kanchan K Singh, ADG (Farm Engg.), ICAR, New Delhi. Dr. C.R. Mehta, Director, ICAR-CIAE, Bhopal coordinated review of the AICRP. During the Technical Session-II, performance of 10 R&D centres (Barapani, Bhopal, Coimbatore, Hisar, Hyderabad, Junagadh, Kharagpur, Ludhiana,

EVENTS/ DISTINGUISHED VISITORS

Rahuri and Udaipur) was reviewed. Besides presentation by FIM Centres, Dr. C.R. Mehta, Project Coordinator, AICRP on FIM also presented Project Coordinator's report on overall progress of work done under the scheme during last 8 years and proposed programme for next 5 years.

Webinar Series

ICAR-CIAE RC, Coimbatore organized the Webinar Series on different topics related to mechanization and processing of food crops. Following four talks were delivered by the scientists of the centre in the month of October 2020. A total 1326 participants across the country participated in these webinar lecture series.

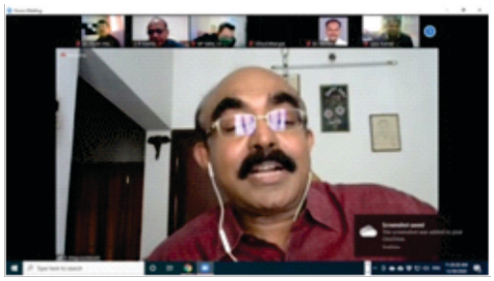
Speaker	Topic
Dr. S. Aleksha Kudos	Quinoa - A new generation plant
Dr. R. Senthilkumar	Gender and Pandemic: Skill Upgradation of Farm Women for Livelihood
Dr. R.H. Sadvatha	Turmeric processing: A spice to boost immunity
Dr. S. Syed Imran	Automation in Agricultural Mechanisation

Swachhta Pakhwada

Swachhta Pakhwada was organized by institute during 16-31 December, 2020. The programme was inaugurated by Dr. C.R. Mehta, Director ICAR-CIAE, Bhopal on 16 December by taking oath of cleanliness by the staff of the institute. A tree plantation campaign was also organized on this occasion. Some of the programmes organized during the *pakhwada* were:

- Organic waste management and green energy technology at village Kachhi Barkheda
- Proper garbage disposal, water conservation and its recycling at a residential colony near CIAE campus
- Poster competition on the topic "Wealth from Waste".
- Speech competitions on the topic "Effect of Swachh Bharat Mission" and "Rural cleanliness and green technologies"
- Kisan Diwas
- Cleanliness campaign at market place near the Institute.
- Online poster competition for school children of Red Rose School, Lambakheda to create cleanliness awareness amongst them
- Various activities were also organized at Regional Centre, Coimbatore

On 30 December, 2020, DDG (Engg), Dr. K. Alagusundaram addressed the staff of the institute. He advised everyone to adopt cleanliness in their personal lives.



DISTINGUISHED VISITORS

Visit of MP State Horticulture & Food Processing Minister

Shri Bharat Singh Kushwah, Cabinet Minister for Horticulture & Food Processing, MP State visited ICAR-CIAE, Bhopal on 29 December, 2020 with an objective to identify machinery for horticultural mechanization and processing which can be included in MP State subsidy schemes. The overall activities of the Institute and AICRPs including machinery and technologies related to horticulture and processing were presented by Dr. C.R. Mehta, Director, CIAE. After the interaction meeting, the Honourable Minister was demonstrated horticulture machinery and processing technologies developed by the institute. He

DISTINGUISHED VISITORS/ NEWS FROM PERSONNEL

showed interest to include Tractor operated garlic planter, Onion transplanter, Inclined plate planter, Pneumatic planter, Platform for orchard management, Garlic stem & root cutter, Onion detopper, Modular onion storage structure, Ripening chamber, etc. in state subsidy schemes for the benefit of Madhya Pradesh farmers. The minister appreciated the technologies and processes developed by the institute and instructed the state officials for long term association with ICAR-CIAE, Bhopal.

Visit of CGM, NABARD

Smt. TS Rajgiri, Chief General Manager, NABARD visited the Institute on 1 October, 2020 to see equipment and technologies developed by the institute and have collaboration for joint organization of training programmes.

STAFF PROMOTED

Dr. C.K. Saxena
Senior Scientist
wef 26 June, 2014

Dr. M.M. Selvan
Principal Scientist
wef 4 July, 2018

Dr. S.K. Chakraborty
Principal Scientist
wef 14 June, 2018

Dr. D. Mohapatra
Principal Scientist
wef 15 June, 2018

Dr. R. Senthil Kumar
Senior Scientist
wef 21 April, 2018

Dr. Sandip Mandal
Senior Scientist
wef 13 Feb., 2019

Smt Premlata Verma
Assistant
wef 5 Dec., 2020

Smt Vijaylata Minj
Assistant
wef 5 Dec., 2020

Shri R.K. Hedau
Assistant
wef 5 Dec., 2020

NEWS FROM PERSONNEL

Selection

Dr. Nachiket Kotwaliwale, Principal Scientist & Head, Agro Produce Processing Division of the Institute joined as Director, ICAR-Central Institute of Post-Harvest Engineering & Technology (CIPHET), Ludhiana on 12 October, 2020.

STAFF SUPERANNUATED

Dr. L.K. Sinha
Principal Scientist
31 October, 2020

Shri K.P. Debnath
T-5 (Technical Officer)
31 December, 2020

Shri S.K. Mansoori
T-5 (Technical Officer)
31 December, 2020

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