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From the DG's Desk

Dear Readers,

Among several sources of renewable energies like solar, wind, small hydro, biomass plays a key role in catering of energy requirements of rural India. Biomass is an organic matter derived from wood, agricultural residue, and animal waste; biomass is an abundant, naturally occurring source of energy, and one that is also carbon-neutral, i.e., it generates an equal amount of carbon dioxide that it consumes. While biomass energy in the form of fuelwood and dung have had a long history of fulfilling humanity's basic lighting, heating, and cooking needs, its potential as a source of electricity has been steadily developed since the oil crisis of 1973.

As a result of fourfold increase in agricultural production since 1951, large quantity of crop residues are produced some of which have become surplus to their traditional uses as animal feed, domestic fuel, construction material, etc. The annual surplus of crop residues in India estimated at 70 million tonnes per year is burnt on-farm. Punjab alone burns about 14 million tonnes of paddy straw during October month each year. There is a general desire to restrict and even stop the practice of uncontrolled burning of rice straw because it causes serious air pollution. Paddy straw has high cellulose and hemi-cellulose content and low lignin content. Collection and disposal of this straw which is spread thinly over large harvested area poses a practical problem. Most of this surplus, which is now wasted, could serve as a source of energy generation in the form of methane rich biogas or liquid transport fuel (alcohol).



India has high potential of 18 GW of energy from Biomass. The government of India plans to add 175 GW by year 2022 from renewable energy sources. Of these, 100 GW will be from solar energy, 60 GW from wind energy, 10 GW from small hydropower, and 5 GW from biomass based power projects. At the end of first quarter of 2017, about 59 GW were installed as per MNRE, Govt. of India reports. The total potential for renewable power generation in the country as on 31 March 2017 was estimated at 10,01,132 MW (Energy Statistics, 2018, MSPI Government of India). Of these, 18,601 MW (1.86%) is produced from biomass power, 7260 MW

(0.73%) from bagasse-based cogeneration in sugar mills, and 2554 MW (0.26%) from waste to energy. India has huge potential to generate energy from bio resources but these resources were not utilized properly as compared to other renewable energy sources.

Out of a total of 199,877 MW of installed capacity in the country, biomass accounts for 3095 MW. This includes 1952 MW of grid-connected cogeneration from bagasse, and 1143 MW of biomass-based power from agro residues. A bulk of this capacity is from combustion technology. Power generation through biomass gasification contributes 148 MW, chiefly in off-grid rural and industrial settings. Clearly, when contrasted with its estimated potential of 18,000 MW annually, bioenergy is some distance from achieving its promise in India. This under performance is due to several barriers - technical, institutional, regulatory, and financial. One of the biggest hurdles is continued absence of demonstrated operational feasibility and financial viability.

Bioenergy is produced either through combustion, where biomass is burned to generate heat that is, in turn, used to generate steam and then converted to electricity (much like coal is used in thermal power stations); or through gasification, which is a thermo-chemical conversion of biomass into a combustible gas mixture (producer gas) that fires in engines or in turbines generating electricity. Typically, power plants with installed capacities of 2 MW and above produce electricity through combustion. Gasification to electricity, on the other hand, is a relatively newer development which opens up possibilities for small-scale (a few kilowatt- to megawatt-scale) biomass power projects. While the technology of gasification is not new, its application to produce bioenergy has been pioneered in large part by Indian scientists and entrepreneurs.

Government of India has prepared a strategic action plan for product development and commercialisation of bioenergy technologies. Ministry of New and Renewable Energy is currently implementing bio-energy technologies through various schemes including family size biogas plants through National Biogas Manure Management Programme and promoting and providing subsidiary incentives for the installation of various off grid decentralized renewable energy projects. Biomass based heat and power projects, industrial waste to energy projects for meeting captive needs and biomass gasifiers for rural and industrial energy applications have been promoted for implementation. Four sets of programmes are being implemented with the aim to generate competitively priced bio power and/or heat from agricultural, agro-industrial residues and plantations and urban and industrial wastes. These are biomass power, bagasse cogeneration, non-bagasse cogeneration, biomass gasifier and urban and industrial waste management, etc.

Ministry of New and Renewable Energy (MNRE) has taken up initiatives on research and development of biofuel production technologies. Government of India

announced national policy on biofuel technology in December 2009 which was further revised and appeared as National Biofuel Policy of India. The major goals of the policy are development and utilization of indigenous non-food feedstocks raised on degraded or wastelands, thrust on research and development on cultivation, processing and production of biofuels and a blending mandate of 20% Ethanol and bio-diesel. The objective of biofuel programme is to support R and D, Pilot plant/ demonstration projects leading to commercial development of second generation biofuels. The Ministry supports R and D projects for development of technologies for production of biofuels through biogas, pyrolysis and gasification, besides promoting deployment of technologies for pilot and full-scale projects on biofuels in general.

It is now widely believed that 100% rural electrification requires solutions beyond grid electricity, which is always going to be diverted first to serve the ever hungry urban and industrial clusters. The environmental cost of this is an added concern, considering the majority of grid power in India is generated through coal use. In such a scenario, bioenergy - which is carbon-neutral, amenable to off-grid power generation, and operable at sub-megawatt capacities - is an eminently viable solution. Because energy demand in villages is characterized by dispersed and low load density, and with adequate potential for biomass plantations, bioenergy seems tailor-made for rural energy requirements. Bioenergy technology has not elicited significant interest from investors, curtailing the flow of funds for development and replication. Bioenergy has to eventually compete in an energy market against subsidized grid electricity and fossil fuels. This has placed bioenergy at a competitive disadvantage, which has further acted as a barrier to its widespread adoption. The steps to be implemented for ensuring energy access to rural India through cleaner technologies necessitates promoting decentralized modes of power generation from biomass fuels. Capacity building in local institutions to manage demand and supply of rural integrated energy systems is essentially required.

Government of India has to increase investment in implementation of biomass gasification based power plants, biomass briquet production and utilization in existing coal based power production plants, utilization of domestic as well as industrial biodegradable waste for biogas production, bio-CNG production and its utilization for vehicular application, bioethanol production from agro-residues, and its utilization for vehicular application etc. Therefore, it is peak time to develop a policy to support utilization and management of agricultural crop residues. The government needs to increase an investment to increase bioenergy production plants in different states to overcome stubble burning issue.



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WORKSHOPS, MEETINGS, SEMINARS, CONFERENCES, SYMPOSIA

90th AGM - 2019

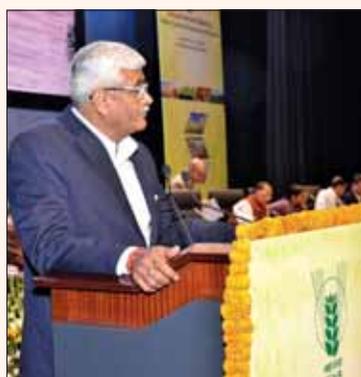
New Delhi, 28 February 2019. The Indian Council of Agricultural Research, New Delhi organized the 90th Annual General Meeting of the ICAR Society at National Agricultural Science Centre Complex, New Delhi.

In his address, Shri Radha Mohan Singh, Union Minister of Agriculture and Farmers' Welfare applauded the construction of Bharat Ratna C Subramaniam Auditorium at NASC Complex, New Delhi. The Minister mentioned that the newly built auditorium with a capacity to accommodate 1,200 persons is equipped with all the modern world-class facilities. The Minister congratulated the ICAR for its 90th successful year. The Minister applauded the conferring of Padma Sri Awards to 12 farmers including 2 women farmers by the government for their outstanding contributions in the field of agriculture and farming.



Shri Radha Mohan Singh mentioned the government's initiative to give ₹ 6,000 to small and marginal farmers' families having a combined landholding and ownership up to 2 ha under the government's "Pradhan Mantri Kisan Samman Nidhi" scheme.

Shri Gajendra Singh Shekhawat, Union Minister of State for Agriculture and Farmers' Welfare also lauded the role of agricultural scientists in developing the farmer-



friendly technologies and helping in empowering poor farmers of the country to now become self-dependent.

Dr. Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) presented the Year

Report and briefed about various achievements made in the Financial Year - 2018 to 2019. In his address, Dr Mohapatra mentioned about the introduction of more than 400 crops varieties. He also highlighted the felicitation of stakeholders for the registration of 15 new breeds of livestock and poultry. He discussed ICAR's initiatives and advancements made in agricultural technologies with the help of global networking.

The Director-General, ICAR mentioned about recent ventures of ICAR in forms of Memorandums of Understanding signed between ICAR and the various other Organizations namely Department of Biotechnology, CSIR ILRI, etc.



He said that around 100 plus Mobile Apps have been developed for farmers' outreach which depicted considerably good results in helping the farmers to avail the latest technologies in their agricultural fields. The occasion marked the releasing ceremony of "Textbook of Basic Concepts of Weed Management" and "Textbook of Basic Concepts of Daily Microbiology", etc., by dignitaries.

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"Per drop, more crop can become our mission"

— Narendra Modi

Annual Group Meeting of ICAR-AICRP on Pearl Millet

New Delhi, 15 March 2019. Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) inaugurated the “54th Annual Group Meeting of ICAR-AICRP on Pearl Millet” at Dr BP Pal Auditorium, IARI, New Delhi.



Dr Mohapatra, emphasized on contributions made in the research works by each and every individual is important. He urged scientists and researchers to give due importance to contributions made by their co-workers. He urged scientists from various agricultural and allied sciences’ backgrounds to maintain a proper record of their valuable researches by promptly



documenting them. He said that this would be helpful to pass on their research expertise to the young researchers and scientists for understanding the various issues related to their particular fields promptly and effectively.

Stressing on the phenomenal changes in the climatic conditions in the country, he said that scientists must come out with prompt actions that can be taken in order to maintain and retain the nutritional values of the crops more efficiently and effectively.

Dr AK Singh, DDG (Agricultural Extension) and Director, IARI highlighted that till date, around 16 hybrids/composites of Bajra (Pearl Millet) have been developed. He said that this is the sole responsibility and duty of scientists and researchers to maintain quality of crop. The designated scientists and farmers should also maintain the quality of the storage system of the pearl millet which will result in retaining natural nutritional values of the crop.

Dr RB Singh, Former President, NAAS said that the Pearl Millet is the real pearl for the farmers of the country. He stressed that the malnutrition is one of the major problems of the country and requires prompt attention to address it. He said that nutrient rich millet is

necessary for a good and healthier life.

Dr C Tara Satyavathi, Project Coordinator, ICAR-AICRP on Pearl Millet, Jodhpur highlighted the main nutritional values of Millet and its health-related advantages. Dr Satyavathi said that the crop occupied 7.4 million ha with an average production of 9.13 million tonnes and productivity of 1237 kg/ha during the Year 2017-18 (Directorate of Millets Development, 2019 Project Coordinator Review, 2019).

She said that ICAR-AICRP on Pearl Millet is committed to pearl millet improvement through research, technology generation and transfer. Dr Satyavathi highlighted that Pearl Millet is one of the first crops where MAS strategies and tools have been applied for developing the “Improved HHB-67”.

She underlined that the ICAR-AICRP on Pearl Millet is actively collaborating as technology and knowledge partner in several new research initiatives namely UNEP-GEF Project, Millet Mission by NFSM, Niche Area of Excellence (NAE) Programme from ICAR, ICAR-BMGF Project, etc.

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Awareness-cum-Inception workshop

Bhubaneswar, 4 January 2019. The ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar organized one-day Awareness-cum-Inception Workshop on CIFABROOD™ under NFDB funded (NFDB-CIFABROOD™) demonstration project at the conference hall, Meen Bhavan, Ulubari, Guwahati, Asom.



The workshop was organized in collaboration with Directorate of Fisheries, Department of Fisheries, Government of Asom. Shri PN Das, (ACS) Director of Fisheries, Asom, shared his concerns about inability to provide the good quality of fish seeds at proper time to the fish farmers when the state is already producing ~ 800 crore fish seed/fry annually.

An interaction session was held for clarifying doubts of hatchery owners in different aspects of CIFABROOD™ applications, their availability and costs and queries about the possibility of getting the feed on subsidy to senior executive, NFDB were also discussed.

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Workshop of AICRP on Farm Implements and Machinery

Rahuri, 8 January 2019. The 33rd workshop of AICRP 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 MPKV. The meeting was attended by around 75 participants from Research and Development organisations from different SAUs, ICAR institutes, and farm machinery manufacturers etc.

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 highlighted the importance of mechanization in present context and appealed the PIs of the project to accelerate their efforts in delivery of technologies.

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Interactive Session at ICAR-NAARM

Hyderabad, 9 March 2019. Shri Gajendra Singh Shekhawat, Union Minister of State for Agriculture and Farmers' Welfare, participated in the Interactive Session held at ICAR-NAARM.

Shri Shekhawat also had an interactive meeting with the farmers, farmer associations, scientists of all the ICAR Institutes, officials, students, start-ups and State Agri-Allied Sector Universities, etc., located at Hyderabad. He highlighted that the market infrastructure, farmer centric crop insurance, Minimum Support Price, support to organic farming including input cost, organic produce market, area based drip irrigation subsidy considering the climatic factors, promotion of integrated farming system, inclusion of agriculture in MNREGA, FPO promotion,



village agri-clinics, PM Kisan Samman Nidhi Yojana, etc., are the issues that prove helpful in making the agriculture to be profitable. Besides this, they are also helpful to intensify the awareness among the farmers about the various government schemes. The Minister also released a NAARM hindi publication titled "AgRIM" during the occasion.

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Scientist-Entrepreneur meet on camel leather and bone products

Bikaner, 24 February 2019. The ICAR-National Research Centre on Camel, Bikaner organized a "Scientist Entrepreneur Interactive Meet for value addition of leather and bone obtained from Camel"



at its campus.

Dr RK Sawal, Director, ICAR-NRC on Camel said that besides being popular the camel leather is specially processed to be used for the traditional Usta Art of Bikaner. The main aim of the meeting was to address the issues of rising demand and the expectations for quality products. The scientists of the Centre and ICAR Institutes at Bikaner attended the meeting.

The entrepreneurs and artisans exhibited the various products namely bags, belts, caps, different kinds of leather purses, folder bag, different kind of shoes etc., prepared from camel bone.

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Ranching-cum-Mass awareness programme at Kumbh Mela

Allahabad, 26 February 2019. The ICAR-Central Inland Fisheries Research Institute organized a Ranching-cum-Mass Awareness Programme at Kumbh Mela, Sangam, Allahabad.

Shri Prashanna Kumar Patshani, Member of Parliament and Chairperson of Parliamentary Committee on Official Language appreciated the noble cause of the mission *Namami Gange* and briefed the mandate of the *Namami Gange* Project. He expressed concern that river Ganga is facing threat like industrial and sewage effluents, abstraction in flow of water through constructions of dam and barrages, pollutant discharge, damage of basin that is affecting the ecosystem's health and loss of biodiversity. He expressed deep concerns for restoring the availability of indigenous fish in the entire stretch of river Ganga through the technology and policy initiatives.

He inaugurated the releasing of 15,000 wild stock advance fingerling of the Indian major carp at the point of Sangam Nose, Prayagraj.

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National Group Meeting of AICRP

Raipur, 26 February 2019. The National Group Meeting of the All India Coordinated Research Project on Forage Crops and Utilization was inaugurated at Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh).

Dr SK Patil, Vice Chancellor, IGKV, Raipur highlighted the need of forage resources and improved technologies for enhancing the livelihood options and increasing the farmer's income in Chhattisgarh.

Dr Vinay Jaiswal (MLA, Manendragarh, Chhattisgarh) and Smt Anita Yogendra Sharma (MLA, Dharsiwan, Chhattisgarh) highlighted the importance of forages and animal husbandry especially with reference to Chhattisgarh. They briefed about the state government policies to develop cow shelters and grassland in each village panchayat which is being implemented. They emphasized on the use of technologies developed by research organizations to produce more forages for these livestock. The need of conservation of surplus fodder for lean period was also highlighted.

Various publications were released which included the Annual Report of AICRP on Forage Crops and Utilization, and extension bulletins in regional languages by different AICRP centers. Certificates of appreciation were awarded to BCKV, Kalyani and IGKV, Raipur AICRP centers for their outstanding contribution. Fourteen varieties in 9 forage crops

including cultivated forage crops, range grasses and legumes were identified for release in different zones of the country.

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National Consultation on Application of ICT in Agriculture

New Delhi, 6 March 2019. The Indian Council of Agricultural Research, New Delhi organized a one-day "National Consultation on Application of Information Communication Technology in Agriculture".

Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) said that over one billion mobile users in the country provide opportunity to scientists in using ICT in agriculture for intelligent farming and post production management of the produce. The Director General stated that there is a bright future for emerging areas of ICT such as artificial intelligence (AI), block chain technology, Internet of Things (IoT) cloud computing and sensor-based precision farming in agriculture in the country.



Dr Mohapatra said that pan-India presence of ICAR Institutes and KVKs provide ICAR with a unique strength in developing the ICT interface with plants, animal, man and machine. He also urged experts to develop pilot projects to standardize protocols of AI and sensor-based precision farming.

The Director General shared his concerns about the deteriorating conditions of the natural resources that calls for producing more from less by the adoption of smart agricultural practices. He said this marks the forthcoming technological revolution in agriculture that encompasses the use of IoT for ubiquitous data gathering, use of connected farm machineries for variable rate application of water and fertilizer, use of big data analytics for informed decision making and timely responsiveness.

Dr Mohapatra also instructed to form an expert committee on application of ICTs in agriculture and organise meetings regularly to expedite the development in their areas. He emphasized that the aim of future projects should be on developing IoT-based data acquisition and cloud-based data analytics platform for the agriculture sector for expediting the

adoption of Smart Agriculture in the country. Mr. Himanshu, Scientist ICAR informed that it is for the first time that all computer applications scientists of ICAR have gathered for national consultation on emerging ICTs in agriculture. A team of more than 100 computer scientists and experts from ICAR participated in the meeting and deliberated upon the application of Information Communication Technology in Agriculture.

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ICAR-AICRP on fruits organizes Sixth Group Discussion

Jorhat, 14 February 2019. The ICAR-All India Coordinated Research Project on Fruits organized the Sixth Group Discussion at Assam Agricultural University, Jorhat.

Dr KM Bujarbaruah, Vice-Chancellor, Assam Agricultural University, Jorhat, underlined the horticulture sector's success to increase the horticulture crops' production in the recent years. He also stressed on the need for a sustainable system. Dr Bujarbaruah also accentuated the need for quantifying the ICAR-AICRP's contribution for the success in horticulture sector.



Dr WS Dhillon, ADG (Horticultural Science - II), ICAR stressed on the need to have research programmes on rootstocks, High Density Planting coupled with suitable training system and ways for reducing the juvenility in fruit crop production system. He also emphasized the need for narrowing down the gap in research results' availability and their application in farmers' field.

Dr BMC Reddy, Former Vice-Chancellor, DRYSRHU briefed about AICRP's historical background of fruits along with its impact in different parts of the country with regard to spread of technologies.

Dr Prakash Patil, Project Coordinator, ICAR-AICRP on Fruits, presented the progress of work done at the participating centres on nine fruit crops (mango, citrus, banana, guava, litchi, grapes, papaya, sapota and jackfruit).

A monograph on insect pests of sapota in India along

with several other extension folders on different aspects of production and protection technologies of fruit crops were also released during the occasion. A promising banana grower, Shri Devabrat Rabha from Madang village, Goalpara (Assam) was felicitated during the event for his effort in earning a profit of ₹ 1 crore by adopting the improved technologies that proved helpful in providing the employment opportunities to the rural youth. A total of 200 delegates from all the coordinating centres including farmers attended the event.

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Annual review workshop of network project

Udaipur, 7 February 2019. The Maharana Pratap University of Agriculture and Technology (MPUAT), Udaipur organized the Sixth Annual Review Workshop of Network Project on Conservation of Lac Insects Genetic Resources (NP-CLIGR) at its campus.

Chief Guest, Dr KK Singh, ADG (FE) highlighted the importance of conserving bio-resources of the country. He also advised for intensifying and diversifying all the research and development activities and creating enabling across whole value chain. Dr Singh briefed about AICRP and AINWP projects in ICAR and urged to provide the concise output to the Council and policy makers.

Dr KK Sharma, PC, NP-CLIGR and Director, ICAR-IINRG shared his concern on depletion of lac insect biodiversity throughout the country. He also accentuated on *ex-situ* and *in-situ* conservation of lac insect, creating co-operating centres considering agro-ecological zone, the importance of lac in various fields especially in providing livelihood support to tribals and rain-fed farming community.

The occasion also marked the releasing ceremonies of various publications, viz., "Ber par lac ki kheti" and Status of lac insect and host in Arid Western Plain of Rajasthan by MPUAT, Rajasthan; Bulletin on "Economic analysis of lac insect on *semialata* in Assamese language by AAU, Jorhat .

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Workshop of Farmer FIRST and ARYA

Ludhiana, 9 February 2019. The ICAR-Agricultural Technology Application Research Institute, Ludhiana organized the Zonal Review Workshop of Farmer FIRST Programme (FFP) and Attracting and Retaining Youth in Agriculture (ARYA) for reviewing the activities conducted during the Year 2018-19 under Zone-I.

Dr R Parshad, Former Assistant Director General (Agricultural Extension) stressed on the involvement of farm families selected under the programme as

active partners at every stage for improving the livelihood security in a sustainable way.

Dr Rajbir Singh, Director, ICAR-ATARI also accentuated on promoting income generating activities, resource conservation technologies, diversification and intensification to double the farmers' income.

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Group Meeting on Arid Zone Fruits

Parbhani, 23 February 2019. Annual Research Workers Group Meeting of ICAR-All India Coordinated Research Project on Arid Zone Fruits was held at Vasantrya Naik Marathwada Krishi Vidyapeeth, Parbhani (Maharashtra). The 95 scientists of all centres, guests

and university officials attended the 3-day meeting in which research workers presented their achievements and finalized the technical programme for the next year (2019) of present and future.

Dr WS Dhillon, ADG (Horticultural Science), ICAR, New Delhi stated that the AICRP system contributed a lot in the progress of the horticultural scenario. He said that horticulture is a vibrant sector and suggested that efforts should be concentrated on quality production for export destinations. He said that, productivity can be enhanced through use of authentic disease free quality planting material alongwith water and canopy management of the arid fruit crops. Dr AS Dhawan, Vice Chancellor urged scientists that arid fruit crops are future crops in the country's GDP.

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International Linkages

Golden Jubilee International Salinity Conference

Karnal, 9 February 2019. The three-day Golden Jubilee International Salinity Conference (GJISC - 2019) was organized at ICAR-Central Soil Salinity Research Institute, Karnal.

The Chief Guest, Professor Ramesh Chand, Member, NITI Aayog applauded the ICAR-CSSRI's illustrious journey of five decades that has led to the productive use of about 2.14 million ha salt affected area in environmentally harsh conditions.



He mentioned that although ICAR-CSSRI continues to be one of the global leaders in agricultural salinity management, but its glorious achievements should not lead to complacency; especially with regard to the time of natural resources getting shrunked at a rapid rate while food demands are growing and diversifying.

He urged to make all possible efforts to convert the waste into wealth (*i.e.* conversion of municipal solid

wastes into compost) in order to enhance the soil resilience and crop productivity. He also stressed on further strengthening the partnerships between research institutions and KVKs for quick and effective disseminating of improved technologies to farmers' field.

Various recommendations of different technical sessions of GJISC-2019 were also presented along with release of some publications. A total of 275 delegates from 17 countries, CGAIR institutions, ICAR institutes, SAUs, State Line Departments and farmers registered their participation in this event.

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Modernization of Indian crop breeding

New Delhi, 25 January 2019. The ICAR in collaboration with Bill Melinda Gates Foundation launched a Mega Project on "Application of Next-Generation Breeding, Genotyping and Digitalization Approaches for Improving the Genetic Gain in Indian Staple Crops".

Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) mentioned that the country is producing around 285 million tonnes of food grains. He also talked about the country's capability to feed 1.3 billion plus populations by its better performance in milk and animal husbandry sectors. He informed that the project will help in digitalization of plant breeding activities, use of next generation breeding approaches and advanced genomic tools for enhancing productivity and rapid varietal development. The DG also released the Project

Brochure.

Dr Purvi Mehta, Senior Advisor and Head of Agriculture for Asia, BMGF regarded ICAR as the global player in the field of agriculture research. She also mentioned that the project does not only target the staple crops, but also the other arenas like animal husbandry, milk production, livestock, etc.

The project has been implemented with a budgetary outlay of ₹ 51.33 crores. The BMGF has contributed ₹ 27 crores (US\$ 4.00 million) with a matching grant from ICAR. The knowledge partners include State Agricultural Universities and Government, Excellence in Breeding Platform, CIMMYT, Mexico and ICRISAT. The project spanning over a period of four years, will aim to optimize conventional breeding pipelines towards development of consumer-oriented products while improving climate resilience, crop productivity and profitability of Indian farmers.

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BRAQCON 2019



Chennai, 23 January 2019. The World Brackishwater Aquaculture Conference (BRAQCON 2019), was inaugurated by Dr Trilochan Mohapatra, Secretary, DARE and DG, ICAR. In his valedictory address, Dr Modadugu Vijay Gupta, the World Food Prize Laureate congratulated ICAR-CIBA and Society of Coastal Aquaculture and Fisheries (SCAFi) for organizing this world conference on Brackishwater Aquaculture at appropriate time. His major concern on the brackish water aquaculture is the exclusive dependence on one single species, the pacific white shrimp, *Penaeus vannamei*. He highlighted that, we have not used any other species, although we have number of potential species, which could be used for enhancing production and productivity of the aquaculture sector. With regard to issues raised and the recommendations of the BRAQCON 2019, he encouraged organizers of the conference to identify the right institutions to take it further forward for implementing the recommendations. It is paramount for the fruitful realization of the BRAQCON 2019.

He further said that with a value of coastal and

marine resources worth 28 trillion USD, the fisheries sector contributes significantly towards livelihood for coastal communities. He mentioned, in India alone, 15 million people were directly involved in fisheries activities and many more millions are involved in other ancillary activities related to fisheries and aquaculture. The fisheries sector has the lowest carbon footprint. He stressed on the importance to create a separate Fisheries Ministry in Government of India, which had been promised in 2006 by the cabinet minister to agriculture at that time, while inaugurating the National Fisheries Development Board.

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Assessors Training Organized by FAO

Kochi, 21 January 2019. Food and Agriculture Organization (FAO) organized an Assessors Training for Principal Investigators of Indian Network for Fisheries and Animal Antimicrobial Resistance (INFAAR) on FAO Assessment Tool for Laboratories and Antimicrobial resistance surveillance system (FAO-ATLASS) at one of its Nodal Centre ICAR-CIFT, Kochi. About 20 project Investigators associated with the INFAAR project from different ICAR research institutes of fisheries and animal science all over India actively participated in the training programme. Five FAO experts who imparted training to the participants included Dr Joy Gordoncillo, Dr Michael Treilles, Dr Francesca Latronico, Dr Rajesh Bhatia, Former AMR Advisor and Dr Rajesh Dubey, National Operational Officer, FAO, India.



Chief Guest Dr JK Jena, DDG (Fisheries and Animal Sciences), ICAR, New Delhi stressed the need for the surveillance of disease in fisheries and animal sectors as it is the key for AMR management. He said that production of shrimp, the major export item was being badly affected by diseases since last two decades. Early mortality syndrome in fisheries and FMD in animal sector have been the major menace. Intensification and diversification in farming sector and evolving climate change are primarily responsible for diseases emergence in these sectors. Over-use of antibiotics in aquaculture has aggravated the problem of AMR in fisheries.

Dr Ravishankar CN, Director, ICAR-CIFT highlighted importance of surveillance and appraisal of Antimicrobial Resistance (AMR) in fisheries and animal sectors and its containment in perspective human health in general and fisheries and animal health in particular. He also dealt at length on the contribution of the institute for fisheries development in chronological perspective. FAO experts drew attention on issues of AMR right from mythical nature to subject of priority issue and were optimistic of mutual benefits likely to be derived from the training programme.

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Asian Soil Partnership Meet

New Delhi, 26 February 2019. The Indian Council of Agricultural Research, New Delhi organized the 5th Meeting of Asian Soil Partnership (ASP) of Food and Agricultural Organization (FAO) including Steering Committee Meeting of Centre of Excellence of Soil Research in Asia (CESRA) at National Agricultural Science Centre Complex, New Delhi.



The four-days long Meeting aimed to fulfill the mandates of Global Soil Partnership (GSP) that aims for improving the governance of the limited soil resources of the planet in order to guarantee the agriculturally productive soils for a food secure world. It also aimed to support the other essential ecosystem services in accordance with the sovereign right of each country/state over its natural resources.

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7th Pan Commonwealth Veterinary Conference

Bengaluru, 3 March 2019. The ICAR-National Institute of Animal Nutrition and Physiology hosted the 7th Pan Commonwealth Veterinary Conference (PCVC7). The Conference titled "The role of veterinarians in addressing the global challenges to the lives of our pets, livestock, wildlife, humans and our environment" was jointly organized by Commonwealth Veterinary Association (CVA), ICAR-NIANP; Karnataka Veterinary, Animal and Fisheries Sciences University (KVAFSU); Karnataka Veterinary Association (KVA) and Pet Practitioners Association of Karnataka.

Two dedicated workshops on Animal Welfare Research and Working Equines were organized during the occasion. The PCVC7 provided a perfect platform to the delegates to share, exchange and gather current knowledge and future opportunities in the different fields of veterinary and allied sciences.

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Regional Expert Consultation International Meet

New Delhi, 27 February 2019. The Indian Council of Agricultural Research (ICAR), New Delhi and Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok, Thailand jointly organized an International two-day ICAR-NACA Regional Expert Consultation Meet on "Genetically Responsible Aquaculture: sustainability of genetically fit brood stock and seed of certified origin in Asian aquaculture".

The programme was conducted by the ICAR-National Bureau of Fish Genetic Resources (NBFGR), Lucknow with an aim of identifying the several missing components in the current aquaculture production economy of Asia and global South region. Approximately 90% of the global aquaculture production is the product of sustainable intensification of aquaculture of the region.

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MoUs

ICAR and ILRI inks MoU

New Delhi, 25 February 2019. Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR), and Dr Iain Wright, DDG (Integrated Sciences), International Livestock Research Institute (ILRI), Nairobi signed a mutual Memorandum of Understanding at Krishi Bhawan, New Delhi.



The MOU includes four years (2019-2022) Work Plan for undertaking collaborative research programmes between Indian Council of Agricultural Research (ICAR) and International Livestock Research Institute (ILRI), Nairobi.

Shri Sushil Kumar, Additional Secretary (DARE) and Secretary (ICAR); Dr JK Jena, DDG (Animal Sciences), ICAR; Dr H Rahman, Regional Representative, South Asia, ILRI at New Delhi and other dignitaries were also present.

The major areas of collaborative research identified in the Work Plan are Animal Disease Economics; Backyard Poultry Genomics; Methane Emission and its Mitigation; Improvement of Basal Feed Resources and Capacity Development and other activities.

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ICAR inks MoU with CSIR

New Delhi, 25 February 2019. The Memorandum of Understanding was signed between Indian Council of Agricultural Research (ICAR), New Delhi and Council of Scientific and Industrial Research (CSIR), New Delhi



at ICAR Headquarters, Krishi Bhawan.

Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) and Dr Shekhar C Mande, Secretary (DSIR) and Director General (CSIR) agreed to collaborate and work together on mutually agreed areas of agri-foods, medicinal and aromatic plants, nutraceuticals, precision agriculture, big data analysis, use of artificial intelligence, genetic modifications in cotton, application of sensors in agriculture, post-harvest management and agricultural mechanization.

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Capacity Building

Transfer of rural technology

Arunachal Pradesh, 12 February 2019. ICAR- Central Institute of Fisheries Technology, Cochin in collaboration with KVK, Balek, Lower Dibang Valley, Arunachal Pradesh organized demonstration of smoke curing fish in hygienic conditions and distributed 15 Community Fish Smoking Kilns (COFISKI) units. The programme as part of CSR Scheme of Coal India Project "Community Fish Smoking Kilns for better health, hygiene, quality product with longer shelf life, sustainable income generation and lesser carbon foot print for hinterland women fishers belonging to



economically under-privileged SC and ST groups" was organized at KVK, Balek. Dr MM Prasad, Principal Investigator of Project and HOD, MFB Division, ICAR-CIFT and Dr TJ Ramesha, Head, KVK, Balek appraised Smt Mitali Namchoom, IAS, Lower Debang Valley on the developmental programmes undertaken by ICAR-CIFT in harvest and post harvest fisheries in Lower Debang Valley as a part of NEH programmes of Government of India.

Smt Oimang Lego of Jiya Village narrated her experience of journey of success and encouraged women of Lower Debang Valley to become role models of the country. Delivering the Presidential address Dr MM Prasad said women of Arunachal Pradesh in particular and NE Region states in general are leading in different walks of life. The Chief Guest of the function Shri Tapik Pertin, ADC, Roing said that ICAR-CIFT needs all appreciations for the support provided to women fishers of Lower Dibang Valley and opined that women fishers are becoming trainers and are able to train other fisherwoman resulting in better development of the fisheries sector. Later certificates were issued to beneficiaries along with 15 numbers of COFISKI units worth ` 8 lakh including kits to handle smoke cured fish.

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Shri Gajendra Singh Shekhawat inaugurates Administrative Building

Jodhpur 27 February, 2019. Shri Gajendra Singh Shekhawat, Union Minister of State for Agriculture and Farmers' Welfare inaugurated the Administrative Building of Krishi Vigyan Kendra, Jodhpur - II (Phalodi).



Shri Gajendra Singh Shekhawat urged farmers for using the Soil testing facilities and ensuring the use of balanced fertilizers as per the soil analysis based on Soil Health Cards. Shri Shekhawat also urged the farmers to get benefited by the recently launched "Kisan Samman Nidhi" Scheme.

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Fish waste utilization programme

Kochi, 30 January 2019. Under the Swachhta Action Plan, a sanction of ` 10.00 lakh was received by ICAR-CIFT, Kochi for implementing the "Management and commercial utilization of waste in 20 fish markets (10/Year) in urban locations" from the Council. Under the programme it was envisaged to cover 20 fish markets/fish landing centres located in six states namely Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra and Gujarat along with two markets at Delhi. Procurement of model kit consisting of equipments/tools for demonstration of the technology on conversion of fish waste to feed/manure was made. A processing line including meat mincer for preparation of fish silage from fish waste was perfected and tested for field trials.



Dr AA Zynudheen, Principal Scientist and I/c QAM Division, ICAR-CIFT, Kochi explained the technical details of the technology on "fish waste conversion to feed" and how it can be implemented at a larger scale at fish markets and harbours where tonnes of waste gets generated.

The programme was well attended by fishermen, market vendors, representatives from fish processing industry and the general public.

The inaugural function was followed by a demonstration on the technology on conversion of fish waste to feed. Dr Zynudheen and Dr Binsi conducted the demonstration assisted by Shri Ajeesh, Shri N Sunil and Shri Rahul Ravindran, Technical Assistants of the Institute. The questions of the participants were answered by the scientists of CIFT.

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Fish vending kiosk and solar-electrical hybrid dryer launched

Kochi, 18 February 2019. ICAR-Central Institute of Fisheries Technology, Cochin has developed a refrigeration enabled mobile fish vending kiosk to improve the unhygienic handling and marketing practices of fisher folk, small scale vendors and retailers. The main components of the kiosk are chilled storage cum display facility, hand-operated descaling machine, fish dressing deck with wash basin, water tank, waste collection chamber and working space. In this unit, consumer can see the fishes directly through transparent glass cover and select according to their choice of purchase. The kiosk has provision for descaling, cutting, cleaning, and packing operations. Under ideal operating conditions, the unit can extend shelf life of fish for 4 to 5 days and increase marginal benefit to fish vendors. In addition to this, 20 kg solar-electrical hybrid dryer was launched for hygienic drying of fish and fishery products to get quality dried products. The kiosk and dryer were launched by Dr Ravishankar CN, Director ICAR-CIFT.

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Mini fish processing unit at Kadamakkudy

Kochi, 13 February 2019. ICAR-CIFT, Cochin launched a Mini Fish Processing Unit and Custom Hiring Centre at Kadamakkudy village, near Varappuzha, Ernakulam in a function attended by budding entrepreneurs, people's representatives, Kudumbasree members, teachers and students of VHSC, Kadamakkudy and scientists from ICAR-CIFT. The Processing Unit and Custom Hiring Centre are output of the fishery entrepreneurship project started by ICAR-CIFT at Kadamakkudy in 2017. On this occasion, two fish

dryers of 10 kg capacity each and two sets of Mini Fish Processing Unit consisting of 21 implements each, were handed over to the PTA of VHSC, Kadamakkudy.

Dr AK Mohanty, Head, EIS Division informed that ICAR-CIFT has also taken initiative for conducting studies on market feasibility and consumers' behavior towards fish-based food products and gender roles in fish entrepreneurship among stakeholders at Kadamakkudy.

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Shri Gajendra Singh Shekhawat inaugurates CAZRI Road



Jodhpur, 5 March 2019. Shri Gajendra Singh Shekhawat, Honorable Union Minister of State for Agriculture and Farmers' Welfare inaugurated the CAZRI Road at ICAR-Central Arid Zone Research Institute, Jodhpur. The road outside the main gate of ICAR-Central Arid Zone Research Institute, Jodhpur was named as CAZRI Road.

The Minister applauded CAZRI's contribution in the field of arid agriculture. Shri Shekhawat applauded the Mayor for naming the road in the name of CAZRI, on an auspicious occasion when the institute is itself celebrating the Diamond Jubilee Year of its establishment.

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Productivity in bovines

Karnataka, 19 January 2019. A technical seminar on "Role of nutrition in augmenting fertility and productivity in bovines" was organized at ICAR-NIANP, Bengaluru in association with Karnataka Milk Federation (KMF). About 150 field extension officers of different milk unions of Karnataka attended the seminar. Dr DN Hegde, Director, Animal Husbandry, KMF was the Chief Guest and Dr Raghavendra Bhatta, Director, ICAR-NIANP presided during the inaugural function. A talk on fertility management in bovine

through ethno-veterinary approach Dr S Satheesh Kumar, Professor and Head, Division of Department of Gynaecology, TANUVAS, Chennai was presented by Dr NKS Gowda and Dr K Giridhar, Principal Scientists of ICAR-NIANP presented talks on nutrition of dairy calves and recent developments in fodder quality and management, respectively. A low cost hydroponic grain sprout unit was demonstrated in the seminar.

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Foundation stone of women trainees' hostel

Bhubaneswar, 26 February 2019. Honorable Union Minister of Agriculture and Farmers' Welfare, Shri Radha Mohan Singh laid down Foundation Stone of ICAR-CIWA Women Trainees' Hostel through E-plaque from ICAR-NRRI, Cuttack. During the occasion, the Minister also visited the ICAR-CIWA Institute.

While interacting with the staff members of CIWA, Shri Radha Mohan Singh also encouraged scientists to develop some women-friendly novel farming technologies. The Minister accentuated about the CIWA's significant role in the upcoming *Krishi Unnati Mela* in motivating the nation's women farmers through easy and innovative farming techniques.



He also urged scientists to design a model of 1-2 acres of integrated farming with women-friendly technologies at the Institute's farm in order to help the farmers learn about managing their locally available resources scientifically. The Minister highlighted about the importance of terrace gardening, urban horticulture, mushroom farming and value addition with special reference to banana fruit and pseudostem processing as successful enterprise for women groups.

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DG, ICAR inaugurates Coastal Agri Expo 2019

Goa, 2 March 2019. Dr Trilochan Mohapatra, Secretary (DARE) and DG, ICAR inaugurated the Coastal Agri Expo 2019 at ICAR-Central Coastal Agricultural

Research Institute Old Goa. The Expo is jointly organized by ICAR-CCARI, and Association for Coastal Agricultural Research, Old Goa, Goa. The Expo is organized with a central focus on agriculture, livestock and fisheries in the coastal region of the country. Dr Mohapatra stressed that 'dissemination of the technologies through platforms like expo's or mela is one important way to create awareness among farmers and other stakeholders'.

A three-day workshop on "Coastal agriculture for sustainable production vis-à-vis doubling farmer's income" and the farmer-Scientist interaction was also organized.



A visit to the experimental farm of the Institute was also organized during the event where scientists introduced newer research and development.

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Awareness camp for fisheries tribals

West Bengal, 6 January 2019. The ICAR-Central Inland Fisheries Research Institute organized a two-day mass awareness camps at Amtoli and Kochukahali, Gosaba block of Sunderban, West Bengal.

The camps were organized in collaboration with the local NGO "Sunderban Dream" under TSP. Dr BK Das, Director, ICAR-CIFRI urged women participants to collectively start intervention of fisheries in the utilized canals of Sunderbans to enhance the production. He also emphasized on conserving fish diversity and importance of small indigenous fish on human nutrition.

A Farmers-Scientists' Interaction Session was also held. The scientists of ICAR-CIFRI provided solutions to several queries related to fisheries development.

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Seeds released into sea to boost marine production

Kochi, 7 March 2019. In a major effort to increase the marine production, the ICAR-Central Marine Fisheries Research Institute (CMFRI) released seeds of shrimp, cuttlefish and squid into the sea. The Mandapam Regional Centre of the ICAR-CMFRI released a total of 11 lakh seeds of green tiger shrimp (*Penaeus semi-sulcatus*) was released at Villundi Theertham, Palk Bay, while the Tuticorin Research Centre of the Institute conducted the sea ranching of cuttlefish (*Sepia pharaonis*) and squid (*Sepioteuthis lessoniana*) at Tuticorin.



A regular activity of the ICAR-CMFRI, the sea ranching is aimed at increasing the production of these species to ensure the livelihood of fishermen in the regions. This will also help in conserving and maintaining sustainability of the stocks in the wild.

When the fishermen venture into the sea for fishing after fishing ban period, these shrimps will be available to support their livelihood. During 2017-18, Mandapam Centre had released 1.7 million seeds of green tiger shrimp into the sea in Gulf of Mannar and Palk Bay region and 1.4 million seeds of the species in 2018-19 at Kunthukal (Gulf of Mannar) and Sangumal (Palk Bay).

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*Plant trees,
Conserve water,
Protect environment.*



Celebrations

Pradhan Mantri Kisan Samman Nidhi Programme and Kisan Mela

Bhubaneswar, 24 February 2019. The ICAR-Central Institute for Women in Agriculture, Bhubaneswar arranged the live telecast of *Pradhan Mantri Kisan Samman Nidhi* launching ceremony at its campus.



It was out of four States, viz. Kerala, Karnataka, West Bengal and Odisha, that the ICAR-CIWA got identified as the nodal institute for arranging the live interaction of Honorable Prime Minister with the farmers in Odisha in the form of live webcast that was participated by about 1,500 farmers, Government officials and scientists.

Chief Guest, Shri Gajendra Singh Shekhawat, Union Minister of State for Agriculture and Farmers' Welfare outlined the importance of several newly launched schemes of the Government along with the *Pradhan Mantri Kisan Samman Nidhi* to Double Farmer's Income by the Year - 2022.

During the live webcast, one of the progressive farm women, Smt Gouri Mohapatra of Nuasahi village of Puri District interacted enthusiastically live with the Honorable PM and expressed her gratitude for the benefits that she availed from the several Government schemes that are aimed at doubling the farm income. The farming community was vividly explained about the scheme's benefits, thus adding new dimensions to their existing pattern of assistance in agriculture from the Central Government.

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Kisan Mela in Cuttack

Cuttack, 26 February, 2019. Shri Radha Mohan Singh, Union Minister of Agriculture and Farmers' Welfare inaugurated the Kisan Mela organized at the ICAR-

National Rice Research Institute, Cuttack.

The Minister discussed about the various achievements of the government's flagship schemes to the agriculture and allied sectors. In his address, he also gave an account of several farmers' beneficiary schemes like e-NAM, MSP, RKVY, NFSM, NHM, PMKSY, PMFBY etc., which are benefiting millions of farmers across the country. The Minister fundamentally accentuated on villages and farmers' development for achieving the goal of inclusive national development.

Guest of Honor, Shri Dharmendra Pradhan, Union Minister of Petroleum and Natural Gas and Skill Development and Entrepreneurship accentuated the functional and technical linkage between Agriculture and Petroleum Ministries. The Minister opined on using major portion of agricultural wastes to generate energy. He mentioned that such initiative would be a significant move for augmenting the farmers' income and will help to make India independent in the energy sector.

Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) underlined ICAR's various research achievements to achieve the national food and nutritional security and bring the prosperity and economic security to our farming communities.

The Union Ministers jointly inaugurated the newly built 'Central Genomics and Quality Laboratory' of the institute, a first of its kind in the country. They dedicated the laboratory to the farmers of the nation.

Several public amenities like Arunodyoy Post Office, Cuttack Railway Station, foundation stones laying ceremony of ICAR-CIWA Guest House and *Shishu Sadan* at KG National Memorial Trust, Satyabhamapur, etc., were also jointly inaugurated by Union Ministers. The extension of one train and new stoppages of two trains through the e-Plaques were also announced by Union Ministers. Over 20 *Divyangs* were distributed aids and appliances by Union Minister as a CSR initiative by ONGC. The Union Ministers also felicitated the 10 best farmers and farm women for using innovative practices in farming to double up their farm income.

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Poorwanchal Kisan Mela and Krishi Pradarshani

Gorakhpur, 3 March 2019. Shri Radha Mohan Singh, Union Minister of Agriculture and Farmers' Welfare and Shri Yogi Adityanath, Chief Minister of Uttar Pradesh, jointly inaugurated the *Poorwanchal Kisan*



Mela and Krishi Pradarshani organized by Mahayogi Gorakhnath KVK, Gorakhpur.

The *Kisan Mela* and *Krishi Pradarshani* were organized in collaboration with the ICAR-Agricultural Technology Application Research Institute (ATARI), Kanpur, Uttar Pradesh. The Administrative Building of Mahayogi Gorakhnath KVK, Gorakhpur was also inaugurated by the dignitaries. Shri Radha Mohan Singh urged the farmers to get benefited by the various agricultural schemes being announced by the central government. The Minister urged for promoting the intercropping and mixed cropping system for minimizing the risk of crop loss. Shri Singh also urged that the animal rearing and organic farming must go hand-in-hand.

Shri Yogi Adityanath said that KVKs are the innovative institutions at the district level. Therefore, there is a need to up-scale its benefits for the large number of farmers of the district. The Chief Minister accentuated on organizing a large number of awareness campaigns at the village level in order to help the farmers get benefited from them. Shri Yogi urged farmers to get benefited from the various beneficiary schemes that are aimed for upliftment and improve the farmers' income at least by two folds.

Shri Surya Pratap Shahi, Minister of Agriculture, Agricultural Education and Research, Government of Uttar Pradesh accentuated that farmers who are using improved agricultural technologies are getting the enhanced production. He also stated lack of remunerative price to such farmers leads to the discouragement in adopting improved technologies. The Minister stressed upon the inter-department and institutional convergence at the district level to arrange marketing facilities, input procurement and ensure the related logistics.

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Tripura *Krishi Unnati Mela* - 2019

Tripura, 1 March 2019. The first Tripura *Krishi Unnati Mela* (TKUM) - 2019 was organized by Tripura Centre of ICAR-Research Complex for North Eastern Hills

Region at the Centre.

Shri NC Debbarma, Minister of Revenue and Fisheries, Tripura appreciated ICAR for organizing the "First Tripura *Krishi Unnati Mela* - 2019" at Lembucherra. He said that more emphasis should be given on agriculture in Tripura. The Minister said that one third of Tripura's land being cultivable, the farmers should take multiple crops and adopt diversified integrated farming system that comprises of crop, horticulture, livestock and fisheries for food, nutritional security, higher income and minimal risks from climatic adversities.

Dr PK Pandey, Dean, College of Fisheries, Lembucherra stressed on scientific fish-farming to enhance the farmers' income. He also said that besides producing fish, a small pond in every household could be used for life saving irrigation.



A total of 15 deliberations from experts from ICAR, Universities, College of Agriculture, College of Fisheries, Department of Horticulture, Fishery, NABARD and other organizations were organised. The Horticulture Research Station, Nagicherra bagged the first prize among the Government exhibition stalls.

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PUSA *Krishi Vigyan Mela* - 2019

New Delhi, 5 March 2019. Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) inaugurated the PUSA *Krishi Vigyan Mela* - 2019 at Indian Agricultural Research Institute (IARI), New Delhi.

Dr Mohapatra applauded the institute's efforts of organizing such knowledge gaining event for the agricultural and farming community.

Dr Mohapatra lauded PUSA's contribution in making the country food-sufficient in its real terms and emphasized on the efforts that needs to be taken promptly in order to promote the practices of precision farming on a large scale across the agricultural and farming community of the country. He said that there is also a need for the promotion of censor-based irrigation like facilities too



that can truly come fruitful in lessening down the burden of farming community and increase their productivity in a long run.

Dr AK Singh, DDG (Agricultural Extension) and Director, IARI accentuated that the agricultural mela is one of the best place for the exchange of various technologies of agricultural and farming communities. He said that Mela is like a *Kumbh* where experts of the different fields of agriculture, farming, technologies, policies, etc., meet, share and exchange their valuable expertise in the particular areas of research with each other.

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International Women's Day - 2019

ICAR HQ and ICAR Institutes, 8 March 2019. Every year 8 March is celebrated as International Women's Day all over the world with enthusiasm. The theme this year was, "Think Equal, Build Smart, Innovate for Change". ICAR Institutes also marked the celebrations of International Women's Day - 2019.

ICAR-NIASM, Baramati

The Institute arranged live streaming of the Honorable Prime Minister, Shri Narendra Modi's address to the nation from National Women Livelihood Meet, Varanasi. The programme registered a total participation by 150 participants including 90 women working in various capacities. The function concluded with the recital of national anthem.

ICAR-Indian Institute of Oil Palm Research, Pedavegi

The Institute organized Essay Writing Competition and Extempore during the occasion. Dr Ravi Kumar Mathur, Director, ICAR-IIOPR felicitated the winners of the competitions during the closing ceremony.

ICAR-ATARI, Ludhiana

The Chief Guest, Dr GS Khush, World Food Laureate applauded the farm women for participating and exhibiting their ventures.

Dr Arbinda K. Padee, IAS, Director Country Relation

and Business Affairs, ICRISAT, New Delhi discussed about two products namely "Healthy Snack" and "Smart Breakfast" based on sorghum and millets developed by ICRISAT which are beneficial for the family's health. He said that the institute is working towards preventing the malnutrition and the degradation of the environment.

Dr Rajbir Singh, Director, ICAR-ATARI, Ludhiana underlined the various activities that are carried out by KVKs of Zone-I for the empowering farm women. He stressed on importance of knowledge of healthy diet among women.

ICAR-NAARM, Hyderabad

Dr Ch Srinivasa Rao, Director, NAARM accentuated the women's role as the managers in home and work. The Director applauded the women's capability to know how to adapt to the different situations at home or work. For making the occasion a memorable one, the Director also provided the Women Cell in collaboration with the farm section the responsibility of Amla and custard apple orchard development. Dr Rao released a book on "Women in Agriculture (The Invisible Partners in Development)".

ICAR-DOPR, Rajendranagar, Hyderabad

The Director discussed about the various responsibilities of the working women. He also applauded the women staff's contribution and urged them for working for the development of the institute.

ICAR-CIAE, Bhopal

The ICAR-CIAE arranged the live webcast. The occasion also marked the exchange of success stories of women groups during the interaction session. The programme coordinated by Dr Debabandya Mohapatra, Chairperson, Women's Cell registered an active participation by the Heads of Divisions, PCs, Incharge of various sections and all administrative and technical staff of the institute.

ICAR-IINRG, Ranchi

Dr KK Sharma, Director, ICAR-IINRG accentuated on the transformative shifts to advancing the gender equality and empowering women. He stressed on the importance of balance in equality for the society. The Director also said that the women are better than men in many fields. A debate on the relevance of the idea of International Women's Day Celebration was organized.

The occasion marked certificate distribution ceremony for women trainees for completing one-week training programme on "Scientific method of Lac Cultivation, Processing and Utilization".

ICAR-CIFA, Bhubaneswar

The Chief Guest, Dr SN Mohanty, Head, Obstetrics and Gynaecology, Apollo Hospital, Bhubaneswar

emphasized on importance of women health and hygiene. Dr Mohanty stressed on physiological development of women in different phases and need to maintain good health for development of a healthy nation. The participants of different competitions namely Elocution, Quiz, Rangoli, Crafts, Salad Plating and Mehendi, etc., were given prizes.

ICAR-CIWA, Bhubaneswar

The Chief Guest, Dr Anil Kumar, Director, I/C, ICAR-CIWA urged women to take their own stand in society and fight for their fundamental human rights. The Director also emphasized on the line of Simone de Beauvoir, "One is not born but becomes a woman".

Guest of Honor, Ms Sneha Mishra, Secretary, AAINA lauded the work done by the institute for farm women. Ms Mishra urged to have equal balance between both genders with regard to responsibilities in life. There was a lecture on "Genesis of International Women's Day" by Er. Chaitrali S Mhatre.

ICAR-CIAE, Bhopal

International Women's Day was celebrated at ICAR-CIAE. Not only women staff but male employees also



attended the webcast program. The success stories of women and the motivational speech of Honorable Prime Minister inspired the staff.

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National Science Day

Hyderabad, 28 February 2019. The ICAR-National Academy of Agricultural Research Management, Hyderabad organized the National Science Day celebrations at its campus. The programme was organized in order to commemorate the great contribution of noble laureate Sir CV Raman.

Dr Ch Srinivasa Rao, Director, NAARM advised the students to get the benefits of the latest scientific technologies wisely and never get themselves addicted to the technologies. Dr Rao motivated the students towards the bright career aspects in the field of science and also underlined the farmers and agriculture's importance for the nation.

Dr SK Soam, Joint Director highlighted the importance

of science in day-to-day life. He also discussed about the bright career options for youth in agriculture. A campus tour was also organized during the occasion to explain the participating students about the various units like vermi-compost, water harvesting, pits, nursery, sports, water purifying plant and infrastructure facilities. The students were explained about ways to grow nursery and its propagation.

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Foundation Day Celebrations

ICAR-CIAE, Bhopal

Bhopal, 15 February 2019. ICAR-Central Institute of Agricultural Engineering, Bhopal, celebrated a two-day programme to commemorate its 44th foundation day.

Dr KK Singh, Director, ICAR-CIAE 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.

Professor Panjab Singh, Chancellor, Rani Laxmibai Central Agricultural University, Jhansi 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 stage-wise development of the institute and future challenges. Prizes and awards were bestowed for various annual events and the staff members serving for more than 25 years were given recognition of service.

On February 16, 2019, ICAR-CIAE organized 'Agri-Tech-Expo' themed at 'Farmers' Prosperity through Agricultural Mechanization', Farmers' interaction meet and Academia-Industry Interaction Meet in the premises of the Institute. Dr KK 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.

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 ICAR-CIAE also displayed and demonstrated the recently developed advanced technologies.

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ICAR-NRC on Meat

Hyderabad, 22 February 2019. The ICAR-National Research Centre on Meat, Hyderabad celebrated its 12th Foundation Day.

The Chief Guest, Shri Akhil Kumar Gawar, Director, Telangana State Food Processing Society, Department of Industries and Commerce, Government of Telangana delivered his talk on the "Future challenges, researchable areas in meat sector". He also urged scientists to develop the burning socio-scientific consumer need based research projects concerning meat quality, meat industry and policy matters. The Chief Guest also conferred certificates to trainees for successfully completing their entrepreneurship training on "Value added meat products processing" held from 18th to 22nd February-2019.

Guest of Honor, Dr Asha Martin, Principal Scientist, CFTRI, Mysuru delivered a lecture on "Ensuring Food Quality and Safety". She discussed about importance of food in nutrition, safety issues associated with them, future food, role of FSSAI as regulatory body and its food safety related guidelines, etc. The lecture also discussed about need of collaborative research work between CSIR-CFTRI, Mysuru and ICAR-NRC on Meat, Hyderabad.

The occasion also held an open day program for children from various schools of Chengicherla.

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ICAR-CMFRI, Kochi

Kochi, 5 February 2019. The ICAR-Central Marine Fisheries Research Institute (CMFRI) opened its doors for students and public on the occasion of its 72nd Foundation Day celebrations at its Headquarters in Kochi and Regional Research Centres. The Open House programme evoked a huge response from the public to enjoy the ringside view of marine wonders and to learn the latest developments in marine research. Nearly 5000 people visited the Headquarters of the institute located in Kochi, to watch the splendours of aquatic organisms in the sea and to interact with scientists.

The huge crowd was awestruck by the giant-sized Napoleon Wrasse, weighing 35 kg, at the National Marine Biodiversity Museum at the CMFRI. The CMFRI museum is the national designated registry of marine species which has a collection of around 3000 marine specimens. CMFRI also arranged a display of pelagic, demersal, molluscan and crustacean fishery resources



such as dolphin fish, rare species of sharks and rays, giant tiger shrimp and giant-sized crabs.

Visitors displayed keen interest in understanding the functioning of fish ageing laboratory of CMFRI. They interacted with scientists and engaged in discussions on issues and challenges being faced by marine fishery of the country. Laboratories related to molecular biology, bioprospecting, cell culture, fishery biology, environmental research, climate change, ocean acidification etc., also were opened to public during the programme.

The foundation day was also celebrated in all Regional Research Centres located in Veraval, Mumbai, Karwar, Mangalore, Calicut, Vizhinjam, Chennai, Tuticorin, Mandapam, Visakhapatnam and Digha, and the field centre in Puri and the KVK of ICAR-CMFRI in Ernakulum by conducting similar open house programmes, attracting the public to view and understand the research activities of the institute.

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Success Stories

Enhancing livelihood through oyster mushroom cultivation

The mild climate of Ranchi offers suitable conditions for successful cultivation of oyster mushroom (*Pleurotus* spp) for a prolonged period. Although, mushrooms growing in the wild have a presence in the gourmet of local population, commercial mushroom cultivation is at its infancy in this area. Its cultivation does not require much inputs in terms of infrastructure, water and labor. It can be successfully done with moderate skill and training. Ranchi being a capital city has easily accessible market for mushroom. The ICAR Research Complex for Eastern Region, Research Centre, Ranchi, under the Farmer FIRST Programme, focused on promotion of mushroom cultivation as an entrepreneurial activity for the women farmers in a cluster of four villages viz. Kutiyatu, Malti, Pindarkom and Tetri, situated within a distance of 10 km from Ranchi city.



The activity was initiated with a sensitization programme by organizing 'Mushroom day' at Kutiyatu village in collaboration with TSP programme of AICRP on Mushroom in December. Based on the response of the farmers, three more training programmes were conducted in the subsequent week at ICAR RCER, Research Centre, Ranchi where women farmers were provided hands-on training on oyster mushroom cultivation. Participants were trained on different techniques like preparation of mushroom bags, aftercare of the bags during incubation, harvesting and packaging. In order to motivate and mobilize women farmers for undertaking mushroom cultivation, ten numbers of mushroom bags were installed in the homes of each of forty interested farmers. Regular visits were made to all these farmers in order to provide any need based support and keep their morale high. At the time of harvest, they were trained about hygienic harvesting and packaging practices before taking their product to the markets.

Mrs Suman Lakra, a resident of Malti village grows vegetables in her homestead garden and sells the surplus in the nearby weekly haat. From a total land holding of 6.4 acres (low and medium land 5 acre, upland 1.4 acre), she and her husband used to earn nearly ` 85,000/year from crops and animal husbandry. Her husband, Shri Mahavir Lakra also earns additional income of ` 18,000/year by working as daily wage labour in Ranchi. This income was not sufficient to cater to the need of her family of five members. Inspired by the effort of ICAR RCER, RC, Ranchi, she started cultivation of oyster mushroom in one room of her house with the help of her husband. She has developed a facility for installing 25 bags per week in succession using her own paddy straw. Her first batch was harvested in 2nd week of January, 2019 and since then she has been harvesting on an average of 5-6 kg/day. She follows all the recommended post harvest practices including hygienic harvesting and packing in neatly in transparent polythene bags. Her husband takes the produce in nearby market and weekly *haat*, and earns nearly ` 500-700/day. For the initial two batches, the entire inputs were supplied by ICAR, RCER, Plandu. After that Mrs Lakra arranged for all the inputs by herself. From first month onwards, she could earn gross income of ` 15,000- 17,000/- per month and net profit of ` 11,000 to 13,000/- per month. Estimation of biological efficiency in her mushroom production unit indicated a value of more than 80%. Keeping in view the availability of paddy straw to the tune of nearly 4 tonnes after fulfilling the requirement of animal feed, she can continue with the same quantum of production by utilizing her own paddy straw. Apart from this, employment opportunity of more than 100 numbers of additional mandays can be generated for her family members per year. Similarly, estimation of water use efficiency indicated nearly 7.4 litres/kg of mushroom which is much lower as compared to other crops.

At present, Mrs Suman Lakra has become a role model for other tribal women of surrounding villages. Encouraged by her success, seven other women farmers from the surrounding villages have already started commercial production of oyster mushroom. According to Shri Mahavir Lakra, the unit can ensure adequate employment for himself and he will not be requiring to go to Ranchi town anymore in search of job. With strong technological backstopping and availability of quality mushroom spawn, from ICAR RCER, RC, Ranchi, it is hoped that many more women farmers will be taking up mushroom cultivation as an entrepreneurial activity in the adopted villages and other villages located in the peri-urban areas of Ranchi.

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Litchi: A success story

Litchi cultivation is localized to only few pockets in India. Recent efforts by ICAR-National Research Centre on Litchi, Muzaffarpur in identifying patches suitable for litchi cultivation shows that litchi can be grown well in non-traditional areas of South India, either as sole or mixed plantations with coffee in parts of Coorg in Karnataka, Wynad in Kerala and Lower Puleny hills, Kallar and Burliar of Nilgiri hills, besides some parts of Kanyakumari district of Tamil Nadu.

In these regions, litchi trees flowers in the month of August - September and fruits mature in the month of December and January in contrary to April and May in Northern India. Shahi, Rose Scented, Early Seedless, Dehradun, Maclean, Green and Calcuttia are the varieties grown with good fruit quality. Climatic survey in high altitudes of Southern India (Karnataka, Kerala and Tamil nadu) revealed the potentiality of these regions in producing quality fruits that was at par with fruits produced in Northern India. By breaking the seasonality barriers, it was observed that a difference of 6.50 °C in temperature and 981.99 mm rainfall between the traditional and non-traditional litchi growing areas is the prime factors triggering flowering in litchi (Fig.1). The places with more than 900 m MSL like Coorg, Kelpata, Iduki, Ooty are good for off season (November-January) litchi production in India. The potential area of litchi cultivation in South India includes Coorg, parts of Chikmagalur and Waynad.

In Coorg and Wynad areas it is estimated that more than 200 growers are growing litchi on a smaller scale with 1-10 trees in their gardens/plantation/back yard. But there are few farmers who have planted 1 acre to 10 acres of litchi as intercrop with coffee. In Wynad district of Kerala, Mr Kuruvilla Joseph, a successful litchi grower explored benefits of off-season litchi. Not many farmers in South are aware of litchi and benefits of its plantation. He grows coffee, cardamom and pepper, apart from litchi, mangosteen and rumbutan. His success in litchi cultivation inspired a lot of people in Wynad and Coorg to take up farming of this fruit through best practices and reap its benefits. Mr Ahmed Kutty developed keen interest and dedication in litchi farming. With the intervention of NRCL, the good management practices were adopted. After getting training, he is now able to develop litchi gootees/air-layers and established 15 acres plantation of Shahi and China cultivars in his farm at Vythiri and Mepadi. He adopts girdling technology for ensuring flowering and expressed his contentment with the results achieved. The scientists of ICAR - National Research Centre on Litchi is regularly monitoring the performance of litchi in his farm couple with hands on training which ultimately lead to yield fruits in 2018-19 in a recorded time. Mr Kutty was able to harvest 1 ton of fruits from his plantation which has

started yielding fruits in the fourth year in December month. As such, there was a growing demand of litchi planting materials among growers. Since availability of genuine and quality planting materials is a problem, and looking at the hurdles faced during rail and road transportation, a group of growers from Karnataka air-lifted freshly detached litchi air layers from ICAR - NRCL, Muzaffarpur within 24 hours, with a success rate in survival of air layers to the tune of 80%.



In collaboration with CHES (ICAR-IIHR) Chettalli, training programmes on technology dissemination and field day was organized. During, a national dialogue on Improving productivity and utilization in litchi held at ICAR-NRCL, litchi growers from Kerala and Tamil nadu were invited and issues and prospects of litchi cultivation was presented. The problems of bats attack and fungal infection on fruits owing to heavy rains were highlighted and accordingly, solutions for tackling the same were addressed. The interests in litchi cultivation among farmers of these non-traditional belts have developed and ICAR-NRCL has been instrumental in imparting hands on training and know-how with regards to scientific litchi cultivation. To promote litchi cultivation in these areas, the ICAR-NRCL has supplied more than 20,000 litchi plants to growers, in the last couple of years and has targeted to double the quantum of supply of planting materials in the coming years. Litchi cultivation is gaining popularity in this area and has potential for providing litchi during off season which certainly helps in crop diversification and income enhancement of farmers of these areas.

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Make in India—*Makhana* Machine

Gorgon nut or *makhana* is a seed of an aquatic plant grown mainly in Bihar, Assam, West Bengal, Tripura and Odisha. In Bihar alone about five lakh families are directly involved in makhana cultivation, its harvesting, popping, and produce selling. Traditionally *makhana* seeds are roasted and popped manually in a 3 stage manual process – the seeds are roasted at very high temperatures ranging from 250



to 320°C, tempered for 2 to 3 days, roasted again and popped manually using a mallet. Malleting after roasting requires highly skilled workers because few seconds delay in malleting will result in poor quality popped *makhana* resulting in huge monetary losses. Open fires by burning wood and agricultural wastes are used for roasting purposes. Experienced poor fishermen in *makhana* growing areas are employed for such cumbersome operations.

To save fishermen from the toil and drudgery, and to produce high quality *makhana* for domestic consumption and export market a completely mechanized system for roasting and popping operations has been developed and commercialized by the ICAR's Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana. The mechanized model developed by ICAR has roasting and popping unit. The roasting is done in closed barrel using electric heated thermic oil. Thermally insulated barrel saves the worker from intensive heat and malleting does not require at all as hot roasted seeds automatically hit a closed casin within seconds

to break the hard roasted seeds for popping. There is no human intervention between roasting and popping. This system has also reduced the process time from 2 to 3 days to only about 20 hours. The capacity of the popping operation has been increased by about 8 times. The quality and market value of *makhana* produced using the mechanized process is much better than the manually popped *makhana*. This machine is now commercially manufactured and has been installed in several *makhana* growing areas.

The machine was launched on December 3, 2013 by Research Centre for *Makhana* Darbhanga, Bihar. Demonstrations and trainings were conducted in Darbhanga and Madhubani districts of Bihar. Entrepreneurs from Madhubani, Saharasa (Bihar), Indore (MP), Lucknow, UP have purchased the machine commercially and thus the technology has solved a long due indigenous problem of manual popping of indigenous crop. A full line comprising threshing, cleaning, drying, grading, roasting and popping is being established at CIPHET Ludhiana for training and demonstration purposes. Government of Bihar has started giving subsidy and National Research and Development Corporation (NRDC), Government of India has given Societal Innovation Award in 2014 to CIPHET. Economic analysis of about ` 15 lakh investment as fixed cost and about ` 5 lakh as working capital per month, indicates that break even point will reach in 6 months and profit will be manifolds, besides giving employment to rural youth. It is a blockbuster technology of CIPHET, Ludhiana and users have rightly named it "Vardan". After this development, ready-to-constitute *makhana kheer* (milk based pudding) mix was developed from the second or third grade of *makhana*.

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Visits

DG, ICAR Visits

ICAR-NAARM

Hyderabad, 22 February 2019. Dr Renu Swarup, Secretary, Department of Biotechnology, Ministry of Science and Technology, Government of India and Chairperson, BIRAC visited ICAR-NAARM's Business Incubation a-IDEA sponsored by ICAR, DST and BIRAC, DBT (Bio Nest).

Dr Swarup also interacted with couple of start-ups viz., Bharat Rohan and Robic Rofarm, who are being supported by a-IDEA in the different areas in agri-value chain.

She accentuated the support by DBT and BIRAC to the Agri based start-ups in more effective ways, provided a strong action plan from the Incubators like a-IDEA. Dr Swarup also visited a-IDEA partner, Agri Biotech

Foundation (ABF) and inspected the wet lab facilities and work of Start-ups. The Director, NAARM briefed the Chief Guest about the vision and mandate of institute. He emphasized on the ICAR-NAARM being a unique institute engaged in capacity building of NARES scientists, Research Policy (think-tank) of ICAR and Agri-business management education.

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KVK Namsai

Arunachal Pradesh, 16 February 2019. Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) visited KVK Namsai. Accompanied by Dr A Arunachalam, Principal Scientist and ADG (IR), Dr Mohapatra reviewed ongoing activities of KVK and visited instructional farm, Soil testing Lab, Animal Health clinic, demonstration units and skill development facilities created by the KVK.

While interacting with scientists, Dr Mohapatra urged to develop farmer's friendly techniques and focus on farmers' centric research. He also emphasized on soil mapping of Namsai district, farmer's digital card and dissemination of agriculture technologies on farmers' mobile by utilization of information communication technologies efficiently. Dr A Arunachalam urged to establish the Agroforestry block and bio fencing or green fencing farmers' field. Dr H Kalita, Joint Director, ICAR RC NEH Region, AP Centre, Basar gave an overview of mandate, achievements and vision of the KVK.

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ICAR-NRC on Meat, Hyderabad

Hyderabad, 18 January 2019. Dr Trilochan Mohapatra, Secretary (DARE) and DG (ICAR) visited ICAR-NRC on Meat, Hyderabad and inaugurated the newly constructed auditorium at ICAR-National Research Centre on Meat, Hyderabad.

Dr Mohapatra appreciated the quality of work and its completion of the project within scheduled time. He urged scientists for proper sampling, recording, maintenance on par with global requirements and develop alternative technologies for validation of meat species and sex determination methods



including development of field usable kits. He highlighted the importance of traceability in meat value chain and its role in domestic and export market, biomarkers for buffalo breed differentiation, metabolic profiling of meat and meat products and identification of bioactive peptides and other nutritionally important compounds, zoonotic diseases and ensuring microbial safety.

The DG released the "NABL accreditation certificate" awarded to "Meat speciation" laboratory of the NRC on Meat; "Technology Booklet" and a brochure published by ABI, NRC on Meat.

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Secretary, DADF and Chairman, MPEDA visited ICAR-CIFT

Kochi, 11 January 2019. Shri Tarun Shridhar, IAS, Secretary, Department of Animal Husbandry, Dairy and Fisheries (DADF), Ministry of Agriculture and Farmers Welfare along with Shri KS Srinivas, IAS, Chairman, MPEDA, Cochin, visited the ICAR-Central Institute of Fisheries Technology, Kochi. Shri Shridhar applauded the research accomplishments of ICAR-CIFT for its outstanding research in harvest and post-harvest sectors in fisheries. He also suggested the pluralistic convergence of different agencies working in the same line for bringing more visibility in the fisheries sector and check unnecessary wastage of resources caused due to duplication of work.



While citing the excellent contribution made by ICAR for introducing the Benami prawn culture and fish disease surveillance, Shri Tarun urged the stakeholders of central and state governments for greater collaboration in strengthening the blue economy initiative of the government.

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Training

Dehradun, 7 February 2019. The ICAR-Indian Institute of Soil and Water Conservation, Dehradun organized the Passing out the function of 119th batch of 4 months "Certificate Course on Soil and Water Conservation and Watershed Management". The four month programme was organized in the institute from 8 October 2018 to 7 February 2019 at the Institute's Headquarters, Dehradun.

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Munnar, 8 February 2019. The ICAR-Directorate of Cold Water Fisheries Research, Bhimtal, Nainital organized a three-day "Rainbow trout (*O. mykiss*) Demonstration-cum-Training Workshop" for the officers and workers of Kannan Devan Hills Plantations Co Pvt Ltd at Rajamallay Trout Hatchery, Munnar, Kerala.

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Odisha, 8 February 2019. The ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar under the Scheduled Tribe Component (TSP) organized a three day "Hands-on-training on Integrated Aquaculture

Based Livelihood Development” programme at Gajapati District On-site training and demonstration programme on “Scientific Aquaculture Methods” was organized in Suluba village, Mohana block.

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Dehradun, 12 February 2019. A ten-day training on, “PRA and Micro Watershed Planning” was organized by the ICAR-Indian Institute of Soil and Water Conservation (ICAR-IISWC), Dehradun in collaboration with MANAGE, Hyderabad. The ten-day programme focused on different aspects of Participatory Rural Appraisal (PRA), basics of Watershed Management, convergence and networking for watershed management, delineation and watershed characterization, hands-on experience in GIS and remote sensing, etc.

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Kochi, 23 February 2019. The ICAR-Central Marine Fisheries Research Institute (CMFRI), Kochi conducted a three-day Skill Development Programme for the youth in the Kadamakkudy Panchayat with aim to help them become small-scale entrepreneurs in cage fish farming.

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Guwahati, 26 February 2019. The ICAR-Agricultural Technology Application Research Institute (ATARI), Zone - VI, Guwahati organized a one-day Training Programme for Sensitizing the Nodal Officers of District AgroMet Units (DAMU) under KVKs of ATARI Zone - VI, Guwahati at ICAR-CIFRI Regional Centre, Guwahati.

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Gangtok, 2 March 2019. The ICAR-National Organic Farming Research Institute, Tadong, Gangtok organized Training-cum-Frontline Demonstration



Programme on “Organic Vegetable Production for the progressive farmers of Lingdok, East Sikkim”.

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Hyderabad, 6 March 2019. A 21-days Training Programme was conducted for Graduating Students of Acharya NG Ranga Agricultural University (ANGRAU) on Entrepreneurial Skill Development by ICAR-NAARM concluded.



The programme was conducted under NAHEP-Institutional Development Plan (IDP) scheme.

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Superannuation

Name, Designation and Address	Date, superannuation
Dr P Chodappa, Director CPCRI, Kasargod	11.01.2019 (VRS)
Dr Bramhadev Patnayak, Project Director PDFMD, Mukteshwar	31.03.2019

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