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Agrisearch with a human touch

Reporter

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OCTOBER – DECEMBER 2012

News in Brief

From the DG's Desk

Dear Readers,

The rapid growth and diversification of development activities have resulted in much needed expansion of employment opportunities, but at the same time have triggered rural to urban migration. This trend has inadvertently resulted in shift of farm labour to non-farm sectors. To sustain food security, it is imperative to encourage farmers to continue with agriculture, wherein the rural youth have a crucial role to play. Currently, there is a challenge of retaining youngsters in agriculture due to various socio-economic factors, including profitability in agricultural pursuits. It has become imminent to reorient agricultural practices to make them intellectually satisfying and economically rewarding for the youth. India has the largest youth population in the world that is poised to increase further in the coming decade. Nearly 70% of India's population is below the age of 35 years making India the youngest nation in the world and interestingly 70% of them live in rural areas. According to *2011 Census*, the youth population in the country including adolescents is around 550 million. In 2020, the average Indian will be only 29-year-old, whereas in China, and the United States of America the average age is estimated to be 37 years. We may utilize this demographic dividend for taking Indian agriculture to new heights by channelizing the creative energies of the youth through development of skills, knowledge and attitudes.

The preamble of India's 2003 National Youth Policy emphasizes youth empowerment in different spheres of national life. Realizing the potential of youth power, the United Nations declared 2011 as the 'International Year of Youth' in which the issue of making farming attractive to youths was deliberated vigorously. A panel

discussion on 'Youth and Agriculture' in the Rio+20 Conference and the recently concluded second Global Conference on 'Agricultural Research for Development' in Uruguay to highlight the need bring forward youth in developing agriculture in a sustainable mode. The special session on 'Youth in Agriculture' in the Farmers' Forum Global Meeting (2012) recommended creation of a 'new rural reality' based on a positive image of farming as a dynamic business by which youth can become entrepreneurs. It was also emphasized that the employment opportunities must be a blend of both on-farm and non-farm activities along the agricultural value chain. Investment in this direction will help boost the rural economy with enhancement in agricultural productivity, profitability and a curb on rural-to-urban migration.

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The Indian Council of Agricultural Research has always been endeavoring to empower youth with appropriate technologies. Way back in 1979, ICAR initiated a novel idea of 'Rural Agricultural Work Experience' (RAWE) which was later integrated as a single semester course for undergraduate students in agriculture. Further, in the last ten years, ICAR has supported the establishment of 351 Experiential Learning units and 51 centres under Niche Area of Excellence in over 50 universities. These universities could act as business incubation hubs enabling the students with business acumen.

The Student 'Rural Entrepreneurship and Awareness Development *Yojana*' (READY) programme envisaged in the XII Five-Year Plan aims at entrepreneurship development among the youth. It combines both RAWE and Experimental Learning courses to make student READY with the grass-root level experience and entrepreneurship skills. The vast network of agricultural universities and colleges can play a leading role in cultivating self-confidence and capabilities in the students required for taking up agriculture as a profession. Farm-graduates can begin with launching of agri-clinics and agri-business centers in villages as rural enterprises. The observance of 'Agricultural Education Day' by the ICAR Institutes during the last year is sure to increase the awareness.

In the XII Five-Year Plan, it has also been proposed to initiate a programme 'Attracting and Retaining Youth in Agriculture' (ARYA). The initiative aims at analyzing the current policy environment and identifying supporting policies that can check the rate of migration of youth from rural areas. The ARYA will identify such mechanisms and models that would encourage the youth to avail the quantum of opportunities in allied sectors. It is expected that the youth educated in agriculture and allied enterprises will be able to earn a dignified livelihood from farming and other related pursuits. Educated youth in urban areas can also take up urban and peri-urban agriculture in which ample opportunities exist. Several parts of our country like Kerala and Punjab are already urban in character, with town and village forming a continuum. These initiatives in coordination with other programmes of both Central and State Governments would empower the youth with knowledge, skills and enthusiasm to pursue agriculture with new vigour. These concerted efforts would enable making Indian agriculture 'green pastures' for the Indian youth in the years to come.

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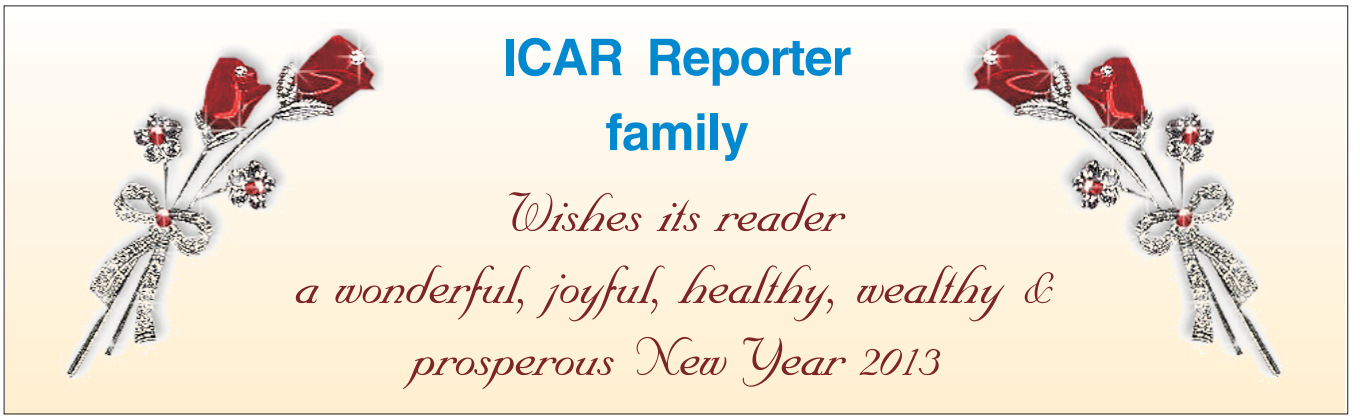

WORKSHOPS, MEETINGS, SEMINARS, CONFERENCES, SYMPOSIA

XXII Meeting of ICAR Regional Committee No.VI

Jodhpur, 17 November 2012. Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) chaired a two-day ICAR Regional Committee No. VI Meeting covering Rajasthan, Gujarat, Dadra Nagar Haveli and Daman & Diu at Central Arid Zone Research Institute (CAZRI), Jodhpur on 16 and 17 November 2012. He urged that there is a need to prioritize the research and development programmes targeting the farmers' needs. There is a need of effective convergence and continuous interaction between research institutions and development departments for effectively addressing the problems of the region, he added.

Dr M. M. Pandey (Deputy Directors General, Agricultural Engineering) stressed on according priority to the use of drip and sprinkler irrigation and also study of the effective irrigation scheduling under these systems. Further, the package of practices should be developed for protected cultivation under greenhouse. Dr K. D. Kokate (Deputy Director General, Agriculture Extension) informed that the Krishi Vigyan Kendras (KVKs) are working in every district of the zone to disseminate the improved agricultural technologies to the farmers. Coordination is required between state agricultural universities, research institutes and the KVKs for continuous flow of the latest technologies. Dr K.M.L. Pathak (Deputy Director General, Animal Science) and Dr N.K. Krishna Kumar (Deputy Director General, Horticulture) also gave their valuable suggestions for the development of animal husbandry and horticulture in the region.

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XXII Meeting of ICAR Regional Committee No. VII

Goa, 9 November, 2012. His Excellency Governor of Goa, Shri Bharat Vir Wanchoo, inaugurated the XXII Meeting of Regional Committee No. VII at International Centre, Goa. His Excellency stressed the need for strengthening the agriculture research and extension services, and evolving strategies to empower farmers. He mentioned about the problems faced by agriculture due to global warming, competitions, reduced soil-health, land holding fragmentation and called for the solutions.

The Minister of Farmer Welfare and Agriculture Development, Government of Madhya Pradesh, Dr Ramkrishna Kusmaria, stressed the need for maintaining the soil-health for sustained production, and focused on organic farming, conservation of indigenous livestock breeds. He floated the idea of setting up a University on Organic Farming. He expressed the concern about weak extension linkages and called for its strengthening.

Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) gave an overall account of agriculture scenario in India vis-à-vis the states under ICAR Regional Committee No. VII. He stressed the need for conservation of agricultural resources, their processing, value addition and food safety. He urged the scientists to bring prestige and profitability in agriculture profession so that young generations get attracted to it. Dr Ayyappan called for registration of more GIs for the crops and commodities in the region.

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XXII Meeting of ICAR Regional Committee No. V

New Delhi, 15 December 2012. Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) chaired a two-day meeting of the ICAR Regional Committee No. V covering Punjab, Haryana and Delhi, organized by Central Soil Salinity Research Institute (CSSRI) at Indian Agricultural Research Institute on 14 and 15 December 2012. He highlighted various achievements of this region, known as the food-bowl of the country.

This region contributes around 20% of the food grains to the national pool. Presently, the major issues affecting agriculture in this region are deteriorating soil health, depleting ground water, diversification and climatic changes leading to declining profits for the farmers. Other major issues highlighted were the development of appropriate resource conserving technologies, frost tolerant mustard, salinity tolerant pulses, drip irrigation, fertigation, artificial insemination, semen sexing, feed blocks, post-harvest losses in horticultural crops, peri-urban horticulture, dairy entrepreneurship, goatery and piggery, *in situ* conservation of important animal breeds, impact of FDI in retail on agriculture besides exploring export possibilities to neighbouring countries. He further urged all the participating Vice-Chancellors, Directors and Senior Officers from State Departments to prioritize research and development programs targeting farmers' needs.

Dr K.M.L. Pathak (Deputy Director General, Animal Sciences) presented the salient achievements of last two years of this region. He expressed his concern over the increasing costs and declining profits in agriculture. The development of cost effective and climate resilient technologies were advocated to enhance the net profit of the farmers. Dr J.S. Samra (CEO, National Rainfed Area Authority) emphasized the role of diversification in the region for solving various problems being faced by the farmers of the region. Cultivation of *guar* gum as an alternate cash crop was also underlined. More than 100 personnel attended this ICAR Regional Committee No. V meeting.

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Research and Education for Fisheries Development

Jorhat, 27 November 2012. Minister of Fisheries, Government of Asom, Shri Basanta Das inaugurated a two days workshop on 'Prioritization of Research and Education for Fisheries Development in North-East', organized by Central Institute of Fisheries Education, Mumbai in collaboration with Assam Agricultural University (AAU), Jorhat at AAU Campus on 26 November 2012. He urged scientists to develop low-cost fish feed to enhance the net profit of the farmers. It was aimed to identify the priority areas of research and human resource planning for fisheries development in partnership mode involving State Agricultural University, Central Agricultural University, ICAR Institutes and the Department of Fisheries. The workshop was attended by the participants of Arunachal Pradesh, Asom, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Some renowned scientists also provided valuable suggestions including the need for a fish disease diagnostic and control facility for the region, refresher courses for state fisheries officials, skill development of the youth involved in research and development etc.

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Second National Conference on Fisheries Biotechnology

Mumbai, 3 November 2012. Dr Mangala Rai, Agricultural Advisor to Chief Minister of Bihar, inaugurated the two-day Second National Conference on 'Fisheries Biotechnology' organized by the Central Institute of Fisheries Education (CIFE) at CIFE, Mumbai on 2 November 2012. He emphasized on the future potential of cutting edge research in aquaculture using modern tools. Discussions were organized under six sessions: Biotechnology for Fish Nutrition, Breeding and Aquaculture; Marine Biotechnology and Biodiversity Conservation; Fish as a Vertebrate Model Organism; Genomics, Molecular Genetics and Genetic Improvement; Biotechnology for Aquatic Environment and Health Management; and

Biotechnology for Post- harvest Processing and Value Addition. Professor (Dr) T. J. Pandian delivered a keynote address on 'Tuna from Mackerel' highlighting the cutting edge technique that can be used to produce gametes of high cost fish from low cost surrogates. Other highlights included a Panel Discussion of experts on 'Biotechnology – past, present and future' and a student speech contest on 'Genetically Modified Organisms: Benefits vs. Risks'. The student speech contest was won by Ms Shamna N.(Ph.D. scholar, CIFE). Over 200 delegates and students from all over the country participated in the Conference.

Recommendations

- There is urgent need to develop network projects and human resource in the field of genomics, bioinformatics and marine biotechnology.

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Precision Farming

Rahuri 23 November 2012. Dr T.A. More (Vice Chancellor, MPKV) inaugurated a one-day state level workshop on' Precision Farming Technologies for Banana', organized by Ministry of Agriculture, Government of India, New Delhi and supported by Maharashtra State Horticulture and Medicinal Plant Board, Pune at Mahatama Phule Krishi Vishwavidhyalaya (MPKV). He stressed the need to adopt the precision farming technologies for saving irrigation water and fertilizers so that area under banana cultivation could be increased. Shri. K.Iyengar (Joint Secretary, Ministry of Agriculture, Government of India, New Delhi) advised the farmers for maximum adoption of precision farming technologies. Nearly 238 farmers from various districts of Maharashtra participated in the university.

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Interactive Workshop-cum-Farmers' Meet

Imphal, 24 November, 2012. A day-long Workshop-cum-Farmers' Meet on "Fisheries and Aquaculture Development in Mizoram- HRD and Research Needs" was organized in association with Department of Fisheries, Government of Manipur at Panchyat Hall, State Institute of Rural Development, Imphal East, Manipur. The programme was attended by 230 Officials and farmers from various districts of Manipur. The Officials from various Valley and Hill districts explained ongoing activities and further requirements in their respective districts. Dr W.S. Lakra (Director, CIFE) and other scientists interacted with the stakeholders and provided various suggestions. It was agreed to train 20 Officials and 20 progressive farmers of the State by CIFE in modern tools and technologies of aquaculture and fisheries management.

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Fisheries and Aquaculture Development in Mizoram- HRD and Research Needs

Aizawl, 22 November, 2012. A day long workshop-cum-Farmers' Meet on 'Fisheries and Aquaculture Development in Mizoram – HRD and Research Needs' was organized by Central Institute of Fisheries Education in association with Department of Fisheries, Government of Mizoram at Agricultural Conference Hall, Aizawl, Mizoram. The programme was attended by more than 140 Officials and farmers from various districts of Mizoram.

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Eastern Region Agri-business Meet

Ranchi, 14 December, 2012. Sri A K Singh (Principal Secretary, Department of Agriculture and Cane Development, Government of Jharkhand) chaired Agri-business Camp, Jharkhand which was jointly organized by ICAR RCER, Patna, ZTM-BPD Unit (East Zone), NIRJAFT, Kolkatta and Agri-Business Incubation Programme, ICRISAT, Hyderabad in collaboration with Jharkhand Chamber of Commerce and Industries (FJCCI) and Jharkhand Small Industries Association (JSIA) at Ranchi. The deliberations were made in three technical sessions which included issues on finance, agri-business incubation, schemes and incentives of different departments and financial institutions. The programme was attended by 110 participants including farmers, aspiring entrepreneurs and representatives from NGOs from Jharkhand and West Bengal Commercializable technologies were displayed by representatives from 16 ICAR institutes in Eastern India and Birsa Agricultural University, Ranchi. A memorandum of understanding was signed between Directors of ICAR RCER, and M/s Sumedha Agri-tech, New Delhi for commercialization of 'Swarna Vijaya,', F_1 hybrid of tomato developed by the institute.

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International Linkages

Review Meeting on ICAR-ICARDA Collaborative Programme

New Delhi, 29 November 2012. Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) inaugurated a Review Meeting on ICAR-ICARDA collaborative programme, held at NASC Complex, New Delhi, and highlighted the importance of the Workshop. He stressed upon on the need for in-depth research in enhancing productivity in crops like lentil, grass pea and chickpea for eastern India, where these crops have huge potential in the existing/prevalent cropping systems. He also expressed the targeted research on high quality fodder production, pre-breeding, water productivity, rangeland management and crop-livestock integration socio-economic and policy issues in this region. He also emphasized on demonstration of improved technologies through Krishi Vigyan Kendra of ICAR.

Dr S. K. Datta(DDG, Crop Science) appreciated ICARDA- South Asia and China Regional Program (SACRP) for establishing strong linkages with various Indian institutions. He mentioned that barley network can be improved with the introduction of wild species and genomic sequencing, which is important for this programme as these species may extinct, if not carefully managed. Chickpea phenotypes also need more improvement with good yield potential so that post-harvest losses can be reduced.

Dr K. Shideed (ADG, International Cooperation and Communication, ICARDA) thanked ICAR for its strong support and long relationships with ICARDA. He elaborated the ICARDA's research programme and stressed the importance of these programmes in India. He also appraised ICARDA's interventions in South Asia and particularly in India that is going to increase with the implementation of CRP 1.1 (Dryland Systems), which is a big domain for dry land systems. The collaborative research programme is in operation for the last four years involving six ICAR institutions and 12 State Agricultural Universities on food legumes, barley and wheat, rangeland and crop-livestock systems, improving water productivity, and on socio-economic and policy research.

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Molecular diagnosis of equine piroplasmosis

Hisar, 8 December 2012. Prof. I. Igarashi from National Research Centre for Protozoan Diseases, Japan facilitated 10-day International Workshop on 'Molecular Diagnosis of Equine Piroplasmosis' for the SAARC countries participants from 29 November 2012 at National Research Centre on Equines (NRCE) as an OIE expert on Equine Piroplasmosis. He added that development of these state-of-the-art diagnostic facilities and capabilities will pave the way for NRCE in applying to the OIE Reference Laboratory on 'Equine Piroplasmosis'. The OIE, World Organization for Animal Health (Paris, France), initiated OIE Laboratory Twinning Programme to create opportunities for developing and in-transition countries to develop laboratory diagnostic methods based on the OIE Standards. Each Twinning project is a partnership between an OIE Reference Laboratory and a Candidate Laboratory.

The participants from Afghanistan, Nepal, Bhutan, Bangladesh and Sri Lanka, including seven participants from state animal husbandry department of Haryana, Rajasthan, Gujarat; DAHD&F (Quarantine Officers) and Turf Club Authority of India attended this Workshop.

FNRCE initiated the OIE-sponsored twinning project on - Equine Piroplasmosis with National Research Centre for Protozoan Diseases (NRCPD), Japan (2010-2013), Japan; Glanders with Loeffler Insitute (FLI), Germany (2012-2015) and Equine influenza with Animal Health Trust (AHT), UK (2012-2015).OIE Laboratory Twinning Program on 'Equine Piroplasmosis' is the first such project awarded by the OIE to the country.Equine Piroplasmosis is an acute, sub-acute, or chronic tick-borne disease, caused by intra-erythrocyte protozoa: *Theileria equi* or *Babesia caballi*. The disease condition caused by *T. equi* is highly endemic in Indian equine population entailing heavy economic losses to equine owners and attribute restriction on international movement of horses.

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Livestock, Research and Development: ILRI-ICAR partnership

New Delhi, 7 November 2012. Professor M.S. Swaminathan [Member of Parliament (Rajya Sabha) and Chairman, M.S. Swaminathan Research Foundation] inaugurated International Livestock Research Institute (ILRI) - Indian Council of Agricultural Research (ICAR) Partnership Dialogue on 'Livestock, Research and Development'. He suggested development of integrated crop-livestock farming system and adoption of naturally bio-fortified foods for enhancing nutritional status of the Indian population. Dr Jimmy Smith (Director General, ILRI) highlighted the efforts of ICAR in the livestock sector and hoped strengthening of research and development through collaborative initiatives. He said White Revolution is led by demand in livestock products which help ensure elevation of nutritional status in the population. Dr K.M.L. Pathak, (Deputy Director General, Animal Sciences) emphasized the need of a Livestock Revolution in the country for prosperity. Earlier, senior experts and officials from ICAR, ILRI, and CGIAR institutions, Government Departments, NGOs, Farmers' Cooperatives and Industries participated in the one-day event.

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International Conference on Statistics and Informatics in Agricultural Research inaugurated

New Delhi. 20 December 2012. Prof. Abhijit Sen (Member, Planning Commission) inaugurated a three-day International Conference on Statistics and Informatics in Agricultural Research, organized by the Indian Society of Agricultural Statistics, at NASC Complex, New Delhi on 18 December 2012.He delivered Dr Rajendra Prasad Memorial Lecture in the 66th Annual Conference of Indian Society of

Agricultural Statistics and said that significant and original contributions have been made by Indian Statisticians in areas of design of experiments, sampling technique, statistical genetics, modeling and forecasting techniques etc.

Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) said that initiatives are being taken for establishing a high-powered computing infrastructure for research in bioinformatics. He hoped that a meaningful academic discussion during the conference would enable to draw the future agenda of research.

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Celebrations/Awareness

Agro-based Industries in Islands

Andaman and Nicobar Island. The Central Agricultural Research Institute (CARI) celebrated ICAR Industry day on the theme 'Agro-based industries in Islands - status and scope' at its Garacharma Research Complex. On this occasion Dr S. Dam Roy (Director, (CARI)) emphasized that the context of scientific enterprising is changing in the era of globalization. He added that it is being increasingly realized that participative mode of action will be more meaningful for addressing national needs of sustainability in ensuring nutritional and agricultural security for all. At the same time bringing profitability in agriculture sector for all segments of the society i.e. farmers, entrepreneurs, industry, traders and other stakeholders.He also underlined the various technologies developed by the CARI in agriculture and allied field and the varieties of rice, coconut, vegetables and other which have been released for the benefit of the farming community.

At the outset a brief presentation was given on the CARI technologies, an account of the food processing scope and the National Mission on Food Processing which is run by the Department, and stressed to go for viable schemes like coconut virgin oil, desiccated coconut powder, bee keeping and protected

cultivation of vegetables. The focus was also on the potential of cage culture; fodder development and popularizing maize cultivation as major thrust in the sector of livestock development; the milk byproducts like curd, *khoa, paneer* and *Ghee* making as livelihood options for the youth; and creation of centralized marketing facilities of all the Andaman products so that it gets importance and good price.

Shri G. Bhasker (President, Andaman Chamber of Commerce) stressed to disseminate the information to the end users and exhorted to the house to make available tourism related fruits like watermelon, pineapple, dragon fruit etc. to get premium rate.

Shri Athirstavel (General Manager, NABARD) gave presentation on the farmers technology transfer fund, rural innovative fund and umbrella programme of Natural Resource Management which address to transfer of technology from lab-to-land, livelihood opportunities and employment to rural youth. Mrs Susan (from Susan Roses) laid upon the challenges like non availability of good quality of soil which is reducing the productivity. She suggested making of coco pith from coconut and improving the marketing. Mr Menthol of (IMPL) and Mr Rubin Fernando (from Rubin sea food) invited the stakeholders on providing marketing opportunities for the sea food.

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Rice Field Day

Laxamicherra, 14 November 2012. Shri Agohre Debbarma (Minister of Agriculture, Tripura) inaugurated 'Rice Field Day' (a 9-day programme, conducted as a part of Technology week) at Laxamicherra village of South Tripura on 6 November 2012. He suggested utilizing the technology as demonstrated by the Krishi Vigyan Kendra (KVK) and using the different variety of rice in the cropping system mode. At least two crops must be taken in a year for better farm-income. The KVK demonstrated four varieties of rice, viz. 'Gomati', 'Naveen', 'MTU 1010' and 'Ranjeet' of different duration under both medium -land and low-land situations. He said that taking advantage of short- and medium-duration crops, farmer should cultivate the second crop in rice fallow areas. The KVK also distributed high-yielding seeds of lentil, groundnut, vegetable pea and hybrid maize to the participating farmers. This type of demonstration will help to maintain the soil fertility status for sustainable food production and also achieve the desired food security of the Tripura. Besides rice crop, KVK also demonstrated the other crops like maize, okra and cowpea in this Laxamicherra village.

The demonstrations on Nutrient Management in rice were conducted *by* Krishi Vigyan Kendra of South Tripura district in tribal villages Laxamicherra and Garjee, which covers about 30 ha area during *kharif* 2012. The main objective of the demonstration was to show the different systems of nutrient management under all the three systems of rice cultivation such as System of Rice Intensification (SRI), Integrated Crop Management (ICM) and Conventional (traditional) at one place with optimum use of fertilizer without affecting the soil health. The success of demonstration to the farmers of other villages was shown at Laxamicherra village of South Tripura in which more than 200 farmers from Laxamicherra, Garjee, Sabroom, Dudhpuskarini, Bagama and Mirza village visited the rice field and observed the impact of different system of nutrient and crop management.

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Agriculture Education Day

- Cuttack, 9 November, 2012. Prof. B.C. Tripathy (Vice-Chancellor, Ravenshaw University) addressed the participants on the 'Importance of biodiversity and basic research in biology' on the Agriculture Education Day at the Central Rice Research Institute. More than 120 students along with their teachers from 12 educational institutions around Cuttack and Bhubaneshwar participated. Several activities including inspirational talks, career counseling, exhibition on agriculture projects and speech and quiz competition were organized. A compilation entitled,*Miracles of Agricultural Science* was brought out and circulated among the students

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- Lucknow, 19 November 2012. Dr J. K. Jena (Director, NBFGR) appraised the students on the prospects of agricultural education and the role of ICAR in agriculture development in the country through research, education and extension on the 'Agricultural Education Day' at the National Bureau of Fish Genetic Resources (NBFGR). This Day was celebrated as Open-House Day for the students from various schools and general public so that they could be appraised about the research

activities of different laboratories, fish farm, Ganga Aquarium etc. of the Institute. The Open House Day was visited by more than 1,250 school children and teachers, beside several others.

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CIBA celebrates World Food Day

Chennai, 16 October 2012. The Central Institute of Brackish water Aquaculture (CIBA, ICAR) organised the "Brackish water Aquaculture Farm Innovators Day" in commemoration of the 'World Food Day'on 16 October 2012. A progressive aqua-farmer Shri B. Suryakumar and his technical consultant Shri M. Kalyanaraman of "Hi-Tide Sea Farms" in Nagapattinam district of Tamil Nadu was invited to present their farm innovations in shrimp aquaculture.

The innovators used 'shade nets' used in covering Greenhouses in agriculture as a substrate for development of periphyton and Bio-flocks for nitrogen assimilation in shrimp culture ponds to control total ammonia nitrogen which is a pollutant in shrimp culture ponds. The principle behind this innovative approach is the use of aquatic microbial community that absorbs the nitrogenous wastes and turns them in to nutrients, stabilises the water quality and enhances shrimp growth in pond culture system. This innovation gives enhanced water quality (zero water exchange) and the carrying capacity of the pond, which facilitates higher stocking density and ultimately higher productivity per unit area.

Availability of quality seed and electricity are the two critical factors which determine the efficiency of this innovation. Besides , innovative ways of disinfection of pond water by connecting a pipe with a bleaching powder drum, comfortable feeding floats, tub made feed check try, pond sludge depth indicator, bottom soil sampler and central drainage system are the other frugal innovations developed by them. The innovators were of the view that it is essential to suggest an alternative carbon source for the development of the biofloc, for an increased shrimp production. Enhancing the efficiency of aerators, lining of shrimp ponds and labelling of aquaculture. Drugs are to be taken up to improve the shrimp farm efficiency and management. The forum felt that ICAR's new initiative on 'Farmer FIRST: Enriching Knowledge-integrating technology-to enhance farmers-scientists contact' with multi-stake holders-participation will facilitate in bridging the gap between technology development and application.

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World Fishery Day

Allahabad, 21 November 2012. The Regional Centre of CIFRI observed World Fishery Day and organized a workshop on '*Nadiyon Main Videshee Matsya Prajatiyon Ka Atikraman: Karan Evam Nivaran'* to mark the important occasion of fishery fraternity and sensitize the stakeholders on alarming issue of rapid invasion of exotic fishes on major river systems including the river Ganga.

The rivers of the country in general and that of the Himalayan origin in particular are facing serious obstructions from hydro-electric projects; abstraction from irrigation, industrial and municipal sectors and addition of effluents into rivers from industrial, municipal sources and agricultural run-off. As a result, in most of the cases the perennial voluminous rivers have been changed into narrow, shallow, semi running, stagnant, seasonal and discontinued channels and the crystal clear, pollution free water changed into dark brown, stinking sink of domestic city sewage and agricultural run-off. The shallow sluggish flow concentrated with effluent load has drastically altered the pristine feeding and breeding grounds hence exterminating the valuable native species including Indian major carps, large catfishes, murrels etc. As a result the vacant habitats/niches have been occupied by resilient exotic fishes like tilapia and common carps, which had made access in the culture systems in and around the basins. The river Ganga is also facing the similar problem due to massive anthropogenic activities throughout the basin. The river system known as original abode of the Indian major carps has been highly invaded by resilient exotic fishes. Under the changed state the exotic carp, *Cyprinuscarpio* made an inadvertent access in the middle stretch of the river probably from adjoining fish farms, which showed constant increase in catches since 2001 onwards. Likewise

another exotic perch, *Oreochromisniloticus* also started its appearance in fish catches at Allahabad since 2003 onwards. The economically important IMC and major catfishes reportedly contributed almost 70% of the catches during 1961-70 have now reduced to about 10-20 % of total catches, while exotics (tilapia and common carp) alone contributes almost 35-40 % of the total catches. World Fishery Day 2012 was organized to highlight the issue of alarming invasion of exotic fishes in our rivers.

Dr K.D. Joshi (Head of the Regional Centre) highlighted about the work done by the centre in the field of river, wetland and reservoir ecology and fisheries; spawn prospecting; socio-economic aspects. He added that the fish diversity, composition and per cent share of exotic fishes in the major rivers. Dr Joshi mentioned about availability of 6 exotic fish species (*Oreochromisniloticus, Cyprinuscarpio, Hypophthal-michthysmolitrix, Hypophthalmichthsnobilis, Ctenopharyngodonidella* and *Clariasgariepinus*) in the river Yamuna; 4 species (*Cyprinuscarpio, Oreo-chromisniloticus, Hypophthalmichthysmolitrix* and *Ctenopharyngodonidella*) in the river Ken; 2 species (*Cyprinuscarpio* and *Oreochromisniloticus*) in Betwa and 4 species (*Clariasgariepinus, Hypophthal-michthysmolitrix, Cyprinuscarpio* and *Oreo-chromisniloticus*) in the river Sone. Dr Joshi also highlighted the exotic fish population at the worst affected Delhi-Etawah stretch of the river Yamuna, where hardy exotic fishes comprises more than 90% of the total fish catch. Presence of *Clariasgariepinus* in the riverine system is viewed as a serious threat to the native species owing to its voracious feeding habits. He also highlighted the probable reasons of flourishing exotic population in our river systems and also suggested remedial measures.

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Women in Agriculture Day

Bengaluru, 12 December 2012. The Indian Institute of Horticulture Research organized the 'Women in Agriculture Day'. Smt Vani Vishwanath (President, Bangalore Urban Jilla Panchayat) and Smt Susheelamma (President, Sumangali Sevashrama, Bengaluru) were the Chief Guest and Guest of Honour respectively. Smt Vani Vishwanath stressed the need for women's empowerment and said that rural women have to take benefit of government schemes and programs. Smt Susheelamma lauded Smt Vani Vishwanath's efforts at women's empowerment and requested her to look into the possibility of developing a shopping area exclusively for selling goods produced/prepared by small scale women entrepreneurs.

Short presentations on topics of interest for farm women, viz. different types of edible mushroom, its cultivation and nutritional importance; how to minimize pesticide residue in food; flower arrangement and extending shelf life of flowers; extending shelf life and food preservation; and financial assistance to farmers from banking sector were delivered. An interactive quiz programme was also conducted.

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Ganga Aquarium certified as ISO 9001:2008

Lucknow, 14 October 2012. The Ganga Aquarium at National Bureau of Fish Genetic Resources, Lucknow has been certified as ISO 9001:2008 (by VRC Services Inc.) and ISO 14001:2004 (by Absolute Quality Certification Pvt.Ltd., a firm accredited By Joint Accredition System of Australia and New Zealand, JAS-ANZ).

Collaborative effort for improving agriculture

Lucknow, 24 November 2012. Professor R. B. Lal (Vice Chancellor, SHIATS, Allahabad) inaugurated a two days Agricultural Research and Development Conclave for Uttar Pradesh – Uttar Pradesh *Kisan-Vigyan Sangam 2012*, jointly organized by IISR, CISH, and NBFGR & CSSRI regional station at Indian Institute of Sugarcane Research, on 23 November 2012. He said that effective management must be adopted at every level of agriculture, and technology should reach to remotest to remote area of villages. Professor Lal remarked that agriculture is the source of livelihood for two-thirds population of the Uttar Pradesh. With the huge yield gaps in the areas of agriculture and allied sectors there is immense scope for productivity enhancement by harnessing the potential of available technologies. In this endeavour the National Agricultural Research System (NARS) comprising various research institutions under ICAR, State Agricultural Universities (SAUs) and Krishi Vigyan Kendras (KVKs) are doing their efforts for productivity improvement. The state has a significant bearing on the national economy contributing more than 13% of agricultural GDP of the country. The State is the

largest producer of food grain and sugarcane in the country. It has a share of 26% in the total horticultural production of the country. Dr S. Solomon (Director, IISR) highlighted the importance of conclave and said that lack of marketing infrastructure, cold storage /godown for storage of additional agricultural produce, unavailability of quality inputs in time are the most inflicting problems in Uttar Pradesh due to which famers are not getting adequate income from their produce. There is a need to introduce "evergreen revolution" at every level in agricultural production in Uttar Pradesh. In this context ICAR institutes and SAUs developed technologies for better production of cereals, pulses, sugarcane, fruits, flowers, fish, aquaculture, dairy etc. Unfortunately these technologies are not being adopted at large by famers as a result the field productivity is stagnant at low level. Demonstration and explanation to development officials and farmers on technologies developed by IISR viz., improved sugarcane variety CoLk94184, cane node technique, bud-chip method, organic cane cultivation, water saving sugarcane techniques, sugarcane machines, value added products from sugarcane juice, bio-intensive management of insect-pests and diseases were major highlight of the organization. The fresh cane juice and organic jaggery made available to the visitors was big hit on the occasion. Awareness programme on PPV & FR Act 2001 and brain storming on IPR issues and commercialization of agricultural technology was also organized.

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Mountain Fisheries: Challenges and Opportunity for livelihood security

Bhimtal, 6 November 2012. In commemoration of Silver Jubilee year of Directorate of Coldwater Fisheries Research (DCFR) a two- day national seminar on 'Mountain Fisheries: Challenges and Opportunity For Livelihood Security' was inaugurated by Dr K.L. Sehgal on 5 November 2012. He expressed that inherent slow growth of coldwater fishes and uneven topography in the mountain region are major hurdles for the development of coldwater fisheries. Availability of feed ingredients for the formulation of artificial feed to reduce the cost of trout production is another concern. Appropriate enhancement programme to replenish the dwindling stock of Mahseers in the lakes, rivers and reservoirs of hill region is urgently required, he said. Dr B. Meenakumari appreciated the contribution of the institute in the development of coldwater fisheries sector. The breeding technology of the declining population of some coldwater species needs to be standardized. She stressed upon the role of nutritious feed and quality seed availability for the farmers of the Mountain region. During the lean period, the problem of water scarcity can be solved by the construction of polythene lined tank in the hilly areas to a certain extent.

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Clean milk production and food-borne infections

Goa, 26 October 2012. An awareness programme on 'Clean milk production and food-borne Infections' was organized under societal development programme on 'Approaches towards combating zoonotic and food-borne infections through community participation', sponsored by Department of Biotechnology, Government of India at ICAR Research Complex for Goa, Old Goa in collaboration with Goa State Cooperative Milk.

The awareness programme focussed on causes of food-borne zoonotic and quality assurance of animal-based products to meet consumer expectations; knowledge of the emerging diseases; adverse effects of agricultural and other human activities on food quality, animal welfare, human health and the environment.

Over 180 farmers from all over the state of Goa participated in the programme. Dr N.P. Singh (Director) informed the farmers about the importance of clean milk production. He also complimented the farmers of Goa for their efforts to produce adulterants free-milk. He assured full support from ICAR for promotion of livestock related schemes for the benefit of farmers. Dr Sawant told about the programme on clean milk production and role of the farmers. Dr Barbuddhe gave an account of various practices useful for clean milk production and prevention of food-borne infections.

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Crop improvement programme to increase crop productivity

Bengaluru, 3 November 2012. Dr K. Narayana Gowda (Vice Chancellor, UAS, Bengaluru) inaugurated one-

day awareness and interactive programme on issues related to 'Plant Genetic Resources (PGR) Management and Registration', organized by the Directorate of Research, University of Agricultural Sciences (UAS), Bengaluru, and National Bureau of Plant Genetic Resources, New Delhi, at UAS, GKVK, Bengaluru. He mentioned that it is important for the crop scientists to understand the procedures of plant germplasm in legal perspectives and also to educate the farmers to know about this, so that the traditional and folk varieties being developed and conserved by them can also be registered. He emphasized that the interest of the farmers and the nation should be protected while registering the plant germplasm. He quoted the example of registering the unique jack fruit germplasm from Tubugere village of Doddaballapur *taluk* Bengaluru Rural District in the name of Shri Narasimhaiah, the farmer of Tubugere village who contributed immensely to protect that jack fruit germplasm. This kind of awareness programme will update the crop scientists/breeders to understand the procedures of germplasm registration and to educate the farmers to promote registration of plant germplasm with unique traits.

The other issues discussed were: the importance of Plant Genetic Resources (PGR) and various programmes that are in operation in the country to protect and utilize the PGR; the importance of Plant Germplasm Resources in Crop improvement programmes to develop high- yielding varieties and hybrids for varied situations; and complete information on the existing procedures of Germplasm Registration and Gene Banks for conservation of germplasm.

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DRMR celebrates its XIX Foundation day

Bharatpur, 20 October 2012.Dr H. S. Gupta (Director, IARI, New Delhi) delivered the Foundation Day Lecture on the 'XIX Foundation day of DRMR'. He stressed the need for collaborative efforts between farmers and scientific community for increasing crop productivity. He also touched upon the un-remunerative price for agricultural produce realized by the farmers. It is estimated that annually India lose about ₹ 70,000 crores worth of cereals, pulses, oilseeds and vegetables due to inadequate storage and post-harvest processing facilities thus warrants policy intervention . The need to integrate animal husbandry with crop production was also stressed upon by him. He also exhorted the scientists to increase their research efficiency so that the diverse challenges faced by Indian agriculture can be tackled.

Dr B. B. Singh (Assistant Director General, Oilseeds and Pulses) highlighted the important role played by rapeseed-mustard in the agricultural economy of the country. Expressing satisfaction over the achievements of the Directorate especially efforts made in generated technology dissemination through its well thought of extension activities. He also suggested developing close linkages with various state department of agriculture for collaborative efforts in knowledge generation and dissemination.

Dr J S Chauhan (Director, DRMR) reflected upon the mission and vision of the directorate. He called upon the rapeseed-mustard farmers to take active interest in the activities of the directorate and adopt the scientific technologies recommended for the crop to realize higher productivity in rapeseed-mustard.

Dr Devender Swaroop (Director, Central Institute for Research on Goats, Mathura, Uttar Pradesh) suggested that better collaboration between the two institutions will be of great benefit to the farming community. Two publications from the Directorate '*Sason Sandesh* ' and '*Sarson News*' were also released by the guests.

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Farm innovator's Day

Jhansi, 23 November 2012. Dr S. K. Dhyani (Director, NRC for Agroforestry) emphasized the need for innovation in agriculture with farmer's participation in the semi-arid and arid region at the Farm Innovator's Day, and *Kisan Mela* was organized by the National Research Centre for Agro-Forestryat Parasai-Sindh watershed of Jhansi district in Bundelkhand region. The watershed is being implemented by the Centre in participatory mode with farming community and ICRISAT, Hyderabad. The other speakers urged the farmers to extend cooperation in watershed development programme; and underlined the various agro-forestry technologies developed and demonstrated by the NRC for Agroforestry for the benefit of the farming community in the region. Thirty farmers were given away seeds of improved varieties for cultivation. Exhibits, posters and live materials pertaining to agro-forestry innovation and natural resource management were displayed on the occasion. Demonstrations on micro-irrigation with

rain gun, sprinkler systems and cultivation through tropicultor were held on the day in farmer's field. An interesting innovation by a farmer was construction of a huge bund across the slopes and cultivation of fish in impounded water. Initially growth of fish was slow due to impounded water. So he tied ropes on both side of pond and one bamboo rafter tied with brushwood across the rope. The rafter is pulled 2 to 3 times a day with tractor to stir water. This resulted in increased growth rate of fishes due to increased dissolved oxygen. A total of more than two hundred participants including farmers, Officers from state departments, scientists and technical officers from the Centre were present. More than forty women farmers attended the event which was widely covered in print media.

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Success stories/Impact Research

CARI-model of backyard poultry rearing attracts tribals

Pandua village (Anandapur block, Keonjhar district, Odisha) is one among the 23 villages adopted under NAIP sub-project 'Sustainable livelihood improvement through integrated freshwater aquaculture, horticulture and livestock development in Mayurbhanj, Keonjhar and Sambalpur districts of Odisha' where 62 farm families (all Scheduled Tribes and 53 below poverty line category) are living. People used to keep 3 to 4 native birds having low

production potentialities (around 1.2 kg and lay 14-18 eggs / year). No visible income from this practice was observed. During 2010-11, Regional Centre, Central Avian Research Institute, Bhubaneshwar as a consortia partner of the project tried to implement 'CARI-Model of Backyard poultry Rearing' through 35 landless and marginal farmers in Pandua. As a first step of intervention, 112 native poultry birds were vaccinated against Ranikhet disease that sensitized the farmers about scientific backyard poultry production. Meetings and demonstrations were organized to enlighten the farmers about brooding of day-old chicks, feeding from natural resource, growing, laying, health management and economics involved in backyard poultry rearing practices.

Poultry show-cum-training

The birds attained more than 3 kg body weight by 5 month and by the same time hens initiated laying of

eggs. As advised by consortia, all male birds in the flock were sold @ ₹ 450 to 550/cock due to high market demand. Hens preferred to lay eggs in bamboo baskets half-filled with straw cuts provided by the ladies. Brown shelled eggs were sold in Anandapur market for ₹ 5 each. In one farmers meeting organized at Pandua showed the acceptance of this technology when many farmers came with their birds that created the atmosphere of a poultry exhibition. The news spread to nearby villages and blocks as *Oriya* daily local Newspaper, *The Sambad* published a column about the event. The average income of ₹ 11,340/house-hold/year for the farmers of Pandua village was observed through the intervention that substantially aided to their livelihood. Now farmers are highly interested to procure CARI- Devendra chicks. The success of backyard poultry rearing with CARI-Devendra variety is not only limited to Pandua village alone but to all the 23 adopted villages under NAIP and other nearby areas of Keonjhar, Sambalpur and Mayurbhanj districts of Odisha

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Wider acceptability of short duration varieties of pigeonpea

Morena. Area under long duration varieties of pigeonpea is shrinking when compared with previous years in Gird zone. This reduction of area is due to the fact that long duration pigeonpea takes 220 to

250 days for maturity, and consequently only a single crop could be grown in a year. Further, several times the crop suffers from severe frost. Per caput income of this district is very low due to fallow/pearl millet-wheat/mustard cropping sequence followed on about 2.30 lakh ha area out of net sown area of 2.68 lakh ha. To raise their socio-economic status, farmers need to grow assured pulse crops which are drought-tolerant, fit well in cropping sequence, require less inputs, enrich the soil with nitrogen and organic matter, provide higher income and also benefit the succeeding cereal crops. To overcome this problem, the R. V. S. Krishi Vishwa Vidyalaya-KVK introduced a short duration, high- yielding variety 'ICPL-88039' of pigeonpea with the help of CIMMYT, New Delhi through demonstrations under pigeonpea-wheat cropping system in Morena district, Madhya Pradesh.

For maximizing the income of farmers by crop diversification, initially a short duration pigeonpea variety ICPL-88039 was introduced to replace fallow land farmers kept in *kharif* for growing wheat crop during *rabi*, long-duration poor yielder pigeonpea and pearl millet. The demonstrations was conducted in two villages (Sirmorkapura and Hatharia) in an area of 25 ha of 75 farmers under seed bank formed by the beneficiaries. Pigeonpea is being sown in this region from mid-June to first week of July. The basal dose of fertilizer recommended for pigeonpea was 20 kg N/ha, 40 kg P_2O_5/ha and 30 kg S/ha. The sources of N, P and S were urea, dia-ammonium phosphate and gypsum, respectively. All improved cultural practices were followed as per package of practices recommended by the R. V. S. Krishi Vishwa Vidyalaya, Gwalior. The rainfall received during the cropping period was 650.8 mm distributed over 31 rainy days. The sowing of pigeonpea under ridge furrow system was recommended to conserve moisture, enhance seed germination and effective management of the crop. For economic and efficient weed management, viz. *patharchata* (*Trianthema monogyna*), *lahsua* (*Digera arvensis*), *hazardana* (*Phylanthus niruri*) etc. herbicide imazathyper 10% SL @ 75 g/ha in 600 litre of water was sprayed after 18-20 days of sowing. This pigeonpea variety matures by mid-November which gives sufficient time for sowing of succeeding wheat crop.

Farmers harvested nearly 20-24 q/ha of pigeonpea grain in 135 to140 days duration and earned ₹ 45-60 thousand/ha. After harvesting of pigeonpea crop, farmers gained 10 to 15% higher yield of wheat from succeeding crop than the normal crop. The availability of extra short duration improved variety of pigeonpea is a boon to large number of farmers in Chambal command area. The Center has established a seed bank in two villages of the district and more than 450 q of ICPL-88039 seed was produced during 2010. The 450 q seed was distributed to 2987 farmers and seed producing centers during 2011. About 845 q of seed was produced during 2011 and further redistributed to 3455 needy farmers during 2012.

Looking to the excellent performance of 'ICPL-88039' variety of pigeonpea, seed was further distributed for multiplication by KVKs of Jhabua, Satna, Ratlam, Dewas, Khargone, Guna and progressive farmers of Bhind and Gwalior districts in Madhya Pradesh. A large number of farmers of the Baharaich, Firozabad district of Uttar Pradesh; Dhoulpur and Bharatpur districts of Rajasthan were also the major beneficiaries. The short duration variety has replaced long duration pigeonpea variety as well as some area of pearl millet and *kharif* fallow. Farmers are making more profit by growing two crops (pigeonpea—wheat) in place of single crop in a year (long duration pigeonpea). Pigeonpea has now become a profitable crop giving higher yield and requiring less input. The center is now giving more emphasis on production constraints such as improved seed availability, balance fertilization, plant-protection practices, mechanize farming, value-addition and proper marketing facilities to the farmers of this area. The area under the short duration pigeonpea variety has increased from 2900 ha in 2008 to 9600 ha during the 2010 in Morena district alone. This has increased the double cropped area. With the increase in the pigeonpea production 5 pulse processing mills (*dal* mills) have started and processing about 45 tonnes dal/day. After fulfilling the local market needs, it is also exporting to other states of the country. Farmers are receiving higher profits as compare to tradition crop and method of cultivation. This has been possible through easy availability of short duration variety seed, demonstrations, visits of farmers to crop cafeteria, trainings, extension literature, *kisan* mobile advisory, radio talks and TV programmes.

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Zero tillage sowing

Morena. Area under long duration varieties of pigeonpea which dominated in Morena district of Madhya Pradesh is shrinking when compared with previous years. This reduction of area is due to fact that long duration pigeonpea takes 220 to 250 days for maturity, and consequently only a single crop could be grown in a year. Further, several times long duration crop suffers from severe frost and diseases like wilt and sterility mosaic. Short duration

pigeonpea base sequential cropping has emerged due to development of short-duration photo-and thermo-intensive cultivars and expansion of irrigation facilities. The district is categorized under Gird Agro-climatic zone. The soil of the demonstration site was sandy loam in texture. The climate of this zone is characterized as semi-arid extremely hot during May-June. Annual rainfall received 644.4 mm during 2010-11 was mostly concentrated in July and August. In this region, sowing of short duration pigeonpea by the farmers' is from 15 June to 1 week of July and harvesting during 15 November to 1 week of December. After harvesting of short duration pigeonpea, wheat crop sowing is delayed due to 5 to 8 tillage operations and pre-irrigation after harvest of pigeonpea for sowing of wheat. Timely planting of wheat is crucial as yield reductions of 1–1.5% per day occur for each day after the optimum sowing date of wheat. Besides land preparation requires high input, energy and increased cost of cultivation of wheat crop. Delayed in sowing of wheat required more input like seed, nutrient, irrigation etc. and crop was also affected by terminal heat. To overcome above problems, conservation tillage and management of pre-irrigation is the only way to mitigate the adverse effects on wheat crop in pigeonpea-wheat cropping sequence.

Sowing of wheat by Zero till seed drill

On-farm demonstrations were conducted using five locations in alluvial soils of NICRA village by zero tillage (ZT) sowing method of wheat (*Triticum aestivum*) after harvest of pigeonpea during *rabi* of 2010-11. For timely sowing of wheat, pre-irrigation before harvest of pigeonpea and just after harvest sowing of wheat by using zero-till seed drill along with recommended dose of fertilizers was 100 kg N, 60 kg P_2O_5, 40 kg S and 20 kg $ZnSO_4$/ha for wheat. Full dose of P, S, Zn and half dose of N was applied as basal application in wheat crop and remaining N at panicle initiation stage. The sources of N, P and S were urea, die-ammonium phosphate and elemental sulphur, respectively. A variety of wheat 'MP 4010' was sown after harvest of pigeonpea and package of practices were followed as per recommendation. Total five recommended irrigations were applied at stages of CRI, tillering, flowering, milking and grain development.

Difference between zero till and conventional sowing

Zero tillage sowing method resulted in increase in yield, net return, B : C ratio, energy output, use-efficiency and productivity of energy as compared with conventional tillage sowing method of wheat. The per cent increased in grain and straw yield by 5.32 to 5.94% with Zero Tillage demonstration fields when compared with conventional tillage sowing method of wheat. Maximum cost of production was observed in conventional tillage in comparison to zero tillage. In zero tillage treatment ₹ 3,760/ha was

saved as compared with cost of cultivation in conventional tillage. To popularize zero tillage sowing method of wheat after harvesting of short duration pigeonpea through custom higher service in NICRA village. Thirty two farmers of NICRA village of Morena district were involved and sowing of 50 ha wheat by zero tillage sowing method during 2011-12 resulting additional 112 q grain and saving ₹ 1.88 in NICRA village. The innovative message of zero tillage cultivation of wheat has spread in neighboring villages of NICRA village in the districts and around 200 ha in the district are being covered during current *rabi*, 2012. It is concluded that adoption of zero tillage practice of sowing of wheat after harvesting of short duration variety of pigeonpea produced higher-yield and profit, saved from terminal heat, energy and resources under the soil and climatic conditions of Gird zone of Madhya Pradesh.Visit of hon'ble VC on Zero till field.

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Pacific White Shrimp Farming *in* inland saline water

Pacific white shrimp, *Litopenaeus vannmaei* has become a game changer in Indian shrimp farming. Since its commercial introduction in 2009, the farming of this exotic species has gained tremendous momentum in India owing to its faster growth rate, tolerance to high stocking density, lower dietary protein requirement and tolerance to wide ranges of salinity and temperatures. Following its tremendous success in coastal states, successful attempts were made by Central Institute of Fisheries Education to develop package of practices for profitable aquaculture for the utilization of fragile and degraded resources. Around 8.62 million ha of agricultural land has been badly affected with the problem of soil salinity and 1.93 million km^2 area is under laden with ground saline water in India. Experimental trials were initiated by CIFE at its Rohtak Centre in Haryana in 2012. The major challenges were the quality of ground saline water because of ionic imbalance. Inland saline waters invariably have low levels of potassium and high levels of calcium and variable concentrations of magnesium in comparison to natural sea water.

The cultivation of *L. vannamei* was undertaken in 3 ponds having a total area of 0.60 ha using inland saline water with a salinity ranging 13-15 ppt. The ponds were initially prepared following standard ways of pond preparation for the shrimp culture except the application of lime. As the saline affected soils have high pH (8.0-9.0) no lime was applied. The pond water was fortified with commercial grade fertilizer, Muriate of Potash to maintain optimum levels of potassium (50-60% of the equivalent salinity sea-water potassium concentration) in the culture water, as the water source is deficient in potassium. The ponds were fertilized with fermented organic slurry prepared with molasses, rice-bran, oil-cake and yeast to develop natural food organisms in the pond water. After 5 days of fertilization, the ponds were stocked with *L. vannamei* SPF post-larvae procured from Bay Fry Hatchery, Kakinada, and Andhra Pradesh. The post-larvae were stocked at the rate of 55 Nos./m^2. Commercial shrimp feed (CP Aquaculture India Pvt. Ltd and Avanti Feeds Pvt. Ltd.) *ad-lib*. was used for feeding the animals. For the initial 40 days, the feeding schedule had been prepared based on the hapa survival obtained after 96 hrs of stocking and for the rest of the culture period, the feeding ration had been prepared following the estimated shrimp biomass obtained from the weekly sampling. The water quality parameters like salinity, pH, dissolved oxygen, ammonia, nitrite, nitrate, hardness and alkalinity were regularly monitored and recorded in the range of 13-15 ppt, 7.8, 5.4-8.2 ppm, 3200-3700 ppm, 250-320 ppm, 600-670 ppm, 200-230 ppm and 80-100 ppm respectively. An adequate number of mechanical aeration units were installed for maintaining desired levels of dissolved oxygen in the pond water. At certain occasions, soil and water probiotics were used for the maintenance of the desired water quality and upkeep of pond bottom health.

After 120 days of pond culture, the mean average weights of shrimp at harvest were 21.5 g, 22. 2 g and 22 g with a survival rate of 94%, 92% and 94% respectively. A total production of 6,744 kg/ 0.60 ha/ 120 days was achieved which works to be 11.24 tonnes/ha/120 days. The results of the present study proved that inland saline waters can be profitably utilized for *L. vannamei* culture by execution of cost effective ionic amendments.

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Handing over of Cobia seed using pond reared broodstock to beneficiaries

Kaushylyaganga. Cobia (*Rachycentron canadum*) known as Black King Fish or Lemon Fish or Crab Eater, is one of the important food fishes. Owing to its fast growth (up to 10 kg in a year), better adaptability, excellent texture and flavour, fetching good price in the domestic market and potential for export, has been identified as a candidate species for diversified farming in cages and ponds in marine and brackish water ecosystem. The Central Institute of Brackishwater Aquaculture (CIBA, ICAR), as one of the Consortium Partners in the NAIP Project on 'An export oriented marine value chain for farmed-seafood production using cobia (*Rachycentron canadum*) through rural entrepreneurship', has taken up developing the technology for breeding, seed production, evaluating the culture potential in brackish water ponds as a priority programme.

CIBA has developed a land-based captive brood stock of cobia and has been maintaining following the routine protocols of feeding them with forage fishes @ 5% of body weight, better health management. The captive brood stock, within 9 months, showed maturity under confinement. The techniques for breeding the matured fishes in controlled conditions have been developed at CIBA with intramuscular administration of HCG hormone @ 500 IU/kg body weight for the females and half of the dose for males. Hatchlings produced through the breeding were reared to juvenile size feeding them with rotifers initially followed by *Artemia* nauplii and weaned to formulated diet.

A function of handing over the hatchery produced Cobia seed using pond reared brood stock was organized at the Muttukkadu Experimental Station of CIBA on 22 October 2012. Dr M. Sakthivel(President, Aquaculture Foundation of India and the Chairman, Consortium Advisory Committee of the NAIP Project) was the Chief Guest. Dr A. G. Ponniah (Director, CIBA) presided over the function. Dr A. R. T. Arasu (Principal Investigator of the project and Head, Fish Culture Division) gave a brief background of the project and the success achieved on the controlled breeding of Cobia.

The Director (CIBA), complemented the contributions of the concerned scientists, emphasized on the need for developing a comprehensive technology package for the successful farming of this fish with consistency in breeding and rearing and with improved survival rate and reliable data on the culture aspect too. On that occasion, a brochure on the Cobia seed production was also released. Dr Sakthivel complemented the scientists of CIBA for significant achievement in the case of Asian seabass farming, which is picking up on commercial-scale farming in India. He insisted that the scientists also develop such a status for Cobia so as to increase the fish production through coastal brackish water aquaculture. The Cobia seeds produced in CIBA were supplied to two beneficiaries from Andhra Pradesh and Tamil Nadu for evaluating the performance of Cobia in the brackish water aquaculture system and the potential of farming to develop a comprehensive technology package for pond culture of the fish.

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MoUs

MoU for establishment of KVK

New Delhi, 6 December 2012. Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) and Dr S.B. Dandin (Vice Chancellor, University of Horticultural Sciences, Bagalkot) signed an MoU for establishment of Krishi Vigyan Kendra in Kolar District at National Bureau of Plant Genetic Resources, New Delhi.

Dr K. D. Kokate, DDG (Agriculture Extension) informed that new Krishi Vigyan Kendra (KVK), first in the XII Five- Year Plan-'KVK, Kolar' will provide technological support required to boost the scientific and climate resilient agriculture in this semi-arid region.

Agro-climatically, the KVK is located in the eastern Dry zone of Karnataka. It is a semi-arid drought-prone region with an annual rainfall of less than 700 mm. In the dryland situations, farmers are growing millets, groundnut, pulses and mango. With the scarcely available underground water, farmers are cultivating hybrid vegetables and mulberry for silkworm rearing. Fodder for crossbred cattle is also grown on a limited scale.

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CIFT provides consultancy for meat products

Cochin 8 November, 2012. The Central Institute of Fisheries Technology signed a consultancy agreement with Meat Products of India Ltd., Edayar, Koothattukulam, Ernakulam District (A Government of Kerala undertaking firm) for assistance for the production of ready-to-serve food products in retortable pouches and implementation of HACCP system.

Under the agreement CIFT shall provide technical and other information for implementation of HACCP which includes preparation of HACCP, manual, HACCP plan, SSOP and GMP for the desired products, providing layout, training to staff on HACCP implementation and auditing as also providing HACCP certification which is valid for a period of two years with scope for surprise audit at least three times during the validity period.

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KVK Corner

Agricultural Cooperatives: Key to feeding the world

Bud Bud, 16 October 2011. The World Food Day 2012 was observed at KVK-CRIJAF, Burdwan, with the theme of 'Agricultural Cooperatives: Key to feeding the world'. Dr F. H. Rahman (Programme Coordinator, KVK Burdwan) stressed on the issue of forming cooperatives in agricultural sector towards food security and employment generation.

Dr D. Ghorai (Subject Matter Specialist, Agriculture, KVK Burdwan) substantiated the point raised by Dr Rahman in details with instances from all over the world and discussed some other relevant technological innovations in agriculture which could help maintaining food security in future. The Farmer-Scientists' Interaction programme was also organized where experts of the KVK Burdwan replied to different pertinent and timely queries of farmers. During interaction the nationally recognized farmers shared their thought on making agriculture a profitable enterprise rather than subsistence agriculture and the need for agri-cooperatives in this respect.

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Womens' Day in Agriculture

Jodhpur, 4 December 2012. The Krishi Vigyan Kendra, Central Arid Zone Research Institute celebrated 'Womens' day in Agriculture' at Lunawas village of *Luni Panchayat Samiti* of the Jodhpur. The objective of the programme was to increase awareness among farm- women about agricultural technologies and other women related issues. More than 300 women and girls from nearby villages of *Luni Panchayat Samiti* participated in the programme and interacted with the scientists and other guests present at this occasion.Some of the young farm- women and village *Sarpanch* (women) expressed their views regarding problems and aspirations of rural women.

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Capacity Building

DG, ICAR inaugurates new rubber roller ginning machine

Nagpur, 24 November 2012. Dr S. Ayyappan (Secretary, DARE and DG, ICAR) inaugurated 'Rubber Roller Ginning Machine', developed by Central Institute for Research on Cotton Technology (CIRCOT), at Ginning Training Centre of CIRCOT, Nagpur. Leather washers used for rollers in conventional ginning machine are replaced by rubber washers in the new innovation. This rubber roller system can increase the productivity of the gin machine by 20 to 25%, reduce energy consumption by 15 to 20% and reduce downtime for grooving roller. Machine has been developed under a public-private partnership with M/s. Millennium Rubber Technologies Pvt. Ltd., Thrissur, Kerala and joint patent has also been filed. The leaflet 'Self Grooving Rubber Roller and Modified Double Roller Gin with Rubber Roller' has been released by Secretary DARE and DG, ICAR.

During this occasion, Dr S. Ayyappan (Secretary, DARE and DG, ICAR) has also given away certificates to the trainee-farmers participated in training programme on Cotton Quality Based Marketing and By-product Utilization of Cotton organized by Ginning Training Centre of CIRCOT, Nagpur from 19 to 20 November 2012.

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Hygienic fish drying improved livelihood of coastal fisherwomen of Odisha

Penthakota, Puri . Dr (Mrs) Krishna Srinath (Director, DRWA) inaugurated a Model Fish Drying Unit at Penthakota, Puri, Odisha under the Network project on 'Capacity building of coastal fisherwomen through post-harvest technology in fisheries', established by the Directorate of Research on Women in Agriculture with the financial support of National Fishery Development Board (NFDB).

She handed it over to Shanti Marine Fisherwomen Society, Penthakota in the presence of Shri P. Krishna Mohan(Director Fisheries, Govt. of Odisha), officials of State fisheries department and scientists of Directorate of Research on Women in Agriculture.

Fish drying is a major activity in the coastal districts of Odisha, carried out mainly by small-scale fisherwomen. However, most of them process dried fish under poor hygienic conditions. Drying usually takes place on bamboo mats, cocoa nut or palm leaves or on the open beach using cheap, unpurified salt and poor quality water is used for rinsing of fish. The product not only lacks quality but also fetches low market price. Dried fish produced in this way provides communities with little bargaining power and leads to small-scale fishers remaining trapped in the vicious cycle of poverty. Moreover unprotected handling while drying affects the health of fisherwomen which is a matter of

concern. Recognizing the need for technological intervention and skills amongst small-scale fisherwomen, DRWA had initiated a Network project at Penthakota Village of Puri for empowering coastal fisherwomen communities for hygienic production of dry fish, its packaging and marketing.

The main objective of the project was to make the fisherwomen self sufficient and self reliant for improving their livelihood. DRWA in collaboration with National Fisheries Development Board (NFDB) taken up the programme which increased the skill of fisherwomen to produce quality dried fish without affecting their health and moreover they got 25 to 30% more market price. The intervention and training programme sensitized the coastal fisherwomen on food safety, hygiene and sanitation and introduced improved processing, labeling and packaging techniques. Under this project quality product was assured as well as links have been created with more profitable market chains that generated increased income. Model Fish Drying Units were created at five locations two in Odisha, one each in Tamil Nadu, Kerela and Maharashtra with the financial support of National Fisheries Development Board for fisherwomen society for hygienic production of dry fish and its marketing through group approach.

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Capacity building in e-publishing

New Delhi, 30 October 2012. A 2-day Hands-on-training in e-publishing for Editors of Society journals was organized at DKMA, ICAR New Delhi by the team members of project on E-publishing and Knowledge System in Agricultural Research (E-PKSAR). The workshop was inaugurated by Dr P. S. Pandey, N C, Component 1, NAIP. Complete life-cycle of on-line article processing was explained to the participants.

Editors and other staff members from the *Journal of the Indian Society of Soil Science, Indian Journal of Dairy Science, Indian Journal of Veterinary Anatomy, Indian Journal of Veterinary Medicine, Journal of Cotton Research and Development , Indian Journal of Agricultural Economics* attended the training. Journals , viz. *Journal of the Indian Society of Soil Science, Indian Journal of Dairy Science, Indian Journal of Veterinary Anatomy, Indian Journal of Veterinary Medicine, Journal of Cotton Research and Development* , were later hosted on the ICAR portal (http://epubs.icar.org.in/ejournal).

The project on E-Publishing and Knowledge System in Agricultural Research (E-PKSAR) has also been awarded by the NAIP for outstanding contribution in e-publishing in ICAR. A Certificate of Appreciation was given by the DG, ICAR to CPI on 14 December 2012 in Regional Committee No. 5 at IARI, New Delhi.

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Visits

Yeoman services for protection of the camel species in India

Bikaner, 7 November 2012. Her Excellency Governor of Rajasthan, Dr Margaret Alva, visited National Research Centre on Camel and was appreciative of the achievements of the Centre as 'Yeoman Service done by the Centre towards protection of the camel species in India'. While the concern was mentioned towards declining camel population in India, she endorsed the need of having defined breeding policy by State Animal Husbandry Departments of Rajasthan and Gujarat where the camel breeds exist. She appreciated efforts of Centre towards promoting camel as "Milch Animal" as the traditional role of camel for draught and agriculture is reducing. She also visited Camel Museum, Milk Parlour, Camel Dairy, Complete Feed Plant and learnt about the beneficial effects of camel milk towards human health and efforts of the Centre towards developing of the camel milk products like Ice cream, Flavoured milk, *Lassi* and various indigenous products which can serve as functional foods. She was also apprised about the

Centre's research efforts in exploiting camel immunology for human medicine purpose by developing diagnostics, treatment and preventive measures using Camel antibodies. She assured to address the issues like approval of MMPO status to camel milk and milk products, and development around the campus of this world class premier research Centre on camel through state and local administration.

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Minister of State for Agriculture visits CIRCOT

Mumbai, 12 November 2012. Mr Tariq Anwar (Union Minister of State for Agriculture and Food Processing Industries) visited Central Institute for Research on Cotton Technology and released a leaflet on Training-*cum*-Exposure Programme on 'Post-harvest Management of Cotton and Value Addition to Crop Residues' to be implemented under Cotton Technical Assistance Programme for Africa, to be held between 2 and 16 December 2012.

Mr. Anwar lauded the progress made by the Institute during the past nine decades and appreciated the work done by the cotton scientists benefitting the farmers in cotton production as well as technological aspects including by-product utilization. The training is intended for 30 participants from seven African Countries, namely Benin, Burkina Faso, Mali, Chad, Nigeria, Uganda and Malawi.

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Social upliftment of small farmers

Patna, 14 November 2012.The Union Minister Agriculture (State), Shri Tariq Anwar, inaugurated newly constructed Veterinary Clinics at the ICAR Research Complex for Eastern Region. In the interactive session with scientists and staff of the institute, The Union Minister Agriculture (State) stressed for the need of large-scale transfer of technologies and urged the scientists to work hard to achieve the goal pertaining to socio-economic upliftment of small and marginal farmers in the region. He reiterated for better utilization of natural resources so as to bring the second green revolution in the region.

Dr B P Bhatt, Director, ICAR RCER briefed on the present agricultural scenario in the Eastern Region and work done by the institute.

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Scientists must develop technologies for small farmers

Ludhiana, 20 November 2012. The Union Minister of Agriculture (State), Dr Charan Das Mahant, visited the Central Institute of Post -harvest Engineering and Technology (CIPHET) to get an overview of research and extension initiatives taken by the institute in the area of post-harvest.

Dr Mahant encouraged scientists to develop technologies and machinery which could help small farmers and enterprises in rural areas. Dr P.R. Bhatnagar (Director, CIPHET) presented recent innovations and technologies developed at the institute. 'Institute is conducting number of training programme for development of entrepreneurship in the area of food processing,' he added. Films on the research activities initiated by the CIPHET were screened on the occasion.

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CIBA technologies benefit brackishwater aqua-farmers

Kakdwip, 5 November, 2012.The Minister of State Fishery, Government of West Bengal Shri Subrata Saha, visited the Kakdwip Research Centre (KRC) of Central Institute of Brackishwater Aquaculture (CIBA). The Minister was satisfied with the work being carried out at Kakdwip Research Centre of CIBA and found that technologies developed by CIBA are of great help to the brackishwater aqua-farmers to achieve better production and improve their economic status.

He complimented CIBA scientist for taking up project work under NFDB, NAIP and CPWF for the betterment of farming communities in West Bengal. He also appreciated the frontline farm demonstration of Asian seabass farming, production of fish polyculture feed by CIBA, Kadwip, and suggested to take up more research work on seabass farming with pellet diet and simpler technology for the white shrimp *Litopenaeus vannamei* farming, by which, the farming communities would reap maximum benefit for socio economic upliftment in Sunderban area.

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Minister of State for Agriculture and Food processing visits CTCRI

Thriuvananthapuram, 15 December 2012. The Union Minister of State for Agriculture and Food Processing, Shri Tariq Anwar, visited the museum of the Central Tuber Crops Research Institute and deliberated with scientists on different technologies showcased in the museum. He showed keen interest in knowing about the potentialities of tropical tuber crops. He stated that our country which was importing food grain is now exporting rice and wheat. Nevertheless, we can't be complacent over the situation in the context of climate change and hence a lot of farmer oriented research is to be intensified. He congratulated CTCRI scientists for their accomplishments and promised to

extend all sorts of help and cooperation in the field of Tuber Crops Research and Development.

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Trainings

- The Directorate of Weed Science Research organized a ten-day national training programme from 31 October to 9 November 2012, on the 'Advances in Weed Management'. Twenty trainees from different ICAR institutes and agricultural universities participated in this programme.
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- The Directorate of Research on Women in Agriculture, Bhubaneshwar organized a training programme on 'Social Development in Watersheds' for 25 participants of Water Management Team (Social) from 5 districts of Odisha from 8 to 12 October 2012. The training was sponsored by Odisha Watershed Development Mission.
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- To revive and improve the status of sugarcane cultivation and sugar industry in the Bihar, Indian Institute of Sugarcane Research, Lucknow has initiated many programmes in collaboration with sugar mills and cane & sugar industry department of Bihar. Recently one day Farmers' Training and Awareness on "Sugarcane Production and Management in Bihar" was organized by IISR at its Regional Centre, Motipur (Muzaffarpur) on 6December 2012 and at Hasanpur sugar mill (Samastipur) on 7 December 2012 in Bihar. The Indian Rural Association (IRA), Deoghar (Jharkhand) sponsored training for 250 farmers at Hasanpur on 7 December 2012.
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- Mumbai, 5 December 2012. With the aim to create awareness on researchable issues and methodologies pertaining to the climate change impact on fisheries and mitigation strategies among the researchers / professors in different research institutes / universities the Central Institute of Fisheries Education organized an ICAR sponsored training on Research Strategies for Mitigation and Impact of Climate Change on Fisheries under Centre of Advanced Faculty Training (CAFT) programme held during 15 November to 5 December 2012. A total of 18 participants attended this national training programme representing different 8 states.
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ICAR invites Entrepreneurs

- ICAR has developed a three-tier system for Intellectual Property and Technology Management and seeks new partners for technology transfer and realization.
- Each ICAR institute has Institute Technology Management Units (ITMUs) to work as facilitation centers for technology protection and commercialization.
- As the middle–tier, five Zonal Technology Management & Business Planning and Development Units (ZTM&BPD) are catalyzing partnerships.
- From the ICAR Headquarters, policy backstopping is provided alongside brand promotion and outreach activities at national and regional level to showcase the ICAR's knowledge, skills and technologies.
- The efforts are leading to relationship building with more and more partners.

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Year round-up 2012

H.E. the President of India emphasized on forming *Mahila Kisan Mandals* for educating farm women on different aspects of agriculture and related activities

Bharat Ratna Dr A.P.J. Abdul Kalam, fourteenth President of India is discussing with Union Minister of Agriculture and Food Processing Industries, Shri Sharad Pawar during inaugural function of 84th Foundation Day of the ICAR on 16 July 2012.

Dr C.D. Mahant, Minister of State for Agriculture emphasized importance of *Mela* for farmers through generation of awareness regarding new farm technologies

Hon'ble Dr Manmohan Singh (Prime Minister of India), inaugurated the 99th Annual session of the Indian Science Congress. H.E. Muralidhar Chandrakant Bhandare (Governor of Odisha), Shri Vilasrao Deshmukh (Union Minister of Science and Technology and Earth Sciences), Shri Ashwani Kumar (MoS for Planning, Science and Technology and Earth Sciences), Shri Naveen Patnaik (Chief Minister of Odisha) graced the occassion

Prof. M.S. Swaminathan (Member of Parliament, Rajya Sabha) was the Chief Guest at 66th Foundation Day function on 23 April 2012 at the Central Rice Research Institute, Cuttack.

Dr S. Ayyappan (Secretary, DARE and DG, ICAR) inaugurating the Centre for Environment Science and Climate Resilient Agriculture

Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) on 6 May 2012 visited the 100 kW biomass-based electricity generation plant installed at village Mana of Raisen district by the CIAE in collaboration with Raisen Municipal Corporation under the NAIP.

Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) inaugurated a 2-day Second Meeting of Agricultural Experts Working group on 'Agro-Products and Food Security of BRICS Countries' on *27* August 2012

← H E President of India, Shri Pranab Mukherjee, conferred prestigious 'Indira Gandhi *Rajbhasha Puraskar'* for 2010-11 to DARE, New Delhi

Mr P.K. Basu (Secretary, Agriculture and Cooperation, Ministry of Agriculture) at the 'Convocation and Prize Distribution function' of the College of Agriculture, PAU, Ludhiana. →

Personnel

Appointments

- Dr B. Mohan Kumar joined ICAR (Hqtrs) as Assistant Director General (A&AF) on 1 November 2012.
- Dr R. K. Pal joined NRC on Pomegranate, Solapur as Director on 1 November 2012.
- Dr Chirantan Chattopadhyay joined NCIPM, New Delhi as Director in the afternoon of 30 November 2012.
- Dr S.M. Deb joined NRC on Yak, Dirang, Arunachal Pradesh as Director on 6 December 2012.

New Secretary joins ICAR

New Delhi, 12 December 2012. Shri Siraj Hussain succeded Shri Rajiv Mehrishi as Secretary, ICAR on 12 December 2012. He is Additional Secretary to the Government of India, Ministry of Agriculture and Cooperation since June 2012.

He has vast administrative experience— as Managing Director of UPSIDC, Uttar Pradesh State Agro-Industries Corporation; General Manager of Uttar Pradesh Finance Corporation; Special Secretary in Energy Department; Registrar of Cooperative Societies; Secretary to Government of Uttar Pradesh in the Department of Panchayati Raj. Besides, he has done commendable work as Deputy Managing Director of National Cooperative Development Corporation, Executive Director of Food Corporation of India; Joint Secretary in Department of Food and Public Distribution; Vice Chancellor of Jamia Hamdard University, Delhi; and Chairman and Managing Director, Food Corporation of India, New Delhi. He has been responsible for helping the Government of India in making Food Policy on Procurement, Storage and Distribution of Food Grains.

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Supperannuation

- Dr V.T. Jadhav (Director, NRC on Pomegranate, Solapur; University employee) was relieved on 31 October 2012.
- Dr A.K. Singh (Deputy Director General, Natural Resource Management) was relieved from the ICAR (Headquarters) on 18 October 2012 (A.N.) on his selection as Vice-Chancellor, Rajmata Vijaya Raje Scindia Krishi Vishwavidyalaya Gwalior, Madhya Pradesh.
- Dr J.P. Mishra (Principal Scientist, ICAR, Headquarters) was relieved from the ICAR on 31 October 2012 (A.N.) to enable him to join the new assignment as Advisor Planning Commission, Government of India New Delhi on deputation for 5 years.
- Dr J. C. Dagar (Assistant Director General, A &A F) superannuated on 31 October 2012.
- Dr K. M. Bajarbaruah (presently Vice Chancellor, Assam Agricultural University, Jorhat) superannuated from the Council's service with effect from 30 November 2012.
- Dr Anubrata Das (Director, NRC on Pigs, Rani) superannuated on 31 December 2012.
- Dr Bangali Baboo (National Director, NAIP, ICAR Hqtrs) superannuated on 31 December 2012.
- Dr Devendra Swarup (Director, CIRG, Makhdoom) superannuated on 31 December 2012.
- Dr P.C. Mahanta (Director, DCFR, Bhimtal) superannuated on 31 December 2012.
- Dr R.L. Srivastava (Coordinator, Linseed, CSAUA&T Kanpur-Hqrs). Delhi University employee) was relieved on 31 December 2012.

Delegation abroad

- Mr S.K. Shukla (Mechanical Engineer, Scientist Sr. Scale, CIRCOT Ginning Centre, Nagpur) visited ARC, Egypt for study visit/training in the field of 'Cotton Processing' from 15 October to 5 November, 2012.
- Dr R. Guruprasad (Textile Manufacture, Scientist, CIRCOT, Mumbai) visited ARC, Egypt for study visit/training in the field of 'Cotton Processing for Fine Quality' 15 from 28 October 2012.
- Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) visited Vietnam from 2 to 4 October 2012, as a member of the Indian delegation being led by Hon'ble Union Agriculture Minister for participating in bilateral Meetings.
- Shri Rajesh Ranjan (Director, DARE) visited Muscat, Oman from 5 to 7 November 2012, as a member of Indian delegation led by Joint Secretary (NHM), Department of Agriculture and Cooperation (DoAC), to attend the Joint Working Group (JWG) meeting to discuss Work Plan for Agriculture Cooperation between India and Oman.
- Dr (Mrs) B. Meenakumari, DDG (Fisheries) visited Jakarta, Indonesia from 6 to 7 December 2012, as a member of Indian Delegation led by Shri Tarun Shirdhar, Joint Secretary (Fisheries), Department of Animal Husbandry, Dairying and Fisheries, to attend the first meeting of the Joint Technical Committee (JTC) on Fisheries with Indonesia.

VIP Delegations

- A 4-member Bangladeshi delegation led by their Agriculture Minister Her Excellency Begum Matia Chowdhury visited ICAR Museam/IARI, New Delhi; CSSRI, Karnal and CRRI, Cuttack from 6 to 10 November 2012.

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2012 — Glimpses of ICAR

Natural Resource Management

- ICAR prepared GIS based geo-referenced soil fertility maps for macro, secondary and micronutrients for 64 districts, totaling 93 out of targeted 171 districts in 21 states.
- ICAR developed 115 districts level contingency plans, totaling 374 districts in the country.

Productivity Enhancement

- ICAR released three new improved varieties of sugarcane, viz. Co 0403 for peninsular zone of Tamil Nadu, Andhra Pradesh, Karnataka, and Maharashtra; Co 0237 and Co 05011 for the north-west zones of Punjab, Haryana, Rajasthan, Uttarakhand and Uttar Pradesh.
- ICAR developed pulse disease/insect pest knowledge based-system to advise farmers and extension workers for controlling diseases and insect-pest in pulse crops.
- ICAR observed based on seven Nitrogen Use Efficiency indices estimated for 15 genotypes and varieties of rice, Rasi and MTU 1010 in early; Vardhan in medium; and Swarna and BPT 5204 in late maturing groups were rated as most efficient.

Cutting Edge Science

- ICAR developed diagnostic kits (DIVA) for foot-and – mouth disease and gastro intestinal *Helminthes.*
- ICAR developed isogenic lines of Pusa Basmati 1 carrying major blast resistance genes(s) Piz 5, Piz.54, Piz.5, Piz.1, Pit a, Pi 9, Pi b.
- Whole genome sequencing of female murrah buffalo (NDRI 5620) under taken and the buffalo assembly integrated into a publicly available genome browser (http://210.212.93.84/cgib-in/gb2/gbrowse/bovine).

Mechanization and Post-harvest Management

- ICAR extended the shelf-life of soy-paneer by packaging in retortable pouches.
- ICAR showed shelf life extension of freshwater fish in round polypropylene rigid containers.

Technology Assessment, Refinement and Transfer

- ICAR installed biomass–based power plant in village Mana, Bhopal, Madhya Pradesh.
- ICAR commercialized six new technologies of production of vaccines against diseases, viz. FMD, IBR,PPR, Bluetongue, and sheep and goat pox, and classical swine fever.
- ICAR established five new Krishi Vigyan Kendras (KVKs). One each in Andhra Pradesh, Jammu and Kashmir, Odisha, Maharashtra, and Karnataka raising to a total of 631 KVKs across the country.

IP Portfolio Management

- Ninety six patents were filed, 13 patents granted by the Indian Patent Office and two patents by United States Patent and Trademark Office.
- Trademark 'CRIJAF SEED' registered by CRIJAF, Kolkata; 'DRR' (word and logo) by DRR, Hyderabed; 'SHATPADA' and 'CARIUTTAM' by NBAII, Bangaluru respectively.

HRD and Capacity Building

- ICAR added 19 new Experimental Learning Units (ELUs) to the existing 264 units in 51 universities and revised in the guidelines for Experimental Learning Units.
- ICAR has established a centralized Statistical and Computational Genomics Lab (SCGL) facility.

Partnership and Linkages

- Agricultural Experts' Working Group Meeting to deliberate on Agro-products and Food Security of BRICS Countries.
- ASEAN- India Agricultural Ministerial Meeting on Agriculture and Forestry.
- Country participation in GCARD-II held in Urugay

Information, Communication, and Publicity Services

- Awareness programme for Youth was launched in Jammu and Kashmir.
- ASEAN–India Agri-Expo was organized, and a six-monthly newsletter — "*India-ASEAN News on Agriculture and Forestry*" was started.

Organizational and Management Reforms

- Consortia Research Platform (CRP), Farmers' First, Student READY, and ARYA for technology development, dissemination, education for entrepreneurship respectively.

New Institutes and Stations

- Three institutions were established such as National Institute for Biotic Stress Management at Raipur, Chattisgargh; Indian Institute of Agricultural Biotechnology at Ranchi, Jharkhand; and Regional Research Station of CAZRI for cold arid agriculture in Leh, Jammu and Kashmir.

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