



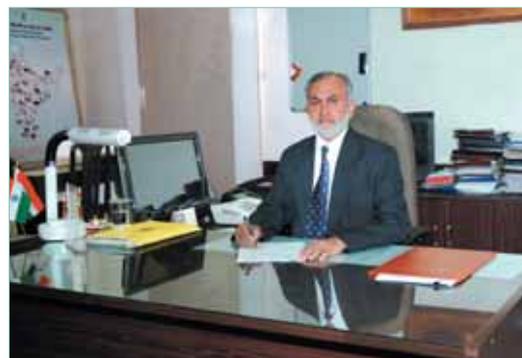
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From the DG's Desk

Dear Readers,

Water is the vital component for agricultural development and economic prosperity of any country. The principal source of water is precipitation and average annual precipitation over India is 1,160 mm, which corresponds to about 4, 000 billion cubic meters (BCM) of water. Of this, about 1,869 BCM is annual runoff appearing as an average annual potential flow in rivers; out of annual runoff only about 1,123 BCM is considered utilizable, due to various constraints in harnessing water from river flows. Even these annual averages are deceptive, as there are significant local, temporal and spatial variations. Owing to limited availability of water, and growing demand of water due to increasing population, urbanization and industrialization, India is facing water stress condition. The per caput availability of water has declined sharply from 5,177 m³ in 1951 to 1,544 m³ in 2011. Agriculture is the largest consumer of water in India. Sustainable management of water in agriculture is therefore critical.



India ranks first among the countries that practice rainfed agriculture both in terms of extent and value of production. Of the estimated 140.3 million (m) ha net cultivated area, 79.44 m ha (57%) is rainfed, contributing 44% of the total foodgrain production, supporting 2/3 livestock and harbour 40% human population. Gross irrigated area, as a per cent of gross cropped area, has increased from 17.1% in 1950-51 to 34% in 1990-91, and 45.0% in 2009-10. It is estimated that even after achieving the full irrigation potential, nearly 45% of the net cultivated area will remain dependent on rainfall. Declining water resources availability for agriculture coupled with ever increasing human population pose challenge to achieve food security in India.

With boom in tube-well irrigation, groundwater has emerged as an important source of irrigation contributing about 60% of the total irrigated area in the country. The annual replenishable

groundwater resources for the country have been assessed as 431 BCM. The annual groundwater draft for the entire country has been estimated as 243 BCM, and irrigation sector accounts for 91% (221 BCM) of the total annual groundwater draft. Though the stage of groundwater development in the country is 61%, it has reached to unsustainable levels in a few states viz. Punjab (170%), Delhi (138%), Rajasthan (135%), and Haryana (127%). Declining water-table not only increases the cost of pumping but also increases the energy consumption for pumping and associated increases in CO₂ emission. Nonetheless, rapid decline in groundwater level due to overdraft has been a matter of concern and can affect sustainability of irrigated agriculture due to over-dependence on groundwater resources. Associated secondary problems of arsenic pollution and fluoride toxicity are important issues related to groundwater and aquifer health with greater implications beyond water resource and agricultural water management.

In India, nearly 6.73 m ha of agricultural land is affected by varying degrees of salt problems and by 2030, the country may have about 15.5 m ha area under salt affected soils. The ICAR has been addressing these challenges to improve secured availability of food for present and also in the future days to come. The Council has developed technologies to support agriculture in saline areas and advocated several soil reclamation and protective water management technologies for avoiding irrigation-induced secondary soil salinization in the country and maintaining productivity of (over irrigated) saline and sodic soils as well as making use of poor quality water.

From agricultural view point, availability of water for agriculture in India is expected to decline from 84% in 2010 to 74% by 2050, mainly due to increased demand for water from other sectors with urbanization and industrialization. The additional water demand in domestic, industrial and energy sectors will need additional 222 BCM water by 2050. Even within agriculture, the water demand for different sub-sectors or farming systems is expected to change significantly in the coming years due to rapid changes in dietary habits as well as composition of consumption basket. The scenario of producing 350 million tonnes foodgrains will put tremendous pressure on the existing water sources. This challenge can be met by enhancing irrigation efficiency and water productivity or by inter-basin water transfer. However, pressure on inter-basin transfer can be eased through improving crop-water productivity. It is time to substantially improve our irrigation efficiency in agriculture from the current level of 38% in canal irrigation and look for water use efficient crops and cropping system and more effective water management practices and devices. The target efficiency should be 60% for canal irrigation and 80% for groundwater irrigation. The widening gap (about 15%) between irrigation potential created and that being utilized is also a matter of concern. One of the most important goals of the

'National Water Mission', institutionalized under the 'National Action Plan for Climate Change', is to improve the efficiency of water use at least by 20%. This objective can be achieved by ensuring improved efficiency both on the demand side as well as the supply side. Thus, development of technologies and management systems that enhance water-use efficiency warrants high priority.

Rainwater harvesting and Integrated Watershed Management are milestones of the ICAR for enhancing productivity of rainfed areas in convergence with Mahatma Gandhi NREGA, and Integrated Watershed Management Programme of Rural Development Ministry. In this regard, water management assumes highest attention in rainfed areas. Improving on-farm efficiency of irrigation system through application of advanced sensors along with communication technology for estimating on-field surface irrigation requirement coupled with accurate control system, better design and cost-effective water extraction devices, groundwater recharge structures to ensure better aquifer health and good quality irrigation water, utilization of waste water for irrigation along with advancement in biotechnology and material science research will provide some leads to effective utilization of water/waste water for agriculture.

The challenges before us are : (i) produce more from less water by efficient use of utilizable water resources in irrigated areas, (ii) enhance productivity of challenged ecosystems (rainfed and waterlogged areas), and (iii) utilize a part of grey water for agriculture production in a sustainable manner. The research and development has indicated that excess irrigation and poor drainage often result into waterlogging and soil salinization. In compliance to the 'National Water Policy 2012' and with institutional arrangements and better coordination of the Centre with State departments, a concerted effort is required to address efficient usage of water/waste water for agriculture in particular. The different technologies for improving water and nutrient use efficiencies included irrigation scheduling (optimum IW/CPE ratio), selection of crop and cropping sequence, drip irrigation including fertigation, micro-sprinklers, water harvesting, mulching, resource conservation technologies, SRI method, laser land leveling, integrated farming systems etc. have been developed and tried at different locations. Successful implementation of technological interventions/innovations and adoption by the stakeholders is the only option for climate resilience and effective water governance. Realizing the importance and magnitude of the issues, the Council is in the process of launching a 'Consortia Research Programme on Water' in XII Five-Year Plan to emphatically address agricultural water management under changed climate scenario, including water management for fisheries and animal husbandry development.



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WORKSHOPS, MEETINGS, SEMINARS, CONFERENCES, SYMPOSIA

Precision Agriculture in Nutrient Management: Present status and future needs in Eastern India

Patna, 19 November 2013. The ICAR Research Complex for Eastern Region organized a Brainstorming Workshop on 'Precision Agriculture in Nutrient Management: Present Status and Future Needs in Eastern India' in collaboration with International Plant Nutrition Institute-South Asia Program, International Maize and Wheat Improvement Centre (CIMMYT) and Climate Change, Agriculture and Food Security. Prof. Saroj Sanyal (former Vice-Chancellor, BCKV, Mohanpur, West Bengal), and scientists focused on what precision agriculture technologies are available for the small-holder farmers and how to make them relevant to the location-specific needs of these small-holder farmers of eastern India.



The following recommendations have emerged as the outcome of the workshop:

- The basic tenets of Precision Agriculture is relevant for the small-holder farmers, however, the technologies and practices need to be standardized and adapted under the local conditions in Eastern India.
- With the growing realization and challenges of the more frequent climatic variability, real-time access to information for precision decision making is very critical for adaptation and risk management in agriculture in eastern India. For this, agro-advisory services on precision technologies and information need to be synchronized and operationalized as being followed in agro-meteorology services.
- Precision-conservation agriculture also offers

opportunities for blending of technologies for the small holder integrated farming systems.

- Nutrient expert decision support tools for maize and wheat are the best-bet precision solutions available which are scale-neutral in application and hence provide precision nutrient prescriptions for all range of farmers. However, how to scale-out them needs integrated planning and innovative partnerships.
- The Krishi Vigyan Kendras and state department of agriculture shall play crucial role in this regard. Stock-taking, planning and sensitization consultations at state level involving key stakeholders need to be organized for developing the road-map for small-holder precision agriculture.
- There is also need to set-up strategic research and learning platforms at Benchmark soils with promising precision management practices through convergence of stakeholders.
- Precision agriculture for Hills and Plateau region needs to be studied. Special emphasis should be paid to workout the nutrient budgeting of the farm along the slopes.
- Assessment of native soil fertility and productivity should form the integral part of precision nutrient management.
- There is a need to link the soil fertility maps, developed by NBSS&LUP, with the precision nutrient management tools (for example Nutrient Expert, Green Seeker etc) for value added precision nutrient management solutions to whole range of farmers of different agro-ecologies. Institutional mechanisms and collaboration for research and out-scaling of precision agriculture technologies needs to be worked-out and mainstreamed.

The workshop was attended by more than 40 participants from State Agricultural Universities, State Departments of Agriculture and ICAR Institutes of eastern states (Bihar, West Bengal, Odisha, Jharkhand and Eastern Uttar Pradesh).

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Land Use Planning for Multifunctional agriculture and land use policy

New Delhi, 18 October 2013. A Brainstorming Workshop on 'Land Use Planning for Multifunctional Agriculture and Land Use Policy' was organized by the Natural Resource Management Division, ICAR (Hq) at the NASC Complex to discuss and develop a road map and action plan on agricultural land use planning to facilitate land use policy. Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) chaired the session and emphasized the need for comprehensive agricultural land use planning. He expressed his concern on changing cropping patterns and the urgent need to utilize Krishi Vigyan Kendra's to get the data at grassroot level. He suggested that district level land use planning needs validation of options/models. He stressed upon synergy of NRM institutes and other stakeholders.



Dr A.K. Sikka (DDG, NRM) highlighted the existing gaps, future needs of land use planning and the need to develop robust methodologies and mentioned that most of the works are sporadic in nature, which emphasize largely on soil-based attributes in land use planning. He urged to develop comprehensive methodology for land use planning using bio-physical, socio-economic and resource availability using latest technologies like remote sensing, GPS and GIS techniques and modeling including optimization techniques in collaboration with NRM institutes and other selected commodity-based institutes besides NRSC and user agencies. He also expressed the need for having land use planning at micro-level (1:10,000 scales). During the session, scientists pointed out that insufficient water resource data is the main constraint in land use planning. There is a need to develop user friendly information system and land use planning should be executed through watershed approach. Some scientists focused on the need to develop off farm land use options to generate the employment for the rural youth; a robust framework should be developed for land use planning in the next six months. More than 50 experts in the field of Natural Resource Management from ICAR, state and central government organizations participated in the workshop.

Dr Dipak Sarkar (Director, NBSS&LUP) emphasized that there is need to evolve and demonstrate a more rigorous and robust methodology for land use planning using modern geospatial tools and incorporating the socio-economic and biophysical parameters.

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Workshop on Dryland Agriculture

Bijapur, 17 December 2013. The 2nd Annual Review Workshop NICRA component of AICRP on Dryland Agriculture was held at Regional Agricultural Research Station, University of Agricultural Sciences, Bijapur from 15 to 17 December 2013. The workshop was inaugurated by Dr A.K. Sikka, DDG (NRM), ICAR, New Delhi. He appreciated the efforts being made by the network to demonstrate Real Time Contingency Planning in farmers' fields to reduce the negative impacts of weather aberrations such as late onset of



monsoon, mid-season and terminal droughts and extreme events such as excess rainfall, floods, wind storms, frost etc.

Dr Venkateswarlu (Director CRIDA) briefed about the implementation of NICRA Project with strategic research at national level and technology demonstrations in 130 locations in the country out of which 23 are being implemented by AICRPDA centres. He highlighted the initial positive experiences in minimizing drought impacts at farm level through interventions made under the programme.



Delegates were exposed to ongoing research and on-farm demonstrations in NICRA village Kaulagi, Bijapur adopted by AICRPDA

Dr Srinivasa Rao (Project Coordinator, AICRPDA) briefed initial experiences out of field demonstrations in about 3,500 farmers fields covering 1,436 ha in 15 states in effectively managing weather aberrations such as late onset of monsoon, mid-season and terminal drought and extreme weather events.

The three-day deliberations reviewed the progress achieved in thematic areas of Real Time Contingency Planning, Rainwater Management, Soil Health, Crops And Cropping Systems, Alternate Land Use, Farm Mechanization and Energy Management. The useful role of village level institutions such as Village Climate Risk Management Committee (VCRMC), Custom Hiring Centre (CHC), seed and fodder banks were reviewed at the meet.

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National Consultation Meet on 'Agro-forestry R&D in India'

New Delhi, 19 November 2013. The Natural Resource Management Division, ICAR and National Research Centre for Agro-forestry, Jhansi organized one-day National Consultation Meet on 'Agro-forestry Research and Development in India' at NASC Complex. It was organized as precursor for showcasing Indian perspective for Agro-forestry R & D at Global level during forthcoming World Congress on Agro-forestry at New Delhi from 10 to 14 February, 2014. Dr S. Ayyappan (Secretary, DARE and DG, ICAR) emphasized that Agro-forestry is a key path to prosperity for millions of farm families, leading to extra income, employment generation, greater food and nutritional security and meeting other basic human needs in a sustainable manner. Dr Gurbachan Singh (Chairman, ASRB) highlighted the role of agro-forestry in providing environmental services and asked the researchers to make available package technology for different situation to the stakeholders. Dr A.K. Sikka (DDG, NRM) focused on the need to organize this meeting involving all the stakeholders in the subject; and on the outcome of the meeting related to status of Agro-forestry research and development, identification of critical gaps and future challenges; implementing constraints in Agro-forestry development and how to overcome



them and Initiative for evolving a framework for a National Agro-forestry Policy. He informed that the draft Agro-forestry Policy has been prepared by the ICAR and other stakeholders under the aegis of National Agricultural Commission.

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'Innovation for Industry' A Business Meet in Fisheries

Cochin, 23 November 2013. The Central Institute of Fisheries Technology organized 'Innovation for Industry', a Business Meet at Vashi. During the meet Zonal Technology Management - Business Planning and Development (ZTM-BPD) Unit, Mumbai Research Centre, CIFT along with Sea Food Exporters Association, Maharashtra Chapter popularized the path breaking technologies developed by CIFT and addressed the issues faced by the Sea Food Industries in Maharashtra.



Dr T. K. Srinivasa Gopal (Director, CIFT, Cochin) indicated that the various Fisheries Research Institutes under ICAR have number of entrepreneur ready technologies ranging from culture, capture to value addition of fish, which have potential to attract industries in India. He highlighted the ZTM-BPD, CIFT initiative to bringing together the scientific community and industry on a single platform and urged participants to adopt new innovative production technologies in fisheries and bring out profitable business ventures. He also delivered a lead talk on the emerging technologies in fish processing and preservation.

Shri Rustom Irani (President, Seafood Exporters Association, Maharashtra) emphasized the necessity of building public-private partnership to uplift the fisheries industry. He asserted that all participating industrialists should adopt the innovative technologies developed by the CIFT for diversification of the sector. He released technical brochures detailing technologies developed by CIFT chitosan and its derivatives, collagen peptide, chitosan sponge, seafood analogues, fish silage, fish oil for

food fortification, instant fish gravy mix, fish sausage and fish de-scaling machine.

The Business Meet had exclusive technical conference that featured technical presentations and panel sessions. This provided topical arena for the industrialists to enhance their technical knowledge and share ideas with scientific community.

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National Group Meeting of Integrated Farming System

Umiam, 4 December 2013. The 3-day Group Meeting of AICRP on Integrated Farming System was started at ICAR Research Complex for North-Eastern Hills Region, Meghalaya on 2 December 2013. The meeting was inaugurated by Dr Celistine Lyngdoh, Parliamentary Secretary for Agriculture and Food Processing, Government of Meghalaya who informed that many rice fields in Meghalaya have been converted into fish ponds due to continuous fragmentation and economically non-viability. He also highlighted the need for integrating indigenous technology knowledge (ITKs) and environment-friendly technologies into Integrated Farming System, being developed for small-and marginal-farmers.



Dr A.K. Sikka (DDG, NRM) opined that Integrated Farming System (IFS) is the best approach for climate resilience and there is need to link IFS development with different government departments and development schemes. The DDG (NRM) was impressed by the location-specific integration of best available technologies, which can minimize the risks under IFS, conserve resources for posterity; and, prove to be business with a new vision. He desired that adequate emphasis needs to be laid by the Project Directorate on Farming System Research on the characterization of farmers' resources and synthesis of scientifically designed, farmer-centric, location-specific Integrated Farming Systems (IFS) modules and models for all the agro-climatic regions.

Dr K.M. Bujarbaruah (Vice Chancellor, AAU, Jorhat) emphasized on integration of household resources and recycling of farm-waste, so that even a small farm household may become economically viable.

Dr B. Gangwar (Director, PDFSR) emphasized that this programme is mainly focused on small-and marginal-farmers who constitute about 86% of the total farm households of the country. Since their holding size is very small and further declining with time, we have to come up with new resource conservation techniques, technologies and tools which can help the farmers to produce more with small holding. IFS is one such approach, which can answer many questions, which are being asked today in agriculture, such as, system profitability, resource sustainability, employability, climate smart agriculture etc.

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National Meet on Fruit-Crops

Bengaluru, 22 October 2013. The Indian Council of Agricultural Research (Hq) and Indian Institute of Horticultural Research organized a National Meet on 'Fruit Crops: Farmers, Traders and Researchers Interface' at National Bureau of Agriculturally Important Insects, Yelahanka Campus, during which all the stakeholders, viz. the farmers, traders and researchers participated and deliberated on various issues of concern and developed a road map to face the challenges ahead. Dr S. Ayyappan (Secretary DARE and DG ICAR) inaugurated the National Meet and emphasized the role of growers associations in airing their problems that can be addressed through research by the NARS. He commended the initiative taken in respect of fruit crops and opined that such interactive meetings are necessary for other commodities too. The Chief Guest stressed the importance of organic production of fruit crops where feasible. Dr N.K. Krishna Kumar (DDG, Horticulture) indicated that all the stakeholders of fruit crops should look into the serious issues concerning production and quality with earnest concern and workout the road map to face the challenges ahead. The technical sessions covered several issues concerning mango, banana, citrus, grapes, guava, sapota, papaya, pomegranate and temperate fruits as well other minor fruits *Annona*, *Aonla* and *Rambutan*. The deliberations were on recurrent flushing and flowering in mango, increasing shelf-life and change in production cycle of sapota, viral diseases management and organic production in papaya, soma clonal variations in tissue-cultured plants in banana, performance of tissue-cultured plants and bacterial blight management in pomegranate, low productivity in temperate fruits and rootstock for wilt in guava.

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An Interface Meeting on Improvement of yak husbandry

Dirang, 8 November 2013. The National Research Centre on Yak organized an Interface Meeting



between researchers-policy makers-state government officials and farmers to formulate a strategy for 'Improvement of yak husbandry and upliftment of socio-economic status of yak rearers in the country' at its Centre, Dirang, Arunachal Pradesh. Dr S. M. Deb (Director, National Research Centre on Yak) made an exhaustive presentation on the technologies developed at NRC on Yak and explained the pathways for the implementation of these technologies at farmers' door step for the sustainable development of yak husbandry throughout the country. The scientists also explained the way of conservation of elite germplasm of yak and significant achievement of NRC on Yak in this aspect. Representatives from the yak rearing states, Jammu and Kashmir, Himachal Pradesh, Sikkim and Arunachal Pradesh, also explained the traditional system of yak rearing in their respective states. They also highlighted their government policies and strategies for the promotion of the yak husbandry in their respective states. Rural Technology Action Group for North-East from IIT (RuTag), Guwahati, also actively participated in this interface meeting and also demonstrated their low cost technology for the betterment of yak herdsmen. A pathways was formulated for the improvement of the yak husbandry as well as yak herdsmen. During preparation of the pathways, emphasis was on reproductive management for improvement of yak germplasm, nutritional intervention and disease management to increase production of yaks and extensive training programme for the sustainable development of yak husbandry of India. Delegates from all the yak rearing states of India took active participation in formulating the roadmap for improvement of yak husbandry as well as quality of life of the yak herdsmen.

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Interface meeting on 'Carp Seed Rearing'

Anand, 10 October 2013. The Regional Research Centre, Central Institute of Freshwater Aquaculture (RRC-CIFA) organized one-day Research- Extension-Farmers Interface meeting on 'Carp Seed Rearing' at KVK, Devataj of Anand district. Dr P. Jayasankar (Director, CIFA, Bhubaneswar) inaugurated the meeting and emphasized on the need of quality seed

for better fish production. CIFA has taken up the programme to sensitize the state governments and other stakeholders on importance of producing and using quality fish seed. The interactive session of the meeting also took a note on farmers' feedback and their requirement. Need for diversified species for culture, facilities for soil and water analysis, advisories in case of fish mortality, etc. were the urgent requirements of the sector. More than fifty farmers, line department officials, research scientists from AAU, Anand were participated in this programme.

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Consultative Meeting on 'Fisheries Development in West Bengal'

Kolkata, 23 November 2013. One day 'Consultative meeting on Fisheries Development in West Bengal' was organized at Kolkata Centre of Central Institute of Fisheries Education (CIFE) to prepare a road-map for fisheries development and bridge the demand-supply gap in West Bengal. It was chaired by Shri Chandra Nath Sinha (Minister In-Charge, Department of Fisheries, Aquaculture, Aquatic Resources and Fishing Harbour, Government of West Bengal). He called upon the ICAR Fisheries Research Institutes to assist and provide research, development and extension support to the State Department in a collaborative approach for fisheries development in the state.

Dr S. Ayyappan (Secretary, DARE and DG, ICAR) led the team of ICAR scientists and coordinated the entire proceedings of the meeting and observed that major focus areas included fish conservation, development of feed and health sectors in aquaculture, brackish-water aquaculture, cold-water fisheries, stock enhancement in inland open waters, quality fish seed production, initiating cage farming in sea and developing a robust harvest and post-harvest sectors in West Bengal. He appreciated the initiative taken by the West Bengal Government and asked that ICAR scientists to take up the challenge and develop action plan for achieving a target of 18.00 lakh tonnes by 2017 to bridge the demand-supply gap in West Bengal. He assured the department to extend all possible support and cooperation and directed all the ICAR institutes to develop a perspective plan with state fisheries department to achieve the targeted production during the XII Five-Year Plan.

Dr B. Meenakumari, (DDG, Fisheries), ICAR discussed the specific technological interventions to be made in fisheries and aquaculture sectors of West Bengal for sustainable increase in fish production. Dr Pradip Majumdar (Agricultural Advisor to the Chief Minister, Government of West Bengal) sought advise from the ICAR Fisheries Institutes: (i) in developing and

utilizing open coal pit for aquaculture/cage culture so as to get additional fish catch from these water bodies; (ii) reinventing aquaculture processes for enhancing fisheries in the state; (iii) integrated farming system to be adopted for fisheries enhancement; and (iv) technology support in increasing fish production from all the resources available in this state.

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Tribal Aqua-Farmers Meet

Kulathumedu, 13 September 2013. The Central Institute of Brackishwater Aquaculture (Chennai), organized a Tribal Aqua-Farmers Meet at Kulathumedu village Tiruvallur, Tamil Nadu. Dr M. Sakthivel (President, Aquaculture Foundation of India, Chennai) described that Pulicat lake region has enormous fisheries potential. He encouraged the farmers and other entrepreneurs to scale-up their brackishwater fisheries activities with the help of CIBA. Various farm inputs such as fish seed, feed, aerators, hapa, nets, casuarina poles, weighing machines, plastic tubs, etc. required for sea bass nursery rearing were distributed to the Irula tribal beneficiaries. Seabass fry were released in hapa's at project site. A publication, '*Seabass nursery rearing in hapas – a livelihood option for the women self-help groups,*' was released on the occasion.

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Entrepreneurship Development Meet

Izatnagar, 31 October 2013. An entrepreneurship development meet was organized by the Joint Directorate of Extension Education, Indian Veterinary Research Institute to educate the progressive farmers and entrepreneurs about various technologies available in the Institute establishing livestock-based enterprise. Dr Gaya Prasad (Director, IVRI) addressed the entrepreneurs to adopt various animal husbandry-based enterprises for self-employment, and explained about the objectives of the meet and inspired them to join hands with the institute and establish livestock-based business ventures.

The meet was attended by 70 entrepreneurs of Uttar Pradesh and Uttarakhand. Most of the farmers expressed their willingness in attending trainings on dairy farming, followed by horticulture practices, value-added milk products, poultry farming, value-added meat products, piggery, goat farming, and fisheries. The organizing team decided that, the Joint Directorate would impart customized trainings to the entrepreneurs as per their need and wish in the near and far future.

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Horticulture Industry Research Partnership

Bengaluru, 4 October 2013, A 2-day workshop on 'Horticulture Industry Research Partnership' between Indian Council of Agricultural Research, New Delhi, and Horticulture Australia Limited (HAL) was coordinated by the Horticulture Division of ICAR, New Delhi at Indian Institute of Horticultural Research, Bengaluru. A team of scientists and other officials from Australia, led by Dr Selwyn Snell (Chairman, Horticulture Australia Limited, Melbourne, Australia), participated in the workshop. It was inaugurated by Dr N.K. Krishna Kumar (DDG, Horticulture) on 3 October 2013 at IIHR, Bengaluru. The initial focus of workshop was on identification of scientists and institutions for possible collaborative research. R&D issues relating to six commodity groups viz. apple and pears, almonds, potato, other vegetables, grapes, mangoes and strawberries were discussed in terms of problems of production and productivity. The deliberations were on the major problems of these commodity groups and to mitigate them through research based on Public -Private Partnership mode.

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Upscaling of Integrated Farming Systems in Hills

Tehri, 21 October 2013. Under Livelihood Improvement through Integrated Farming Systems Project funded by Tehri Hydro Development Corporation a *Kisan Gosthi* on 'Integrated Farming Systems' was organized by Project Directorate for Farming Systems Research (PDFSR) at Koteshwar in the New Tehri District of Uttarakhand. (THDC). Shri Harak Singh Rawat (Agriculture Minister of Uttarakhand), inaugurated the *Kisan Gosthi* as Chief Guest and appreciated the efforts being made by the ICAR Scientists to demonstrate the integrated farming systems approach of livelihood improvement for small holders especially in the remote areas of Uttarakhand. He emphasized that more number of families should be covered with integrated farming systems in the state through critical interventions for improving the productivity of crops and livestock.

The Chief Guest also inaugurated an exhibition organized on the occasion and reiterated that IFS modules that suit for hilly areas need to be replicated throughout the Uttarakhand for deriving the maximum benefits.

During the discussion, Dr B. Gangwar (Project Director, PDFSR, Modipuram) highlighted the major constraints and critical technological interventions like introduction of improved crop varieties, balanced nutrition using SSNM, efficient weed and insect-pest

management, management of old orchard, livestock health management using mineral mixture and disease specific medicines, kitchen gardening, skill development programme through awareness campaigns and hands on training and Field days. During the *Ghosthi*, low cost implements were distributed to all the participating farmers besides

supply of special implements to self help groups in the adopted villages. Seeds of vegetables suitable for kitchen gardening were also distributed during the *Kisan Gosthi*. More than 500 farmers participated in the *Kisan Ghosthi*.

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International Linkages

Nepalese Delegation visits DOGR

Kalus, 7 December 2013. Dr Gajendra Singh Niroula (Project Director, Vegetable Crops Development Directorate, Lalitpur, Nepal) led a team of eight-member Nepalese Delegation at Directorate of Onion and Garlic Research (DOGR)



between 30 November and 7 December 2013. The study tour of Nepalese Delegation was arranged by this Directorate (as per communication received from the Ministry of External Affairs, Government of India, New Delhi). Dr Jai Gopal (Director, DOGR) apprised the team about the global and national scenario of

onion and garlic cultivation. The team members were also exposed to the improved production technology for onion and garlic. Besides, delivering of lectures by the DOGR scientists, practical demonstrations were given on various field

activities both for bulb and seed production. The delegation also visited the seed production farm of the DOGR at Kalus. At Lasalgaon farmers fields (NHRDF, Nashik, biggest onion market of India) were visited.

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Foreign Delegation visits CIFT

Cochin, 13 November 2013. India and the U.S.A have announced a new agriculture partnership to address global food security, during the visit of President Obama to India in 2010. As a part of this initiative, to address the food security challenges in Africa, MANAGE (Ministry of Agriculture, GOI), Hyderabad has been assigned



with the responsibility of organizing the U.S.- Indo-Africa Triangular International training programme on 'New Dimensions in Agricultural Extension Management for Extension Functionaries' from Liberia, Kenya and Malawi. As part of the above programme, 30 International delegates from Liberia, Kenya and Malawi visited Central Institute of Fisheries Technology, along with Dr S. Sentil

Vinayagam, Director (AE), MANAGES.

Dr P.T. Lakshmanan, Head, Biochemistry and Nutrition Division and Director-in-charge, CIFT presided over the meeting at the Conference Hall. Dr S. Balasubramaniam, Head, Extension, Information and

Statistics Division in his welcome address explained about the technology transfer activities carried out at this Institute. Dr S. Sentil Vinayagam, Director (AE), MANAGE narrated about the training programme at MANAGE, Hyderabad. The trainees interacted with the Head of Divisions who answered the queries raised by the trainees.

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a wonderful, joyful, healthy, wealthy &
prosperous New Year 2014*



Integrated Farming for Tribals of Nicobar Islands

Agriculture is the main economic activity of the tribal society on the Car-Nicobar Island, which is entirely rainfed and coconut occupies more than 80% of the agricultural area. Apart from this, banana, papaya, tapioca and sweet potato are also grown on the island. Earlier, the farmers were practising subsistence farming or natural farming and no fertilizers were applied. The entire tribal population depends on food items supplied by the government agencies on subsidized rate. Fruits and vegetables generally are not part of their diet except for some tuber crops, banana and pineapple mainly due to non-availability of fruits at the island.



Backyard Poultry



Okra and banana cultivation

tomato, green amaranth, cucumber, bittergourd and bottlegourd) and fruit seedlings (banana, pineapple and papaya) were distributed after imparting skills on vegetable and fruits cultivation. *Sesbania*

sp. (*agathi*) a multipurpose legume tree was introduced for the first time from mainland as a biofence, green fodder and green leaf manure.

Impact

During the implementation process, initially the farmers were skeptical about the model but in due course the fruits and vegetable in their backyards and the fast growing healthy chicks and goats changed their attitude. For the first time in Nicobar, the villagers harvested a bumper crop of vegetables in their homestead garden. Miss Shilpa is one such beneficiaries who is a resident of Kinmai village and shown enthusiasm to accept and adopt the technology. She successfully harvested 50 kg okra, 20 kg green amaranth, 10 kg radish, 10 kg bottlegourd within four months after intervention. Now, she has become a role model for her village as well as for the entire tribal community of Nicobar. The same case was with the other Nicobarese who adopted this model. Now, farmers from other villages are also motivated by the success of these farmers and most of the village captains are requesting to implement such model in their villages. These interventions made a positive impact on the utilization of scarce resources under fragile island ecosystem benefitting tribal farmers at large.

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Intervention of CARI

Considering the physical, social and economic limitations of the Island, an integrated farming system model for homestead cultivation was developed in participatory mode by the Central Agricultural Research Institute (CARI). The model comprises 400 m² of fenced area in the vicinity of the tribal settlement and integrated with backyard poultry, goat farming and vermi-composting unit for organic waste recycling. The model was implemented in Kinmai and Kimios villages of Car-Nicobar and directly benefitted 40 farm families. After sensitization programme on integrated farming system under Tribal Sub-Plan of AICRP on Integrated Farming Systems, the farmers were given farm implements, fenced area of 400 m² for growing vegetables and fruits, low cost shelters for poultry and four goats. Vegetable seeds (okra, brinjal,

Sunderbans Mangrove Festival

Sunderbans, 8 December 2013. The Mangrove Festival is an initiative of Wildlife Protection Society of India to create awareness and educate the people about the importance of Mangrove forests for their sustainability. Dr Tarun Mondal (an M.P and Member, Parliamentary Committee on Health and Family Welfare) inaugurated the Sunderbans Mangrove Festival that was jointly organized by Sunderbans Tiger Reserve, Sunderbans Biosphere Reserve, West Bengal Police and Wildlife Protection Society of India at Bali island from 6 to 8 December 2013. The CIFRI flagged its programme on



canal fisheries development for livelihood security of tribal fishers in Bali Island in the festival and organized farmers-scientists interaction meeting for inland open water fisheries development. The institute also projected its work on mangrove ecosystem, biodiversity conservation and restoration of small indigenous fishery in the Aila affected islands of Sunderbans. Bali Nature and Wildlife Conservation Society lent active cooperation to CIFRI in this event.

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CIFT completes first All India Technical Survey on Fishing Craft and Gear of the Mechanized Sector

Cochin. The first all India baseline survey of marine mechanized fishing craft and gear and use of energy in the fishing sector of the country was successfully completed, for the creation of a database on fishing craft of India. Scientists, Research Scholars and Technical Officers from Fishing Technology Division of CIFT carried out this survey from 1 October 2012 to 30 September 2013. This was done as part of the project 'Green Fishing Systems for Tropical Seas' funded by National Fund for Basic, Strategic and Frontier Application Research in Agriculture (NFBSFARA).

The study covered the main fishing harbours and important landing centres all along the Indian coast including Lakshadweep and Andaman & Nicobar Islands. Twenty-two maritime districts from the west coast and fifteen maritime districts from the east coast and one typical centre each from the island territories were identified as survey locations based on the maximum number of fishing units operated as per *CMFRI Marine Fisheries Census 2010, India*. Three to five fishing villages were covered under each identified location. Secondary data were collected from state departments, fishermen cooperative societies and logbooks maintained on board fishing vessels. The most popular fishing vessels were identified based on the type of fishing, number of units operating and region of operation and detailed lines plan and structural drawings of 35 selected designs of fishing vessels were documented. The details of the engine power, fish hold capacity, number of crew onboard, type of fishing done from the boat, average fuel consumed during the trip were also collected. The classes of vessels are: trawler, trawler-cum-long liner, purse seiner, gillnetter, gillnetter-cum-long liner, ring seiner and long liner.

As fuel is a major contributor to the operational expenses, engine power, type of engine and approximate fuel consumption for different classes and sizes of vessels also were collected. It was observed that the engine powering was not commensurate to the size of the fishing vessels. The structural, operational and design differences in the common fishing gear systems of different coastal states, viz. details regarding the dimensions, materials, accessories like floats, sinkers; operational parameters and specific details of the gears were also studied. The different type of gears operated from mechanized/motorized craft were trawl nets (pelagic and demersal), gillnets (drift gill net, set gill net, trammel nets and surrounding gill nets), surrounding nets (purse-seines and ring seines), hooks and lines (hand lines, long lines and troll lines).

The outcome of the project is intended to benefit

The fishing industry in particular and will also benefit researchers and policy makers in general; by quantifying and evaluating the characteristic parameters and operational efficiency of the existing fishing craft and gear designs. These survey results offer strong evidence for the need for the effective management measures to be implemented for bringing about brighter future for Indian fisheries. Field level benchmark survey conducted along the Indian Coast showed significant results.

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Quality Vegetable Seedling Production

Ranipool. In an initiative to promote Farmer-to-Farmer extension for effective and fast transfer of agricultural technology among the farming community; Krishi Vigyan Kendra, ICAR Sikkim Centre, Ranipool, started a Farm School at Nandok Village of East Sikkim on 'Quality Vegetable Seedling Production under Low-cost Structure'. In fact, as per the guidelines of the Union Ministry under extension reforms policy the Farm School concept is based on the principles of 'learning by doing' as well as 'seeing is believing' with focus on successful technology dissemination through farmer-to-farmer extension.



Inaugurating the Farm School, Dr R. K. Avasthe (Joint Director, ICAR Research Complex, Sikkim Centre) said that the idea of opening Farm School at the farm and village level is to support agriculture and allied activities to bring about change in the agricultural development scenario in the State, and opined that the Farm School would help in developing a cost effective extension system for effective and rapid technology transfer in agriculture and allied field. He lauded the efforts of ATMA (East) and KVK (East Sikkim) to establish a Farm School in the most relevant field i.e., 'Quality vegetable seedling production' which is commodity based and entrepreneurial oriented. Highlighting the importance of Farm School, Dr A. K. Mohanty (Programme Coordinator, Krishi Vigyan Kendra, ICAR Sikkim

Centre, Ranipool, East Sikkim) pointed out that the Farm Schools on any commodity or enterprise empowers the farmers through Farmer- to- Farmer extension where farmer himself will be the Teacher for other farmers. He stressed upon the advantage of the Farm School which is very effective due to

language convenience with free conversation among farmers, based on farmer's own success, ease in meeting the farmer-teacher at any time being in the same village, having the same agro-eco situations and same socio-economic status.

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Sustainable livelihood improvement of tribal communities in coastal districts

Manmathapur-Mundapara. 12 November 2013. The main aim of the Tribal Sub-Plan scheme 'Sustainable livelihood improvement of tribal communities in coastal districts of West Bengal' is to upgrade the livelihood of the tribal people through aquaculture which they were practising since long without much scientific intervention. Therefore, Kakdwip Research Centre of Central Institute of Brackishwater Aquaculture organized a 'Field Day and Harvest Mela' at village Manmathapur-Mundapara that was inaugurated by Dr A. R. T Arasu (Head, Fish Culture Division, CIBA, Chennai). He appreciated the success of polyculture of fish and shrimp in tribal village and said that the tribal farmers will build their own livelihood with the help of the technologies provided by the KRC of CIBA to a larger extent for the benefit of tribal communities in Sunderbans.

Dr Tapas Kumar Ghoshal (Officer-In-Charge and Principal Investigator of TSP programme of KRC) highlighted the technologies developed and transferred by CIBA for the sustainable development of brackish- water aquaculture. The scientists of KRC, CIBA explained on the profitable use of farm made feed as an alternative measure in brackishwater aquaculture due to the price hike



of commercial fish feed. They assured a minimum productivity of 2,500 kg/ha through scientific management with the use of low cost poly-culture feed.

The authorities of CIBA assured about the focus of the project to initiate integrated farming, crab fattening, and pond renovation activities in near future.

Harvesting of polyculture ponds was also organized as part of the Field Day.

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Celebrations/Awareness

52nd Foundation Day of IGFR

Jhansi, 1 November 2013. The Indian Grassland and Fodder Research Institute (IGFRI) celebrated its 52nd Foundation Day. Padam Bhushan Prof. R.B. Singh (President, NAAS, New Delhi) delivered the Foundation Day Lecture on 'Grasslands and Forages for Greening Livelihoods' as Chief Guest. Prof. Singh expressed his satisfaction over the progress achieved by IGFRI in past 51 years. He emphasized upon the management of resources to enhance forage productivity. Prof. Singh also released 'Saga of IGFRI Journey' and other books/bulletins on different aspects of forage research.

Guest of Honor, Dr V.S. Tomar, Vice Chancellor, JNKVV,

Jabalpur, addressed the audience on the importance of quality forage for nutritional security. Dr S.K. Dhyani, Director, NRCAF was also present on the occasion and stressed upon the need of food-fodder cropping system on marginal lands.

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30th Foundation Day of NBFGR

Lucknow, 12 December 2013. The National Bureau of Fish Genetic Resources (NBFGR) celebrated its 30th Foundation Day at its Institute. Dr S Soloman (Director, Indian Institute of Sugarcane Research, Lucknow) Chief Guest, said that need is to work in accordance with the challenges coming up in the future. He added that NBFGR is developing as a



Center of Excellence in characterizing, cataloguing and conserving fishery resources of the country.

Dr J K Jena (Director, NBFGR) said that NBFGR is directly involved in such technology dissemination to the farmers. In an effort towards recognizing the better performers, Annual Institute Awards were presented to the NBFGR staff members from each category. Selected farmers from Uttar Pradesh were also awarded on the occasion for their significant achievement in higher production levels obtaining better fish production from their ponds after taking training from NBFGR Aquaculture Research and Training Unit located at Chinhat, Lucknow.

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38th Foundation Day of Sikkim Centre of ICAR Research Complex for NEH Region

Gangtok, 10 October 2013. The ICAR Research Complex for North-Eastern Hills Region, Sikkim Centre celebrated its 38th Foundation Day at Research Farm Tadong with the theme 'Technological Empowerment through Input Support System'. Shri D. N. Takarpa, Minister of Agriculture and Horticulture, Government of Sikkim, inaugurated the celebration and focused on the introduction of high-yielding varieties of vegetables, field crops; improved breeds of dairy and poultry along with organic package of practices for ginger and large cardamom. Citing some critical issues in organic farming, he emphasized on research strategy for introduction of pest and disease resistant varieties of various crops, technologies for soil-and-water management, off-season crop production, low cost crop and animal production technologies to improve the agriculture scenario in Sikkim.

Dr R. K. Avasthe (Joint Director, ICAR Sikkim Centre) in his Foundation Day Key Lecture on 'ICAR Sikkim Centre: A way forward towards the agricultural development of Sikkim' briefed about the accomplishments of ICAR Sikkim Centre in the field of research and extension since its inception, and outlined a road map for future research of ICAR

Research Complex for North-Eastern Hills Region, Sikkim Centre keeping eye upon the agro-biodiversity, climatic resilience and organic status of Sikkim agriculture.

Technical folders on Nucellar seedling production in Sikkim mandarin, Backyard poultry, Mushroom cultivation, System of Rice Intensification, Organic ginger cultivation, Upland rice cultivation (in Nepali), Water harvesting through *Jalkund* (in Nepali), Cole crop cultivation and Organic management of ginger soft rot were released on this occasion. Inputs such as mustard seeds of high-yielding varieties, low-cost agricultural implements, HDPE for *Jalkund* and high-yielding seeds of vegetables were also distributed among the farmers of Sikkim.

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Farm Mechanization Technologies showcased to farmers of Uttar Kannada, Karnataka

Sirsi, 19 December 2013. An Exhibition-cum-demonstration on 'Farm Mechanization Technologies' was organized jointly organized by Central Institute of Agricultural Engineering and University of Agricultural Sciences, Dharwad at the College of Forestry, and Krishi Vigyan Kendra, Sirsi, Uttar Kannada, Karnataka. The farm machinery and equipment relevant for Uttar Kannada region were showcased and demonstrated to farmers. Major attractions in the exhibition were the mechanization package for sugarcane bud chip technology, reaper binder for paddy, arecanut stripper, arecanut tree climber and snow ball coconut technology.

The AICRP on Farm Implements and Machinery centre of TNAU, Coimbatore, CPCRI, Kasaragod and KVK Sirsi (UAS, Dharwad) displayed various equipments related to coconut, arecanut, paddy and other crops in the exhibition. The farmers appreciated the new technologies show-cased in the exhibition and evinced keen interest to adopt them. Shri Anant Kumar Hegde, (Member of Parliament, Uttar Kannada) inaugurated the exhibition and stressed the



need for adoption of improved mechanization tools in scientific way to mitigate the labour shortage concerns in the region and help increase the profitability. He lauded the contribution of CIAE, Bhopal in taking the farm mechanization technologies to different parts of the country.

Dr Pitam Chandra (Director, CIAE) suggested the creation of a separate Directorate of Agricultural Engineering for Karnataka for more effective extension of farm mechanization. He also emphasized the need for skill development, promoting custom hiring centres through entrepreneurship development and promotion of farm equipment manufacturing in the region.

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Kharif Kisan Mela

Karnal, 15 October 2013. The Central Soil Salinity Research Institute (CSSRI) organized *Kharif Kisan Mela* at farmers' field in Nain village (Panipat district). Dr A. K. Sikka (DDG, NRM) inaugurated *Kharif Kisan Mela* and highlighted the contribution of CSSRI in serving the farmers. He accentuated the role of CSSRI for developing salt-tolerant varieties of wheat (KRL-19, KRL 210 and KRL 213), and mustard (CS-52, CS-54 and CS-56) having good potential to grow in salty and stressful environments. He also advocated having the sustainable adaptations in the salty environment especially against the variable climate. He stressed upon various activities and projects being pursued by ICAR and Government of India for managing problematic natural resources. He urged the farmers to adopt the modern technologies generated by the institute.

Dr D. K. Sharma (Director, CSSRI) briefed the latest activities of institute for managing the salinity and water-logging problems of the region. He also emphasized on the conservation agriculture and sustainable intensification for higher yield and managing the natural resources.

During the *Kisan Mela*, an exhibition was organized to display the latest technologies in which various institutes and private companies participated. A *Kisan Goshthi* and interactive meeting with farmers were



also organized in which scientists from CSSRI, Regional Research Station of CCSHAU, officials from Line Department, extension officials from state agricultural department participated and replied the queries raised by farmers on different issue. To recognize the 'Grassroot Innovators' 15 progressive farmers were awarded for their contributions made in conservation agriculture and natural resources management. More than 800 farmers participated in the *Kisan Mela*.

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Yak Mela

Dirang, 25 November 2013. The Nation's maiden and biggest 'Yak Mela' was inaugurated by Mr Phurpa Tsering (Parliamentary Secretary and Chairman, Science and Technology, Government of Arunachal Pradesh) at Mandhlaphudung under the aegis of National Research Centre on Yak. He appreciated the efforts of NRC on Yak for organizing such event and appealed them to organize similar events in other



high altitude areas where yaks and yak rearers (brokpas) are active. He added that such *mela* would boost the morale of Brokpas. Mr Tsering highlighted the hardship faced by the yak rearers and promised to give solar light facilities to highlanders where electricity is not available and also to extend help to exterminate grazing taxes in near future. In the *mela* exhibition stall containing products, charts, brochures were displayed.

The NRC on Yak distributed essential materials like tents, tarpaulin, gumboot, raincoat, NRC on Yak made mineral mixture-5 kg, salt-50 kg, and essential medicine to the brokpas and their families. More than 200 brokpas along with their thousands of yaks attended the mela. Wachen Tsering of Lubrang Village, a brokpa got first prize for his best yak.



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ICAR Inter-Zonal Sports Inaugurated

Hyderabad, 17 December 2013. Dr M. Malakondaiah (IPS, Director, RBVRR Andhra Pradesh Police Academy) inaugurated the ICAR Inter-Zonal Sports meet at the Railway Sports Complex Grounds, Secunderabad. He said, “sports inculcates integration and improves performance. Winning and losing is part of sports. All of you must participate with the most competitive spirit.” Dr S.L. Goswami (Director, NAARM) focused on the history of ICAR Sports.



A total of 46 ICAR institutions with 471 athletes are competing in 19 events for the Championship. The Championship Trophy was given to the winning team by Dr A.K. Sikka, Deputy Director-General (NRM), Indian Council of Agricultural Research during the concluding session on 20 Dec 2013.

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Agriculture Education Day

Dehra Dun, 22 October 2013. The Agriculture Education Day was observed at Central Soil and Water Conservation Research & Training Institute. Dr P.K. Mishra (Director, CSWCR&TI) highlighted the importance of Natural Resource Management, Water Harvesting, Water Use Efficiency and Agricultural Education for achieving sustainability in agriculture and meeting the growing food demand of teeming population of this country. The other scientists spoke on various avenues of agriculture education and numerous job opportunities that are available in this country and abroad. The participants were exposed to the various land degradation processes and the mitigation measures through a documentary film show and a visit to the museum of the institute.

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Brackishwater Aquafarm Innovators Day

Chennai, 18 October 2013. The Central Institute of Brackishwater Aquaculture organized ‘Brackishwater Aquafarm Innovators Day’ commemorate World Food Day. Farmers Shri Nithyanandham (Chennai) and Shri S.S. Srinivasan, Velankanni, Nagapattinam were



honored in this function. The first started a novel approach of sport fishing as a farm tourism venture using the fish Asian seabass *Lates calcarifer*, and later started milkfish *Chanos chanos* farming and developed an efficient feeding method for the fishes stocked in his pond using low cost material. The innovations made by farmers are as follows:

1. Aeration through air blowers : The innovative farmer harvested 10 MT with the support of 5 HP air blowers. Almost each HP supported 2 MT of biomass. Paddle wheel aerator supports around 400 to 500 kg approximately.
2. Cattle with yoke disturbing the shrimp pond bottom increases turbidity and prevents *lab-lab* formation.
3. Combination of paddle wheel aerators and spiral aerators enhance the aeration efficiency. This system maintains the dissolved oxygen levels during the night time and keep the water in circulation thereby gathering the sludge to the centre of the pond, where from it can be easily removed.
4. Cowdung-based probiotics: In 200 litre source water, 20 kg cowdung + 10 litre cow urine + 6 kg pulse powder + 1 kg pond soil + 4 kg jaggery are mixed and fermented for 72 hr. The solution is mixed with water and applied @ 50 litre/ha. There is no need to apply probiotics throughout the culture. It saves the cost of production @ ` 5 to 7/kg. This application is indigenous and environment friendly and good for pond hygiene.
5. Ploughing pond bottom with cultivator and rotavator helps in better oxidation and mineralization of pond bottom soil. Ploughing the bottom soil with cultivator and then with rotavator gives better oxidation of soil. Rotavator makes smaller lumps of soil making way for better oxidation and also reduces the seepage.
6. Seepage-based reservoir: This is a modified farmer-designed recirculatory system. The reservoir was made around the pond as an outer layer which draws reservoir water through seepage. The outer bund was made stronger which helps during extreme climatic events, such as cyclone, in protecting the infrastructure and the

stocked shrimp or fish. This innovation is very useful in cyclone prone areas like Nagapattinam, Nellore and Odisha coast.

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Arhar Diwas

Dunda, 30 October 2013. The *Arhar Diwas* (*Arhar* day) was organized at NICRA village under Krishi Vigyan Kendra, Chinyalisaur, Uttarkashi to create awareness about the performance of drought tolerant pigeon pea (*Arhar*) variety 'VL Arhar 1' which is superior over its local counter parts. Dr V K Sachan (Programme coordinator) said that *Arhar* (pigeon pea) is having 20-21% protein, which is an important source for supplementing the energy rich cereal diet. Additionally, pigeon pea crop improves the soil characteristic and fertility status ensuring better growth to succeeding crop that is considered to be an important asset. Dr Sachan said that Dunda village is a drought prone area which is suitable for pulse cultivation and pigeon pea is a viable crop for this area. He emphasized that farmers should grow pigeon pea and other pulse crops in groups so that they could satisfy the demand of the market.

The Subject Matter Specialists of Krishi Vigyan Kendra also addressed the farmers about the importance of pigeon pea cultivation. The farmers who are cultivating 'VL Arhar 1' promised to retain their harvest and share it with their fellow farmers as seed material. More than 200 farmers attended the field day and visited the *Arhar* field.

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Felicitation of innovative farmers of Eastern states

Patna, 5 October 2013. With the aim to share innovative ideas being adopted by the farmers for agricultural development in the region and also felicitate progressive farmers for their significant contribution in the field of agriculture and allied sectors the Farmers Innovation Day was organized at ICAR Research Complex for Eastern Region.

Dr Mangala Rai (Agriculture Advisor to Chief Minister of Bihar) stressed upon women empowerment, processing, storage, marketing and value addition of farm produce for better return and nutritional security. He also emphasized for recycling of farm waste and biomass to reduce dependency on chemical fertilizers. He further appealed to the farmers and scientists to maintain biodiversity of the region to preserve the quality germplasm of different crops, vegetables etc that are unique in the region.

Dr B. P. Bhatt (Director, ICAR RC for Eastern Region) advised farmers to promote indigenous knowledge

for the sustainability of the agriculture. A video film on 'Control of Blue Bull (*Neel Gaay*)' was also shown.

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Save Golden Mahseer in Kumaun lakes

Bhim Tal, 10 October 2013. The Mahseer is a cultural icon of diverse economic, recreational and conservational value in rivers and lakes of 11 Asian Nations (FAO) and has been declared as 'State Fish' of seven states of India. Despite their abundance at one time in Kumaun Lake, Uttarakhand, mahseer population has been declining in number and size in natural waters and is in serious danger of extinction. Therefore the Directorate of Coldwater Fisheries Research organized an awareness campaign 'Save Golden Mahseer in Kumaun Lakes' and seed ranching programme at the bank of Naukuchia Tal.

Dr A. Barat (Director, DCFR, Bhim Tal) expressed his concern to save golden mahseer in the natural water bodies of Kumaun lake. The Directorate of Coldwater Fisheries Research has taken up steps for seed production of golden mahseer in the hatchery complex and release of the seed in the different streams/rivers/lakes of Kumaun region to increase the population of this fish in the natural habitat and also to conserve the germplasm. On this occasion hatchery-produced 25,000 seeds and 1,000 cage-reared advanced fingerlings of golden mahseer were released in the Naukuchia Tal.

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Administrative Block inaugurated at KVK, Solan

Solan, 16 November 2013. The Administrative Block of KVK, Solan under the jurisdiction of Y S Parmar University of Horticulture and Forestry was inaugurated by Smt. Vidya Vidya Stokes, Minister of Horticulture, IPH & IT, Government of Himachal Pradesh, in the gracious presence of Secretary, ICAR,



Shri Arvind Kaushal and DDG (AE), ICAR, Dr K D Kokate and Vice-Chancellor, Dr YSPUH&F, Solan, Dr V S Thakur. Dr A M Narula, Zonal Project Director, Zone-1, Dr N B Singh, Director, Extension Education & all the Programme Coordinators of KVKs of Dr YSPUH&F and faculty members were also present on the occasion along with the progressive farmers, farm-women and farm entrepreneurs of the district.

The KVK organized a Scientists- farmers interaction in the newly inaugurated premises of the KVK. Sh Arvind Kaushal, Secretary, ICAR was the Chief Guest and Dr K D Kokate was the Guest of Honour in the function. Dr N B Singh, Director, Extension Education, Dr YSPUH&F, welcomed all the dignitaries and

delegates. The Chief Guest advised the scientific fraternity of the University to develop cost effective technologies for small holders. The farmers should make Self-Help Groups and Producers' Groups for profitable marketing. Marketing models suited to small holders and especially to hill region should be developed and passed on to the farmers. Dr Kokate appreciated the work done by the KVK and the University and dwelt upon the initiatives to be taken during the XII plan. Dr A M Narula also advised the KVK scientists to involve more number of progressive farmers in the training programmes. Some progressive farmers of the district also shared their experiences with the faculty and the dignitaries.

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DG, ICAR visits

- **Kakdwip**, 22 October 2013. The Central Institute of Brackishwater Aquaculture, Kakdwip Research Centre organized Farmers Field Day and Interaction Meet to disseminate information gained through farming of white leg shrimp *Litopenaeus vannamei* amongst the shrimp farmers



and to explore its culture possibilities in the state of West Bengal. Dr P. Ravichandran (Principal Scientist and Officer-in-charge, KRC, CIBA, Kakdwip) outlined the role of CIBA in bringing *L. vannamei* to India and efforts made by the centre to successfully culture it.

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- **Dalang Maidan**, 17 October 2013. Dr S. Ayyappan, Secretary (DARE) and Director General (ICAR) visited the Regional Station of Directorate of Wheat Research at Lahaul-Spiti, Himachal Pradesh. The station serves as one of the national wheat and barley repository, maintained under the natural conditions in a cost-effective manner. At present, about 9,000 wheat and 2,000 barley accessions are conserved and the accessions have germination capacity of desired level even after 10 years of conservation in the natural conditions.



New initiatives such as development of Doubled Haploids and Winter x Spring wheat hybridization are being undertaken at the station.

The DG, ICAR interacted with farmers of Lahaul valley and emphasized on training and exposure of farmers on improved crop production technologies. Dr Ayyappan also visited the KVK, Bajoura (Kullu) and KVK, Kukumseri (Lahaul- Spiti) and congratulated the staff of KVKs in their role in training and demonstration of new technologies to the farmers. He also visited the Northern Temperate Research Station, Garsa (Kullu) and IARI Regional Station, Katrain and discussed the research activities with the scientists.

During the visit of DG, ICAR Dr (Mrs) Indu Sharma (Project Director, DWR, Karnal) highlighted that more than 43,000 lines of wheat and barley were grown at the station for generation advancement. Every year about 15,000 lines are being screened for yellow rust and about 1,000 crosses are being attempted by various wheat improvement centers.

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- **Kakinada**, 16 November 2013. Dr S. Ayyappan (Secretary, DARE and Director General, ICAR) visited the Kakinada Centre of Central Institute of Fisheries Education (CIFE) on 16 November 2013.

He emphasized upon the need of collaborative efforts of different ICAR institutes and state organizations for the improvement of overall agriculture in the region. He also announced the formation of Network of five ICAR Fisheries Institutes along with other stakeholders to

prioritize the activities and strategies from production to marketing. This group will meet twice a year at a suitable location in the state for in-depth discussions and technological inventions.

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Personnel

Appointments

Name	Designation & address	Date of appointment
Dr Arjava Sharma	Director, NBAGR, Karnal	1 October 2013
Dr P.K. Chakrabarty	ADG (PP), ICAR (Hq)	7 October 2013
Dr Dr K.V. Prabhu	Joint Director (Research), IARI, New Delhi	26 October 2013
Dr R.K. Sastry	Joint Director (Training), NAARM, Hyderabad	6 December 2013
Dr P.K. Sharma	ADG (EPD), ICAR, Hqrs.	10 December 2013
Dr R.K. Jain	Joint Director (Education), IARI New Delhi	18 December 2013

Retirement

Name	Designation & Address	Date of retirement
Dr N. Nadarajan	Director, IIPR, Kanpur (re-employed pensioner)	31 December 2013

Trainings

- **Barrackpore**, 4 October 2013. A National Level Training on 'Improved Production Technologies of Jute and Allied Fibres' under Mini Mission-II of Jute Technology Mission was organized by Central



Research Institute for Jute and Allied Fibres (CRIJAF), at Barrackpore from 30 September to 4 October 2013 in collaboration with Directorate of Jute Development, Kolkata. Total 22 agricultural officers from West Bengal, Tripura, Meghalaya, Nagaland, and Uttar Pradesh participated in the Training.

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- **Hisar**, 28 October 2013. Advanced buffalo husbandry training programme was successfully completed at the Central Institute for Research on Buffaloes. On this occasion, Director, reiterated the policy of 'Farmers First' of ICAR and further assured the stakeholders in buffalo production system for continued support from the institute and its scientists.

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Visits

- **Cochin**, 7 November 2013. Shri Anup Kumar Thakur, (Secretary, Department of Animal Husbandary, Dairying and Fisheries, Ministry of Agriculture, Government of India), visited Central Institute of Fisheries Technology, Cochin. The Secretary visited the various laboratories, BPD unit, pilot plant and ATIC of the Institute and had interactions with the scientists.

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- Dr P.C. Tripathi (Head, Central Horticultural Experiment Station, Chettalli Kodagu, Karnataka) and Dr M. Loganathan (Senior Scientist, IIVR), Varanasi) visited Malaysia to attend ASEAN-India training on Organic Certification of Fruits & Vegetables on 20 October 2013.
- Shri Arvind Kaushal (Additional Secretary, DARE & Secretary, ICAR) and Dr Arvind Kumar (DDG, Education, ICAR) visited Addis Ababa, Ethiopia to attend the all stakeholders meeting of PAN African University and to meet the officials of the African Union Commission and authorities of the government of Ethiopia for setting up of Farm Science Centre in Ethiopia under Indo-Africa Forum Summit -II from 28 October to 1 November 2013.
- Dr O. P Chaturvedi (Principal Scientist, Central Soil & Water Conservation Research & Training,

Dehra Dun) visited Canberra/Melbourne, Australia to attend the second Indo-Australia Joint Working (JWG) meeting from 22 to 25 November 2013.

- Dr Abhijit Kar (Senior Scientist, IARI, New Delhi) visited Myanmar to provide consultancy on setting up of laboratory at an Advanced Centre for Agricultural Research and Education (ACARE) Project at Ye Zin, Myanmar from 16 to 20 December 2013.
- Dr Bishnu Prasad Mishra (Head, Animal Biotechnology, IVRI, Izatnagar) visited Oman as expert in the field of Animal Biotechnology under the workplan finalized between the ICAR and Oman from 22 to 28 December 2013.
- Shri Arvind Kaushal (Additional Secretary, DARE and Secretary, ICAR), Dr M.M. Pandey (CEO, AgrInnovate India Ltd., New Delhi), and Dr Sanjay Srivastava (Principal Scientist, Indian Institute of Soil Sciences, Bhopal) visited Burkina Faso & Togo from 2 to 6 December 2013.

Latest Publications of ICAR

- *Agricultural Technologies : Crop Science*
- *Agricultural Technologies : Horticulture (Volumes I)*
- *Agricultural Technologies : Natural Resource Management*
- *Agricultural Technologies : Agricultural Engineering (Volumes I and II)*
- *Agricultural Technologies : Animal Science*
- *Agricultural Technologies : Fisheries*

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Announcement

National Academy of Agricultural Sciences

Nominations for Academy Awards for the Biennium 2013-2014

Nominations for the following categories of Awards are invited for the year 2013-2014.

I. MEMORIAL AWARDS (6 Nos.)

The nominee shall be a distinguished Scientist above 55 years in age. The period of assessing the contributions shall be life time upto the year of nomination. Each Award consists of a Citation, gold plated silver medal and cash prize of ₹ 1.00 lakh. However, Dr B.P. Pal Memorial Award, being the apex award of the Academy, consists cash prize of ₹ 2.00 lakh.

II. RECOGNITION AWARDS (6 Nos.)

The awards shall be made to distinguished scientists, in the age group of 35 55 years, who are Fellows of the National Academy of Agricultural Sciences. Each award consists of a citation, a gold plated silver medal and cash prize of ₹ 75,000.

III. ENDOWMENT AWARD (1)

The award will be given to an outstanding scientist for contributions towards ensuring food and nutritional security. The nominee can be from any branch of science relevant to agriculture. The award comprises a citation, a gold plated silver medal and cash prize of ₹ 50,000.

IV. YOUNG SCIENTISTS AWARDS (6 Nos.)

Scientists below the age of 35 years are eligible for this award. Each award consists of a citation, a gold plated silver Medal and cash prize of ₹ 50,000.

For details, please visit Academy web site at www.naasindia.org or write to Executive Secretary, National Academy of Agricultural Sciences, NASC, DPS Marg, New Delhi - 110 012. Tel. (011) 25846051, Fax: (011) 25846054, Email: naas@vsnl.com

Last date for receipt of nominations in the Academy is March 31, 2014

Note: Self Nominations are not acceptable.

2013 — Glimpses of ICAR

Forefront Science and Technology

- Decoded the genomes of the cultivated tomato (*Solanum lycopersicon*) and its closest wild relative, *Solanum pimpinellifolium*, in the International Consortium to breed varieties/hybrids with desired traits.
- Sequenced mitochondrial genome for indigenous fishes, *Schizothor axrichar dsonii*, *Tor putitora*, *Channa marulius*, *Clarias batrachus* and *Pangasius pangasius*.

Productivity Enhancement

- Developed an early-maturing basmati rice variety, 'Pusa Punjab Basmati 1509' with moderate resistance to leaf blast and brown spot diseases; tomato 'Arka Rakshak' having yield over 90 tonnes/ha; and first improved makhana variety 'Swarna Vaidehi' having almost two-fold higher production (2.8-3.0 tonne/ha) than traditional cultivars.
- Developed Srinidhi, a dual purpose backyard poultry variety; 140 to 150 eggs per year, broilers attain over 650 grams body weight (6 weeks).

Climate Resilience and Natural Resource Management

- Developed climatic vulnerability atlas of the country and 450 district level contingency plans for mitigating the climatic variability in different agro-climatic regions.
- The National Gene bank added 5,414 accessions of orthodox seed species and 112 of non-orthodox species for long-term cryo-storage.

Mechanization and Value Addition

- Developed tractor-operated multi-row seed-cum-ferti drill that places seeds at 50 mm and fertilizers at 50-150 mm depth to improve efficiency and economy of farm operations.
- Sweet and functional soft cheese from buffalo milk having high potential in the functional food market.

IP Portfolio and Knowledge Management

- Licensed the technology of tissue culture of oil palm and related knowhow for commercialization.
- Launched social media initiatives to develop a dialogue especially with youth.

Reaching out to Farmers

- Provided 2,174 technological interventions at 4,159 locations in different theme areas such as cropping systems, drudgery reduction, farm machineries; 1.43 lakh extension programmes through electronic and print media.
- Demonstrated technology-led agriculture innovation systems for improving livelihood security in 91 backward district of the country to about 143,000 poor farming families.

- Largest commercial sea cage farming for lobster commenced along Veravel Coast, benefitting the families of Sidi African tribes.

HRD and Capacity Building

- Developed e-courses for degree programmes in agriculture, horticulture, veterinary science, home science, fishery science, dairy technology and agricultural engineering having online and offline access.

Partnership and Linkages

- Setting up FMD Vaccine production plant with annual production capacity of 100 million trivalent doses in PPP mode.
- Hosted first conference of Heads of Agricultural Universities and Research Institutions of ASEAN Countries.
- Commemorated Pact-50, the 50th anniversary of the first visit of Nobel Laureate Dr Norman E. Borlaug to India; hosted 5th Borlaug Global Rust Initiative-2013 Technical Workshop.

Award and Recognitions

- Recognized excellence in research, teaching and extension with 79 awards under 16 different categories, including 10 women scientists.
- Achieved 97.6% composite score of RFD for the year 2012-13

Way Forward

- Developing Vision-2050 in sync with Policy Framework for Research and Development in Agriculture and Allied Areas to address the future challenges.
- Formulated operational guidelines for the new programmes, Consortia Research Platforms, Extramural Funding and Performance Indicators of Institutes.

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