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Visit of Our New Secretary, DARE & Director General, ICAR

ICAR-IIWM Scientists and staff extend heartiest congratulation to Dr. Trilochan Mohapatra on his appointment to the Secretary, Department of Agricultural Research and Education & Director General, ICAR since February 22, 2016. He has visited ICAR-Indian Institute of Water Management, Bhubaneswar on April 24, 2016; ICAR-IIWM family heartily welcomed Hon'ble Director General at this Institute and promised the fullest cooperation from this Institute in future on the issues of agricultural water management research. He reviewed the progress of research activities in the institute. He has called upon scientists to generate technologies which are farmers' friendly; released institute publication. He has also emphasized that the viable technologies of the institute needs to be validated in the farmers' field and put into the technology transfer chain for their dissemination on the large scale. On that day, Dr. A.K. Singh, DDG (Agril. Extension), ICAR highlighted the role of KVKs in transfer of technology and urged the research institutes to provide their technologies to respective KVKs for further refinement and dissemination. Dr. S.K. Chaudhari, ADG (SW&M) also graced the occasion. Dr. S.K. Ambast, Director, ICAR-Indian Institute of Water Management highlighted and apprised the significant achievements of the institute.



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Small-scale Online Hybrid Filter for Safe Use of Municipal Wastewater in Irrigation

Urban wastewater is one of the most endearing water resources for peri-urban agriculture in the developing countries because of its large volume, high nutrient content and on-site availability; but it contains a considerable amount of sediments, heavy metals and micro-organisms affecting soil, plant and human health. The Central Pollution Control Board has carried out an inventorization of Sewage Treatment Plants (STPs) located in India in the year 2014-15. The estimated sewage generation from Class I and Class II cities together in India is 62,000 million liter per day (MLD), and sewage treatment capacity developed so far is only for 23,277 MLD from 816 STPs, however, 522 STPs only are operational with the capacity of 18,883 MLD. It is projected by Ministry of Environment & Forests, Govt. of India that gross wastewater generation will be 1,32,253 MLD by 2051. STPs involves huge costs towards its installation, maintenance and operation in the long run as well as larger land areas. Besides, one of the challenges to meet the target of crop water requirement in near future is to explore the feasibility of use of treated municipal wastewater for irrigation in peri-urban areas. Small scale filters would be useful for in situ wastewater treatment with meagre cost. Moreover, when it is coupled with micro-irrigation system, this may prove useful to farmers for irrigation to crops with less water under limited water availability in peri-urban areas.

Bhubaneswar city generates about 180 MLD of urban wastewater and discharges into Daya river through



Gangua nala. Peri-urban farmers cultivate horticultural crops by irrigation from *Gangua nala* water generated from households, hospitals, small scale industries, and schools etc. Chemical analysis of samples collected from *Gangua*

nala indicated the presence of heavy metals viz., chromium (Cr) and cadmium (Cd) beyond permissible limit of 0.1 and 0.01 mg/l, respectively in the wastewater.

A four chambered small scale on-line (through pump) hybrid (coarser and finer material) filter has been designed and developed to reduce sediments, microbial load and heavy metals from the wastewater and evaluated at farmers' field condition. The

Gangua nala water was lifted through 1 HP pump and passed through the filter. It has been observed that the filter reduced turbidity, heavy metals and microbial loads significantly (Table 1). The filtered water was collected in an overhead tank and then applied through drip irrigation. The discharge of the filter was recorded as 0.25 l/s with inlet pressure of 2.1 kg/cm². The average discharge of the dripper varied from 1.38 to 1.43 lph with uniformity coefficient varying from 97.7 to 98.5% for 30 m long lateral. The total volume of water discharged in 8 hrs a day is estimated at 7200 litre which is sufficient to irrigate horticultural crops like papaya with 12 lpd/plant or vegetables with 3 lpd/plant covering 1000 or 1200 m² area, respectively. The filter was demonstrated to the farmers of peri-urban areas using municipal wastewater for cultivation of horticultural crops. The technology was also demonstrated to the line departments for safe use of municipal wastewater use in agriculture.

Table 1: Filtration of wastewater from *Gangua Nala* by small-scale filter designed at the Institute

Parameters	Turbidity (NTU)	Cr (mg/l)	Cd (mg/l)	BOD (mg/l)	<i>E. Coli</i> (cfu/ml)	<i>Salmonella</i> (cfu/ml)	<i>C. fereundii</i> (cfu/ml)
Wastewater-before filtration	42	0.24	0.23	44.9	0.7x 10 ⁵	3.2 x 10 ⁵	1.3 x 10 ⁵
Wastewater-after filtration	20	0.05	0.06	26.4	3.0 x 10 ²	13.0 x10 ²	3.0 x10 ²

Mausumi Raychaudhuri, R.C. Srivastava, S. Raychaudhuri, Ashwani Kumar and D.U. Patil

Transforming Livelihood of Tribal Farmers in Odisha through Irrigation Infrastructure and Management Options

Birjaberna village in Sundargarh district of Odisha is tribal dominated with 77% ST farm families. In spite of 1400 mm annual rainfall and existence of Ghurlijore minor irrigation project, the village was devoid of assured irrigation facility due to poor canal infrastructures and lack of other irrigation

sources. Therefore, mono-cropping of rice in *kharif* was the only option. During 2013-14, ICAR-IIWM, Bhubaneswar intervened in planning, designing and executing various water conservation and management strategies in the village. Irrigation infrastructures like inlet,

outlet and surplus escape structures were introduced in the canal linked community pond, which enhanced water availability by 1.2 ha m in the pond and thus increased command area by 30% in the village.

Further, a dug well of 4.8 m diameter and 9.0 m depth was dug out adjacent to the community pond along the drainage line and the water supply from the well was linked with the underground pipeline with sprinkler irrigation system. These interventions created 1.8 ha m additional water availability, which helped farmers growing three crops in sequence in a year during 2015-16 i.e. paddy in *kharif*, mustard in *rabi*, and groundnut and green gram in summer season instead of only rice crop in *kharif* season. Apart from increase in the *kharif* rice yield by 30%, introduction of sprinkler irrigation system during *rabi* season enhanced groundnut yield by 28% with saving of 32% irrigation water resulting in improved water productivity by 60% compared to traditional check basin irrigation.



Low input based fish culture like fish fingerlings of Indian major carps (*Calla catla*, *Labeo rohita* and *C. mrigal*) were also stocked @ 7500 ha⁻¹ in the pond with a stocking composition of 30:30:40. During first year, after 210 days of rearing, phased harvesting of 472 kg fish resulted in net income of Rs. 62,000 ha⁻¹, which corresponds to Rs. 6.2 m⁻³ of net consumptive water productivity.

Further, through series of capacity building programmes, tribal farmers were exposed to various modern agricultural water management practices. The interventions of water resource development and management in crop production and pisciculture enhanced the average annual net income in 2.1 ha crop area and 1.0 ha pond area from Rs 17,000/- to Rs 1.42 lakh during 2015-16. Enthused with the results, ICAR-IIWM,

Bhubaneswar has taken up another tribal village named Mohuljore for integrated water resource management during 2016-17.

R.K.Panda, R.R. Sethi, S.K. Rautaray, R.K. Mohanty, P. Panigrahi and S.K. Ambast

Research Advisory Committee (RAC) Meeting

The first meeting of 7th Research Advisory Committee (RAC) of ICAR-Indian Institute of Water Management, Bhubaneswar was held on April 22-23, 2016 under the Chairmanship of Dr. T.K. Sarkar, former Project Director, Water Technology Centre, ICAR-IARI, New Delhi, and eminent members of Dr. A.K. Misra, Former Head, Division of Soil Physics, ICAR-Indian Institute of Soil Science, Bhopal, Dr. P.K. Mahapatra, Former Dean, OUAT, Bhubaneswar, Dr. M.K. Jha, Professor, IIT Kharagpur, Dr. S.K. Chaudhari, Asst. Director General (SW&M), ICAR, New Delhi and Dr. S.K. Ambast, Director, ICAR-IIWM, Bhubaneswar. Dr. S.K. Ambast, Director, ICAR-IIWM welcomed esteemed Chairman and all members of RAC and presented research accomplishments of the Institute.

Dr. S.K. Chaudhari, ADG (SW&M) suggested linking Agricultural Water Management Portal (AWMP) with Krishi website and appraising training details under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) to Council for record. He also urged to link Institute's activities with the

work plan of AICRP on Irrigation Water Management. Action Taken Report (ATR) was presented by Dr. S. Roy Chowdhury, Principal Scientist and Member-Secretary, RAC. The members suggested inclusion of high-value vegetables and diversified farming system for enhancing water productivity. Dr. M.K. Jha advised that a group of inter-disciplinary scientists should be involved in the development of an open-ended surface and groundwater conjunctive use model. Theme-wise presentation was also made by theme leaders of different programmes. Chairman suggested to make Agricultural Water Management Portal more informative and interactive.

Institute Research Council (IRC) Meeting

Institute's Research Council (IRC) meeting was organized during June 6-7, 2016. IRC meeting was organized with the Chairmanship of Dr. S.K. Ambast, Director, ICAR-IIWM, Bhubaneswar. The results of the twenty three completed/ on-going in-house research projects (program-wise) were presented and deliberated in the meeting. Also, four new research project proposals were



presented and discussed. Director, ICAR-IIWM & Chairman, IRC highlighted the immediate and long-term challenges in the field of agricultural water management. He emphasized upon taking up of problem solving research that should ultimately lead towards its upscaling. He also emphasized that research findings must be disseminated from research farm to farmers' field. There should be a balance between laboratory/ modeling and field work. Dr. S.K. Jena, Principal Scientist and Member Secretary, IRC organized the meeting.

Review Meeting of Agri-Consortia Research Platform on Water

A review meeting of "Agri-Consortia Research Platform on Water" project for 2015-16 was held at ICAR-IIWM, Bhubaneswar on March 15, 2016 under the Chairmanship of Dr. A.K. Sikka, the then Deputy Director General (NRM),



ICAR, New Delhi. The Director of ICAR-IIWM, all PIs and CCPs of different projects from different Institutes along with the Programme Leaders of ICAR-IIWM were present in the meeting. The technical programmes for 2016-2017 and the achievements so far under different themes of the project were discussed.

National Symposium of ISCAR Organized

ICAR-IIWM organized 11th National Symposium of Indian Society of Coastal Agricultural Research (ISCAR) on 'Innovations in Coastal Agriculture- Current Status and Potential under Changing Environment' during January 14-17, 2016. The sub-themes of the Symposium were Innovations in soil, water and crop management for



enhancing production in coastal region; Advancement in field, horticultural, plantation crops and forestry for coastal areas; Innovative management of aquaculture, livestock and allied activities for enhancing farm income; Transfer of technology, livelihoods improvement, women

empowerment and impacts; and Disaster management in agriculture with special reference to cyclone in Odisha. The Symposium was inaugurated by Chief Guest Professor M. Kar, the then Vice-Chancellor, OUAT, Bhubaneswar. The other dignitaries in the inaugural function were Dr. S.B. Kadrekar, Former Vice Chancellor, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli; Dr. D.K. Sharma, Director, ICAR-CSSRI and Dr. S.K. Ambast, Director, ICAR-IIWM and conveners; Dr. A.K. Bandyopadhyay, President, ISCAR; Dr. B. Maji, Secretary, ISCAR; Dr. B.K. Bandyopadhyay, J.S.P. Yadav Memorial Lecture was delivered by Dr. H.S. Sen, Former Director, ICAR-CRIJAF, Barrackpore on topic 'Coastal zones: Ecology and climate change need concerted attention for sustained productivity'. The organizing-secretaries of the symposium were Dr. B. Maji from ISCAR, ICAR-CSSRI RRS, Canning Town, West Bengal and Dr. S. Roy Chowdhury, Principal Scientist of the institute.

Foundation Day Celebration

ICAR-IIWM celebrated its 29th Foundation Day on May 12, 2016. Dr. N.K. Tyagi, former Director, ICAR-Central Soil Salinity Research Institute, Karnal and Ex-Member, Agricultural Scientists Recruitment Board, New Delhi graced the occasion as Chief Guest. Dr. P. Jayasankar, Director, ICAR-CIFA, Bhubaneswar was Guest-of-Honour of the foundation day celebration function. On this occasion, the Foundation Day Lecture on "An assessment of the role of green revolution technologies and agricultural



development policies in combating climate change impacts in India" was delivered by Dr. N.K. Tyagi. He elaborated alarming changes in climate scenarios from pre-agricultural (early Holocene) period to present day and the future strategies to mitigate such changes. Dr. P. Jayasankar stressed upon the importance of water in every sphere of agricultural activities and need for its careful usage under today's water scarce situation. Dr. S.K. Ambast, Director, ICAR-IIWM narrated scope for adoption of different agricultural technologies developed by ICAR-IIWM to increase on-farm water productivity under rainfed situation, irrigated condition and even for waterlogged areas. The staff members and their family also organized a cultural function in the evening where the children of the institute staff members actively participated to commemorate the foundation day event.

Republic Day Celebration

ICAR-IIWM celebrated 67th Republic Day of the country on 26th January 2016. On this occasion, Director of the institute hoisted the National Flag and appreciated the

accomplishments achieved by the staff members during previous year and reminded for responsibilities to make our institute as well as the country proud.

International Yoga Day

ICAR- IWM celebrated International Yoga day on June 21, 2016. Mass yoga and various aasanas were performed by the staff of ICAR-IIWM in the morning. It was guided by Shri Dhruvajyoti Chowdhury, Youth Coordinator and Yoga expert, Patanjali Yog Samiti, Khurda, Bhubaneswar. In the afternoon, a formal workshop on Yoga was conducted. Dr.



S.K. Ambast, Director, ICAR-IIWM, Bhubaneswar welcomed all guests and briefed about the activities performed to celebrate International Yoga Day. Dr. H. P. Singh, former DDG (Horticulture), ICAR, New Delhi and former VC, RAU, Pusa was the Chief-Guest of the programme and he delivered a lecture on 'Diets and Yoga'. He also acknowledged the contribution of Yoga gurus in popularizing Yoga to the common mass. Shri Sudhanshu Sekhar Adhikary and Shri Pitambar Sahoo, Yoga Experts from Patanjali Yog Samiti, Bhubaneswar and Guest-of-Honours delivered lectures on usefulness of Yoga in our day-to-day life. The programme was coordinated by Dr. M. Raychaudhuri, Principal Scientist of the institute.

Summer Training Organized

- One month Summer Training programme was organized for 3 M. Tech. students from College of Agricultural Engineering and Technology, OUAT, Odisha during May 16- June 15, 2016 at ICAR-IIWM.
- One month Summer Training was organized for 3 M. Tech. students from College of Agricultural Engineering & Post-Harvest Technology, Central Agricultural University, Gangtok, Sikkim during June 1-30, 2016 at ICAR-IIWM.

Farmers' Field Day

A Farmers' Field Day on Wastewater Filter was organised on May 24, 2016 at Jaypurpatna Village, near Bhubaneswar by the Institute to demonstrate the technology developed to use urban wastewater safely for irrigation. A small scale on-line filter has been developed by the Institute to reduce significantly the microbial load, heavy metals and turbidity of the wastewater. The filter has been evaluated under field condition and demonstrated to farmers and officials from the agriculture department at the farmers' field. Dr. S.K. Ambast, Director, ICAR- IWM highlighted the features of the filter developed and



interacted with farmers who adopted the technology. Mr. Khagendra Nath Jena, Deputy Director of Agriculture, Department of Agriculture, Government of Odisha, Khurda, appreciated the efforts, and interacted with the farmers. Sixty one farmers from different villages attended the programme. The programme was organised by Dr. M. Raychaudhuri, Principal Scientist, ICAR-IIWM, Bhubaneswar.

Installation of Rubber Dams



ICAR-IIWM, Bhubaneswar has successfully installed a total 15 ICAR-flexi-check dams in the states of Gujarat, Maharashtra, Odisha and Uttarakhand till June

Swachha Bharat Abhiyan

The Director and staff of ICAR-IIWM, Bhubaneswar participated actively in Swachha Bharat Abhiyan and seven number of cleanliness campaigns were conducted during January-June, 2016 in the Institute main campus.



As a part of fortnightly 'Swachhata Pakhwara' celebrations during May 16-31, 2016 under the directives of Government of India and ICAR, human chain formation, pledge taking ceremony and a debate competition on "Can Swachha Bharat Abhiyan ensure a healthy and wealthy India by the year 2019?" was conducted on May 16, 2016. A monthly Seminar on "Recycling of waste to wealth under Swachha Bharat Abhiyan" was also organized on May 28, 2016.

Mera Gaon Mera Gaurav

Under Mera Gaon Mera Gaurav, various training programmes, scientists-farmers interaction meets and distribution of saplings/seedlings were done at different villages in Odisha. A farmers-scientist interaction meeting was organized on April 27, 2016 at Erikundala village, Tirtol Block, Jagatsinghpur district, Odisha.



- Scientists of ICAR-IIWM interacted with District Magistrate and Additional District Magistrate of Kendrapara regarding farm problems faced by the farming community in five villages i.e., Madana, Jagannathpur, Patakura, Garadpur and Naindipur and requested for implementation of new schemes in these villages. Thorough discussions were held during field visits about the problems faced by the farmers viz., cultivation of summer crops like sunflower, okra, bittergourd etc. Scientists explained improved methods of water management to the farmers. Scientists distributed saplings of guava (var. *Allahabad safeda*) and mango (var. *Amrapali*) to the Headmaster of Schools located in Madana, Jagannathpur, Patakura, Chandapalla and Naindipur villages for planting in respective schools.
- Scientist-farmers interaction meeting were held on January 22, February 29, March 18, May 27 and June 17, 2016 in Nuagaon, Khalibandha, Gajamara, Sadeiberini and Saptasajya Pada village of Dhenkanal district. Leaflets in Odia were distributed to farmers on pond lining, integrated fish-waterchestnut production system, integrated SRI, rainwater conservation and rice-fish farming, and also facilitated supply of tomato (var. *Swarna Sampad*) and brinjal (var. *Arka Nilachal*) seedlings through KVK to 40 interested farmers.
- A farmers field day-cum-training program was organized in collaboration with CIFA, Bhubaneswar at Sarata village on January 22, 2016. One hundred fifty farmers attended the program and training was imparted on soil health management, integrated farming systems and pisciculture.

- A training program on micro-irrigation was organized at Bhakarsahi village on February 7, 2016 and 30 farmers attended this training program. Another farmer-scientist interaction-cum-training program was organized at Bhakarsahi village on March 23, 2016 and 35 farmers attended the program. Training was imparted on cropping practices in groundnut and water management in agriculture.
- A training program was organized at Bhakarsahi village on April 15, 2016 and 40 farmers attended the program. Prof. Radhamohan, a social worker and ex-information commissioner was the chief speaker and training was imparted on organic farming and skill development.
- A farmer-scientist interaction-cum-training programme was conducted at Sarata village on June 18, 2016 and 35 farmers attended the programme. Training was imparted to the farmers on nutrient management in paddy and pisciculture.

Awards & Honours

- Dr. G. Kar, Principal Scientist received the 'Ekamra Shree Award' for his significant contribution in the field of Agricultural Sciences. The award was given by Dr. Damodar Rout, Cabinet Minister, Excise and Cooperation, Government of Odisha in presence of Shri Jewel Oram, Hon'ble Union Minister of Tribal Affairs on March 7, 2016 at Bhubaneswar.
- Dr. S. Roy Chowdhury, Principal Scientist received Fellow Award of the Indian Society of Coastal Agricultural Research for the year 2016.
- Dr. M. Raychaudhuri, Principal Scientist received best oral presentation award for the paper entitled 'Irrigation management using small scale filter for safe use of municipal wastewater' during 'Global Conference on Perspective of Future Challenges and Options in Agriculture' organized by the ASM Foundation, New Delhi and Jain Irrigation System Ltd., Jalgaon, held during May 28-31, 2016 at Jalgaon, Maharashtra.
- Mrs. Pratiba Sahu, Scientist has received the best oral presentation award for the paper entitled 'Approaches for pomegranate improvement & DUS testing: an overview' during the National Seminar on Horticulture Diversity for Prosperity, held during February 10-12, 2016 at OUAT, Bhubaneswar.

ICAR-IIWM Adopted Farmer Awarded

A total 52 adopted farmers of ICAR-IIWM, Bhubaneswar participated in farmers' fair, organized by ICAR-National Rice Research Institute, Cuttack on the occasion of 'Akshaya Tritiya' on 9th May, 2016. Sri Radha Mohan Singhji, Hon'ble Union Minister of Agriculture and Farmers Welfare graced the occasion as Chief Guest; inaugurated an exhibition showcasing frontier agricultural technologies developed by ICAR institutes, OUAT and KVK's and appraised farmers and state Govt. line departments on various flagship programmes of the Central Government like *Pradhan Mantri Krishi Sinchai Yojana* (PMKSY), *Pradhan Mantri Fasal Bima Yojana*, Soil Health Card

Scheme, *Mera Gaon Mera Gaurav, Paramparagat Krishi Vikas Yojana* etc. Shri Dharmendra Pradhan, Hon'ble Minister of State (Independent Charge) Petroleum & Natural Gas, Shri Bhartruhari Mahatab, Hon'ble Member of Parliament (Lok Sabha), Cuttack, Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR), New Delhi, Shri Chhabilendra Roul, Addl. Secretary (DARE) & Secretary (ICAR), New Delhi, Prof. (Dr.) S.N. Pasupalak, Vice Chancellor, OUAT, Bhubaneswar and Dr. Anupam Mishra, Director, ATARI, Zone VII, Jabalpur were also present on the occasion.



Shri Ramchandra Raut of 'Parbatiya' village of Dhenkanal district, Odisha, an adopted farmer by ICAR-IIWM, Bhubaneswar received the 'Appreciation Certificate' from Sri Radha Mohan Singhji for adopting 'Drip fertigation in vegetable crops' in a light textured lateritic soil under National Innovations for Climate Resilient Agriculture (NICRA) Project. The technology adoption has helped the farmer to develop climate resilient agriculture besides enhancing productivity and net income from mere Rs. 10,000 to 2.5 lakh/ha.

Joining/Promotion/Transfer/Superannuation

- Dr. P.K. Panda, Dr. A.K. Thakur, Dr. P.S. Brahmanand and Dr. S. Mohanty have been promoted to Principal Scientist through CAS of the ICAR w.e.f. 08.09.2014, 23.09.2014, 19.12.2014 and 11.03.2015, respectively.
- Er. D.U. Patil, CTO has been transferred to The Ginning Training Centre of ICAR-CIRCOT, Nagpur.
- Dr. R.C. Srivastava, Principal Scientist has joined as Vice-Chancellor of Rajendra Agricultural University, Pusa, Bihar on deputation.
- Mr. H.K. Bal, Skilled Support Staff has got superannuated on June 30, 2016.

HRD Activities

Name of the scientist/staff	Training Programmes attended	Period
Mr. N. Manikandan, Scientist	Professional Attachment Training at ICAR-IARI, New Delhi	December 1, 2015 February 29, 2016
Dr. G. Kar, Principal Scientist	Introduction to Soil and Water Assessment Tool (SWAT) using Open Source Tools (QGIS and QSWAT) at IIT, Madras	January 4-9, 2016
Dr. A.K. Nayak, Senior Scientist Dr. O.P. Verma, Scientist	Training on Landscape Crop Assessment Tool (LCAT) at CIMMYT, New Delhi	May 2-3, 2016
Dr. D.K. Panda, Senior Scientist	BASIN/ HSPE Training Program at IIT, Roorkee	June 6-14, 2016
Dr. R.K. Panda, Principal Scientist	Intellectual Property and Technology Management for Researchers at ICAR-NAARM, Hyderabad	June 13-18, 2016
Dr. S. Mohanty, Principal Scientist	Groundwater Flow and Transport Modeling through Fractured Geologic Media at IIT, Hyderabad	June 27- July 7, 2016

Exhibitions

Institute's achievements was displayed/ showcased in the following exhibitions held in different locations in Odisha and New Delhi

Events	Place	Period
11 th National Symposium of ISCAR	ICAR-IIWM, Bhubaneswar, Odisha	January 14-17, 2016
4 th ICAR Institutes-SAU-State Departments Interface Meet	OUAT, Bhubaneswar, Odisha	January 27-28, 2016
Inter-State Agri-Horti Exhibition	Bargarh, Odisha	February 20-22, 2016
Krishi Mahotsav 2016 (State-Level Agriculture Fair)	Baramunda, Bhubaneswar, Odisha	March 11-14, 2016
Rashtriya Krishi Unnati Mela 2016	ICAR-IARI, New Delhi	March 19-21, 2016
70 th Foundation Day of ICAR - NRRI	ICAR-NRRI, Cuttack	April 23, 2016
Farmers' Fair organized by ICAR-NRRI	ICAR-NRRI, Cuttack	May 9, 2016
7 th Krishi Fair 2016 organized by 'Shree Shrikshetra Soochana'	Shree Gundicha Temple, Puri	June 4-8, 2016



Sustainable Approaches to Agricultural Water Management

The pressure on land and water is escalating in the country due to progressive fragmentation of operational land holdings, degraded resource base and increasing concerns on climate change. Increasing population with higher per capita income demands for increased agricultural production to meet the diversified food basket from the same net sown area of about 140 mha. Increasing productivity with optimal use of water is essential. Hence, sustainable approach is the need of the hour to address the whole water management system at the command as well as at the on-farm level.

The net irrigated area in the country is about 65.3 mha *i.e.*, 46.5% of the net sown area is being irrigated; about 26.3 mha only is irrigated more than once. This indicates that there is a need for evolving, as well as adoption of water saving on-farm agricultural practices and enhancing irrigation efficiency. This would bring more area under irrigation. Sustainable approaches would include: continued efforts for augmentation of water resources *i.e.*, creation of auxiliary storage structures at tail-end of canal systems to store rainwater as well as canal water when available in excess for use during dry periods, construction of tube wells and dug wells in areas where groundwater development is low, increasing recharge of aquifers where extraction is more, increasing the capacity of existing water bodies by renovation; promotion of efficient water conveyance systems; precision irrigation *viz.* use of surface and sub-surface drips, sprinklers, rain-guns etc. Sustainable use of water is to be considered while developing cropping pattern

of a region; there is a need to make desirable shift to alternate cropping pattern giving preference to cultivation of low duty crops like millets, pulses and oilseeds. For rice, it is essential that higher productivity is maintained with sustainable on-farm technologies *viz.* land leveling, mud plastering of bunds, making diversion and field channels, avoiding field-to-field irrigation, direct-seeding, saturated soil culture, SRI method of cultivation, alternate wetting and drying etc. The choice of appropriate technique would depend upon the land situation and availability of water. The conservation agricultural practices *viz.* conservation tillage, bed planting, paira-cropping, mulch farming etc. would reduce irrigation need and decrease rice-fallow areas in the country, and enhance productivity of crops. Further, appropriate plan for conjunctive use of water would be required for effective implementation at the farm level. Use of wastewater for irrigation holds promise if low-cost treatment facilities are evolved.

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), which has been initiated last year, is a sustainable approach to water management in the country as it has strong components *viz.* accelerated irrigation benefit programme, '*Har Khet Ko Pani*', watershed and enhancing water use efficiency *i.e.* '*Per Drop More Crop*'. Further, there is need for dissemination of existing technologies, capacity building, awareness campaign on water saving technologies and agricultural systems. The institute has taken up consultancy to develop irrigation plans of 5 districts of Odisha and organized training programmes. Scientists of the institute acted as key resource person for over 800 district officials of different states.

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