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**ICAR - Indian Institute of
Water Management**

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Director's Column

Water : A Key to Doubling Farmers Income



In India, irrigated area is about 65.7 million ha, which is 47% of net cultivated area of about 141 million ha, and only about 26 million ha is under irrigated double cropping. Hon'ble Prime Minister of the country has urged upon doubling farmers' income by 2022. Therefore, it is essential that farm productivity is increased in irrigated as well as in rainfed conditions. The primary objective should be to enhance the area irrigated more than once. As water supply is a major factor to achieve this target, water is certainly a driving force to double the farmer's income. In general, crop productivity in rainfed areas is about half of those in irrigated fields. Moreover, productivity in rainfed areas is unpredictable due to uncertainty of rainfall and other extreme climatic events viz. drought, terminal heat stress etc. A better water management for every farm enterprises with assured source of irrigation sets the foundation towards sustainable production systems at the farmer's level. At the same time, there must be a jump in the production per unit amount of any input or investment

from irrigated agro-ecosystems. Then only farmer's net income will be doubled from their farm activities.

Better water resource development through harvesting of rainwater in reservoirs, farm ponds, even in soil profile would help in increasing the crop area under irrigation. Further development of irrigation infrastructure and rejuvenation of existing facilities should be taken up as a step towards our aim to double farmer's income by 2022. Providing irrigation to crops during dry spells would be a mitigation option to total crop failure as well as increasing productivity through conjunctive use from different sources of irrigation viz. canal, tanks, wells, farm ponds etc. Existing water saving technologies viz. micro-irrigation may be popularized among farmers.

The integrated approach of water management along with other agricultural development or practices should be fine-tuned and adopted. Yield improvement may be achieved through genetic or biotechnological advancements like better crop varieties with improved nutritional status, stress tolerance and resistant to insect-pests and diseases. All recommended agronomic practices should be in tune with agro-ecological sub-regions, soil test based fertilizer and fertigation recommendations in the form of integrated farming systems approach. For farmers having small and fragmented holdings, water conservation and distribution at community basis or integrated watershed management approach can help in better water management. Diversification of crops along with adopting micro-irrigation systems from cereal-based farming to pulses, oilseeds, millets and/ or other coarse

cereals would help in fetching better market price of farm produce with enhanced net income. The most important part is the crop planning, which needs to be done keeping water resources of a region and the water intake by various crops in mind. For example high water consuming crops like paddy and sugarcane should be grown in high rainfall areas. There is a need for integrated water use policy. We should develop a system of judicious and integrated use of water throughout the country.

This premier institute has developed several viable technologies on water management on putting continuous efforts for a period of about three-decades. The notable of them are: determining water requirement and irrigation scheduling for different crops in selected agro-ecological sub-regions, tank-cum-well system in irrigated commands, raised and sunken bed system in medium and low lands for crop diversification, pond-based integrated farming systems, rainwater conservation techniques and multiple use of conserved water, sub-surface water harvesting, integration of system of rice intensification with fish culture, lessening water use in high value aquaculture, agronomic practices for irrigation water saving and enhancing water use efficiency, conjunctive use of water through bore-wells, dug-wells and ponds on farmers' participatory approach, conjunctive use of fresh water and poor quality water, development of surface drainage system for low lying areas and development of package of practices for bio-drainage; development of rubber check dams for watersheds, micro-irrigation technology for different crops and enhancing crop produce quality for different agro-ecological sub-regions etc. There is a need to disseminate those technologies to double the farmer's income in the country.

Concept :

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Compiled, Edited and Layout Design :

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Dr. O.P. Verma & Dr. Rachana Dubey



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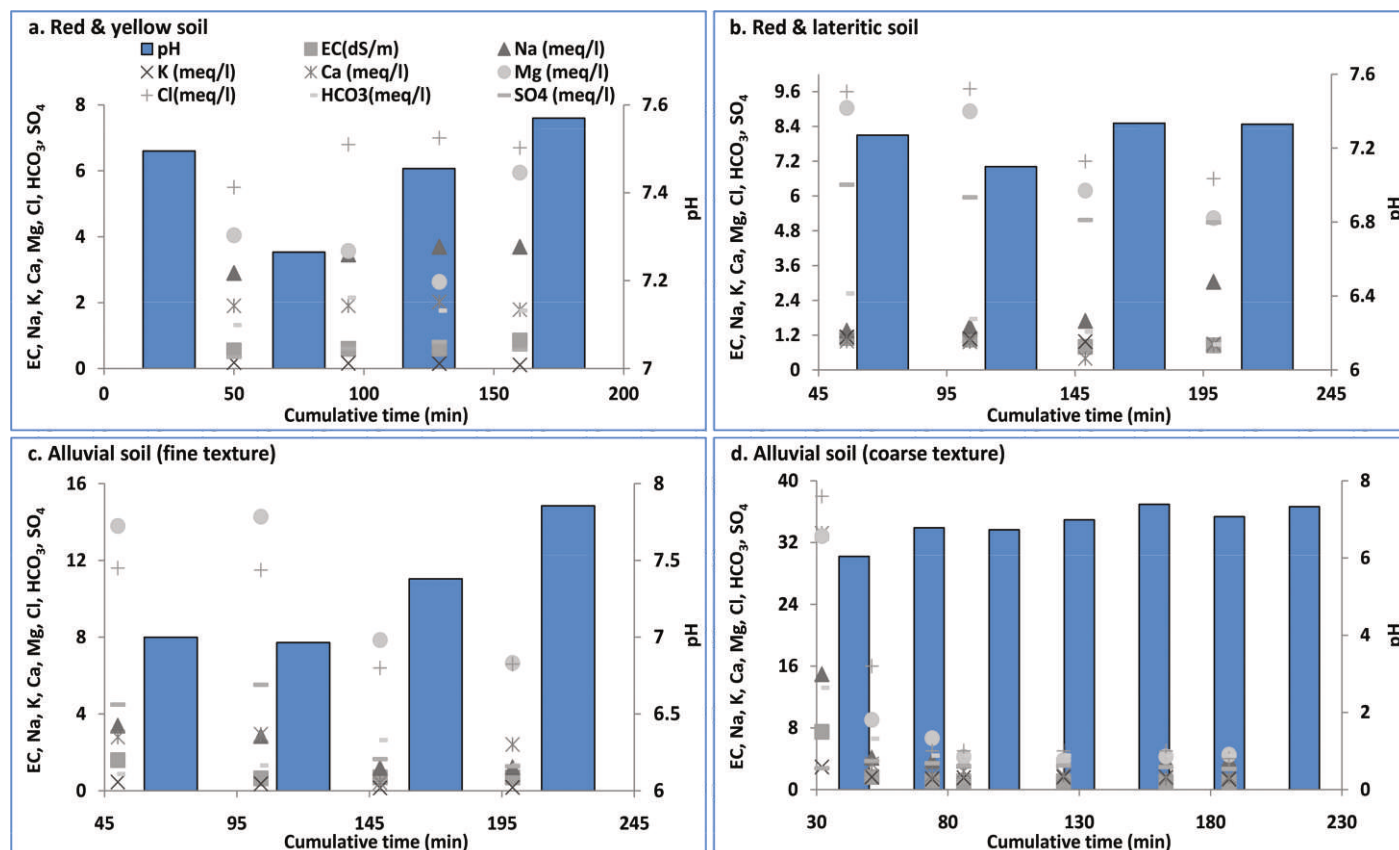
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Scope of Using Agro-based Paper Mill Wastewater in Irrigation

Paper industry is the largest industry in India and a water intensive industry, consumes as high as 60 m³ and releases 150-175 m³ wastewater per metric tonne of paper produced. In a study on chemical analysis of wastewater, the treated paper mill effluent (PME) of COS Board, Jagatpur, Cuttack was found neutral in reaction (pH7.0), low saline (EC,1.32 dS/m), rich in Ca (154.71 mg/l), Mg (53.28 mg/l), Cl (779.9 mg/l), HCO₃ (91.5 mg/l), SO₄ (88.5 mg/l), and moderate to low amount of

NO₃, organic carbon, Zn, Cu, Fe and Mn, with no detection of Cd, Cr and Pb. To determine its impact on soil properties and water quality on four types of soil (red & lateritic, red & yellow, alluvial coarse and fine texture) revealed that the leachate as well as soils get enriched with various ions during the progress of leaching with PME (Figure). A net increase of organic carbon, Ca, Mg and P was observed, i.e., 0.34 to 1.53, 0.4 to 1.17, 0.18 to 0.73 and 7.06 to 26.85 times, respectively after leaching

with PME in all the four soil types. These were substantially decreased particularly EC by 15.38 to 166% after washing with water. Water scarcity is a problem and might be going to hit agricultural production under vulnerable eco-system. Apart from supplying different amounts of plant nutrients, the treated PME has been found as a supplementary source of irrigation for acidic to neutral, non-saline soils, mostly dominated in humid to sub-humid regions.



Characteristics of leachate collected with time during leaching with paper mill effluent through different soil types

Madhumita Das, O.P. Verma, R. Sethi and A.K. Nayak

Delineation of Waterlogged Area for Fitting-in Suitable Cropping System

In India, 11.6 Mha area remains unproductive due to water logging problem. However, there are several technological options for converting this vast area into productive agriculture depending on nature of water logging. With this aim, waterlogged areas in eastern India was firstly delineated and suitable crops / options for those areas were suggested.

Increase in waterlogged area in post-monsoon period was assessed for in total twelve districts of Bihar, West Bengal and Jharkhand taking help of georeferenced satellite P6- LISS-III imagery (path 106 and

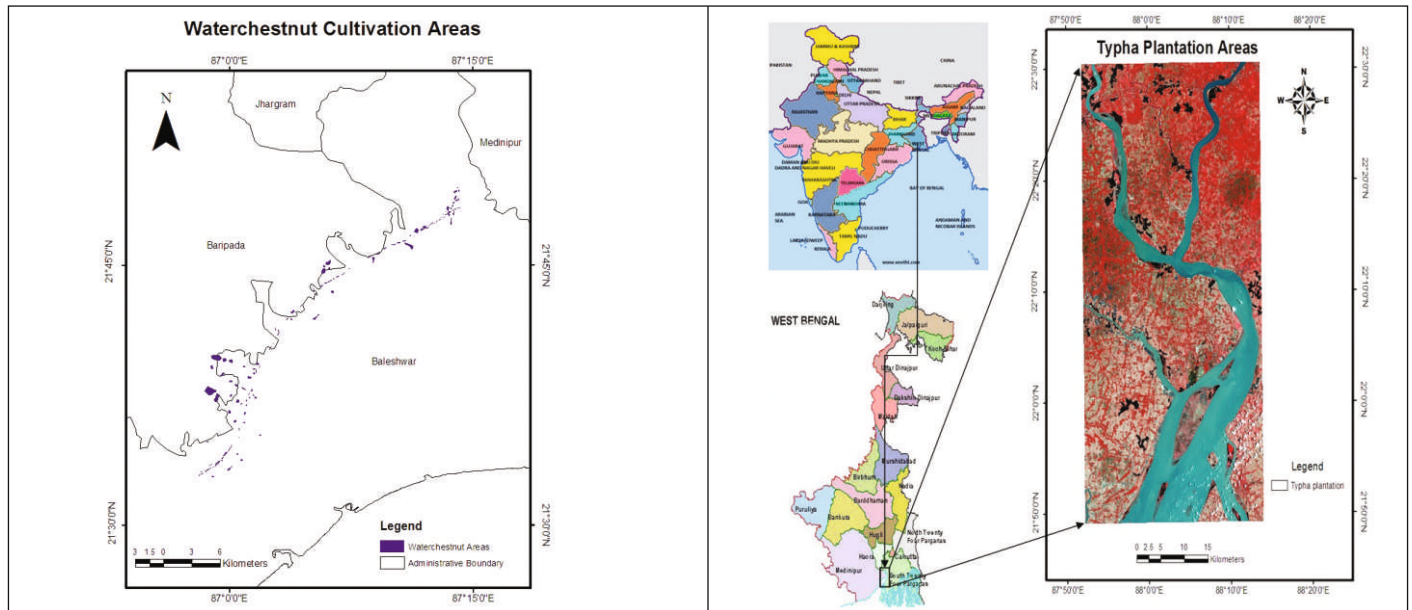
row 54) for both pre-monsoon (April-May) and post-monsoon period (November) procured from ISRO, Govt. of India. The ground truthing data from visit of the area and topo-sheet maps procured from Survey of India, Govt. of India, Dehradun were also utilized for the study. Thematic maps were prepared for pre-monsoon and post-monsoon period for different districts. Excluding the area under perennial rivers and streams, the increase in spread of landlocked waterlogged areas were estimated. Depending upon the nature of waterlogging, suitable aquaculture and

cropping system were developed with their package of practices. The supervised classification of images were done for fitting in different crops like water chestnut in Odisha and *Typha* in West Bengal (in figures). The possible district-wise capture fishery practices, integrated fish + water chestnut production system, lotus and makhana cultivation were identified in these delineated waterlogged areas. Scope for integrated rice-fish farming, cultivation of overaged rice seedlings after damage of first sowing, *Kharuhan* (double-transplanting) cultivation and using submergence tolerant

paddy cultivar 'Swarna sub-1', intervention with bio-drainage vegetation in low lying areas were identified. For fitting in suitable crops in identified tidal waterlogged areas along bank of Rup Narayan river from study area of 2,86,100 ha, 928 ha area was

found suitable for *Typha* cultivation in east Medinipur and adjoining Howrah district in West Bengal. Similarly, in Odisha, in waterlogged areas of Balasore district out of 92452.61 ha study area, 607.87 ha was found suitable for integrated water chestnut-

aquaculture intervention. Water chestnut cultivation in a delineated waterlogged area in Balasore district gave net profit of ₹117,000/- per ha through integrated water chestnut and aquaculture with net water productivity of ₹ 7.31/m³ of water.



Water chestnut and *Typha* cultivation areas

S. Roy Chowdhury, A.K. Nayak, R.K. Mohanty, P.S. Brahmanand and S.K. Ambast

Density-dependent Water Use in High-value Aquaculture

Aquaculture is a highly profitable farm enterprise and livelihood option for a large number of farmers in India. Under changing climate scenario, water budgeting and density-dependent water use are two major requirements in improving aquaculture performance. Therefore, enhancing water productivity in aquaculture sector is of prime

necessity. Further, more often than not, farmers carry out unplanned water exchange during culture period that becomes counterproductive and uneconomical, thus there has been the need to determine ideal amount of water required for successful aquaculture operation. With this challenging mission, for the first time in India, Scientists

from ICAR-Indian Institute of Water Management, Bhubaneswar, quantified the optimum total water requirement and consumptive water use through hydrological water balance study. They assessed the water productivity, production performance and profitability of carp poly culture and shrimp monoculture under varying intensity levels.



In carp poly culture (IMCs), the optimum stocking density was found to be 8,000 fingerlings per ha, total water use will be 39,200 cubic meter and water exchange 2,000 cubic meter per ha. With this stocking density, fish productivity enhanced to 3.62 t ha⁻¹ in 180 days with net income of ₹ 9.4 per cubic meter of water; only 5.61

cubic meter of water would be required to produce 1 kg of carp biomass. In pacific white shrimp (*Litopenaeus vannamei*) culture, with best management practice at the optimum stocking density of 5 lakh shrimp seed per ha, total water use could be minimized to 32,500 cubic meter and water exchange be minimized to 6,300 cubic

meter per ha, without hampering the normal growth and production. With this stocking density, shrimp productivity enhanced to a level of 10.58 t ha⁻¹ in 120 days. Further, with this novel technique, net income of ₹ 83.3 would be generated per cubic meter of water used while only 1.72 cubic meter of water would be required to produce 1 kg of

L. vannamei shrimp. Similarly, in monoculture of *Penaeus monodon* (black tiger prawn), stocking density of 2,00,000 post larvae ha⁻¹ gives significantly higher yield (4.58 t ha⁻¹

125 d⁻¹), economic benefit (OV:CC, 2.46) and net consumptive water productivity (₹ 37.9 m⁻³). At this optimum stocking density, total water use could be minimized to

32,400 cubic meter and water exchange be minimized to 9,000 cubic meter per ha; only 4.72 cubic meter of water is required to produce 1 kg of *P. monodon* biomass.

Technologically validated field trial result

Culture system	Carp polyculture	Monoculture of <i>L. vannamei</i>	Monoculture of <i>P. monodon</i>
Optimum density, ha ⁻¹	8,000 fingerlings	5,00,000 PL	2,00,000 PL
Culture duration, days	180	120	125
Total water use, (× 10 ⁴ , m ³)	3.92	3.25	3.24
Consumptive water use, (× 10 ⁴ , m ³)	1.89	1.43	1.08
Consumptive water use index, m ³ kg ⁻¹ biomass	5.61	1.72	4.72
Productivity, t ha ⁻¹	3.62	10.58	4.58
Feed conversion ratio, FCR	1.74	1.68	1.40
Sediment load, m ³ t ⁻¹ biomass	58.00	45.30	44.10
OV-CC ratio	1.88	1.97	2.46
Net total water productivity, ₹ m ⁻³	5.20	46.60	26.60
Net consumptive water productivity, ₹ m ⁻³	9.40	83.30	37.90
Total water footprint (WF _t , m ³ t ⁻¹)	3425	1229	3515

Technology validation has been carried out in farmers' field at Balasore district covering an area of 12 ha and has now widely been adopted by many farmers of coastal Odisha. Apart from higher productivity and profit, there is huge scope of export and foreign

exchange earning in monoculture of *P. monodon* and *L. vannamei* due to global market demand and consumer preference. Similarly, carp polyculture can fulfil the increased domestic market demand of freshwater fish. Further, less water use in

aquaculture could provide the basis to optimize pond rearing efforts and the water management strategies can be tailored to minimize production costs.

Rajeeb K. Mohanty

Science

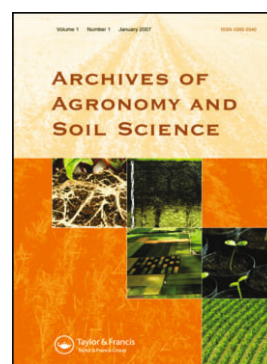
Energy Efficiency, Productivity and Profitability of Rice-based Cropping Systems for Selected Conservation Practices

Presently, crop productivity and profitability depends on energy consumption. However, rising energy costs, growing concerns about greenhouse gas emissions, and the need to protect soil and water quality warrants to quantify production efficiency of agricultural systems in terms of energy analysis in addition to economic analysis and water productivity. Energy efficiency can be achieved through selected conservation agricultural (SCA) practices such as integrated nutrient management (INM), water saving, reduced tillage, and suitable cropping system.

With the objective of achieving higher energy efficiency without decreasing crop productivity, a group of scientists from ICAR-IIWM compared the effects of SCA with conventional practices in selected rice based cropping systems. For wet season rice crop, SCA included *Sesbania* as legume cover crop without additional tillage for its sowing and incorporation, and INM. For dry season crops, SCA included INM using farm generated vermicompost and reduced tillage. Results revealed that at similar yield level, energy input was less by 24.5% as compared to the conventional (10.2 GJ ha⁻¹). Higher net energy (137.1 GJ ha⁻¹), energy output: input ratio (18.9) and energy productivity (1.41 t biomass GJ⁻¹) in the SCA indicate higher energy efficiency. Also, higher net return with SCA resulted in higher net economic water productivity. Among dry season crops, highest net energy (57.2 GJ ha⁻¹) was recorded in sunflower followed

by horsegram and cabbage. Net economic water productivity was highest for babycorn, followed by cabbage and sweetcorn. However, the per cent increase in net return, net energy and the net economic water productivity for SCA was highest for horsegram followed by sunflower. Despite having low system productivity, rice-sunflower and rice-horsegram systems were more energy efficient with high net energy of 194.4 and 169.4 GJ ha⁻¹, respectively. Considering high net energy, favourable residual soil properties and low water demand, rice-horsegram and rice-sunflower systems were beneficial. Thus, in water scarce area with low soil fertility, rice-horsegram followed by rice-sunflower cropping systems are suitable for resource poor farmers considering energy benefit and soil fertility improvement with the SCA.

Adapted from S.K. Rautaray, A. Mishra and O.P. Verma. 2017. Energy efficiency, productivity, and profitability of rice (*Oryza sativa* L.) based cropping systems for selected conservation practices. *Archives of Agronomy and Soil Science*, 63(14): 1993-2006. View the full article online at <http://doi.org/10.1080/03650340.2017.1319049>



Can System of Rice Intensification Contribute to Climate-Smart Agriculture ?

System of Rice (*Oryza sativa* L.) Intensification (SRI), an agro-ecological crop management system developed in Madagascar. Substantial increase in average rice yields have been reported from 50 plus countries when these methods are used. Most attention thus far has focused on yield and little on whether or how SRI methods can help farmers adapt to and buffer the adverse stresses of climate change as well as reduce their rice paddies' contribution to global warming. According to FAO criteria, achieving all three impacts would qualify SRI as 'climate-smart agriculture'.

Recently, it has been reviewed how making SRI modifications in agronomic practices can elicit plant phenotypes from given rice genotypes that are more robust and adaptive as well as more productive. This effect appears to result from SRI's inducing larger, healthier root systems and enhancing beneficial soil biota. These effects are associated with improvements in a variety of morphological and physiological characteristics in rice plants. Cross-national meta-analysis has documented reductions in crop water

requirements and increased water productivity under SRI management. These methods have potential to contribute to greater drought-tolerance, resistance to storm damage, cold-temperature hardiness, shortened crop cycles etc. That reduce crops' exposure to biotic and abiotic stresses, less susceptibility to insect pest and disease damage, and diminished net emissions of greenhouse gases from paddy fields. The efficacy of SRI management methods is increasingly accepted by governments, donor agencies and farmers, but more remains to be researched and evaluated.

Adapted from Amod K. Thakur and Norman T. Uphoff 2017. How the system of rice intensification can contribute to climate-smart agriculture. Agron. J. 109:1163-1182. View the full article online at <http://doi.org/10.2134/agronj2016.03.0162>



Events & News

Visit of Watershed Development Doyens

Dr. Rajendra Singh, Water Man of India, visited ICAR-Indian Institute of Water Management, Bhubaneswar on December 21, 2017 to interact with scientists of the institute and trainees of PMKSY. He delivered a lecture and shared how his efforts was instrumental in bringing water to nearly thousands of villages of Rajasthan and lessons to be learned from his experience. He also shared his fascinating story during his journey to make water scarcity into water sufficiency for the villagers. Dr. S.K. Ambast, Director, ICAR-IIWM welcomed him and expressed his gratitude for addressing audience.



Rajendra Singh

Mr. Papatrao Baguji Pawar, Farmer Sarpanch of Hiwared Bazar, a gram panchayat in Ahmednagar district of Maharashtra visited ICAR-IIWM on October 12, 2017 and delivered a lecture on 'Community based watershed development: A success story' during a training program on 'Advanced Capacity Building Program' under PMKSY. He is the Executive Director of Maharashtra state Government's Model Village program. He is credited to have transformed it from an impoverished village into a model of development that the Government of Maharashtra wishes to implement across the state.



Popatrao Baguji Pawar

Mr. Laxman Singh, founder of a Non-Governmental Organization Gram Vikas Navyuvak Mandal Laporiya (GVNML) visited the institute on November 7, 2017 and delivered a lecture on 'Natural resource based watershed development: A success story' during a training program on 'Advanced Capacity Building Program' under PMKSY. He could bring happiness back to the Laporiya village of Rajasthan, along with young villagers. His leadership and efforts converted the drought-prone village into a lush green arable land, which supports both livestock and agricultural production. His innovations include *Chauka* system, conservation techniques for bird species, organic farming etc. He designed location-specific water conservation systems that are managed and spread by local communities.



Laxman Singh

Quinquennial Review Team (QRT) Meeting

The 5th Quinquennial Review Team of ICAR-IIWM and AICRP-IWM held its first meeting at ICAR-IIWM, Bhubaneswar during September 18-19, 2017 and second during November 10-12, 2017 at SKUAST, Jammu. The Team constituted the following members:



QRT meeting at ICAR-IIWM

1.	Dr. S.S. Magar, Former Vice-Chancellor, BSKKV, Dapoli, Maharashtra	Chairman
2.	Dr. C.L. Acharya, Former Director, ICAR- IISS, Bhopal	Member
3.	Dr. M.G. Chandrakanth, Director, ISEC, Bengaluru	Member
4.	Dr. R.K. Batta, Former PC, AICRP on WM	Member
5.	Dr. J. M.L. Gulati, Former Dean, OUAT, Bhubaneswar	Member
6.	Dr. S.D. Gorantiwar, Head, IDE, MPKV, Rahuri	Member
7.	Dr. P. Nanda, Principal Scientist, ICAR-IIWM, Bhubaneswar	Member Secretary

QRT reviewed achievements of ICAR-IIWM and AICRP-IWM for the period 2012-2017 as well as research proposals for next five years under different programs and themes of ICAR-IIWM and AICRP-IWM. Program leaders of ICAR-IIWM and Chief-Scientists of respective centers presented the achievements made during 2012-2017 during the meetings.

Institute Research Council (IRC) Meeting



IRC meeting at ICAR-IIWM

IRC meeting was held on July 7, 2017, and results of externally-funded projects- TSP, NICRA, LBS, GYGA, MoA, PRP and Agri-CRP on Water as well as AICRP on Irrigation Water Management were discussed apart from two new research proposals. Based on the recommendations of the IRC meeting, new projects were decided to be discussed further in the monthly meeting held on July 28, 2017 and August 18, 2017. Dr. S.K. Ambast, Director & Chairman, IRC concluded with remarks and encouraged scientists to continue good work, timely reporting and systematic record keeping. He also emphasized for publication after completion of each project. Vote of thanks given by Dr. S.K. Jena, Principal Scientist & Member-Secretary, IRC.

Advanced Capacity Building Program under PMKSY

Nine advanced capacity building program under *Pradhan Mantri Krishi Sinchayee Yojana* (PMKSY) was conducted at ICAR-Indian Institute of Water Management, Bhubaneswar for Assistant Soil Conservation Officer/ Assistant Project Directors of the Directorate of Soil Conservation and Watershed Development, Govt. of Odisha. Dr. S.K. Ambast, Director, ICAR-IIWM, Bhubaneswar was Course-Director of these training programs.

Detail of programs	Coordinators	Duration	No. of participants
Hydrological Study and Monitoring of Watersheds	Dr. A. Mishra & Dr. S.K. Jena	August 8-12, 2017	20
		August 28-September 1, 2017	20
		September 11-15, 2017	20
		September 18-22, 2017	20
Concepts of Standard Design, Layout of Different Structural Measures in Watersheds	Dr. R.K. Panda & Dr. R.R. Sethi	October 9-13, 2017	25
		October 24-28, 2017	23
		November 6-10, 2017	20
		November 21-25, 2017	28
Improving Water Productivity in Rain-fed Agriculture	Dr. S. Mohanty & Dr. P. Panigrahi	December 18-22, 2017	21



Organized Brainstorming Workshop

A brainstorming workshop on 'Converting Extreme Rainfall Events into Opportunities' was organized by ICAR-IIWM in collaboration with Indian Society of Water Management (Odisha Chapter) on November 22, 2017. Dr. T. Mohapatra, Hon'ble Secretary (DARE) & DG (ICAR) graced the function as Chief-Guest. Dr. G. Amaranth, IWMI, Colombo; Dr. Paul Pavelic, IWMI-Southeast Asia Regional Office, Lao PDR; Prof. A.K. Gosain, IIT, Delhi; Prof. M.K. Jain, IIT, Roorkee; Dr. T. Thomas, NIH-RC, Bhopal; Dr. Y.R. Satyaji Rao, NIH-RC, Kakinada; Dr. A. Anandan, ICAR-NRRI, Cuttack; and Dr. S. K. Ambast & Dr. S. Roy Chowdhury, ICAR-IIWM, Bhubaneswar were invited speakers.



Dr. S.K. Ambast, Director, ICAR-IIWM welcomed the dignitaries and briefed about the workshop. Presentations were made on flash floods in hilly terrains, floods in plains and waterlogging in agriculture and urban areas caused due to extreme rainfall events occurring in different parts of our country in recent years and the management strategies/policies for flood with ultimate aim for betterment of the society and farming community by eminent Scientists / Professors and Experts. The Scientists / Professors, Engineers and Officers from different ICAR Institutes and Regional Centers; Orissa University of Agriculture & Technology; Department of Water Resources,

Department of Agriculture, and Directorate of Soil Conservation & Watershed Development, Govt. of Odisha participated in the workshop and discussed on the issues pertaining to the topics. Dr. T. Mohapatra expressed his concern for more accurate forecasting of flood events and the effective management of flood water in agriculture under climate change scenarios. Secretary also stressed on the need for further strengthening of research on the issues and to make action plan for flood affected areas in collaboration with different institutes in the country. Dr. P. Panigrahi, Senior Scientist coordinated this workshop.

Vigilance Awareness Week

ICAR-IIWM observed vigilance awareness week during October 30-November 4, 2017 with a focus on 'My Vision: Corruption Free India'. Dr. S.K. Ambast, Director, administered the pledges to all the staff members of the institute. A 'WhatsApp' based social network was created to sensitize staff members and for taking e-pledge and posting them in the 'WhatsApp' social network. An elocution competition for staff members of the institute and debate competition for students were organized. An 'Awareness Gram Sabha' was organized at Madana village, Garadpur Gram Panchayat, Kendrapara, Odisha. Thirty three participants attended the 'Awareness Gram Sabha' including ward-members and farmers.

The participants were explained about vigilance monitoring mechanisms in order to check corruption at every sphere of life.

A seminar lecture was delivered by Dr. S.K. Srivastava, Principal Scientist & VO, ICAR-CIWA, Bhubaneswar on 'Vigilance mechanisms for removing corruption'. On the concluding day, a human-chain formation was organized at the institute campus, where Director, ICAR-IIWM, participated along with all staff members and others who was present in the campus. Dr. S. Roy Chowdhury, Principal Scientist and Vigilance Officer, ICAR-IIWM, Bhubaneswar coordinated these programs.



Human-chain formation during Vigilance Awareness Week

Farmers' & Students Exposure Visit

Farmers/ Students from	Date	Participants
Egra Block II, Purba Medinipur, West Bengal	July 26, 2017	23
Katni Block, Bilaspur, M.P.	December 8, 2017	25
SOA University, Bhubaneswar	November 28, 2017	30

Independence Day Celebration



ICAR-IIWM celebrated 71st Independence Day of the country on August 15, 2017 with patriotic fervor and gaiety. On this occasion, Director of the institute hoisted the National Flag and addressed the staff and family members of ICAR-IIWM. He urged upon the staff to make rational use of freedom of thought, expression and action to achieve the goal of the organization; and appealed not to become complacent on the achievements of the past. He emphasized to continue working with new enthusiasm for doubling the farmers' income through new innovations, thereby bringing smile on their face.

World Soil Day

ICAR-IIWM celebrated 'World Soil Day' on December 5, 2017. All staff of the institute and 46 farmers from Joypurpatna and Bikipur villages (Dist. Khordha) participated in the function. Scientists of the institute explained farmers about importance of 'Soil Health Card' and soil sample collection procedure, relevance of soil test, benefits of applying organic manures and soil based application of plant nutrients for different crops to restore soil health and environment quality. An elocution competition on 'Importance of Soil' was held for students to motivate young minds. Twenty-nine students from Vivekananda Siksha Kendra, Chandrasekharpur, Bhubaneswar participated and made the day a grand success. Dr. (Prof.) M. Kar,

Hindi Pakhwada



ICAR-IIWM celebrated *Hindi Pakhwada*, 2017 during September 14-28, 2017. During *pakhwada*, various Hindi competitions were organized viz., Hindi to English translation, essay writing, speech in Hindi, official note writing in Hindi and debate competition etc. Dr. S.K. Ambast, Director distributed prizes to the winners. Dr. O.P. Verma, Scientist co-ordinated this *pakhwada*.

Celebration of Agricultural Education Day



ICAR-IIWM celebrated Agricultural Education Day on December 3, 2017 to sensitize students about the importance of agricultural education for feeding growing population of the country at Jayadev Shiksha Kendra, Patia, Bhubaneswar. Competitions were organized on essay-writing, art and debate among students.



Ex-Vice-Chancellor, OUAT, Bhubaneswar graced the occasion as Chief-Guest. Dr. M. Das, Principal Scientist coordinated this program.

Exhibitions

Institute's achievements were displayed/ showcased in the following exhibitions held at different locations:

Events	Place	Period
Celebration of <i>Mahila Kishan Diwas</i> on World Food Day	ICAR-CIWA, Bhubaneswar	October 16, 2017
82 nd Annual Convention of the Indian Society of Soil Science	Amity University, Kolkata	December 11-14, 2017

HRD for ICAR-IIWM Staff

Following officials/ staff of ICAR-IIWM participated in various training programs:

Official	Subject	Organization	Period
Dr. A.K. Nayak, Principal Scientist Mr. N. Manikandan, Scientist	Internal Auditor Training Course for ISO 9001:2015	TUV India Pvt. Ltd, Kolkata	August 17-18, 2017
Dr. O.P. Verma, Scientist Mr. N. Manikandan, Scientist Mr. Abhijit Sarkar, Scientist Mr. Partha Deb Roy, Scientist	Advanced Capacity Building Program on 'Hydrological Study and Monitoring of Watersheds'	ICAR-IIWM, Bhubaneswar	September 11-15, 2017
Mr. S.K. Singh, AO Mr. J. Nayak, Assistant Mr. R.K. Dalai, Assistant Mr. N. K. Mallick, UDC	Public Finance Management System (PFMS) & GST	ICAR-NRRI, Cuttack	September 11-12, 2017
Dr. S. Pradhan, Scientist Dr. Debabrata Sethi, Scientist Dr. Rachana Dubey, Scientist	Advanced Capacity Building Program on 'Hydrological Study and Monitoring of Watersheds'	ICAR-IIWM, Bhubaneswar	September 18-22, 2017
Dr. O.P. Verma, Scientist Mr. Abhijit Sarkar, Scientist	Advanced Capacity Building Program on 'Concepts of Standard Design, Layout of Different Structural Measures in Watersheds'	ICAR-IIWM, Bhubaneswar	October 9-13, 2017
Dr. S. Pradhan, Scientist Dr. Rachana Dubey, Scientist	Advanced Capacity Building Program on 'Concepts of Standard Design, Layout of Different Structural Measures in Watersheds'	ICAR-IIWM, Bhubaneswar	October 24-28, 2017
Mr. B.K. Acharya, Technical Officer	Capacity Building & Skill Upgradation Program on Farm Management	ICAR-IIFSR, Modipuram	October 24-28, 2017
Dr. Debabrata Sethi, Scientist Mr. Partha Deb Roy, Scientist	Advanced Capacity Building Program on 'Concepts of Standard Design, Layout of Different Structural Measures in Watersheds'	ICAR-IIWM, Bhubaneswar	November 6-10, 2017
Mr. N. Manikandan, Scientist	Advanced Capacity Building Program on 'Concepts of Standard Design, Layout of Different Structural Measures in Watersheds'	ICAR-IIWM, Bhubaneswar	November 21-25, 2017
Mr. V.K. Sahoo, F&AO Mr. A. Mallick, AAO	Public Finance Management System (PFMS) & GST	ICAR-NRRI, Cuttack	November 27-28, 2017
Mr. A.K. Binakar, Senior Technical Assistant (Driver)	Competency Enhancement Program on Automobile Maintenance, Road Safety And Behavioral Skill Development	ICAR-CIAE, Bhopal	November 27-28, 2017
Dr. S.K. Jena, Principal Scientist	Management Development Program on Leadership Development	ICAR-NAARM, Hyderabad	December 12-23, 2017
Dr. K.G. Mandal, Principal Scientist Dr. D.K. Panda, Principal Scientist	Multivariate Data Analysis	ICAR-NAARM, Hyderabad	December 14-20, 2017
Dr. S. Pradhan, Scientist Dr. Debabrata Sethi, Scientist	Advanced Capacity Building Program on 'Improving Water Productivity in Rainfed Agriculture'	ICAR-IIWM, Bhubaneswar	December 18-22, 2017
Mrs. Sunanda Naik, ACTO (Library)	Training-cum Awareness Workshop on J-Gate@CeRA for North-East Region	ICAR-CIFA, Bhubaneswar	December 19, 2017

Farmer's Training under Farmer's FIRST Project

Three one-day farmer's-training programs were organized under Farmer's Farm, Innovations, Resources, Science and Technology (FIRST) Project at Khuntapingu, Malarpada and Jamuda villages (Dist. Keonjhar) on September 12, 13 and 14, 2017, respectively. A total of 370 farmers including women farmers participated in the training programs. Scientists from ICAR-IIWM, Experts on watershed, agriculture,

veterinary, horticulture and fishery departments provided training to the farmers. The line departments agreed to work on a collaborative approach along with the scientists of ICAR-IIWM in the project area to improve water productivity and farm income to improve livelihood of the farmers. Farmers were also demonstrated with system of rice intensification (SRI) trial laid in farmer's field of Khuntapingu village;

vegetable seedlings were distributed among farmers for cultivation during *rabi* season. A WhatsApp group was formed during the training in order to use social media as a tool for sharing images and videos of problems faced in farming and get appropriate solutions from the expert scientists. Dr. P. Nanda, Principal Scientist and Dr. Debabrata Sethi, Scientist coordinated the program.

Another three-day farmers' training was organized on 'Entrepreneurship development for income generation and enhancement of water productivity' at KVK, Keonjhar under Farmer's FIRST Project during December 27-29, 2017. A total of 28 farmers and farm women from three villages (Khuntapingu, Malarpada and Jamuda) of Saharpada block (Dist. Keonjhar) participated in the training programme. Scientists of ICAR-IIWM along with experts from watershed, fishery, animal husbandry and KVK provided training to farmers. Participants undergone practical demonstrations on drip irrigation, portable sprinkler irrigation and mushroom farming. Dr. P. Nanda, Principal Scientist and Dr. Debabrata Sethi, Scientist coordinated the program.



Farmer's Training under TSP

A field demonstration-cum-training program on 'Pump operation, maintenance and irrigation application techniques' was conducted at Birjaberna village in Sadar block, Sundargarh under TSP project during November 29-30, 2017. The program was attended by 100 farmers including 20 women participants. Different irrigation

water application techniques, field demonstration on water application methods in different crops, crop water requirement and aquaculture practices to enhance the farm income were also briefed to the farmers during the training program. Dr. R.K. Panda, Principal Scientist coordinated the program.



Organized Inter-State Farmer's Training Program

ICAR-IIWM organized Inter-State farmers training program on 'Water conservation and efficient irrigation system for enhancing income and livelihood' during November 27-30, 2017. Eleven progressive farmers attended this training program, sponsored by Agricultural Technology Management Agency (ATMA), Samastipur, Bihar under PMKSY. Farmers were exposed to various agricultural water management practices for enhancing productivity and income during training program. Dr. M.K. Sinha, Principal Scientist and Dr. R. Dubey, Scientist coordinated the program.



Organized Kisan Gosthi

ICAR-IIWM organized a *Kisan Gosthi* on 'Water management strategies for *rabi* crops' at research farm, Deras on November 10, 2017. Sixty progressive farmers from villages of Durgapur, Chhatabar, Jammujhari, Haridamada and Giringaput of Jatni and Bhubaneswar block, Khordha district participated this program. Dr. S.K. Ambast, Director informed farmers about various water management technologies developed by the institute. Program leaders of the institute shared detailed information of various technologies relating to groundwater, safe use of poor quality water in agriculture, and



relevance and limitations in waterlogged areas including their economic viability. This *gosthi* was coordinated by Dr. P.K. Panda, Principal Scientist of the institute.

Swachha Bharat Abhiyan

The Director and staff of ICAR-IIWM, Bhubaneswar participated in *Swachh Bharat Abhiyan* and 23 number of cleanliness campaigns were conducted during July-December, 2017 in the Institute main campus, public places and tourist spots. All staff members actively participated in cleanliness campaign on the occasion of celebration of 'Sewa Diwas' during September 15 - October 2, 2017.

Swachhata Shapath was administered by the Director of the institute to all the staff members twice on September 15 and October 2, 2017. *Swachhata Abhiyan* programmes were organised at the Institute campus and also on both the corners of Daya River Bridge, 20-km away from the Institute. The staff members also participated in removal of night soil and slit deposited in the drainage line causing



severe obstruction to the sewage/toilet water flow on the occasion of celebration of 'Samagra Swachhata Diwas' on September 24, 2017. An awareness campaign was organized for public about the need for creating proper toilet facility in the disadvantageous areas. They also participated in removing weeds and non-biodegradable articles like, plastic and polythene adjacent to the main road passing through the Santal Sahi Basti. Major emphasis was given on eradication of most obnoxious weed *Parthenium* sp. on the occasion of celebration of 'Sarvatra Swachhata Diwas' on September 25, 2017. On October 1, 2017, ICAR-IIWM staff cleaned the premises in front of Nandankanan Zoo. Six persons were awarded with *Swachhata Puraskar-2017* for their excellent efforts in ensuring their surroundings clean and for their overall initiative and leadership in *Swachh Bharat Abhiyan* on the occasion of Gandhi Jayanti on October 2, 2017. Dr. P.S. Brahmanand, Principal Scientist & Nodal Officer, *Swachh Bharat Abhiyan* coordinated these activities.

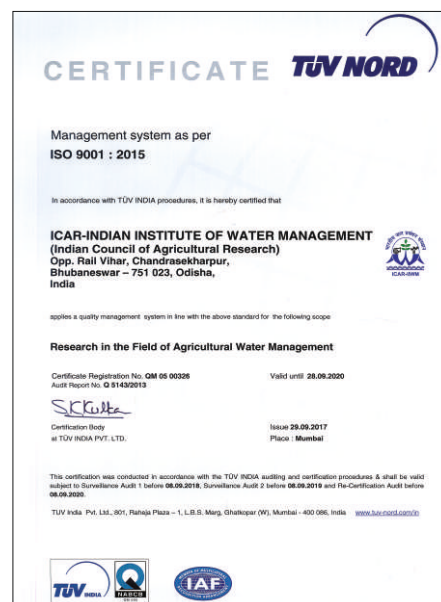
Mera Gaon - Mera Gaurav

Training and interaction meeting organized at adopted villages-

Detail of programs	Place and date	No. of beneficiary farmers
Distribution of banana saplings (var. G-9) and training on its package and practices	Chatabar village; July, 15 2017	28
Farmer-Scientist interaction on pond-based integrated farming system in waterlogged areas	Sukalpada, Puri; July 29, 2017	78
Scientist-Farmers interaction meeting line transplanting and basal fertilizers application for paddy	Sarat and Bhakarsahi villages, Balipatna Block; July 29, 2017	16
Scientist-Farmer interaction meeting on crop, nutrients and water management in rice and pulse crops; animal health management	Nuagaon and Gajamara villages, Dhenkanal; July 29, 2017	68
Interaction meeting on water management practices and management measures for control of pests and diseases in rice and vegetable crops	Madana Village, Garadpur Block, Kendrapara; August 26, 2017	12
Farmer-Scientist interaction on aquaculture	Sukal, Puri; August 26, 2017	32
Farmer-Scientist interaction meet on pest and diseases problem in paddy	Haridamada village; August 26, 2017	5
Scientist-Farmer interaction meeting on water conservation, insect and pest management, fertilizer scheduling in rice and pulse crops	Saptasajya para and Sadeiberini villages, Dhenkanal; September 23, 2017	53
Farmers training on eco-friendly agricultural practices	Sarat village, Balipatna Block; October 7, 2017	34
Interaction meeting on control of pests and diseases of <i>rabi</i> crops and organized 'Awareness Gram Sabha'	Madana Village, Garadpur Block, Kendrapara; November 2, 2017	24
Farmers training on cultivation practices for groundnut	Bhakarsahi, Balipatna Block; November 18, 2017	40
Scientist-Farmer interaction meeting on crop and water management in <i>kharif</i> rice; conservation of rainwater in fields and its effective use	Gajamara and Nuagaon villages, Dhenkanal; November 25, 2017	68
Farmers training on <i>rabi</i> rice cultivation	Alisha village, Puri; November 29, 2017	15
Scientist-Farmer interaction meeting on mechanical harvesting of rice, growing pulses, groundnut, mustard etc. along with water, insect and pest management for <i>rabi</i> crops	Gajamara and Khalibandha villages, Dhenkanal; December 20, 2017	57
Farmer-Scientist interaction on vegetables crops for <i>rabi</i> season	Jammujhari village; December 23, 2017	25

Awards / Honours / Recognitions

- ICAR-Indian Institute of Water Management has been recognized as ISO 9001:2015 certified research institute in the field of Agricultural Water Management.
- Dr. G. Kar, Principal Scientist has been recognized as 'Fellow of Indian Society of Soil Science' during 82nd ISSS convention at AMITY University, Kolkata on December 11, 2017.
- Drs. S.K. Rautaray, A. Mishra, M.K. Sinha, R.K. Mohanty, M.S. Behera, and S.K. Ambast received '*Krishi Vigyan Gaurav, 2017*' awarded by *Bharatiya Krishi Anusandhan Samiti* and *Krishi Anusandhan Sanchar Kendra*, Karnal.
- Drs. M.K. Sinha, N.N. Thombare and B. Mondal received '*Krishi Vigyan Gaurav, 2017*' awarded by *Bharatiya Krishi Anusandhan Samiti* and *Krishi Anusandhan Sanchar Kendra*, Karnal.
- Dr. M. Raychaudhuri, Principal Scientist became women chess champion during 'ICAR Eastern Zone Sports Meet 2017' at ICAR-RCER, Patna held during November 13-16, 2017.
- Dr. S.K. Rautaray acted as panellist in the session 'Management Structures for River Basins' organized by the Odisha Environment Congress 2017 on December 21, 2017 at Regional Museum of Natural History, Bhubaneswar.



Dr. G. Kar, Principal Scientist awarded with 'Fellow of ISSS'



ICAR-IIWM sports team at ICAR-RCER, Patna

Deputation Abroad

- Dr. S.K. Ambast, Director, visited Thimpu, Bhutan to attend SAARC Expert Consultation Meeting on 'Water Energy and Food Security Nexus' during July 3-6, 2017.
- Dr. A.K. Thakur, Principal Scientist, visited USA to attend and present paper in International Annual Meeting of ASA-CSSA-SSSA-2017 on 'Managing Global Resources for a Secure Future' during October 22-25, 2017 at Tampa, Florida, USA. His oral presentation was



on paper entitled 'Impacts of cultivation practices and water management in the post-vegetative stage on rice grain yield and water productivity'.

Radio Talk

- Dr. P. K. Panda, Principal Scientist delivered a radio talk on '*Dhana Phasalare Jala Parichalana* (Water management in rice crop)' at All India Radio, Cuttack on July 20, 2017.
- Dr. P. K. Panda, Principal Scientist of this institute delivered a radio talk at All India Radio, Cuttack on '*Chasinka Aya Ku Digunita Kariba Kipari?* (How to double the income of farmers?)' on December 29, 2017.

Joining / Promotion

- Dr. Debabrata Sethi, Scientist (Veterinary Extension), joined ICAR-IIWM on July 03, 2017 on transfer from ICAR- CSWRI, Avikanagar.
- Mr. Partha Deb Roy, Scientist (Soil Science), joined ICAR-IIWM on July 10, 2017 on transfer from ICAR-NBSS&LUP-RC, Jorhat, Assam.
- Dr. R.R. Sethi and Dr. A.K. Nayak promoted to Principal Scientist through CAS of the ICAR w.e.f. September 4, 2016 and December 27, 2016., respectively.
- Mr. Chhotelal promoted to Senior Technical Officer through DPC w.e.f. June 29, 2015.
- Mr. R.C. Jena, Mr. P.C. Singh Tiyyu, Mr. S.K. Das, Mr. B.K. Acharya and Mr. S. Lenka promoted to Technical Officer through DPC w.e.f. December 19, 2015, December 29, 2015, February 24, 2016, May 21, 2016 and April 18, 2017, respectively.
- Mr. A.K. Binakar and Mr. L. Singh Tiyyu promoted to Senior Technical Assistant (Driver) through DPC w.e.f. June 29, 2016.

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