



ICAR-IIWM News

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IN THIS ISSUE



DIRECTOR'S COLUMN



Roadmap for enhancing Agricultural Water Productivity in Irrigated Agriculture

Our country juxtapositioned with 50% area under rainfed and irrigated agriculture, water management technologies would play a vital role in enhancing agricultural water productivity. India is the leader with 71Mha of irrigated land besides the largest groundwater well equipped area of 41Mha. However, the area covered under micro irrigation (about 15%), need substantial up-scaling to ensure higher irrigation water use efficiency and agricultural water productivity. Hence, remaining 85% area under surface irrigation necessitates a plausible roadmap to feed the burgeoning population besides attaining sustainability in irrigation water availability for the canal commands of the Country. In this context, technologies developed by IIWM pertaining to use of different water saving technologies, soil moisture sensing systems and water measuring devices would assist in supply of the desired quantity of water as per crop water demand. Present practice of canal rostering schemes need to be converted to

crop water demand based rostering schedules to ensure supply of water as and when required by the crop. Besides this, there is an urgent need of volumetric supply of irrigation water in the canal commands to ensure uniform distribution of water in the head, middle and tail reaches of a distributary in the command. Application of sensing systems, AI/ML tools and IoT enabled platforms clubbed together should to ensure automation of the canal system to streamline water distribution and enhance irrigation water application efficiency. Overall, the surface irrigation systems using open channels without any lining need to be converted to pipeline distribution system to enhance the irrigation water conveyance efficiency and add to the agricultural water productivity of different crops grown in the region. Subsequently, the crop diversification and use of efficient pumping systems with IoT enabled soil moisture sensing systems to supply water as per crop water demand would ensure saving of water under surface irrigation method. Nonetheless, all these gadgets and water management technologies will be effective by strengthening the water user associations (WUA) with skill development and capacity building programmes besides their active involvement in water management decisions.

Saving of water and use of efficient pumping systems would lead to reduce carbon dioxide emission and generate carbon credits and create a responsive voluntary carbon market (VCM). So, implementation of water management technologies in agriculture would play a major role in the carbon credit and VCM programme of the Country. However, it is essential to develop protocols for quantification of VCM based on the saving of water under different agricultural water management technologies. Such quantification of VCM would assist the



ICAR - Indian Institute of Water Management

Chandrasekharpur, Bhubaneswar - 751 023, Odisha, India

Phone : 91-674-2300060 (Director), 2300010/2300016/2301815

E-mail : director.iiwm@icar.gov.in, // Web : <https://iiwm.icar.gov.in>

CONCEPT

Dr. Arjamadutta Sarangi

EDITORS

Dr. Ranu Rani Sethi

Dr. Rajeeb K. Mohanty

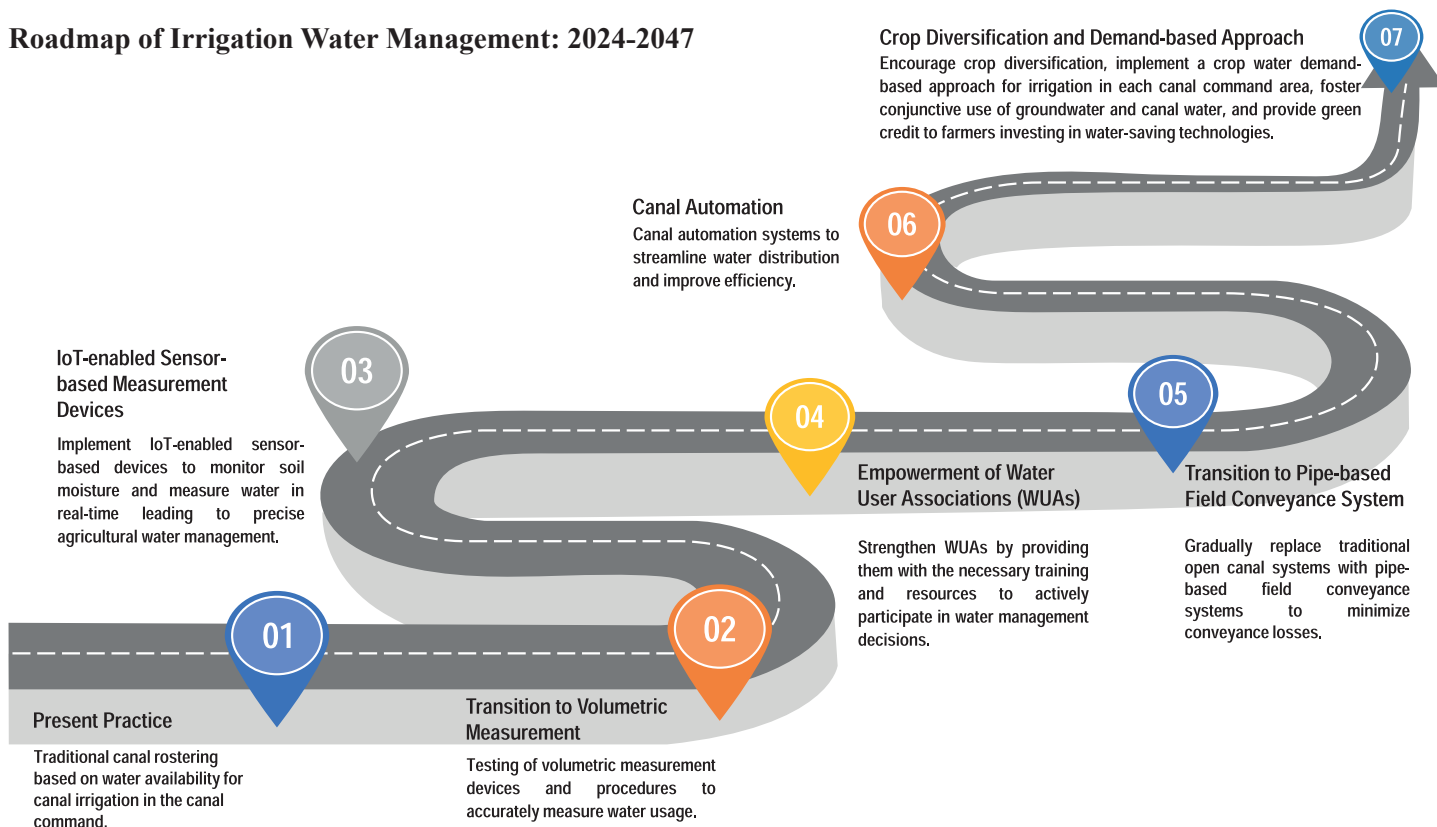
Dr. Ashok K. Nayak

Dr. Om Prakash Verma

Dr. Sanatan Pradhan

Dr. Ankita Jha

Roadmap of Irrigation Water Management: 2024-2047



stakeholders to claim the benefit based on the VCM created due to adoption of water saving technologies. Such quantification and rewarding the stakeholders based on the good agricultural practices will not only encourage others to adopt the technology but also create green ecosystems and attain sustainability of water resources.

Attempts were made by the Institute during last six months to disseminate IIWM technologies and undertake different flagship and outreach programmes, participate in farmers fairs and demonstrate different technologies, undertake training

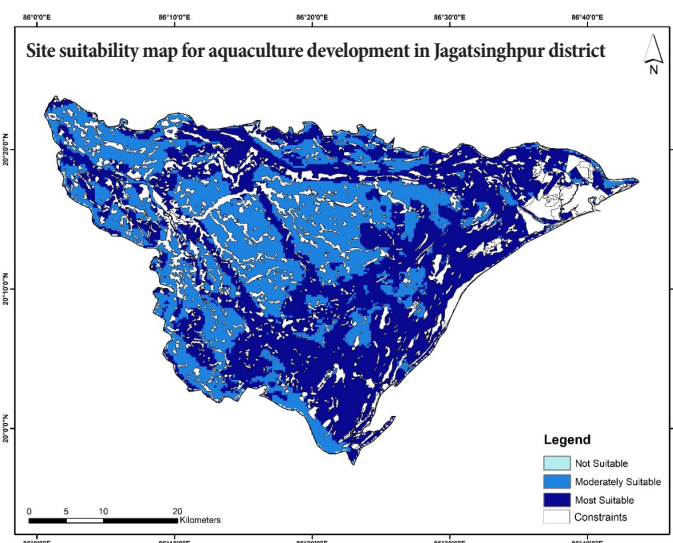
and capacity building programmes under TSP, SCSP, Farmers FIRST, MGMG etc. Research projects on canal automation, use of ICT in agriculture, groundwater recharge, sea water intrusion, hydroponics and aquaponics systems, targeting location of aquaculture ponds etc were undertaken besides submission of innovative projects for funding from different agencies. The scientists have published research papers beside release of policy papers and poly briefs during the 37th foundation day of the Institute. World Water Day programme was organized on 22nd March 2024 in which Dr S.K. Chaudhari, DDG

(NRM) was the chief guest. Besides this, the Institute received 2nd rank in ICAR *Swachhta Pakhwada* Award among all ICAR Institutes. Scientists and staff of the Institute were able to expand their knowledge and were encouraged by visits of eminent personalities and academicians including DDG (NRM), ICAR, Chairman and members of RAC, Chairman CGWB, CE and EE of Govt of Odisha and Director of ICAR Institutes. Besides this, several programmes as desired by the Council and GoI in form of awareness initiatives were also organized.

RESEARCH ACHIEVEMENTS

Geoinformatics application in site suitability analysis for crop planning and aquaculture development in Eastern coastal region of India

An attempt was made to identify suitable sites for aquaculture in the Eastern coastal region of India. Land use and land cover maps of three coastal districts i.e. Puri, Jagatsinghpur, and Kendrapara were prepared by using Sentinel-2 data. The water quality parameters viz. pH, CO₂, dissolved oxygen, TDS, Transparency, Alkalinity and Salinity were estimated and spatio-temporal variability maps were prepared using geo-statistical interpolation technique. Further, soil, water, and infrastructure facilities were assessed by the Analytical Hierarchy Process (AHP). The soil suitability map was prepared by assigning weightage to the parameters based on the published protocols & AHP model. For infrastructure facilities, the distance



to water sources (km), distance to the hatchery (km), and distance to the market (km) were considered. This region was categorized into different suitable locations for developing aquaculture activities in all coastal districts. From the analysis, it was observed that for Jagatsinghpur district out of total area of 1759 km², 631 km² (35.9%) was most suitable area for aquaculture and 724 km² (41.2%) was moderately suitable whereas 55 km² (3.1%) was unsuitable

for aquaculture with constraint area of 349 km² (19.8%). The present study will assist in delineation of aquaculture development zone for enhancing production and income of stakeholders.

(Ashok K. Nayak, S.K. Jena,
Rajeeb K. Mohanty and S.K. Rautaray)

SCIENCE

Analyzing time series variations in groundwater levels within the Baitarani River Basin, India

Groundwater has been the largest accessible freshwater source globally. The overall dimensions of every basin's water budgeting are closely linked to the quantity, quality of available surface and subsurface water. The groundwater levels trend in six districts within the Baitarani River Basin, Odisha, India has been analyzed. Data on the depth to groundwater level for pre- and post-monsoon season from 32 wells spreading over six different regions from 1997 to 2020 were analyzed. Sen's slope techniques and innovative trend analysis were used to investigate the behavior of groundwater level changes in pre-and post-monsoon periods to identify both monotonic and non-monotonic behaviors. The findings showed that, throughout the pre-monsoon and post-monsoon periods, the depth to groundwater level for four tubewells, five borewells, and seven dugwells stations increased. However, only three tubewell stations Champua, Bhadrak, and Karanjia exhibited declining trends in the pre-and post-monsoon periods. In

the case of borewell, only one station (Anadapur) has a negative trend in post-monsoon. For dugwell, during pre-monsoon Banspal represents the -ve trend, and Bhandaripokhari, Banspal, Anandapur, and Joda show negative trends in post-monsoon seasons. Accordingly, spatial maps of increasing and decreasing trends of groundwater levels were prepared, which can be used by water resource managers to identify the causes of declining groundwater levels for managing the resources effectively

Adapted from Sethi, R.R., Dandapat, A.K., Sankalp, S., Panda, D.K., Jena, S.K. and Sarangi, A. 2024. Analyzing time series variations in groundwater levels within the Baitarani River Basin, India. Environ Earth Sci, 84, 363.

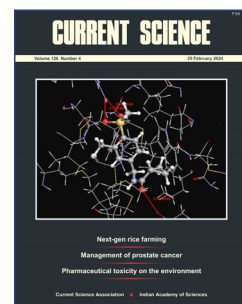


Next-generation rice farming: ways to achieve food, nutritional and economic security

The present rice cultivation systems face challenges of low production, water scarcity, shrinking cultivable land area due to degradation and urbanization, labour shortage, diminishing soil health, climate change, greenhouse gas emissions and low income for farmers. Changes and/or modifications are thus necessitated in rice production to feed future generations. The aim of next-generation rice farming is to provide food, nutrition and economic security, as well as climate-smart solutions to safeguard ecosystems while using better tools and techniques, improved cultivars and management practices. To achieve these, there is a need to develop suitable farm mechanization for small-sized fields, precision (sensor-based) water-saving irrigation methods, greater input use-efficient systems, digital farming

considering soil health improvement and proper utilization of rice straw. Next-generation rice farming should be taken as a business opportunity for the youth to earn more income and must be supported by a favorable Government policy.

Adopted from Thakur, A.K., Mandal, K.G., Mohanty, R.K., and Sarangi, A. 2024. Next-gen rice farming: ways to achieve food, nutritional and economic security under changing climatic conditions. Current Science, 126 (4): 426-433.

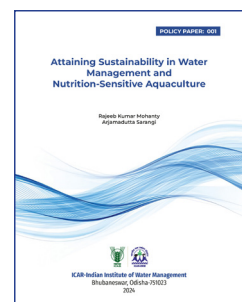


Policy Paper

Despite being one of the most dynamic industries in the world food chain, aquaculture is still remarkably under-represented in the majority of food policy literature. New aquaculture production techniques hold great promise for reducing the world's food security and achieving sustainability while meeting human nutritional demands. With the largest share of water resources and the largest labor force, India's agriculture and aquaculture industries guarantee the Nation's food and nutritional security. It is important to look at ways to enhance the utility of water, as shortage looms big in different parts of the country due to changing climate. In light of the restricted water supply, aquaculture productivity needs to be raised. Such situation warrants for the implementation of a water budgeting strategy

that will increase water use efficiency. Application of smart aquaculture practices emphasizing water management protocols, water productivity, water and carbon footprint in nutrition-sensitive aquaculture is required to sustain aquaculture productivity and nutritional security.

Adopted from Mohanty, R.K., Sarangi, A., 2024. Attaining Sustainability in Water Management and Nutrition-Sensitive Aquaculture. Policy Paper-001, ICAR-Indian Institute of Water Management, Bhubaneswar, India, 36p.



Policy Brief (1)

SRI is a climate-smart agriculture which offers numerous benefits and can make multiple contributions to achieving Sustainable Development Goals (SDGs). Adoption of SRI practices on a large scale is limited at present despite SRI's numerous benefits. Policy support from the government is essential to promote any new technology/intervention like SRI. Infrastructure development for irrigation, incentives to farmers, skill development, farm mechanization, and

Policy Brief (2)

Judicious irrigation scheduling in canal command through the volumetric supply of water as per crop water demand would not only save water but could bring more area under irrigation, minimizing the irrigation potential lag in canal commands. The present scenario of irrigation in canal command and, thereby, the expanding water influence zone necessitates modification of the protocol for estimating the irrigation potential utilized in the canal command. Alternate cropping patterns and crop diversification can generate income and enhance economic water productivity for farmers in canal commands. Climate-resilient, high-value, and less-water-intensive perennial crops can enhance climate resilience in canal irrigation systems. Designing irrigation

User Manual

This user manual provides a comprehensive overview of the features of the ICAR-IIWM developed IoT enabled soil moisture sensing system. It covers key features and components, initial setup instructions, guidelines for using and maintenance of the IoT enabled system, technical specifications, data visualization security and troubleshooting assistance.

promotion of organic fertilizers are areas for government policy support.

Adopted from Thakur, A.K. and Sarangi, A. (2024). System of Rice Intensification (SRI): Benefits and challenges in technology upscaling. Policy Brief No. 1, ICAR-Indian Institute of Water Management, Bhubaneswar, Odisha.

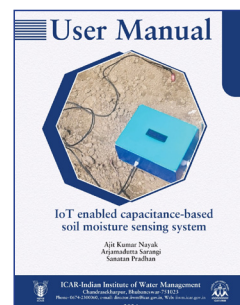


systems that combine the use of surface and groundwater can ensure more crops per drop under the escalating climate vagaries.

Adopted from Panda, R.K., Sarangi, A., Sikka, A.K., Gorantiwar, S.D., Amarasinghe, U.A., Mahapatra, S., Mandave, V. and Chaudhari, S.K. (2024). Bridging the Irrigation Potential Gap in Canal Commands- A Plausible Approach. Policy Brief No. 2, ICAR-Indian Institute of Water Management, Bhubaneswar, Odisha.



Adopted from Nayak, Ajit K., Sarangi, A., Pradhan, S. (2024). User manual on IoT enabled capacitance-based soil moisture sensing system. ICAR-Indian Institute of Water Management, Bhubaneswar, Odisha.



EVENTS, NEWS & CELEBRATIONS

New Year Celebration 2024

ICAR-IIWM celebrated new year on January 01, 2024 with joy and teamwork. The day started with a speech by Dr A. Sarangi, Director of the Institute, highlighting last year's achievements and setting goals for the next year. A cultural programme was also organised there after.



ICAR-IIWM Conducted Review Meeting of Research Projects

A meeting to review all research projects (Institute funded, Agri-CRP on water, NASE, DST, ICAR-IWMI, ICAR-CYMMYT, SCSP, TSP, RKVY, NICRA, NePPA etc.) were held during January 2-5, 2024. Dr. A.Sarangi, Director of Institute chaired the meeting, progress and achievements of all projects were presented and discussed.

Farmers-Scientists Interaction Meet cum Field Monitoring Visit by ICAR-ATARI, Kolkata Team

A "Farmers-Scientists Interaction Meet cum Field Monitoring Visit" was organized by Dr. Kalyan Sundar Das, Principal Scientist & Nodal Scientist (FFP), ICAR-ATARI, Kolkata along with all PIs, Co-PIs and other project staff of four FFP Centres in Odisha, namely, ICAR-IIWM, ICAR-CIFA, ICAR-NRRI and OUAT, Bhubaneswar on January 11, 2024. Over hundred farmers and farm woman participated from three adopted villages of Haridamada, Jamujhari and Barapita at Khordha district under IWM-Farmer FIRST Project. The two-days visit programme to all other FFP Centres was organized during January 11-12, 2024 and coordinated by Dr. S.K. Mishra, PS & PI of Farmer FIRST Project.



ICAR-IIWM Celebrated Republic Day

The 75th Republic Day was celebrated on January 26, 2024, with great enthusiasm. Dr. A. Sarangi, the institute's Director, hoisted the national flag. He addressed the staff and their families, encouraging them to work hard and stay dedicated for the welfare of the farming community and to bring pride to the institute and the country.

Consultative Review Meeting of Agri - CRP on Water (Theme II)

A consultative review meeting for the Agri-CRP on Water (Theme II- Canal Automation) Research Project was held at ICAR-NRC on Grapes, Pune, on January 30, 2024. Dr. Sarangi, Director, urged partners to expedite all project activities for the timely commissioning of the canal automation system. Dr. S.D. Gorantiwar highlighted that this canal automation would be the first of its kind in Odisha and India. All partners provided updates on their progress. The meeting concluded with a commitment to complete the work as per the schedule.

ICAR-IIWM Conducted Training-cum-Scientists-Stakeholders Interaction Workshop

A training -cum- scientists-stakeholders interaction workshop on “Post-Flood Management Practices for Enhancing Production, Productivity, and Profitability of Flood-Prone Lowlands” under the IWMI-IBFI project was held at Lokapala village, Kanas block, Puri district, Odisha, on February 12, 2024. Dr. Sarangi emphasized the importance of adopting innovative, climate-resilient, technically feasible, scientifically sound, and economically viable technologies for crop production in flood-prone areas. He also encouraged scientists and farmers to approach natural farming holistically. The workshop was conducted by Dr. S. K. Jena, PS and PI of the IBFI project, along with Dr. B. S. Satapathy and Dr. A. Maity, both Senior Scientists and Co-PIs of the project.



ICAR-IIWM Organized Brainstorming Workshop

A brainstorming workshop titled “Enhancing Agricultural Water Productivity in Canal Commands: A Dialogue” was held in hybrid mode on February 13, 2024, at ICAR-IIWM, Bhubaneswar. The workshop featured four sessions focused on the status and scope of agricultural water productivity in canal commands, the use of geo-spatial tools and ICT, climate-smart agricultural water



management technologies, and policy frameworks. Eminent hydrologists, including Dr. A.K. Sikka, Dr. T.B.S. Rajput, Prof. Nayan Sharma, Lingaraj Gouda, Dr. U. Amarasinghe, S. Kulkarni, Dr. S.D. Gorantiwar, Dr. V.M. Chowdary, Dr. S. Pazhanivelan, Dr. R.R. Nayak, Dr. R.K. Panda, Dr. K. Yella Reddy, Dr. Harish Verma, and Dr. Prabhat Kishore, participated either physically or virtually. Key topics discussed included water measurement and monitoring, water budgeting, feasibility of new tools and technologies, water-saving techniques like partial root zone drying and regulated deficit irrigation, underground pipeline system, automated systems, pressurized irrigation, and the use of geospatial and IoT-enabled systems for real-time irrigation scheduling. The workshop also addressed climate-smart water management practices, reclamation of command areas, water price regulation, and on-farm application efficiency. A total of 38 participants, including 10 virtual attendees, joined the workshop. The event was organized by Dr. R.K. Panda, PS, Programme Leader and Scientists of the Canal Water Management Programme.

Research Advisory Committee Meeting of ICAR-IIWM

The second meeting of the 9th Research Advisory Committee (RAC) of ICAR-IIWM was held on February 22-23, 2024. Dr. Alok Kumar Sikka, IWMI India Country Representative and Former DDG (NRM), chaired the meeting. Attendees included ADG (SWM) Dr. A. Velmurugan and other members. Dr. N. S. Raghuwanshi, Dr. B. S. Yadav, and Dr. S. K. Pattanaik attended in person, while Dr. Amit Kar participated virtually. The meeting began with the Director of ICAR-IIWM welcoming and felicitating the Chairman and members. Following the introductory remarks, Dr. Sikka released three new ICAR-IIWM publications. Dr. A. Sarangi presented an overview of the institute, and Dr. S. Mohanty, Principal Scientist and Member Secretary, presented the Action Taken Report on the previous RAC recommendations, which was accepted. Program Leaders then presented significant research achievements.



ICAR-IIWM Organized *Timahi Hindi Baithak*

A *Timahi Hindi Baithak* was held on March 5, 2024, to discuss the progress of Rajbhasha Hindi work at ICAR-IIWM for the period from January to March 2024. The meeting was presided over by Dr. A. Sarangi, who emphasized on the importance of promoting the use of Hindi. He stressed that the institute should increase its use of Hindi in all aspects, including scientific, administrative, financial, and technical work. The meeting was coordinated by Dr. O. P. Verma and Mr. K.K. Sharma, Technical (Hindi).



and Dr. Chandra Sekhar Sahay, Principal Scientist at ICAR-CIAE, Bhopal. The workshop was attended by all scientists and project staff of ICAR-IIWM. Dr. Sarangi presented on “IP related issues and patent application processes in Agricultural Water Management,” highlighting technologies developed by ICAR-IIWM scientists that could be patented or copyrighted. Dr. S. K. Jena, PI-ITMU, encouraged scientists to patent their products and copyright their innovative ideas.

ICAR-IIWM Participated in Exhibitions

ICAR-IIWM exhibited agricultural water management technologies at Regional Agricultural fair, ICAR-IIVR, Varanasi during February 3-5, 2024. Dr. Prativa Sahu, Er. Ajit K. Nayak and Dr. S. Karna showcased ICAR-IIWM technologies during the exhibition.



On February 20, 2024, ICAR-IIWM showcased various technologies and displayed posters at the one-day *Kisan Mela* cum Exhibition held by the Central Institute of Freshwater Aquaculture in Kausalyaganga, Bhubaneswar. Dr. R.K. Jena, Dr. A. Jha and Mrs. S. Naik showcased ICAR-IIWM technologies during the exhibition.



ICAR-IIWM Organized Training cum Demonstration on Drone Technology in Farmer's Field

ICAR-IIWM organized a four-day off-campus “Awareness Training cum Demonstration Programme” on using drone technology in farmers’ fields from March 7-10, 2024, under the ICAR-Drone Project. The training was conducted at three adopted villages: Haridamada and Barapita in Khordha district under the Farmer FIRST Project, and Hansapada in Puri district under the Scheduled Caste Sub-Plan Project. Over 200 farmers, farmwomen, and rural youths participated in the program. The demonstration involved spraying the insecticide ‘Chlorantraniliprole 18.5 SC’ (60ml/acre mixed in 8 liters of water) using a 16-liter capacity drone, covering more than 30 acres of summer rice fields affected by stem borers. This benefited over 40 rice farmers in the clusters. The farmers were very satisfied with the drone’s performance and effectiveness in controlling rice insects. The program was coordinated by Dr. D. Sethi, Dr. S.K. Mishra, Dr. H.K. Dash, Er. A.K. Nayak, and Er. Ashish Jadhav.



ICAR - IIWM Organized Sensitization Workshop

A “Sensitization Workshop on IP Related Issues” was held on March 11, 2024, at ICAR-IIWM, Bhubaneswar, chaired by Dr. A. Sarangi, Director, ICAR-IIWM. Expert lectures were given by Dr. Uma Sankar Pal, Professor CAET, OUAT, Bhubaneswar,

ICAR-IIWM exhibited water management technologies at the SOA Agri-Confluence 2024, held at SOA University, Bhubaneswar, from March 12-14, 2024. The theme of the event was “Sustainable Agriculture and Livelihood Security.” Dr. M. Raychaudhuri, Dr. O.P. Verma, Er. A.M. Jadhav, Dr. S. Karna and Mr. S. Lenka showcased ICAR-IIWM technologies during the exhibition.



ICAR-IIWM showcased Agricultural Water Management Technologies at *Krusha Odisha-2024* organized by the Institute on Management of Agricultural Extension (IMAGE), Bhubaneswar at Janata Maidan, Bhubaneswar during 12-14 January, 2024. The programme was coordinated by Dr. D. Ghosh, Dr. D. Sethi, Mr. S. Lenka and Dr. S. Karna.



ICAR-IIWM showcased Agricultural Water Management Technologies at Kisan Gosthi organized by ICAR-NRRI, Cuttack at Sambalpur, Odisha on March 13, 2024. The programme was coordinated by Dr. D.K. Panda, Dr. D. Ghosh, and Dr. S. Karna.



ICAR-IIWM showcased Agricultural Water Management Technologies on Foundation day of ICAR-CIWA, Bhubaneswar on February 17, 2024. The programme was coordinated by Dr. D. Ghosh, Dr. D. Sethi, Mr. S. Lenka and Dr. S. Karna.

ICAR-IIWM Conducted a Training Program

A virtual training program on “Current Methodologies for Water Footprint Estimation and Techniques for Water Saving” was organized by ICAR-IIWM under the Annual Capacity Building Plan 2023-24 of the Human Resource Management Unit of ICAR from March 18-20, 2024. Dr. Arjamadutta Sarangi welcomed the Chief Guest, Dr. S.D. Gorantiwar, Director, Research, MPKV, Rahuri, and the trainees, providing an overview of the training. The program featured lectures and hands-on training by 12 resource persons, including nine from the institute and three guest experts: Prof. Shekhar Muddu, Indian Institute of Science, Bangalore; Dr. Gouranga Kar, Director, CRIJAF, Barrackpore; and Prof. D.K. Singh, ICAR-IARI, New Delhi. Nearly 60 scientists from across the country, participated in the program. The training program was coordinated by Dr. K.K. Bandyopadhyay, Principal Scientist, with co-coordinators Dr. S.K. Routaray, Dr. Sheelabhadra Mohanty, and Dr. Ashok K. Nayak.



ICAR-IIWM Developed IoT Enabled Soil Moisture Sensor

The ICAR-IIWM developed soil moisture sensing system ‘Use case Design and development of an IoT-enabled soil moisture sensing system’ was shortlisted for presentation in the Focus Group-Artificial Intelligence for Agriculture, which was organized by the International Telecommunication Union and Food and Agriculture Organization held on March 19, 2024, at NASC complex, New Delhi. The case study is among the nine case studies of 5G-used cases from India for the study period 2022-24. The case study was presented to the international delegates of more than 50 nations and was later approved by the ITU.

ICAR-IIWM Observed “WORLD WATER DAY 2024”

ICAR-IIWM, Bhubaneswar, observed “World Water Day 2024” on March 22, 2024, with the theme “Leveraging Water for Peace,” in collaboration with IWMI, India Office, New Delhi. Dr. S.K. Chaudhari, DDG (NRM), ICAR, emphasized on sustainable water management for efficiency and productivity, highlighting the need for a balanced approach to water scarcity and societal issues. Dr. A.K. Sikka, IWMI Representative-India, discussed water management’s role in ecological security and achieving SDG goals, stressing collective action to reduce water tensions. Dr. Himanshu Pathak, Secretary, DARE & DG, ICAR, highlighted on agricultural water and climate challenges, advocating for technological, institutional, and policy interventions. Er. Lingaraj Gouda, Engineer-in-Chief (P&D), DoWR, Odisha,



addressed water sharing issues and the importance of educating farmers for efficient water use. Dr. A.K. Nayak, Director, ICAR-NRRI, Cuttack; Dr. A. Velmurugan, ADG (S&WM), ICAR (virtually); Dr. N.G. Patil, Director, ICAR-NBSS&LUP, Nagpur (virtually); Dr. R.K. Yadav, Director, CSSRI, Karnal (virtually); Dr. M. Madhu, Director, IISWC, Dehradun (virtually); and Dr. D.R. Sena, Researcher, IWMI, New Delhi, shared their insights. The Chief Guest and dignitaries awarded ten farmers with the “Water Saver Award,” distributed prizes to six school children for speech and essay competitions.

Student Internship Program

Two final-year B.Tech (Agril Engg.) students from the Department of Agricultural Engineering, School of Agricultural and Bio-Engineering, Centurion University of Technology & Management, Paralakhemundi, Odisha, completed a two-month internship at ICAR-IIWM, Bhubaneswar, from April 12 to June 11, 2024. The program was coordinated by Dr. Ranu Rani Sethi and Dr. Bira Kishore Sethy, Principal Scientists of the Institute.

Students' Exposure Visit Organized

On April 16, 2024, a group of hundred 4th year undergraduate students from the Faculties of Agriculture, Horticulture, and Technology, along with three professors from UBKV University, Cooch Behar, West Bengal, visited ICAR-IIWM. They explored various technologies demonstrated at ICAR-IIWM Technology Park, including the dragon fruit experimental unit. Dr. Arjamadutta Sarangi, Director, presented on “Recent Developments in Water Management and Current Research Trends with a focus on ICAR-IIWM technologies,” followed by an interactive session with the students and faculty. The visit was coordinated by Dr. S.K. Mishra, Dr. Pratiba Sahu, Dr. Debabrata Sethi, and Er. Ashish Jadhav.



ICAR-IIWM Celebrated its 37th Foundation Day

ICAR-IIWM celebrated its 37th Foundation Day on May 12, 2024. Chief Guest Dr. S.K. Chaudhari, Deputy Director General (Natural Resource Management), highlighted the importance of using natural resources, including water, holistically and urged for low-cost, eco-friendly water management practices. Dr. P.K. Roul, Vice Chancellor, Odisha University of Agriculture and Technology, spoke on the need for effective on-farm water management. Dr. S.K. Ambast, Chairman, Central Ground Water Board, emphasized on the importance of groundwater recharge. Dr. A.K. Nayak, Director, ICAR-National Rice Research Institute, discussed regarding improving water productivity in canal ecosystems and rice cultivation. Dr. A. Sarangi, Director, ICAR-IIWM, showcased the institute's technologies, including sensor-based automated irrigation systems. The event included the release of policy papers, research bulletins, an exhibition featuring technologies from ICAR Institutes and private organizations. The celebration was attended by Directors of ICAR Institutes, OUAT officials, state government officials, CGWB staff, students, and scientists.



ICAR-IIWM Released the Second Episode of ICAR-IIWM *Krishi Jal Samachar*

On the 37th Foundation Day of ICAR-IIWM, the institute released the second episode of the ICAR-IIWM *Krishi Jal Samachar* (Bhag-02) in Hindi on May 12, 2024. The episode covered recent news, activities, and events of the institute, as well as promising technologies like the IoT-enabled irrigation automation system, rainwater harvesting technologies, and crop diversification to enhance water productivity. The episode is available on the YouTube channel (<https://www.youtube.com/watch?v=IOcaKX4gunI>). The publication was prepared by Dr. P.K. Panda, Principal Scientist, and Dr. Ankita Jha, Scientist.



ICAR-IIWM Conducted Rice Field Day cum Crop Cutting Experiments

Over twenty rice field days along with crop cutting experiments of demonstrated high yielding rice varieties (*CR Dhan-206*, *CR Dhan-310*, *CR Dhan-312*, *CR Dhan-313*, *CR Dhan-314*, *CR Dhan-317*, *CR Dhan-324*, *Binadhan-11*, and *Khitish*) during summer 2024 were conducted during May 3-20, 2024 in Haridamada and Barapita villages in presence of beneficiary as well as non-beneficiary farmers, scientists and project staffs under Farmer FIRST Project. Average fresh grain yield of better performing varieties namely, *Binadhan 11* (6.56 t/ha), *CR Dhan 314* (6.40 t/ha), and *CR Dhan 324* (6.14 t/ha) were found very encouraging as against local popular check 'Mamata' with 5.24 t/ha. Highest grain yield advantage of 24.44 % was recorded in case of *Binadhan-11* with 6.56 t/ha over the local check.



ICAR-IIWM Celebrated World Environment Day

ICAR-IIWM, Bhubaneswar, celebrated World Environment Day on June 5, 2024, with a multi-stakeholder "Interaction Meet" on the theme "Innovative Water Saving Technologies in Agriculture – A Dialogue." The event, chaired by Dr. A. Sarangi, Director, also included a plantation drive in support of the Mission 'LIFE' (Lifestyle for Environment) and this year's World Environment Day theme of 'Land Restoration, Desertification, and Drought Resilience.' Shri Rashmi Ranjan Nayak, Additional Secretary, Water Resources Department and Director of Command Area Development Agency, Odisha, was the Chief Guest, and Shri Sailendra Narayan Naik, Joint Director, Soil Conservation and Watershed Development, Odisha, was the Guest of Honour. The event was coordinated by Dr. S.K. Mishra, Principal Scientist & Convener.



ICAR-IIWM Celebrated International Day of Yoga (IDY)



The 10th International Yoga Day, themed "Yoga for Self and Society," was celebrated at the Institute on June 21, 2024. Dr. A. Sarangi, Director, inaugurated the event, emphasizing the importance of mental and physical fitness for enhancing productivity and work efficiency. Yoga Guru Shri Manoj Kumar Rout stressed the benefits of yoga for all age groups, from school children to retirees, to maintain overall health. The event included a yoga practice session where staff, scholars, and family members performed various Asanas and Pranayams. Dr. S.K. Mishra, Principal Scientist, acted as the Convener of the event.

ICAR-IIWM Signed MoU with Different Organizations

1. Nabakrushna Choudhury Centre for Development Studies (NCDS), Govt. of Odisha, Bhubaneswar to conduct a study on "Understand the Impact of millets cultivation with respect to climate resilience and water footprint reduction" under Odisha Millets Mission on February 2, 2024.
2. Central Water Commission (CWC), Dept. of Water Resources, RD &GR, Ministry of Jal Shakti, GoI represented by Director, IPO, Dte. under Chief Engineer, POMIO of CWC, New Delhi for evaluation of water use efficiency of Upper Kolab Major Irrigation Project, Koraput district, Odisha and Satiguda Medium Irrigation Project, Malkangiri district, Odisha on March 05, 2024.
3. NERIWALM, Tezpur, Assam for facilitating Student's Training/Postgraduate Research on May 12, 2024.



ICAR-IIWM Scientists Visit Western Sydney University, Australia

Dr. Arjamadutta Sarangi, Director and Dr. S. K. Jena, Dr. R. R. Sethi and Dr. D. C. Sahoo, Principal Scientist visited Western Sydney University and University of Melbourne, Australia during May 20-30, 2024 to get exposure to modern facilities of watershed planning, management and possible collaborations with Australia under REWARD project.



ICAR-IIWM Organized National Brainstorming Session

A national Brainstorming session on “Rainwater Management Options for enhancing Agricultural Productivity” was held at ICAR-IIWM, Bhubaneswar on June 28, 2024 in hybrid mode. Out of 51 participants representing ICAR, SAUs, KVKs, and State Govt. representatives, 21 were on physical mode and remaining 30 participated online. There were eight sessions on rainwater management considering different agroecosystems viz., Peninsular plateau, high rainfall coastal ecosystem, hilly ecosystems, Indo-Gangetic Plains, arid and semi-arid ecosystems in addition to policy issues, use of ICT and sensor, and the concluding session. Each session was chaired by a Chairperson, and involved keynote address followed by lead speaker presentation and discussion. The Brainstorming session recommended agroecosystem specific rainwater conservation and utilization measures for enhancing agricultural productivity. The programme was coordinated by the Programme Leader and scientists of Rainwater Management Programme.



Institute Research Council (IRC) Meeting Organized

The Institute Research Council (IRC) meetings took place from June 18-21, 2024. During these sessions, the achievements of all institute-funded projects were presented and discussed. Dr. A. Sarangi chaired the meetings, offering valuable suggestions to enhance the quality of the research. External members from the Central Ground Water Board (CGWB), Odisha University of Agriculture and Technology (OUAT), and state government officials were invited to provide their insights on the research outcomes for consideration in policy-level discussions. The meeting was effectively coordinated by Dr. A.K. Thakur, Principal Scientist as Member Secretary, IRC.



ICAR-IIWM Conducted Series of AICRP-IWM Meetings through Virtual Mode

ICAR-IIWM organized meeting of AICRP on Irrigation Water Management on “Protocols of irrigation scheduling” on February 16, 2024. Dr. V. Ravikumar, Chief Scientist, AICRP on IWM Coimbatore Centre was resource person for the meeting. A meeting on “Water resource budget for the state of Gujarat” was organized on April 2024. Dr. H. D. Rank, Chief Scientist, AICRP on IWM Junagarh Centre was the resource person. A meeting on “Normalization of K_c Values” was organized on June 25, 2024. Dr. Harish Awari, Chief Scientist, AICRP on IWM Parbhani Centre was the resource person. A meeting on “Methodology of groundwater potential zoning and selection of sites for groundwater recharge” was organized on June 25, 2024. Dr. P.K. Singh, Chief Scientist, AICRP on IWM Udaipur Centre and Dr. Samanpreet Kaur, Professor, AICRP on IWM Ludhiana Centre were the resource persons. All the meetings were chaired by Dr. A. Sarangi, Director, ICAR-IIWM.

Activities Under SCSP Project

In June 2024, under the SCSP, 40 quintals of paddy seeds were distributed to over 250 farmers across six villages in Nimapara block, covering nearly 150 hectares. Additionally, a power tiller (12 hp), two mini tillers (7 hp each), two chain saws, and one digger were provided to a farmers' group in Hansapada village, Puri district. The operation of these machines was demonstrated to about 50 farmers. In Bhiligram village, two 7.0 hp and two 1.5 hp power weeders were demonstrated to 15 farmers. An interface meeting in Bhiligram included the distribution of 2.0 quintals of

green gram and black gram seeds, 7.0 liters of rhizobium culture, 10 liters of Phosphate Solubilizing Bacteria liquid, and 16 liters of nano urea. A chainsaw was also provided to help with shrub cutting and plant pruning.



Activities Under Farmer FIRST Project

Research and extension activities under the Farmer FIRST Project were carried out in three tribal-dominated villages: Haridamada and Barapita in Bhubaneswar block, and Jamujhari in Jatani block, Khordha district. To boost farmers' income and



skills, three training programs were conducted, covering crop and water management technologies for 231 farmers and farm women. Critical inputs distributed included 6.0 quintals of paddy seeds (eight varieties) for summer 2024, covering 50 acres; 12.0 quintals of paddy seeds (three varieties) for kharif 2024, covering 100 acres; 50 kg of finger millet seeds (var. Arjun) for 8 acres, 10 kg of *Trichoderma viridae* bio-agent for seed treatment; hybrid vegetable seeds, nutri-garden kits, and pro-trays, 3 rice power threshers cum winnowers, 12 battery-operated power sprayers, 100 pheromone traps, 500 oyster mushroom spawns, 2639 poultry chicks of four strains, along with feeders, drinkers, 500 kg of poultry feed, and necessary vaccines and supplements and 200 kg of mineral mixture for milk production and need-based pesticides. These were distributed to over 1000 farmers and farm women. Additionally, two ICAR-IIWM technologies, namely dugout sunken ponds (3) and optimum dyke heights (18), were implemented in Haridamada village. Rice field days and crop cutting experiments revealed a 10-20% yield advantage of demonstrated high-yielding rice varieties over the local check 'Mamata'. Seven one-minute success story videos of adopted farmers and farm women were created and submitted to ICAR-DKMA, New Delhi, as part of the "Meri Kahani, Meri Zubani" initiative for publicity on ICAR's website and social media.

Activities Under TSP

A one-day scientists-farmers interaction meeting and field demonstration were held under the TSP program in Khaira village (Gunupur, Rayagada district) and Phatachanchada village (Gajapati district). Farmers received training and demonstrations on the System of Rice Intensification (SRI), integrated farming systems, and line sowing in cotton. In Phatachanchada village, HDPE pipes and saplings of banana, papaya, and drumstick were also distributed to the farmers.



ICAR-IIWM Conducted Capacity Building Program for Horticulture Officers

ICAR-IIWM, Bhubaneswar conducted three training and capacity-building programs on “Enhancing Productivity in Horticultural Crops through Water Management Technologies.” The programs were organized during January 8-15, February 5-12, and March 1-8, 2024. A total of 71 Assistant Horticulture Officers from 30 districts of Odisha participated in the program. The training focused on water management technologies and advanced horticultural practices in India. Dr. A.Sarangi, Director, ICAR-IIWM acted as Programme Director. Dr. Pratiba Sahu and Dr. D.C. Sahoo acted as Course Directors of the training programs.



NEW FACILITIES DEVELOPED

I. Automatic Weather Station and Electronic Weather Display LED board

Two Automatic Weather Stations have been installed at ICAR-IIWM main campus and Deras Research Farm, Mendhasal to



record the daily weather data. This data shall be helpful in carrying out various research experiments with reference to changing climate. The LED board, connected to the AWS telemetrically is capable of displaying real-time weather data and also supports various file formats viz. .jpg, .mp4 etc. This facility is being managed by Dr. Ankita Jha, Scientist.

The LED display board shows the following data:

Parameter	Value	Unit
Rainfall	0.6	mm
Ambient Temperature	28.64	Deg. C
Relative Humidity	80.2	%
Wind Speed	1.921	m/s
Wind Direction	273.8	Deg.
Solar Radiation	108.5	W/sq.m

The display also shows the date 26/07/2024 and the time 04:58 PM.

II. Naturally Ventilated Polyhouse

A naturally ventilated polyhouse, developed under the National Agriculture Science Fund (NASF) funded project was inaugurated at ICAR-IIWM campus on May 12, 2024 in presence of Dr. S.K. Chaudhari, DDG(NRM) and Dr. S.K. Ambast, Chairman, CGWB. This facility is being managed by Dr. Pratiba Sahu, Scientist, Dr. R.K. Mohanty, Principal Scientist and Er. Ajit K. Nayak, Scientist.



III. Climate Controlled Polyhouse

A Climate Controlled Polyhouse covering an area of 560 m² has been developed for reserch and demonstration of high-value horticultural crop. This facility is being managed by Dr. Pratiba Sahu, Scientist.



IV. GPS Station

A GPS station is installed at ICAR-IIWM main campus under the GRACE network project, with financial support from NRDMS, DST, GoI. This is a part of 15 such installations across the Ganges River Basin. The main objective is to investigate the hydrological loading effects, due to anthropogenic and natural factors in the form of groundwater withdrawals and tectonic deformations. This facility is being managed by Dr. D.K. Panda, Principal Scientist.

ICAR-IIWM Obtained Patents / Copyrights / Commercialization

One Copyright was granted for “Android Mobile App for ICAR IIWM Farm Management”. (Registration No.: SW-17690/2023 on December 05, 2023.)



CAPACITY BUILDING & TRAININGS

Training and Capacity Building of ICAR- Employees

Official & Designation	Subject	Organization	Period
Dr. S.K. Jena Principal Scientist	Self-Reliant Initiatives through Joint Action “SRIJAN”	ICAR, IPTM, New Delhi	January 17-19, 2024
Dr. S.K. Jena Dr. R. R. Sethi Dr. D. C. Sahoo Principal Scientists	Groundwater exploration for sustainable water resource management	IIT, Bhubaneswar	February 08, 2024
Dr. Ashok K. Nayak Principal Scientist	Short course on “e-Governance Tools and Applications in ICAR”	ICAR-IASRI, New Delhi	February 08-14, 2024
Dr. S.K. Jena Principal Scientist	Hydrological modelling for science-based watershed planning	OUAT, Bhubaneswar	March 01-02, 2024
Dr. S.K. Jena Principal Scientist	Training on Design and development of digital library and geo-portal	CoE, UAS, GKVK, Bengaluru	March 18-20, 2024
Dr. Dibakar Ghosh Sr. Scientist	Current Methodologies for Water Footprint Estimation and Techniques for Water Saving	ICAR- IIWM, Bhubaneswar	March 18-20, 2024
Er. Ashish M. Jadhav Scientist	Components of Internet of Things	CSRE, IIT Bombay	November 21, 2023 - February 20, 2024

Training / Program Organized for the Farmers by ICAR-IIWM

Subject	Place	Period	Participants
Training cum demonstration programme on “Paddy seed treatment with <i>Trichoderma viridae</i> bio-agent in summer rice”	Haridamada, Jamujhari & Barapita village, Khordha	January 15, 2024	60
Training and capacity building programme on “Efficient water management and production practices of horticultural crops” for horticulture farmers	ICAR-IIWM, Bhubaneswar	January 18-25, 2024	24
Training cum scientists’ stakeholders’ interaction workshop on “Post-flood management practices for enhancing production, productivity and profitability of flood prone low lands”	Lokapal, Kanas, Puri	February 12, 2024	111
Demonstration of Agri-equipment under SCSP	Hansapada village, Nimapara, Puri	February 16, 2024	50
Training and capacity building programme on “Efficient water management and production practices of horticultural crops” for horticulture farmers	ICAR-IIWM, Bhubaneswar	February 19-26, 2024	14
Training cum demonstration programme on “Scientific backyard poultry farming with improved breeds for livelihood and nutritional security”	Haridamada, Jamujhari & Barapita villages, Khordha	February 21, 2024	51

Awareness cum demonstration programme on “Use of drone technology in agriculture” for controlling rice stem borer in summer paddy	Haridamada & Jamujhari villages, Khordha, Odisha	March 7-10, 2024	120
Training and capacity building programme on “Efficient water management and production practices of horticultural crops” for horticulture farmers	ICAR-IIWM, Bhubaneswar	March 11-18, 2024	26
Training cum scientists’ stakeholders’ interaction workshop on “Flood assessment and PFMS approach in Daya River Delta”	Srimakundpur, Kanas, Puri	March 13, 2024	100
Demonstration of power weeder under SCSP	Bhiligram village, Nimapara block, Puri	March 31, 2024	15
Scientists-farmers interaction meeting and Field demonstration under TSP	Khaira village, Gunupur, Rayagada	June 26, 2024	117
Scientists-farmers interaction meeting and Field demonstration under TSP	Phatachanchada village, Gajapati	June 27, 2024	96

Webinar / Programs / Virtual Meetings Attended by Scientists

Official	Name of the conference/ meetings/ workshop/ symposium/ seminar	Organized by	Period
Dr. S.K. Jena	Workshop on “Precision monitoring and management of water	ICAR-IIWM, Bhubaneswar	February 06, 2024
Dr. S.K. Jena	Divisional committee meeting for monitoring and reviewing the progress of foreign aided projects	NRM Division, ICAR at ICAR-CAZRI, Jodhpur	February 16-17, 2024
Dr. K.K. Bandyopadhyay	National seminar on “Smart technologies for sustainable agriculture and environment”	Indian Society of Agrophysics	February 22-23, 2024
Dr. K.K. Bandyopadhyay	Massive open online course on “Artificial intelligence in agriculture”	ICAR-National Academy of Agricultural Sciences, Hyderabad	March 1-31, 2024
Dr. S.K. Jena	Bilateral international workshop on “Climate smart farming resilient technologies and practices in Japan and opportunities for Indian farmer and Agri-tech start-up entrepreneurs”	IIT, Kharagpur	March 06-07, 2024
Dr. S.K. Mishra Dr. B.S. Satapathy Dr. D. Sethi	Zonal review workshop of Farmer FIRST programme	ICAR-ATARI, Kolkata	March 12, 2024
Dr. M. Raychaudhuri Dr. O.P. Verma Er. Ashish M. Jadhav	SOA Agri-Confluence-2024 on “Sustainable agriculture and livelihood security”	SOA, Bhubaneswar	March 12 -14, 2024
Dr. S. K. Jena, Dr. D. C. Sahoo, and Dr. R. R. Sethi	Workshop on “Rainwater harvesting and its efficient use (Catch the Rain)” under REWARD project	ICAR-CRIDA, Hyderabad	May 6-7, 2024
Dr. Roomesh K. Jena	National Conference on “Living with Nature : Soil, Water and Society in Ecosystem Conservation” LNSWEC-2024	Indian Association of Soil and Water Conservationists (IASWC)	June 20-22, 2024
Dr. K.K. Bandyopadhyay Dr. Roomesh K. Jena	Workshop on “ Application of generative AI tools in agriculture”	ICAR-National Academy of Agricultural Sciences, Hyderabad	June 26-28, 2024

AWARDS, HONOURS & RECOGNITIONS

- Dr. S.K. Mishra, Principal Scientist was invited as Chief Guest during the Republic Day function at the Saraswati Shishu Vidya Mandir, Niladri Vihar, Bhubaneswar on January 26, 2024.
- IIWM-Farmer FIRST Project adopted farm woman Smt. Mina Mahanta of Khuntapingu, Keonjhar was felicitated with the “Excellent Farmer Award” by Sri Arjun Munda Ji, Hon’ble Union Minister for Ag. & FW, Govt. of India on February 03, 2024 during the “Regional Agricultural Fair for Eastern region” organized at Torpa, Khunti, Jharkhand during February 3-5, 2024.



- Dr. R. R. Sethi, Principal Scientist as resource person delivered a talk on “Design and field evaluation of groundwater recharge structures in hard rock areas” at IIT, Bhubaneswar on February 08, 2024.
- Two adopted farmers under Farmer FIRST Project namely, Sri Narayan Behera and Sri Atila Nayak of Haridamada village were felicitated with “Water Saver Award” during the ‘World Water Day’ celebration by ICAR-IIWM on March 22, 2024.
- Er. Ajit Ku. Nayak, Scientist presented the technology on ‘Use case Design and development of an IoT-enabled soil moisture sensing system’ in the Focus Group-Artificial Intelligence for Agriculture organized by International Telecommunication Union (ITU) and Food and Agriculture Organization held on March 19, 2024.
- Dr. S.K. Mishra, Principal Scientist attended the “Students’ research evaluation” meeting as the Technical Expert (Agricultural Extension) at the Institute of Agricultural Sciences, SOA University, Bhubaneswar on April 10, 2024 for assessing the PG & PhD thesis synopsis in Social Science disciplines.
- Dr. P. K. Panda, Principal Scientist was invited as Chief guest on the occasion of birthday celebration of Dr. B. R. Ambedkar at Saraswati Vidyamandir, Unit-8, Bhubaneswar on April 14, 2024.
- Dr. D. Ghosh received Young Scientist Award-2024 during 37th Foundation Day Programme of ICAR-IIWM on 12th May, 2024.
- IIWM-Farmer FIRST Project adopted farm woman Smt. Mina Mahanta was awarded with the prestigious “IARI Innovative Farmer 2024” during the ‘Innovative Farmers Meet’ held at ICAR-IARI, New Delhi on June 06, 2024.
- Dr. P. K. Panda, Principal Scientist has received “Biswa Odia Bhasa Samman” from OUAT, Bhubaneswar on the occasion of First World Odia Conference, 2024.



- Dr. S. Mohanty, Principal Scientist was awarded for the Best research paper for the year 2022 in “Indian Journal of Soil Conservation” by Indian Association of Soil and Water Conservationists on June 20, 2024 during the National Conference (LNSWSEC-2024) held at Dehradun.
- Dr. S.K. Jena, Principal Scientist acted as Councilor, Indian Society of Coastal Agricultural Research, Canning Town, West Bengal.
- Dr. S. K. Jena, Principal Scientist acted as member of the national committee for “Reassessment of waterlogged, and salt/alkaline affected soils in the commands of all major/ medium irrigation projects in the country” CWC, Government of India
- Dr. S. K. Jena, Principal Scientist acted as member of the National Level Technical Committee (NLTC) for development of National guidelines for watershed management constituted by DoLR, Govt. of India

JOINING, PROMOTION AND SUPERANNUATION

- Dr. Om Prakash Verma, Senior Scientist promoted to Principal Scientist (Level-14) w.e.f. January 07, 2023.
- Dr. Ashis Y. Maity, Senior Scientist promoted to Principal Scientist (Level-14) w.e.f. January 07, 2023.
- Mr. Anand Gaurav joined as Technician (T-1) at ICAR-IIWM, Bhubaneswar on April 22, 2024.
- Mr. A. K. Binakar (Technical Officer) superannuated from ICAR service on April 30, 2024.

TV / RADIO PROGRAMMES

- Dr. P. K. Panda acted as an expert in panel discussion on “Selection of cropping pattern as per water availability” in Naxtra TV on February 7, 2024.
- Dr. P. K. Panda acted as expert in discussion on “Aim and objective of world water day” in the *Ajira Atithi* programme of Argus TV on March 24, 2024.
- Dr. P. K. Panda acted as an expert in panel discussion on “Agriculture development in Odisha” in Argus TV on May 15, 2024.



- Dr. Prativa Sahu, Scientist, ICAR-IIWM delivered an expert talk on “ Training & Pruning operations in fruit crops” at All India Radio, Puri, on June 3, 2024.



- Dr. P. K. Panda acted as an expert in discussion on “Role of Lift Irrigation in Agriculture Development in Odisha” in DD Odia on June 17, 2024.
- IoT enabled soil moisture sensing system developed by Er. Ajit K. Nayak and installed at ICAR-IIWR was telecasted by the ‘Amar Ujala’ group (<https://www.youtube.com/watch?v=l-3l0MEey30>)



भाकृअनुप - भारतीय जल प्रबंधन संस्थान
भुवनेश्वर-751023, ओड़िशा, भारत

