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ICID *Digest*

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Towards A Water Secure World Free From Poverty & Hunger

**Inaugural
Issue**

**CHONGYI SHANGBAO
TERRACES**



ICID-CIID

An International Periodical of
International Commission on Irrigation and Drainage



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Cover Page Story

Between the Luoxiao Mountains and the Zhuguang Mountains, at the source of the Zhangjiang River, a tributary of the Ganjiang River in the Yangtze River basin, China, there is a settlement of the Hakka people where the local mountains have been transformed into terraces. This is the Chongyi Shangbao Terraces, a marvel of the Hakka farming culture. More details in next issue.

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Dr. Marco Arcieri *President, ICID*



Dear Colleagues, partners and friends,

Greetings from International Commission and Irrigation and Drainage (ICID).

In an era of escalating water scarcity, climate variability, and the urgent need for sustainable agricultural practices, the International Commission on Irrigation and Drainage (ICID) is proud to unveil the first edition of ICID Digest—a quarterly publication dedicated to disseminating cutting-edge technical insights, ground-breaking innovations, research papers, in-depth case studies, and comprehensive overviews of global developments in the realms of irrigation, water resources management, and climate resilience. Unlike ephemeral news bulletins that skim the surface of emerging trends, the ICID Digest is meticulously crafted to serve as a perennial resource, fostering enduring knowledge exchange and actionable strategies for professionals worldwide. I therefore invite all my colleagues from ICID family, as well as all partners and other stakeholders to contribute articles and details of other activities in the field, to make ICID Digest more colourful and successful.

We are delighted to share that in 2025, the International Commission on Irrigation and Drainage successfully organized the 4th World Irrigation Forum in Kuala Lumpur, Malaysia, the 6th African Regional Conference in Abuja, Nigeria, and 11th Micro-irrigation Conference in Baghdad, Iraq. In addition, ICID launched several new initiatives, meetings, and knowledge-sharing

activities dedicated to advancing sustainable agricultural water management.

A highlight of the year was the 1st Indo-Global Irrigation Summit, held in New Delhi on 24–25 June 2025, to commemorate the 75th anniversary of ICID's establishment. This landmark event marked a significant milestone in ICID's ongoing pursuit of its vision and mission to ensure water and food security worldwide. ICID unveiled a World Declaration on “Best Irrigation practices for Water and Food Security in the context of Climate Change” during the summit.

The achievements of 2025 have greatly inspired us, and we are confident that 2026 will be even more productive and impactful, fuelled by renewed commitment, determination, and the continued support and goodwill of our National Committees, partners, and professionals.

In 2026, the ICID flagship triennial event - 26th International Congress on Irrigation and Drainage and the 77th International Executive Council meeting is being organised on the theme ‘Water and agricultural resilience in the face of climate change during 12-17 October 2026 in the scenic and historic port city of Marseille, France. On this occasion, I urge all National Committees, all partners, and other stakeholders to contribute their valuable works / studies for the event and also participate in the ICID Congress in large numbers.

As in 2025, this year too, the International Commission on Irrigation and Drainage (ICID) is organising the 2nd Indo-Global Irrigation Summit on 24–25 June 2026 in New Delhi, to mark the 76th Anniversary of ICID's establishment. I warmly invite all stakeholders to actively participate by contributing articles, presentations, or other inputs, thereby helping celebrate and honour ICID's enduring legacy.

ICID's Working Groups constitute the very foundation of our technical expertise and global outreach. I strongly encourage their Chairpersons and members to significantly increase the high-quality technical publications and to broaden their reach and impact.

The National Committees (NCs) are the support to ICID; without their active and sustained engagement, meaningful progress would be impossible. We, therefore, implore all NCs to redouble their efforts in knowledge dissemination by way of contributing high-calibre technical papers and publications, organising seminars, webinars, and capacity-building events, and hosting national or regional conferences through involvement of ICID.

We also encourage National Committees to strengthen collaboration among themselves, jointly addressing common regional challenges and developing shared solutions through co-hosted conferences, seminars, and other cooperative initiatives.

Although our journey has been enriched by many valuable collaborations with experts and organisations worldwide, we also face our moments of profound sorrow. The ICID community mourns the loss of three of its highly respected former Vice Presidents - Dr. Gerhard Backeberg and Mr. David van der Merwe from South Africa, and Dr. A. Hafied A. Gany from Indonesia. Each of them made lasting and significant contributions to the advancement of irrigation research, water management, and international cooperation. Their dedication and legacy will continue to inspire the global ICID family.

In the end, I extend my warmest wishes for your happiness, good health, professional fulfilment, and ever-higher levels of achievement and output.

Warm Regards,



Dr. Marco Arcieri
President, ICID

Dr. R.K. Gupta *Secretary General, ICID*



Dear Colleagues, partners and friends,
Greetings from ICID Central Office.

In response to growing water scarcity, climate change, and the need for sustainable farming, ICID proudly launches the first edition of ICID Digest — a quarterly publication offering cutting-edge insights, innovations, research papers, detailed case studies, and global updates on irrigation, water management, and climate resilience. Unlike short-lived quarterly news summaries, ICID Digest is designed to be a lasting resource that supports long-term knowledge sharing and practical solutions for professionals everywhere. I invite all my colleagues from ICID family, as well as, all partners and other stakeholders to contribute articles and details of other activities in the field to make the ICID Digest more colourful and successful.

At its core, the ICID Digest transcends the limitations of traditional news updates, which often prioritize brevity and immediacy at the expense of nuance and depth. While news feeds deliver snapshots—fleeting headlines on policy shifts or isolated events—the ICID Digest offers a panoramic view, weaving together multifaceted narratives that illuminate the interconnected challenges and opportunities in our field. This layered approach empowers readers not just to stay informed, but to anticipate, innovate, and adapt with precision.

The publication's value is amplified by its rigorous editorial framework, drawing on contributions from a global consortium of thought leaders. ICID

maintains intimate collaborations with eminent experts, leading organizations such as the UN-FAO, World Bank, IWMI, ICARDA, etc, esteemed academic institutions and forward-thinking industry players. I am sure that these partnerships will ensure that every issue is a tapestry of diverse perspectives: from hydrological modeling breakthroughs in resilient water resources infrastructure and from precision agriculture tools harnessing AI for water optimization to policy frameworks integrating indigenous knowledge for drought-prone communities.

One of the most compelling advantages of the ICID Digest lies in its capacity to build intellectual capital. This archival depth not only accelerates research but also democratizes access to high-caliber knowledge, bridging gaps between resource-rich Global North institutions and innovation-hungry developing economies. Furthermore, the concept of ICID Digest cultivates a vibrant ecosystem of collaboration, far surpassing the passive consumption of news updates.

We extend a heartfelt invitation to our National Committees, esteemed partners, seasoned professionals, academics, and dynamic industry representatives to lend their expertise to this vital endeavour. Whether through original research manuscripts, reflective essays on adaptive management, or vivid narratives of on-the-ground triumphs and trials, your contributions will shape the discourse and drive collective progress. Submissions are welcomed via our dedicated portal, with guidelines emphasizing

clarity, evidence-based rigor, and global relevance. Together, let us harness the ICID Digest not as a mere chronicle, but as a catalyst for a water-secure future.

In summary, while news updates flicker like distant stars, the ICID Digest shines as a steadfast beacon—illuminating pathways to innovation, equity, and sustainability in irrigation and water resources. Please join us in authoring this legacy by way of contributing articles to help make the Digest rich, diverse, and successful.

In order to further extend the technical outreach of ICID, we launched a Webinar Series on “Smart Irrigation Management” in October 2025. The series has continued to attract an enthusiastic response from professionals, researchers, and industry representatives in India and abroad. These webinars underscore the critical role of data-driven smart irrigation management in addressing challenges such as climate change, water scarcity, food security, and sustainable agriculture. The fifth webinar in the series, titled “Daily Satellite Measurements to Support Smart Irrigation Management,” was held on 10 March 2026. The next webinar titled “Bringing together Technology, Innovation & People to Enhance Water Efficiency” is scheduled for 16 April 2026.

Preparations are well-underway for the 26th ICID Congress, to be held in Marseille, under the theme “Water and Agricultural Resilience in the Face of Climate Change.” The Congress will emphasize irrigation efficiency, agroecological transitions, innovative technologies, non-conventional water sources (including reuse and desalination), and supportive policy frameworks for sustainable water management. This event will convene researchers, policymakers, practitioners, and stakeholders from around the world to exchange practical solutions for building climate-resilient agriculture. I request you all to participate in the flagship mega-event of ICID.

ICID's Working Groups form the backbone of its technical expertise and global outreach. I encourage the Chairpersons and members of these groups to increase the number of technical publications and extend their outreach.

The National Committees (NCs) are the limbs of ICID; without their active involvement, progress would not be possible. We urge our NCs to intensify efforts in knowledge dissemination by contributing technical papers and publications, organizing seminars and webinars, and hosting national or regional conferences. NCs are also encouraged to collaborate with one another to address shared regional challenges and develop joint solutions through co-hosted conferences and seminars.

ICID has opened nominations for several prestigious awards, including the World Heritage Irrigation Structures (WHIS) recognition, the Best Performing Workbody Award, the Best Performing National Committee Award, and the WatSave awards. These honours celebrate exceptional contributions to the conservation of irrigation heritage, technical activities, and organizational excellence.

Overall, ICID's activities in 2026 reflect an even stronger resolve to fostering knowledge exchange, technological innovation, climate resilience, and sustainable agricultural water management on a global scale.

While our journey has involved fruitful collaborations with many experts and organizations, we also have our share of grief. The ICID community mourns the passing of its three esteemed stalwarts - two from South Africa (Honoraire Vice Presidents Dr. Gerhard Backeberg and Mr. David van der Merwe) and one from Indonesia (Honoraire Vice President Dr. A. Hafied A. Gany). They made profound contributions to irrigation research and international cooperation.

I wish you all a very happy, healthy, and professionally accomplished year ahead.

Warm Regards,



Dr. R.K Gupta
Secretary General, ICID

A Talk with ICID President Hon. Prof. Bart Schultz



Prof. Dr. Ir. Bart Schultz is Emeritus Professor of Land and Water Development, UNESCO-IHE, Delft, The Netherlands

Q: Professor, how long has been your association with ICID? In your opinion, what role ICID is playing in achieving the goal of a water and food secure world?

In 1983, I was approached about becoming the Netherlands representative of ICID, in connection with my work at the IJsselmeerpolders Development Authority. To be honest, I had never heard of ICID at the time, but after some investigation, it seemed like a good fit. So, after receiving permission from my Authority, I said yes. My first participation in an international ICID meeting was in 1984 at the 12th ICID Congress in Fort Collins, United States. This Congress was an eye-opener for me to the international community in my field of expertise. It also turned out that they were establishing a Working group on Drainage. During this meeting, I was told, You are Dutch, your country is famous for its drainage, why don't you become the first chairman? So, in addition to being the Netherlands representative, I was suddenly also chair of the Working group on Drainage. Since then I have participated in almost all the annual meetings and served in various positions.

ICID is one of the 11 international associations of professionals in the water sector. It focuses on water management in the broadest sense, with an emphasis on the role for food production.

It is, therefore, in my opinion one of the key international organisation in achieving the objective of a water and food secure world?

Q. Dr Bart, you have had a very long association with International Commission on Irrigation and Drainage (ICID) in various capacities including being President (Hon) ICID. How do you see ICID's role in fulfilment of its vision "A water secure world free of poverty and hunger through sustainable rural development"? How various activities undertaken by ICID align with its vision-2030?

By its events, publications, webinars, the website www.icid.org, as well as, by the activities of the respective National Committees in their country ICID is a very significant disseminator of information on historical background and new developments in the sector that undoubtedly contribute to the fulfilment of its vision. In addition, the Working Groups and informal contacts among the professionals, when they are longer participating in the events and become more familiar to each other, results in a lot of information that can be helpful for their work at home.

Q: Climate Change globally and Population growth in many parts of the World have been adversely affecting reliability of precipitation & availability of water, drop in crop-yield, rising water demands, etc. This may become a major cause of rift between various regions and even countries (especially Africa and Asia continents). What all should be the main focus areas, policies, and strategies towards management of water resources so that the humanity can become free of poverty and hunger in a sustainable manner?

So far, it has been possible to produce sufficient food for the World Population. Hunger and undernourishment are mainly caused by poverty and by regional, or local unavailability of food. Population growth, improvement in the standard of living and improvement in the life expectancy result in increased consumption. While there are limited possibilities to increase the area of agricultural land focus on producing sufficient food has to be on the increase in the yield per hectare. This implies expansion and improvement of irrigation, drainage and flood protection.

Q: Many parts of the world have monsoon-based climate where more than 80% precipitation occurs in just three months. These areas also have very high population density. What, in your opinion, would be a better strategy to manage rising water demands: Demand Management or Water Supply augmentation through WR infrastructures, or both?

Population growth and urbanisation are not determined by agricultural needs. Society expects that sufficient food will be produced, what is in fact also the case. The measures to be taken depend on private and public initiatives. Basically, this

requires that Governments implement the right policies for food security in their country, while properly taking into account the requirements of the riparian countries in the river basin. With respect to this, I think the European Union with its Water Framework Directive and its implementation is a good example how this can be applied in practice. The private sector, and especially the farmers would have to be able to produce the required food at affordable prices.

Q: In some regions of the world, Floods and Droughts, both, have been a major concern for the mankind since time immemorial. What, according to you, can be an integrated solution that can work in addressing these challenges in a sustainable manner to provide water & food security?

Floods, droughts and climate change have indeed been always there. Increasingly man induced changes in land use have their impact on climate change and on changes in the hydrology in the river basins. The problems are, in my opinion, with respect to droughts and floods that the risks are often insufficiently taken into account. With droughts the problems have especially increased due to mining of surface and groundwater. Here, increase in irrigation is often the main reason. Basically, you cannot use more water than on average is being available at river basin, or sub-basin level. With floods the story is the opposite. Our ancestors were not stupid, they settled themselves, as much as possible, at the better places. What frightens me is that 80-90% of the new urban developments take place in the floodprone areas. There are sufficient reasons to do this, but you can only do this in the right way when you take adequate measures to protect the people against flooding. Unfortunately, this is generally not the case.

“We forget that the water cycle and the life cycle are one”

– Jacques Yves Cousteau



Q: Many low-lying areas have problems related to drainage, salinity, and water logging. These can be due to geogenic reasons like in coastal areas or due to anthropogenic reasons such as excessive irrigation and groundwater withdrawal. This also affects the productivity of water & soil. Should the drainage management and agricultural water management be planned in an integrated manner? Does it need policy level provisions or is it majorly a technical issue? We would like to hear your views on this, you being a renowned expert on irrigation and drainage and have seen such water related issues in many countries, closely.

The first key issue is, in my opinion, which design standards are being applied for irrigation, drainage and flood protection. This is basically a policy issue at National level. Second is sufficient arrangements, regulations and measures for operation and maintenance. Generally, it is considered to be a success when an irrigation, drainage, or flood protection project is being completed. There is a celebration, the Minister comes and there is a lot of attention in the news. I have always taught my students, that this is, in fact, not the real success. It is really a success when five years after completion the system is successfully operated and maintained. I have often observed that when the local people, their associations and authorities are committed to operate and maintain the systems, things will go better than forecasted in the feasibility studies. When they are not committed, whatever feasibility study you may have done, the results in practice will be significantly below the forecasted result.

Q: Professor, the question is about Water-Food-Energy Nexus. What is the Water-Food-Energy Nexus, and how do the three sectors interact in ways that amplify vulnerabilities in global systems and what are the primary challenges in managing the WFE Nexus in water-scarce regions like the Middle East, Sub-Saharan Africa, and South Asia, and how do these differ from water-abundant areas?

There is clearly a Water-Food-Energy Nexus. However, in the nexus, sustainability in light of the availability of the resources has to be taken into account, as well as, a constraint. In the areas that you mention more water is being used at several places than the resources provide. A clear example of the negative impact is the drop down in the water levels of, for example, Lake Chad, Aral Sea and Urmia Lake. In the water abundant areas the problem is, of course, the opposite, the increase in flooding, especially due to the urbanisation, land subsidence, climate change and the insufficient measures to protect the people against these floods.

Q: Professor, What key messages you would like to convey to the world for achieving SDGs related to water?

Take care that the concept of a project is O.K., that the availability of resources is respected and that you may expect that the local people and organisations are committed to operate and maintain the systems in their area.

The earth, the air, the land and the water are not an inheritance from our forefathers but on loan from our children. So we have to hand over to them at least as it was handed over to us.

– Mahatma Gandhi



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JAIN CONNECT



JAIN CONNECT

ICID President Hon. Prof. Dr. Chandra A. Madramootoo elected as Chair of TAC, Global Framework on Water Scarcity in Agriculture (WASAG), FAO



ICID President Hon Prof. Chandra A. Madramootoo is elected as Chair of the Technical Advisory Committee (TAC) of Global Framework on Water Scarcity in Agriculture (WASAG), UN-FAO. The TAC consists of members representing the regional groups and the four categories of WASAG partners and provides technical and scientific expertise to WASAG.

FAO WASAG is a Global Framework on Water Scarcity in Agriculture, a partnership hosted by the Food and Agriculture Organization (FAO) that brings together various organizations to help countries use water more efficiently in agriculture to ensure food security, especially in the context of climate change. It facilitates collaboration, knowledge sharing, and development of policies & strategies to build resilient agrifood systems by matching country needs with partner resources, and it supports the Sustainable Development Goals (SDGs). It is matter of great pride for ICID that ICID's nominee in the TAC of WASAG is leading this important prestigious group of FAO.

Preserve, Reserve, Serve....



Loic Fauchon

President, World Water Council

As we are living in a troubled and unsettled world, traditional reference points elude both our perception and our understanding. Humanity struggles to adapt, and humankind is slow to recognize the path that still lies ahead.

Both inner peace and peace in the world seem increasingly out of reach, at a moment in history when artificial too often prevails over the natural.

The time has come for a collective awakening, one that is essential if humanity is to preserve its primacy. By fully assuming its role, and particularly in the field of water, humankind must safeguard its capacity to innovate, finance, and govern, in order to ensure the world's fair share of high-quality water.

The World Water Council through you, through its Board, and through its members is here to show the way forward, to affirm rights, to chart new paths, and to provide answers to unresolved questions. Throughout 2026, while continuing preparations for the 11th World Water Forum with our Saudi colleagues, we will strengthen

what already exists by combining vertical and horizontal approaches.

But that is not all. We will also explore new and unprecedented topics, as discussed last December in Marrakech: turning ideas into projects, and projects into action. This will include the creation of a global center for non-conventional water resources, an alliance of megacities for water, a sobriety laboratory, a dedicated wastewater and sanitation value chain, and a "One Water, One Health" coalition.

To these initiatives are added many other ambitions and entrepreneurial aspirations, born of your cultures and your expertise. Bring them to the great table of the future, under the seal of excellence. Let us be the drivers of this necessary transformation.

And may this year, dear colleagues and friends, be one of solidarity, mutual respect, and peaceful imagination.

"Preserve, reserve, serve": this is the privilege of humankind. May 2026 fulfill your aspirations and bring you success.

ICID President Visited UNESCO Beijing

On November 18, Dr. Marco Arcieri, President of the International Commission on Irrigation and Drainage (ICID), accompanied by Dr. Wu Wenyong, Secretary-General of the Chinese National Committee on Irrigation and Drainage, visited UNESCO Regional Office for East Asia (UNESCO Beijing) and held talks with its Director, Prof. Shahbaz Khan. The two sides engaged in in-depth discussions on future cooperation in areas such as water resources management, irrigation and drainage, and cultural heritage protection, exploring ways to jointly promote the sustainable use and development of global agricultural water resources.

During the meeting, Dr. Marco Arcieri expressed ICID's strong commitment towards deepening cooperation with UNESCO. He highlighted the potential for strengthened collaboration in



the identification, protection, and promotion of World Heritage Irrigation Structures, noting that these heritage sites not only represent outstanding examples of human ingenuity but also offer valuable insights for modern sustainable water resources management.

FAO Celebrates 30 Years of AQUASTAT, the World's Leading Source on Water and Agriculture Data

Rome, 2025 – The Food and Agriculture Organization of the United Nations (FAO) today marked the 30th anniversary of AQUASTAT, the organization's flagship global water and agriculture data platform, during a high-level hybrid event held at FAO Headquarters in Rome. The celebration also featured a joint FAO–UN–Water briefing on the UN System-wide Strategy for Water and Sanitation, which was officially

endorsed in 2024 by the UN Chief Executives Board for Coordination.

The event featured a high-level segment with remarks by Alvaro Lario, President of the International Fund for Agricultural Development (IFAD) and Chair of UNWater, alongside Ambassadors and Permanent Representatives from South Africa, Morocco, and Peru to the Rome based UN agencies. They shared national perspectives on the critical importance of water data in shaping policy and managing water resources effectively.

Launched by FAO's Land and Water Division in the 1990s, AQUASTAT was developed in response to the global need for comparable, up-to-date, and policy-relevant information on water use in agriculture—the world's largest water consuming sector.



Disasters Cost Global Agriculture \$3.26 trillion Over Three Decades, FAO Report Reveals

Disasters have inflicted an estimated \$3.26 trillion in agricultural losses worldwide over the past 33 years – an average of \$99 billion annually, roughly 4 percent of global agricultural GDP – according to a new report by the Food and Agriculture Organization of the United Nations (FAO). The Impact of Disasters on Agriculture and Food Security 2025 highlights how digital technologies are transforming how farmers, governments and communities can monitor risks, anticipate impacts, and protect livelihoods.

The report provides the most comprehensive global assessment to date of how disasters – from droughts and floods to pests and marine heatwaves – are disrupting food production, livelihoods and nutrition. It also demonstrates how digital innovations are shifting agrifood systems from reactive crisis management to proactive data-driven resilience-building.

FAO's report identifies digital transformation as a game-changer for agricultural disaster risk reduction. Emerging tools such as artificial intelligence (AI), remote sensing, mobile connectivity, drones and sensors are now enabling hyperlocal, real-time insights that improve



early warning, advisory services, risk transfer mechanisms and anticipatory action.

The report calls on governments, international partners and the private sector to advance digital innovation to enhance efficient and effective disaster risk reduction in agriculture and food security. It also emphasizes the need for integration of these digital solutions into national agricultural policies and strategies and calls for increased investments to support agrifood system transformation. Furthermore, the report underscores the critical importance of scaling up digital infrastructure and literacy to enhance accessibility and enable innovation to influence decision-making.

The Status of Youth in Agrifood Systems – FAO

The world's agrifood systems stand at a crossroads. With 1.3 billion youth globally, the future of food, livelihoods, and economic resilience depends on their participation in agrifood systems. At the same time, agrifood systems need youth to drive productivity, innovation, and sustainability in a



crucial and rapidly evolving sector. FAO's "The Status of Youth in Agrifood Systems" report is a call to action.

This report marks FAO's first comprehensive evidence-based assessment of youth engagement in agrifood systems on a global scale. It explores the multiple dynamics that shape youth experiences in agrifood systems and derives actionable and policy-oriented recommendations based on programmes, initiatives, and regulatory measures that have worked in the past. Agrifood systems employ 44 percent of working youth and remain a key entry point for youth employment, especially in low- and lower middle income countries, where nearly 85 percent of the 1.3 billion global youth population resides.

2025 Africa Sustainable Development Report

“Africa is making progress in 12 of the 17 SDGs, however the current pace of progress is insufficient to achieve the SDGs by 2030,” and “data gaps prevent a full picture of the continent’s performance.” These are the main takeaways from the 2025 Africa Sustainable Development Report, which reviews the status of Africa’s implementation of the 2030 Agenda for Sustainable Development and Agenda 2063 and offers policy recommendations to facilitate their attainment.

Themed ‘Advancing sustainable, inclusive, science- and evidence based solutions for the 2030 Agenda for Sustainable Development and its Sustainable Development Goals for leaving no one behind, and the African Union’s Agenda 2063,’ the report focuses on the five SDGs that underwent in depth reviews by the 2025 UN High level Political Forum on Sustainable Development (HLPF) – SDG 3 (good health and

well-being), SDG 5 (gender equality), SDG 8 (decent work and economic growth), SDG 14 (life below water), and SDG 17 (partnerships for the Goals). It analyses each Goal in relation to the corresponding goal of Agenda 2063.

The report underscores that there are substantial opportunities to accelerate progress in Africa, despite the debt burden, unemployment growth, and rising global uncertainties. It recommends making use of the demographic dividend, natural resources, digital technology, private sector investment, and strong institutions to facilitate the transformative change needed for sustainable and inclusive development.

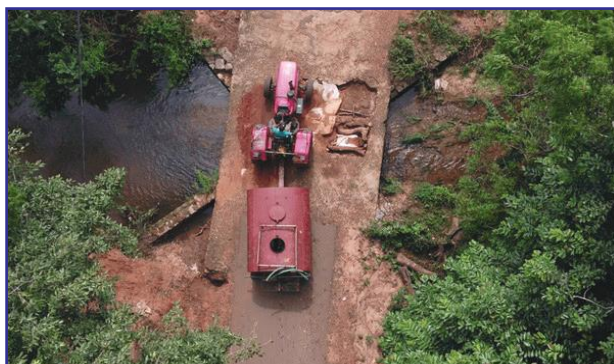


IWMI Launches the Early Warning, Early Action, Early Finance Platform to Pre-Empt Disaster in Sri Lanka



The International Water Management Institute (IWMI) launched its early warning, early action, early finance platform, called AWARE, in Colombo, Sri Lanka, on May 20, 2025. The platform serves as a centralized hub for early warning information and coordinated anticipatory response planning. Leveraging advanced technology, it monitors weather conditions in real time and delivers actionable alerts on

impending threats. AWARE is designed to ensure that hazard warnings trigger prompt on-the-ground actions and timely funding to protect vulnerable communities, thereby strengthening disaster preparedness and resilience across the country. The system was piloted in Sri Lanka in 2023 and 2024, with simulations of floods and droughts at the community level in the Nuwara Eliya and Anuradhapura districts, respectively.



During the flood simulation, residents received an early warning SMS from the Disaster Management Centre (DMC) about the forecast of heavy rainfall, prompting them to reinforce defences and evacuate before the flood. The residents also

received cash vouchers to support their immediate needs. The exercise demonstrated that acting early can significantly reduce disaster impacts and help communities better manage risks.

Public - Private Partnerships Scale Solar - Powered Agriculture in Bangladesh



As climate change intensifies, Bangladesh's farmers face the brunt of increasingly unpredictable weather, from prolonged summers to delayed monsoons. Nearly half the country's agricultural workforce of women and marginal smallholder farmers, do not own land and face sociocultural barriers that restrict their access to modern technology.

Since irrigation in Bangladesh depends heavily on imported diesel, the Government of Bangladesh has been investing in solar irrigation pumps (SIPs) to enhance energy security and reduce greenhouse gas emissions. Supported by the Swiss Agency for Development and Cooperation (SDC), the International Water Management Institute's (IWMI) Solar Energy for Agricultural Resilience (SoLAR) project in Bangladesh provides critical

insights into the transition from diesel to solar-powered irrigation.

The second phase of SoLAR goes beyond replacing diesel pumps; it focuses on reimagining how the country uses solar energy for agriculture in ways that benefit farmers especially those often left behind. Through public-private partnerships, the second phase will help improve policies to reduce emissions and unlock investments that build climate resilience. The project will extend the solar frontier beyond irrigation to integrate innovative applications like agrivoltaics combining agriculture and solar energy production through solar panels installed above crops and solar-powered cold storage, which helps increase the shelf life of produce.

“When the well is dry, we know the worth of water”

– Benjamin Franklin

Launch of WMO Flood Forecasting and Warning Community of Practice

The WMO Standing Committee on Hydrology (SC-Hyd) and the Global Water Partnership (GWP) launched the Flood Forecasting and Warning Community of Practice on 13 October, a dedicated platform for professionals working across hydrology, meteorology, disaster risk reduction, and water management. It facilitates the exchange of knowledge, operational experience, tools, share case studies, operational insights and lessons learned to enhance flood early warning systems—ultimately helping countries deliver timely, actionable information to communities at risk. The launch highlighted success stories and learning opportunities that embody the vision for this new Community of Practice.

Four country experiences presented illustrated how flood early warning systems are evolving in diverse hydrological environments:

- Pakistan shared lessons from recent monsoon seasons, emphasizing the need for real-time monitoring networks and cross-agency operational coordination
- Niger showcased progress in regional flood management along the Niger River, demonstrating the value of harmonized data and basin-level collaboration
- China highlighted advancements in data automation and the role of WMO Regional Training Centres in strengthening technical capacity



- South Africa presented its work on impact-based forecasting, underscoring how clear communication and community engagement can improve response outcomes.

The WMO Secretariat shared examples of Water at the Heart of Climate Action (WHCA) project and CREWS Initiatives where stakeholders could benefit from Community of Practice. The Flood Forecasting Framework (FFF), an open-source, modular approach designed to enhance interoperability and long-term sustainability of flood forecasting systems, was also presented. The FFF aims to enable National Meteorological and Hydrological Services (NMHSs) to adopt flexible tools suited to their hydrological contexts while integrating seamlessly with broader early warning services.

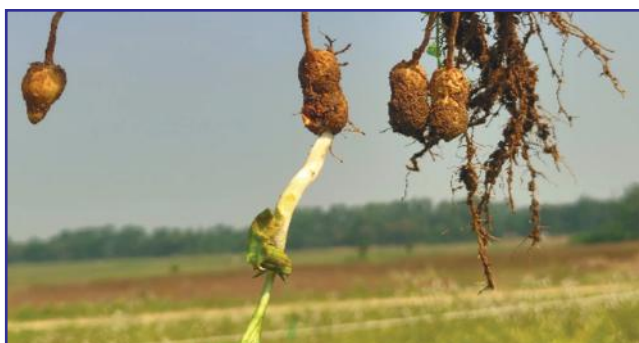
The participation of over 300 representatives from NMHSs, research institutions, river basin authorities, and development partner from 60 countries in the inaugural session demonstrated the strong global demand for a coordinated approach to flood forecasting. <https://wmo.int/media/magazine-article/launch-of-wmo-flood-forecasting-and-warning-community-of-practice>



New Genomic Discovery from ICRISAT Could Save Farmers Millions by Preventing Groundnut Sprouting Before Harvest

Unpredictable rains pose a serious threat to groundnut farmers, with pre-harvest sprouting causing significant losses. Spanish groundnut varieties, representing nearly 60% of global production, are particularly vulnerable. Premature germination triggered by early rains can reduce yields by 10–20%, and up to 50% in severe cases. This makes understanding the genetics behind varieties that resist sprouting under high-moisture conditions especially critical.

In this study, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)



and its partners show how breeders can develop groundnut varieties with fresh seed dormancy—a natural “built-in wait time” that prevents pre-harvest sprouting and protects both yield and quality. This trait offers a powerful safeguard against the severe financial losses farmers face when early rains trigger sprouting.



By evaluating 184 groundnut genotypes from the ICRISAT Genebank over two seasons, the study revealed a wide range of natural variation, with some varieties remaining dormant for over 30 days without sprouting, while others sprouted within a week. The team selected the varieties with 10–21 days of dormancy, an ideal window to balance sprouting protection with timely planting.

The team further screened the genetic make-up of these select varieties and identified 9 high-confidence candidate genes associated with fresh seed dormancy and pre-harvest sprouting resistance, providing valuable insights for breeding improved varieties. <https://pressroom.icrisat.org/new-genomic-discovery-from-icrisat-could-save-farmers-millions-by-preventing-groundnut-sprouting-before-harvest>

Nature-based Infrastructure is Vital to Avert Asia's Looming Water Crisis



The Asia-Pacific has made remarkable progress in water and sanitation over the past decade. Hundreds of millions more people now have access to clean and reliable water and sanitation, improving public health, productivity and dignity across the region. But beneath the progress lies a growing vulnerability. The natural systems that are the basis for water security—wetlands, rivers, and aquifers—are deteriorating rapidly.

This is evident in the more than 80% slump in the global populations of freshwater species since 1970. If the decline in water systems continues, it could unravel decades of hard-won gains and expose economies and communities to escalating risks.

The Asia-Pacific is home to 60% of the world's population and some of its most fragile ecosystems. Rapid urbanization and industrialization, groundwater depletion, river pollution, deforestation, and the loss of coral reefs and mangroves are straining water systems to breaking point. The changing climate is intensifying these pressures, bringing longer droughts, heavier rainfall and more destructive floods.

Just over a decade ago, the region's most urgent water challenge was basic access to water and sanitation, particularly in rural areas. Massive investments into supply systems, sewers and wastewater treatment, as well as better access to toilets and improved hygiene, have transformed that picture. In Nepal, for example, the near-total

elimination of open defecation has delivered major benefits in public-health and reduced waterborne diseases.

Water decisions must also be inclusive, especially at a local level, to benefit groups that are most exposed. A community-led project in Mongolia shows what can be done: through training in forest planning, including practices to protect riparian zones, local people were able to improve forest health, protect river flows and boost environmental water security.

The Asia-Pacific will need an estimated \$4 trillion in water, sanitation and hygiene investment by 2040. Current public spending covers only about 40%. Closing this investment gap is essential. But how money is spent is just as important as how much is spent. Funding new infrastructure matters; so too do budgets for maintenance and improvements. <https://www.adb.org/news/features/nature-based-infrastructure-vital-avert-asias-looming-water-crisis>

Data centres use vast amounts of water – here's how we advance water circularity



As digital infrastructure expands, data centres are becoming the backbone of modern connectivity, powering everything from cloud services to artificial intelligence (AI). Yet this growth carries a hidden environmental cost beyond its energy use: rapidly rising water consumption.

Cooling alone requires vast volumes of water and AI workloads are set to intensify this demand.

Recent estimates suggest that accelerated AI adoption alone could result in an additional 4.2 to 6.6 billion cubic metres of water withdrawal by 2027, including onsite cooling and offsite electricity generation. This projection is equivalent to four to six times the annual water withdrawal of Denmark, underscoring the need for urgent action.

The opportunity lies in circular water management strategies, which can deliver up to 75% water savings. Solutions can range from water optimization, such as advanced liquid and closed-loop cooling solutions in data centres and replenishment, offering the potential to address water scarcity and energy efficiency challenges.

Yet, implementation is often delayed when business cases are lacking, monitoring is insufficient and because integrating new

technologies into existing infrastructures is complicated. Overcoming these barriers requires collaboration.

By partnering with technology providers, startups and local communities, circular water

management solutions can be scaled, enabling data centres to operate more sustainably while safeguarding freshwater resources. <https://www.weforum.org/stories/2025/11/data-centres-and-water-circularity/>

GWP Partners Approve Landmark Governance Reforms to Strengthen Accountability and Accelerate Global Water Investment

In a unanimous vote, Partners of the Global Water Partnership (GWP) approved proposed amendments to the GWP and GWPO Statutes during an Extraordinary Network Meeting yesterday – a decisive step in Phase 2 of GWP’s Governance Reform, focused on strengthening accountability, clarifying governance roles, and streamlining decision-making across the Partnership.

The meeting brought together almost 200 participants from about 60 countries, with Partners from 23 countries participating in the vote.

The vote clears the way for final consideration by GWP Sponsoring Partners, as required under the GWP Establishment Memorandum of Understanding.

The reforms establish a single, streamlined, and inclusive governance system for GWP, strengthening accountability, clarifying decision-making roles, and reinforcing the central role of GWP Partners in shaping how the Partnership is governed. They also enhance fiduciary oversight and position the network to deliver large-scale, climate-resilient water investment outcomes aligned with GWP’s Global Transformation Agenda and strategy 2026-2030. <<https://gwpo-gwp.org/news/gwp-partners-approve-landmark-governance-reforms-to-strengthen-accountability-and-accelerate-global-water-investment/>>

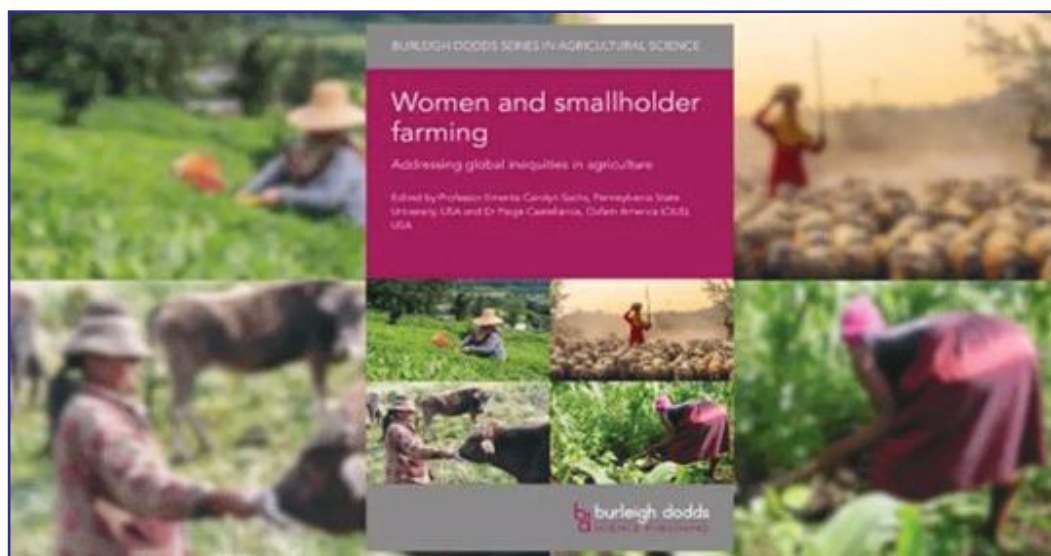
Strengthening Genebanks Through Regional Collaboration in CWANA

Safeguarding plant genetic resources is fundamental to food security, climate resilience, and sustainable development across the Central and West Asia and North Africa (CWANA) region. To advance this mission, ICARDA convened genebank managers and partners from across the region for a multi-day regional workshop focused on collaboration, capacity strengthening, and long-term sustainability of genebanks.



The workshop opened with welcoming remarks from Dr. Mesut Keser, ICARDA Country Coordinator – Türkiye, who underscored the

critical role genebanks play in transforming conserved diversity into practical solutions for food security.



Participants represented a wide range of national genebanks and institutions across the CWANA region, including Armenia, Kazakhstan, Lebanon, Morocco, Oman, Kyrgyzstan, Uzbekistan, the Kurdistan Region, Jordan, Libya, Tunisia, Turkiye, and the United Arab Emirates, alongside the Islamic Organization for Food Security (IOFS).

Each country representative presented an overview of their genebank systems, highlighting

unique accessions, national priorities, institutional partnerships, and key operational challenges. These presentations revealed both the diversity of collections across the region and the shared constraints facing genebanks, including funding limitations, technical capacity needs, and long-term sustainability concerns. Throughout the discussions, participants stressed the importance of positioning genebanks as national priorities and essential pillars of food security.



Mainstreaming Indigenous Underutilised Crops: A Climate Change Adaptation Strategy

Dr Luxon Nhamo and Prof Sylvester Mpandeli

Mainstreaming underutilised indigenous crops is a critical, proactive climate change adaptation strategy that enhances food and water security, nutritional diversity, and agricultural resilience. Their adoption enhances food security, improves dietary diversity, and boosts smallholder farmers' income

Adopting locally available resources, including underutilised indigenous crops (also called neglected or orphan crops), is key to socio-ecological stability, including climate change adaptation and improved agricultural water management practices. Underutilised indigenous crops, in particular, are well-suited to harsh local climatic conditions, support sustainable diets and food systems, create niche markets within local economies, enhance food, nutritional, and water security, and help preserve local knowledge by serving as a foundation for rural food systems. In addition, they are more resilient to local adverse climatic and environmental conditions, including drought, heat, and poor and degraded soils, as they generally grow naturally in the wild. However, they have been neglected in favour of adapted crops like maize, wheat, soybean, and rice, which are well marketed, mainstreamed, and studied, yet present local challenges by requiring

a lot of nutrients and water, apart from being prone to pests and diseases, and contributing to adverse environmental challenges.

Mainstreaming underutilised indigenous crops into the main food value chain enhances food security by diversifying agricultural systems, improving nutritional intake, and allowing farming in marginal lands that are increasingly becoming unsuitable for adapted crops due to soil degradation and climate change. Adopting these crops is a highly effective, evidence-based strategy to enhance drought resilience and reduce agricultural water demand in water-scarce regions. They exhibit superior water-use efficiency, enabling them to sustain high yields and endure water-stressed conditions while maintaining high productivity levels. Cultivating traditional crops, therefore, helps manage degraded lands and enhances agro-biodiversity, supporting long-term ecosystem health.



Dr Luxon Nhamo is Research Manager at the Water Research Commission of South Africa(WRC)



Prof Sylvester Mpandeli is a Vice President Honoraire at the International Commission on Irrigation and Drainage (ICID), he is also the Chairman of the South African National Committee on Irrigation and Drainage (SANCID)

Mainstreaming Indigenous Underutilised Crops

However, besides these known benefits, the role of underutilised indigenous crops remains unexploited. As the population grows, agriculture faces pressure to meet rising food demands amidst the triple challenge of climate change, water insecurity, and degraded arable land. Current evidence indicates that climate change and degraded soils are reducing the cultivated land and yields. A key strategy to build climate change resilience and boost crop productivity is to mainstream indigenous crops, as they require fewer nutrients than adapted crops, which incur significant production costs. The current reliance on a few crop species for food leaves many genetic resources and beneficial traits underutilised. Tapping into this large reserve of indigenous crops offers a more diverse agricultural system and food sources necessary to address water, food, and nutritional security amidst a shrinking food basket. In addition to enhancing water, food, and nutritional security, underutilised indigenous crops provide income for many resource-poor smallholder farmers and offer financial relief to consumers, particularly in developing countries.

Bringing back underutilised indigenous crops into the main food value chains remains constrained by the lack of formal seed systems, insufficient research funding, and diminishing knowledge about their cultivation and preparation. The way forward requires a paradigm shift that integrates scientific knowledge with traditional wisdom to build a more resilient and equitable food system.

As already alluded to, underutilised indigenous crops, including Bambara groundnut, sorghum, finger millet, cowpea, amaranth, marama bean,

moringa, and black nightshade, are nutrient-dense, climate-resilient plants that offer a sustainable, “future smart” solution to food insecurity. Despite their adaptability to harsh environments and superior nutritional profiles compared to major staples, these crops are overlooked by modern commercial agriculture in favour of a few labour-intensive crops that require significant nutrients and water. They are neglected and overlooked as (a) they suffer from weak value chains, limited market access, and a lack of processing infrastructure, and (b) agricultural policies and subsidies that prioritise the current staple crops, leading to underfunding and a lack of investment in research, development, and seed improvement for indigenous alternatives. Besides, these crops are often unjustly associated with low social status or perceived as “food for the poor,” leading to declining consumer demand. Another factor contributing to the poor consumption of underutilised indigenous crops is their low, inconsistent yields or labour-intensive cultivation and preparation. For example, the Bambara groundnut has long cooking times and therefore



becomes energy-intensive. However, these disadvantages can be overcome by mainstreaming and establishing processing infrastructure.

Strategies to mainstream underutilised indigenous crops require a transdisciplinary approach that integrates these crops into the dominant food system, including (a) aligning policies that facilitate the transition from policies that only support a few crops to ones that embrace agricultural diversity, (b) promoting research that

Mainstreaming Indigenous Underutilised Crops

includes genetic improvements and suitability mapping, (c) overcoming the stigma of these crops as "poverty food" by promoting their nutritional value through consumer education to create demand, and facilitate their entry into mainstream markets, and (d) supporting informal traders and establishing local food chains, as they are crucial conduits for the distributing these crops.

Climate-induced challenges are manifesting rapidly, causing socio-economic insecurities and health and environmental challenges. There is increasing evidence of indirect links between climate change and rising rates of malnutrition, poor health, hunger, and food and water insecurity, which further stresses an already burdened natural resource base. These climate-induced challenges reduce the resilience of agro-ecosystems. Tackling these challenges requires a shift from current incremental adaptation strategies to transformative alternatives that equally emphasise human nutrition, health, and environmental sustainability. As a result, policy should focus on establishing resilient agri-food systems, enhancing water,

food, and nutritional security, and promoting both human and environmental health amidst increasing climate variability and extremes.

Mainstreaming underutilised indigenous crops is a critical, proactive climate change adaptation strategy that enhances food and water security, nutritional diversity, and agricultural resilience. Their adoption enhances food security, improves dietary diversity, and boosts smallholder farmers' income. Considering the current climate change and food insecurity challenges, underutilised indigenous crops are the foods for the future. Recent initiatives, such as the African Orphan Crops Consortium and the work of the Water Research Commission, are improving these crops, but further investment is needed to move them from subsistence to mainstream commercial markets. Adopting these crops, along with water-conservation methods such as rainwater harvesting, is essential for developing sustainable and climate-resilient agricultural systems in areas facing water scarcity.



Beyond Infrastructure: People's Institutions as the Leading Link in Effective Irrigation and Drainage

Lessons from Smallholder-Dominated and Traditional Water Systems in India

— DHAN Foundation, India

Small, Marginal, and Landless Farmers: The Real, Often Invisible Water Users

Before engaging with this article, it is useful to pause and ask a few foundational questions.

1. Should irrigation projects be evaluated only by irrigated area and productivity, or also by the number of people they actually serve?
2. Which systems—large, capital-intensive irrigation projects or traditional water bodies—reach the greatest number of farmers, and how small are those farms in reality?
3. Why do responses to large irrigation challenges continue to focus primarily on engineering and technical outcomes, while comparatively little attention is paid to building strong local people's institutions capable of managing water equitably?
4. Finally, what happens to irrigation systems when a significant share of users do not own land at all?

At the global level, agriculture is numerically dominated by small farms. Of the approximately 570 million farms worldwide, nearly 84 per cent are smaller than 2 hectares, yet together they contribute close to one-third of global food production. Defining these farmers, however, is not straightforward. The Food and Agriculture Organization (FAO) does not rely on a single land-size threshold, instead adopting a functional definition that recognises variation across regions, agro-ecologies, and production systems. For analytical consistency in global comparisons, most empirical research adopts 2 hectares as a working threshold. What is beyond dispute is that world agriculture is overwhelmingly characterised by very small, family-operated farms, whose water needs are dispersed, intensive, and highly sensitive to institutional arrangements.

India represents one of the clearest and most well-documented examples of this global pattern. Official census and survey data show that nearly nine out of ten Indian farms are below 2 hectares, making smallholder-focused irrigation governance unavoidable rather than optional.

	Value	Source / Note
Population dependent on agriculture	~613 million (≈42%)	Labour & NSS estimates
Total farmland holdings (2015–16)	146.45 million	Agriculture Census
Small + marginal holdings (<2 ha)	~126.1 million (≈86%)	Core structural fact
Avg. farmland holding size (2015–16)	1.08 ha	Increasing fragmentation
Landless famers (Includes Leases)	115–120 million	synthesised from NSS

Within this already fragmented agrarian structure lies an even more invisible group: landless farmers and land-insecure cultivators. India has no single official census of landless farmers; instead, landlessness is inferred using multiple proxies across datasets. Synthesised estimates suggest that around 65 million people belong to pure landless households, while an additional 50–55 million are tenant or leased-in cultivators, resulting in a total landless and land-insecure population of roughly 115–120 million people. This constitutes nearly one-fifth of India's agriculture-dependent population, most of whom remain institutionally excluded from formal irrigation governance.

The other reality is particularly visible in traditional irrigation systems. In India, as per national minor irrigation estimates Tanks and other traditional water bodies irrigate approximately 2.18 million hectares, corresponding to around 2 million farm holdings, of which nearly 1.7 million belong to small and marginal farmers. In contrast to large modern irrigation projects, traditional systems often support a larger number of smaller farmers, highlighting their social reach and institutional importance.

Taken together, the global and Indian evidence points to a central structural reality: most irrigation users—especially within traditional systems—are small, marginal, or landless, yet most irrigation projects and institutions are not designed with them at the centre. The next section examines why conventional irrigation institutions struggle to respond to this reality, and how DHAN Foundation's Vayalagam model offers an alternative by treating people's institutions as core irrigation measures, rather than as peripheral social components.

DHAN Foundation's Vayalagam Approach and the CAUSE Framework: Linking Irrigation Institutions to Holistic Development

Across the world, experience increasingly shows that irrigation performance depends not only on physical infrastructure, but also on the strength of local institutions that govern water access, maintenance, and collective decision-making. While many irrigation programmes have promoted

Water User Associations and similar bodies, results have often been uneven due to limited social legitimacy and weak local ownership. In this context, the Vayalagam approach of the DHAN Foundation offers a distinctive and field-tested model that treats people's institutions as hydraulic–social systems, rather than as purely administrative arrangements.

m is a voluntary, membership-based people's institution formed around a shared surface water body such as an irrigation tank or pond. It brings together all categories of users—small and marginal farmers, tenants, women farmers, landless households, and agricultural labourers—who depend on that water system. Through collective action, Vayalagams take responsibility for conserving and restoring water commons, regulating water use, preventing and removing encroachments, sustaining agriculture-based livelihoods, and securing usufruct rights and public entitlements for vulnerable groups. By placing decision-making in the hands of users themselves, the programme rebuilds social capital and revives traditional practices of collective maintenance, such as kudimaramath.

The Vayalagam programme is strengthened through a nested institutional structure. Primary Vayalagams operate at the level of individual tanks or water bodies; these are then networked at the cascade level to reflect hydrological linkages among chains of tanks, and further federated at block or district levels. This structure enables coordinated action at scale, facilitates engagement with government agencies and other stakeholders, and allows local institutions to influence planning beyond the village level.

At the core of this programme is the CAUSE framework, which provides a clear operational pathway for advancing people's institutions from basic water management to holistic development. CAUSE integrates Conservation and development of water assets, Agriculture development aligned with water availability, Usufruct sharing to ensure equity (including for landless households), SCRIPT (SCRIPT is a community-based financial inclusion system—Savings, Credit, Remittance, Insurance, Pension, and Transactions—that strengthens farmers' financial resilience and enables people's institutions to sustainably

manage and invest in irrigation systems.), and Encroachment control, endowments, and entitlements to protect commons and ensure long-term sustainability. Rather than treating these as separate interventions, the CAUSE framework enables Vayalagams to function as comprehensive governance institutions, capable of managing irrigation systems while translating water access into inclusive, resilient, and sustainable livelihood outcomes.

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term sustainability. Rather than treating these as separate interventions, the CAUSE framework enables Vayalagams to function as comprehensive governance institutions, capable of managing irrigation systems while translating water access into inclusive, resilient, and sustainable livelihood outcomes.

Effective Irrigation and Drainage Performance: An Institution–Infrastructure View

Conventional irrigation assessments emphasise physical indicators such as irrigated area, efficiency, and crop output. In systems dominated by small, marginal, tenant, and landless farmers, these indicators capture only part of system performance. Field evidence shows that irrigation outcomes depend as much on institutions as on infrastructure. Infrastructure creates water availability; institutions determine how equitably, efficiently, and sustainably that water is used.

Effective irrigation and drainage performance is therefore defined as a balanced outcome of infrastructure functionality and institutional effectiveness, with equal weight assigned to both:

$$EIDI = 0.5 I_f + 0.5 I_c$$

Where EIDI is the Effective Irrigation and Drainage Index, I_f represents infrastructure

	C	A	U	S	E
Drives					
	Conservation and development	Agriculture development	Usufructs sharing	SCRIPT	Encroachment eviction
Focus of the component	Safeguarding the environment and bio-diversity	Advancement in Tank-fed agriculture	Exchange of rights and resources	Agriculture financing and integration	Removing unauthorized occupants
USP of the component	Context specific community-led conservation	Resilient choices with prosumer emphasis	Mutual goals with distinct roles	Community financing for sustainability	Non-violence and persuasive moves
Impact anticipated	Attaining sustainable eco system	Livelihood security with multiple benefits	Resource generation for Commons	Holistic development at family level	Retrieving water commons

Beyond Infrastructure

performance, and I_c represents institutional performance.

Infrastructure performance is not defined by engineering complexity, but by simplicity, reliability, and farmer operability. Systems that farmers can operate and maintain locally tend to perform better over time. Accordingly, infrastructure performance is expressed as:

$$I_f = f(W_p, D_p, C, A, E)$$

Here, W_p and D_p represent water and drainage infrastructure, while Conservation and development (C), Agriculture development (A), and Encroachment control, endowments, and protection of commons (E) directly reinforce infrastructure functionality and longevity.

Institutional performance captures how water is governed and benefits are shared among users. It is defined as:

$$I_c = f(U, S)$$

Where Usufruct sharing (U) ensures equity in access to water-related benefits, including for landless and tenant households, and SCRIPT (S) strengthens financial resilience through savings, credit, insurance, pensions, and digital transactions.

Combining these elements, effective irrigation and drainage performance can be expressed as:

$$EIDI = 0.5 [f(W_p, D_p, C, A, E)] + 0.5 [f(U, S)]$$

This formulation highlights a simple but critical insight: irrigation systems perform best when simple, farmer-operated infrastructure is matched with strong people's institutions that conserve resources, support productive use, and ensure equity. Strengthening institutions is therefore not an add-on, but a core requirement for achieving inclusive and sustainable irrigation and drainage outcomes.

Case Evidence: Institutions Improving Irrigation Performance

Case Study 1: Usufruct Rights Reviving Village Tanks in Kottampatti, Tamil Nadu: In Kottampatti block of Madurai district, two

traditional irrigation tanks—Kumarasamudram and Adiya Kulam—illustrate how clearly defined usufruct rights can transform declining water bodies into self-sustaining irrigation systems. After severe damage to tank bunds in the early 1990s disrupted irrigation and livelihoods, farmers in Vellinipatti village came together, with facilitation from DHAN Foundation, to form Vayalagam (tank) associations. The tanks were initially restored through public funding combined with a 25 per cent contribution from farmers, re-establishing their physical storage and irrigation functions. However, the most significant transformation occurred when farmers were enabled to collectively exercise usufruct rights over tank-based resources.

The Vayalagams systematically used these rights to generate revenue by leasing fisheries, harvesting tamarind trees planted on tank bunds, selling water from community wells during dry periods, and removing invasive *Prosopis* species. All income



was transparently managed and reinvested into tank maintenance, feeder channel repairs, and the creation of endowment funds. Over time, Kumarasamudram tank alone accumulated a fixed deposit of nearly ₹5.8 lakh, enabling the association to maintain not only its own tank but also support nearby tanks within the cascade. This experience demonstrates that when communities hold clear rights and collective responsibility, village tanks shift from being neglected assets to locally governed, financially viable irrigation systems, benefiting both landholding and landless households.

CAUSE linkage: This case primarily reflects the Usufruct sharing (U) and Encroachment control, endowment, and sustainability (E) components of the CAUSE framework, supported

by Conservation and development (C) through tank rehabilitation. By institutionalising usufruct rights within a Vayalagam, the irrigation system generated its own maintenance resources, ensured equitable benefit sharing—including for landless households—and strengthened the long-term institutional capacity to govern water commons.

Case Study 2 : Farm Pond Fisheries Enhancing Irrigation and Livelihoods in Viralimalai, Tamil Nadu: In the drought-prone Viralimalai block of Tamil Nadu, farm ponds constructed primarily for irrigation have evolved into multi-functional water assets supporting both agriculture and inland fisheries. With facilitation from DHAN Foundation and support from corporate social responsibility (CSR) programmes, 546 farm ponds were constructed between 2018 and 2025, of which 346 farmers adopted fish rearing as a supplementary livelihood. These ponds, with an average storage capacity of about 540 m³, enabled protective irrigation during critical crop stages while allowing productive use of stored water. Small and marginal farmers—many with limited or no access to wells—began rearing locally preferred fish species such as tilapia, catla, and murrel, using family labour and local markets to keep costs low.

The results demonstrate the value of integrating livelihood-oriented water use with irrigation infrastructure. Survey data from 103 farmers indicate that fish rearing generated an average annual gross income of about ₹1.1 lakh per pond, with net profits of around ₹70,000, significantly strengthening household resilience. Farmers also reused nutrient-rich pond water for crop irrigation, improving soil health and enabling double cropping. Beyond income gains, the ponds enhanced water-use efficiency, improved household nutrition through fish consumption, and reduced dependence on rainfall. This experience shows how simple, farmer-managed water infrastructure, combined with productive use rights and institutional facilitation, can deliver both irrigation security and sustainable livelihoods in water-scarce regions.

CAUSE linkage: This case primarily reflects the Agriculture development (A) and Usufruct sharing (U) components of the CAUSE framework, supported by Conservation and development

(C) through decentralized water storage. By enabling farmers to use irrigation infrastructure for multiple livelihood purposes, the Vayalagam-supported approach increased water productivity, diversified incomes, and strengthened resilience—demonstrating how CAUSE translates water access into holistic development outcomes.

Case Study 3: Reclaiming the Paralaiyaru Supply Channel through Collective Action, Tamil Nadu: The Melakodumalur irrigation tank in Ramanathapuram district supports over 150 farming families across a 695-acre command area, with regulated water distribution managed by the local Vayalagam (tank association). Farmers operate a transparent system in which water is released only upon presentation of paid irrigation receipts, enforced by elected Neerkattis (water managers). Despite this strong local governance, tank performance declined sharply due to severe encroachment along the Paralaiyaru supply channel, one of the tank's two main feeder sources. Over time, the channel width was reduced from its original 15 metres to just 4–6 metres, with sections converted into roads and culverts that diverted runoff away from the tank. As inflows from the Vaigai River became increasingly unreliable, the reduced supply from the Paralaiyaru resulted in frequent second-crop failures and growing financial stress among farmers.

In 2025, the Melakodumalur Vayalagam, with facilitation support from DHAN Foundation's federation, initiated a coordinated effort to reclaim the encroached channel. Using locally generated funds from the auction of *Prosopis juliflora*, the association contributed 50 per cent of the ₹6 lakh restoration cost and persistently engaged district authorities, leading to formal action by the Revenue and Public Works departments. While 2.5 km of the 3 km channel was restored smoothly, a contested 500-metre stretch required intensive community negotiation, combining official boundary demarcation with sustained peer engagement in the neighbouring village. After 11 days of collective effort, the encroachment was fully removed. With the channel restored to its full width, farmers expect 1.5 times higher water augmentation, enabling reliable second cropping and fisheries, and an

estimated ₹20,000 per acre increase in annual income, amounting to ₹1.4 crore annually across the command area. This case demonstrates how strong local institutions, community investment, and negotiated governance can restore critical irrigation infrastructure.

CAUSE linkage: This case reflects a strong integration of Conservation and development (C) and Encroachment eviction (E), reinforced by SCRIPT (S) logic. Regular water charges collected through the Vayalagam, transparent financial management, and savings generated from common-property resources enabled the association to co-finance channel restoration and sustain follow-up actions. By linking financial discipline (SCRIPT) with collective action and institutional legitimacy, the Vayalagam was able to overcome entrenched encroachments and restore the hydrological integrity of the irrigation system.

Way Forward: Strengthening Institutions for Sustainable Irrigation and Water Governance

The future of effective irrigation and drainage lies in building strong social capital that enables holistic governance of water resources. People's institutions such as Vayalagams demonstrate that when farmers collectively manage water, infrastructure performance improves, conflicts are reduced, and benefits are distributed more equitably. Strengthening these institutions should be treated as a core investment—on par with physical infrastructure—to ensure long-term protection of water commons and sustained farmer welfare.

Addressing contemporary challenges requires continuous capacity building at the local level, equipping communities to respond to climate variability, land fragmentation, and market uncertainties. Placing hydrology at the centre of ecosystem development—by understanding flows, recharge, and surface-groundwater interactions—allows irrigation systems to be designed and managed in harmony with local landscapes. This must be supported by integrated management of surface water and groundwater, recognising them as a single interconnected resource rather than separate domains.

Finally, achieving scale and durability calls for long-term partnerships among communities, governments, research institutions, and private actors. Such partnerships enable saturation of successful models, sustained financing, and adaptive learning over time. By combining simple, farmer-operated infrastructure with strong institutions, hydrology-based planning, and integrated water management, irrigation systems can deliver inclusive growth, climate resilience, and sustainable outcomes—offering a globally relevant pathway for the future of water governance.

Water systems endure not because of concrete and canals alone, but because communities care for them across generations. When people's institutions are placed at the heart of irrigation, water becomes not just a resource to manage, but a shared responsibility that sustains life, livelihoods, and hope.



About DHAN Foundation

DHAN Foundation is a professional development organisation working at the intersection of water, livelihoods, and people's institutions, with a long-

standing commitment to community-led poverty reduction. Through its water-thematic institution, the DHAN Vayalagam (Tank) Foundation (DVTF), DHAN advances the core idea of this article—that effective irrigation depends as much on strong institutions as on physical infrastructure. Guided by

the purpose of ensuring water security for generations, DVTF focuses on conserving and governing small-scale water bodies using the CAUSE framework, integrating water management with agriculture, equity, finance, and sustainability. Operating across 25 river basins in 7 states, DVTF engages nearly 5 lakh farming community members through 7,105 Vayalagams (people's water institutions) and 4,858 Agricultural Finance Groups, demonstrating people-centred pathways to inclusive and resilient irrigation outcomes.

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Gudeuljang Irrigated Rice Terraces in Cheongsando, Republic of Korea

Name	Gudeuljang Irrigated Rice Terraces in Cheongsando
Location	Wando County, Republic of Korea
Latitude	34°10'56.1"N (based on the core zone)
Longitude	126°53'35.8"E (based on the core zone)
Category of Structure	Terraces
Year of commissioning	A.D. 17C ~ mid-20 C
River Basin	Small streams in the eastern part of Cheongsan-Myeon
Irrigated/Drained Area	1370 ha



History

The structure began to be built in the 1600s, when villages were expanded in Cheongsando Island, until the mid-1900s, over 400 years old. According to recent studies, upon researching the pottery sherd found in stacked stones of nearby Gudeuljang rice fields, Gudeuljang rice fields are about 700 years old.

Rice terrace was the only method to grow rice in such conditions as found in many other rice-growing countries in the hilly or mountainous areas. The people on the Island wished to have a rice field, and finally, they found the method of Gudeuljang irrigating rice terraces. Gudeuljang rice terraces are using the principle of Ondol, which is a traditional room floor heating system of Korean houses. It makes several longitudinal short stone walls and covers them with Gudeuljang (large flat stone) in every room. The heat produced in the fire inlet goes through those culvert-shaped passages and heats the room floor, then to the chimney.

Description

Cheongsando Island has an area of 41.95 km², with a maximum east-west distance of about 7.5 km and a north-south distance of 7 km. It is a mountainous area with five mountains among which three mountains are higher than 300 m from the mean sea level, with a maximum of 387 m. There was no adequate area for rice cropping that needs flat farmland and irrigation. Also, no stream was developed due to the small watershed area and steep mountain slope, and most of the soil was mixed with sand and various size of the stone.

Gudeuljang rice terraces are composed of Gudeuljang rice fields. Each parcel of the rice field was made with a stone layer to get a horizontal surface and boundary wall. The surface was covered with a water leakage prevention layer and then a rice cultivation soil layer. For irrigation water supply, a stone culvert covered with Gudeuljang was installed in the stone layer.

World Heritage Irrigation Structure

Major features of Gudeuljang rice terraces were an underground irrigation water supply system using an underground stone layer and a stone culvert covered with Gudeuljang stone. This was a very unique method for rice terraces in the sloping area available with much stone.

Water Heritage

Gudeuljang rice fields have the purpose of obtaining larger terraced flat farm parcels in sloped areas for the cultivation of rice crops. To make a larger flat parcel area, a higher downstream boundary wall and filling inside were required. On this island, much stone was available, therefore, stones were used for the wall and filling inside horizontally. After that, the horizontal surface of the stone layer was covered with clay soil or fine soil to prevent downward water leakage and then covered again with ordinary soil for the cultivation of rice crops. A larger parcel area has many benefits such as better irrigation water management, efficiency in farm work, increase in cropping area, etc.

For irrigation, the stone layer was designed to include a stone culvert covered with large flat stone (Gudeuljang stone). Irrigation water arriving at the upper side of the parcel can be introduced to the parcel for irrigation or directly enters to stone layer through a vertical inlet. Water entered the stone layer flows along the slope, then meet the culvert and finally goes to the downstream paddy field at the end of the culvert. The amount of water in the parcel and the stone layer shall be controlled depending on the need for irrigation water in the parcel. Water entering the vertical inlet will be irrigation water to the downstream parcels.

The difference between ordinary rice terraces and Gudeuljang rice terraces is the irrigation water supply system. Ordinary rice terraces depend on the paddy-to-paddy surface flow system, while Gudeuljang rice terraces are on an underground stone culvert flow system.

Gudeuljang rice fields embody Cheongsando islanders' strong attachment to land usage and food production. Currently, 72% of Cheongsando Island's land usage is wooded and sloped lands, while rice fields only take up 21.1%. When settlers who came to Cheongsando Island began farming 400 years ago, there were significantly fewer farmlands compared to today. On the Island, Gudeuljang rice fields were the only places to cultivate rice crops which were why they invented Gudeuljang

rice fields with an underground culvert irrigation system. Before and after rice crop cultivation or in the dry year, the Gudeuljang rice fields were used for other crop production such as vegetables, barley, garlic, beans, buckwheat, potato, etc. On the isolated island, crop production within the island was most important for the living of the people.

Before agricultural technology developed and rice production and consumption increased, rice was hard to come by in Cheongsando Island so the rice could only be eaten during ancestral rites or holidays. This shows how little the amount of rice produced from the harsh and small Gudeuljang rice fields was. Islanders' main foods were sweet potato or potato, with rice mixed with barley, millet, or mugwort. Also, they frequently consumed various seafood which was easily obtained from the sea.

Gudeuljang rice fields exhibit a similar structure to Ondol, Korea's traditional floor heating system. Similar to how Ondol transfers the heat from the fireplace via Gudeul (similar to the culvert) laid out under the floor, Gudeuljang rice fields stack stones of varying sizes at the bottom of the rice field and controls water flow through the culvert that sends water to downstream paddy field.

The culverts are typically 3-10 m long under the parcel. And leakage prevention layer above the stone layer is placed by hand with puddled clay or fine soil to prevent remaining of any holes or cracks in the layer. The upper soil layer shall be about 20-30 cm depth with good quality soil for good crop growth.

The dolmens from the Bronze Age found on Cheongsando Island can be called the foundation for the island's Stone Stacking Culture. Stones were foundational material in constructing houses, roads, towns, etc. needed for the everyday life of the people. Cheongsanjinseong Fortress was built for defence in the Joseon dynasty. Moreover, Gudeuljang rice fields were developed as a way to solve food problems by developing mountain slope areas as cultivable areas. We can see low and high stone walls between parcels that provide a unique landscape.

Cheongsando islanders including soldiers made Gudeuljang rice fields via cooperative labour mobilization. Making one parcel of Gudeuljang rice field took a few months to 1- 2 years. Cooperative labour was an essential factor in constructing Gudeuljang rice fields. Also, they wisely came up with the idea of sharing the oxen for ploughing and material transport.

With Gudeljang (large flat stone cover) and Gudel (similar culvert), a room heating system in the house was used for the warm floor in the winter season, and the same principle was adopted to make cultivable Gudeuljang rice fields having stone culverts, under the cultivation soil layer, through which irrigation water is supplied.

After the 1990s, as the ageing of the island society and population outflow to cities increase, Gudeuljang rice fields, which took care of islanders'





life for a long time, are left neglected and forested. It is estimated that 37.83% of the entire surface area is left as fallow land, especially those nearby mountain ranges and forests far from villages.

In response to the increase in fallow land caused by ageing and the outflow of population, Gudeuljang rice terraces have been continuously restored since 2018. According to the Gudeuljang rice field distribution status research held in 2019, it was found that 1,370 ha and 12,629 parcels of Gudeuljang rice fields are located across Cheongsan-myeon. Many Gudeuljang rice fields are distributed across basins near Buheung-ri, Yangjung-ri, Sangdong-ri, and Cheonggye-ri. Because Gudeuljang rice fields are made along mountain slopes they resemble regular terraced rice fields.

Efforts to maintain and manage the traditional agricultural system through the composition and operation of a resident organization in charge of Gudeuljang rice terraces

To solve this problem, the 2018 Cheongsando Island Gudeuljang Preservation Council formed Gudeuljang rice field join-cultivators to promote restorative and maintain idle Gudeuljang rice fields twice every year. Through this, approximately 10 ha of idle farmland was restored by the year 2020. Gudeuljang rice field join-cultivators are turning idle farmlands into scenic agriculture areas that farm landscape crops such as rapeseed or buckwheat via restoration and maintenance of fallow land, and they are making an effort to transform such land into a tourist attraction.

Systematization of policy support for the conservation of Gudeuljang rice terraces by designating GIAHS following KIA

After Cheongsando Island's Gudeuljang rice fields were designated as No. 1 Korea's Important Agricultural Heritage Systems (KIAHS) by the Ministry of Agriculture, Food and Rural Affairs in 2013, it was designated as Globally Important Agricultural Heritage (GIAHS) by the Food and Agriculture Organization of the United Nations (FAO) in 2014. As Gudeuljang rice fields' agricultural and cultural value is being recognized globally, central government and local government's policies and financial support are continuously taking place to support farmers' voluntary resource preservation actions.

Archipelago Maritime National Park, and the first Slow City in Asia

Cheongsando was designated as an archipelago maritime national park in December 1981, and the first Slow City in Asia in December 2001. Many people visit the Island and enjoy the slow scenery of the blue sea, green mountains, flat Gudeulgang rice fields covered with crops, dolmens, stone walls, etc. Therefore, islanders and the County Office pay more attention to the conservation of the Gudeuljang rice terraces.



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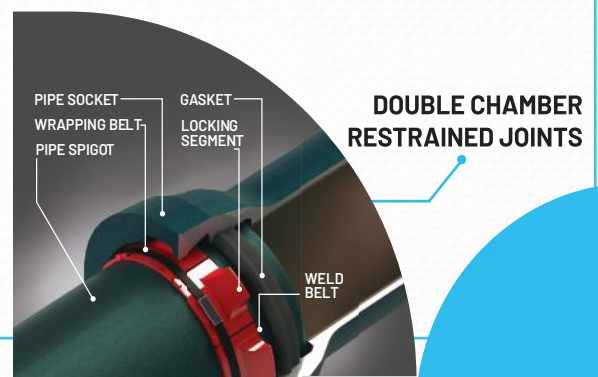
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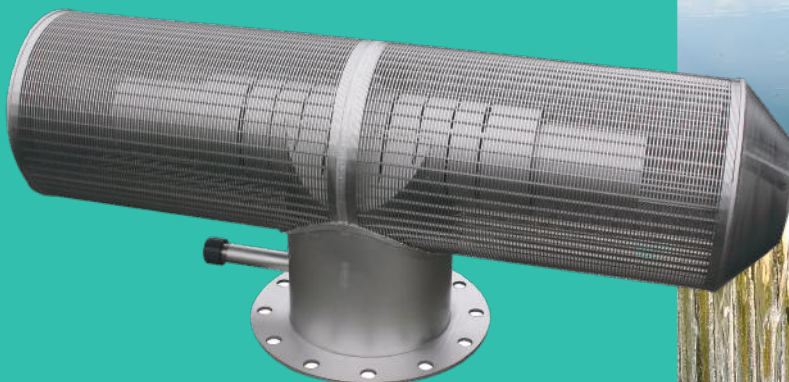
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Japan: Irrigation and Drainage Profile

Geo. Area 0.38
M Sqkm,



Population
123.4 M



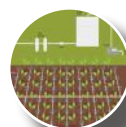
Average
annual rainfall
1,700 mm



Arable Area
4.297 Mha
(2023)



Irrigated Area
2.843 Mha
(2023)



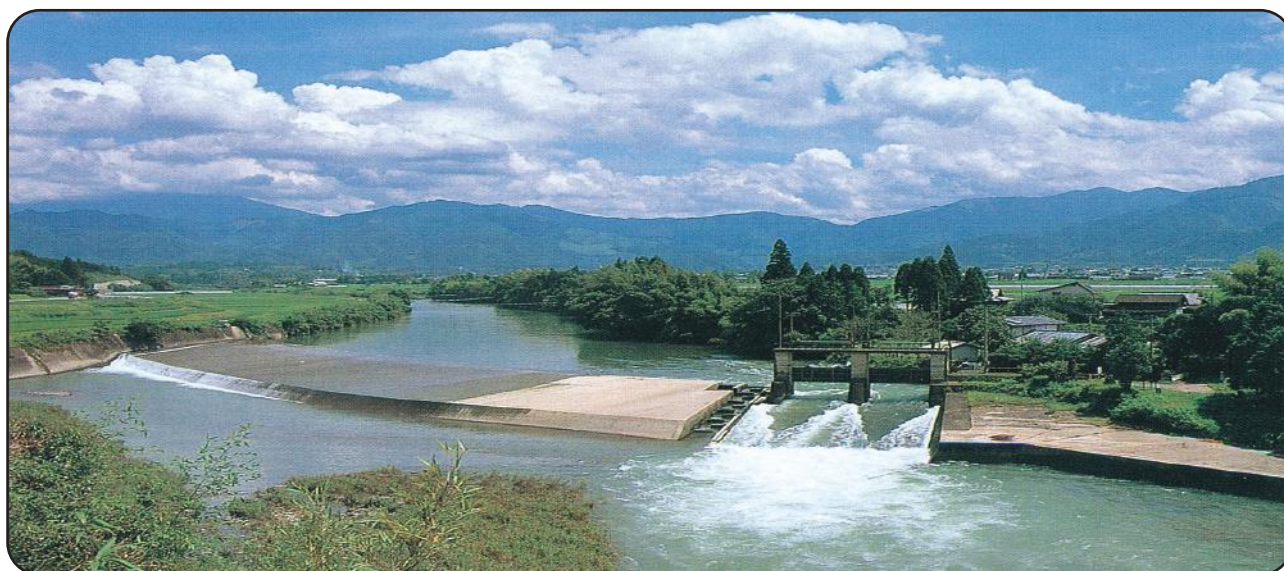
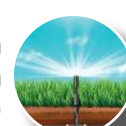
Drained Area
3.070 Mha
(2023)



Micro Irrigation
0.422 Mha
(2013)



Sprinkler Irrigation
0.958 Mha
(2013)



Geography

Japan is an archipelago in East Asia comprising 6,852 islands, with an area of 377,975 Sq.Km. Out of these, four major islands - Hokkaido, Honshu, Kyushu, and Shikoku - form a bow-shaped curve that extends for about 1,900 Km of the total coastline of 3,000 Km. About 70% of these islands are mountainous. Japan is divided into 47 prefectures and into eight regions. The latitude of Japan is 36.2048° N, and the country's longitude is 138.2529°E.

Population and land use

The population of Japan was 126 million in mid-2019 as per Population Reference Bureau. Japan has the 11th highest population in the world,

making up 1.7% of the total world population. The population density is 332 persons per Sq.Km. The total area of the country is 37.79 Mha, out of which the land area is 36.45 Mha. The area under agriculture is 4.5 Mha and 24.96 Mha is under forest cover.

Climate and rainfall

Most parts of Japan are within the north temperate zone with four seasons a year. The length of the archipelago and the ocean currents along the coasts lend a wide variety of climates to Japan. The major landmasses fall into two typical climatic zones: The Pacific coast climatic zone and the Sea of Japan climatic zone, which have different seasonal distributions of precipitation.

Country Profile

The average annual rainfall of 1,700 mm is relatively high in global terms.

Food and agriculture

Japan's main crop is rice, and it is a leading rice producer. Rice fields make up more than half of national farmlands. Japanese farmers grow a wide variety of other crops, such as wheat, soybeans, tea, vegetables (onions, radish, cucumbers, eggplants, lettuce, tomatoes, etc.) and fruit (apples, oranges, pears, persimmons, etc.). Sugar beet is grown in cold areas and sugar cane in hotter regions. About 73% of Japan is forested or mountainous and is unsuitable for agriculture. The total arable land in Japan is about 4.3 Mha.

Water resources management

Water is a vital resource, particularly for use in rice farming among rural communities, water use for agriculture is about 53.3 BCM/ year,

canals for paddy fields with pipelines. Pipelines from the 1980s replaced many farm ditches in paddy and upland fields. Farmers draw water individually based on their farming schedules to irrigate their fields as required. Telemonitoring and tele-control systems work well for water management systems. These efforts drastically modernized irrigation in Japan. The total irrigated area in Japan is about 2.8 Mha out of which Sprinkler Irrigation is used on 0.96 Mha and Micro Irrigation is used on 0.42 Mha of land.

River basins

In Japan, there are more than 2800 river basins, of which the government manages 109 rivers. The catchment area of these rivers managed by the government is about 241,000 Sq Km. Out of the total rivers in the country, only ten rivers exceed 200 Km in length. The longest, the Shinano River, winds through the Nagano



comprising approximately two-thirds of overall water use of 78.5 BCM / year in 2019.

Irrigation and drainage

The modern irrigation system in Japan was first introduced in the 1950s when the Aichi Irrigation Project installed one of the fastest advanced automatic-check systems along branch canals to ensure constant and stable water distribution. Japan developed these irrigation canal networks with concrete open channels in both the primary and branch canals. A pipeline system was also introduced in the 1960s for upland crops, while in the 1970s, work began to replace the main

and Niigata prefectures of Honshu Island and empties into the Sea of Japan. It is 367 Km long and has a specific runoff of 1.389 m³/s/Km². The average surface water resources are about 420 Km³/year. Two hundred forty-seven freshwater aquifers are underlying a total area of 69 130 Km².

Water policies

The Japanese agricultural sector accounts for about 1.0% of the entire country's GDP. About 12% of Japan's land is suitable for cultivation. Japan has adopted the system of terraced cultivation due to the scarcity of arable land for



farming in small areas. Japan manages to get one of the world's highest levels of crop yields per unit area, with an overall agricultural self-sufficiency rate based on calorie of about 38% from the cultivable lands available.

Legislations

The Land Improvement Act (enacted in 1949) allowed farmers to establish water users' groups called Land Improvement Districts (LIDs), which are essential for Participatory Irrigation Management (PIM). In Japan, LIDs manage the main irrigation facilities such as dams or headworks. In contrast, farmers or local communities manage terminal canals or small farm roads near paddy fields. Various other countries have adopted the successful PIM model in monsoon climates through international cooperation projects.

ICID and National Committee

Japan joined the ICID in 1951. JNC-ICID secretariat has its office in the Ministry of Agriculture, Forestry, and Fisheries in Japan. The Past Vice Presidents were: Mr. T. Seino honorary (1957-1960); Prof. Hitoshi Fukuda (1962-1965); Dr. M. Nakahara (1985-1988); Dr. R. Nakamura (1993-1996); Dr. Shigetaka Taniyama (2001-2004); Mr. Shinsuke Ota (2008-2011); Mr. Naoki Hayashida (2017-2020), and Prof. Dr. Tsugihiko Watanabe (2021-2024). The Japanese National Committee (JNC-ICID) hosted the 14th IEC meeting and the 5th International Congress on Irrigation and Drainage in Tokyo in 1963, and the 7th Asian Regional Conference in Tokyo in 1989. The details regarding Japanese National Committee, ICID (JNC-ICID) can be accessed from: <https://icid-ciid.org/member/country_profile1/47_A>.



Comparative Analysis of Piped Irrigation System and Canal Distribution Network in Terms of Environmental Impact And Sustainability

A N Dey and Sudipto Lahiri

Introduction

Irrigation is a critical component of agricultural productivity, food security, and environmental sustainability. Traditional canal distribution networks (CDN) have been widely used, but inefficiencies such as high-water loss through seepage, evaporation, and waterlogging remain challenges. Piped Irrigation Networks (PIN) offer a sustainable alternative, delivering water directly to fields while minimizing losses and environmental impact. This paper discusses the advantages of piped irrigation over canal distribution networks in terms of environmental benefits and sustainability.

Why irrigation must change under climate stress

India's agriculture uses ~80–85% of total freshwater withdrawals. Climate change has made rainfall more erratic, intense, and unevenly distributed — meaning higher flood peaks and longer dry spells. Conventional open canals and surface irrigation suffer 30–40% conveyance

losses through seepage and evaporation, worsening under high temperature conditions. Many irrigation command areas face declining groundwater tables, salinity, and soil moisture stress.

Piped Irrigation Network (PIN)

A Piped Irrigation Network (PIN) is a system of pipes, valves, and devices that supplies water under pressure from the source to irrigable areas, it may function as a low-pressure open or semi-closed system for surface irrigation using gravity (5–6m head), or as a high-pressure closed system for drip and sprinkler irrigation (above 10–20m head), typically requiring pumps.

Advantages of Piped Irrigation Network

Land, Soil, and Ecosystem Sustainability: Open-channel systems experience high seepage losses, often leading to waterlogging, soil salinity, and alkalinity. Pressurized buried pipelines eliminate seepage, thereby preventing waterlogging and



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Comparative Analysis of Piped Irrigation System

reducing soil salinity. This helps maintain soil structure, fertility, and long-term productivity.

Traditional canal systems require wide land corridors that divide and fragment farms. Pipeline networks, being underground, occupy minimal surface area and avoid such disruptions. This saves valuable arable land and supports more compact and efficient farm layouts.

Surface canals can disturb natural drainage patterns and modify groundwater recharge. Subsurface pipeline conveyance allows controlled water release and managed recharge through designated zones. When integrated with watershed management, this approach improves hydro-ecological balance and supports sustainable land and water use.

- Reduced Right of Way Issues
- Minimized Cross Structures

- No Drainage Obstruction
- Resistant to Flood Damage
- Ideal for Flood-Prone Areas
- Unobstructed Farm Movement
- Increased Cultivable Command Area
- Suitable for Undulating Terrain
- Efficient & Flexible Water Delivery
- Faster Execution
- Supports Modernization
- Reduces Health Risks
- Higher Project Efficiency
- Fertilizer Integration
- Accurate Water Auditing

Comparative water uses efficiency of PIN and CDN

Comparison of Irrigation efficiency of CDN & PIN

Method of conveyance/ irrigation		Micro Irrigation		Surface Irrigation
		Sprinkler	Drip	
Canal based Conveyance	Conveyance Efficiency (%)	70	70	70
	Field Canal Efficiency	90	90	90
	Field Application efficiency (%)	75	90	60
	Overall efficiency (%)	47.25	56.7	37.8
Pipe based Conveyance	Conveyance Efficiency (%)	95	95	95
	Field Pipe Efficiency	95	95	95
	Field Application efficiency (%)	75	90	60
	Overall efficiency (%)	67.68	81.23	54.15
Increase of overall efficiency (%) (Pipe against Canal)		20.43	24.53	16.35

CWC Piped irrigation Manual (Page-12) / ISO 23991:2022(Page-25)

Piped Irrigation Systems Are More Sustainable



Lower Land Requirement and Minimal Ecological Disturbance

- Pipelines: Laid underground or along existing ROWs.
- Require very narrow corridors. Do not fragment agricultural land or wildlife habitats.
- Canals: Require wide embankments, forest clearing, and land acquisition. Disrupt village connectivity, drainage channels, and natural topography.
- Result: Pipes preserve soil, vegetation, and ecological continuity.

Prevents Waterlogging and Soil Degradation

Open canals often cause:

- Waterlogging in adjacent fields
- Formation of saline and alkaline soils
- Breeding of insects

Pipelines deliver water under pressure directly to farms, preventing:

- Seepage-induced salinity
- Accidental flooding
- Mosquito breeding

Higher Water use efficiency: Traditional systems follow fixed, rotation-based schedules, offering little flexibility. Pipelines equipped with controlled outlets allow water delivery according to crop needs, enabling farmers to adjust irrigation timing based on unpredictable rainfall and temperature changes. Improved crop productivity Studies in Rajasthan, Andhra Pradesh, and Punjab show 15–25% yield increase due to reliable and controlled water delivery.

Supports Micro-Irrigation (Drip/Sprinkler)

Pressurised pipe networks are inherently compatible with:

- Drip irrigation
- Sprinkler irrigation
- Automated irrigation scheduling

These systems reduce water consumption by 30–60%, and deliver:

- Higher WUE (Water Use Efficiency)
- Lower fertilizer use (fertigation-ready)

More climate resilience: Traditional open-channel systems lose about 30–40% of water through seepage, evaporation, and breaches. In contrast, pressurized buried pipelines limit losses to less than 10%, as water flows under pressure and remains covered. This reduction significantly

Comparative Analysis of Piped Irrigation System

lowers total water demand an advantage that becomes critical under decreasing rainfall and frequent drought conditions. Open channels often deliver more water to head-end farmers while tail-end users face shortages. Pipeline systems maintain even pressure, ensuring equitable water distribution across varying terrains. This promotes both social and spatial equity, strengthening the resilience of small and marginal farmers.

Extreme weather impacts CDN:

- Canals breach due to floods or intense rainfall.
- Silting increases during storms.
- Heatwaves increase canal evaporation drastically.

Pipes withstand climate variability:

- Underground alignment protects from storms.
- Heat has negligible impact on flows.
- Reduces flood risk since no embankments exist.

Reduced Maintenance & Chemical Use

Piped irrigation systems may require higher initial investment compared to canal networks but offer lower long-term maintenance costs due to reduced infrastructure degradation and operational simplicity.

Open channels demand regular silt removal, vegetation control, and repair of breaches, leading to higher maintenance energy and material use. Pipelines, once installed and properly monitored, require minimal upkeep. This results in lower recurring energy demands and a reduced long-term carbon footprint.

Pipelines require minimal interventions:

- No weeds
- No embankment erosion
- Long service life (>70–100 years for DI, >50 years for HDPE)
- Lower maintenance → lower carbon footprint

Better Water Quality and Agriculture Productivity

Open canals accumulate:

- Algae and Weeds
- Animal contamination Silt
- High possibility of contamination

Pipes ensure:

- Clean water
- No contamination from drainage or runoff
- Stable flows to micro-irrigation systems

This enhances crop yield and reduces disease incidence

Soil and Crop Health: Efficient water delivery through pipelines reduces soil erosion typically caused by canal water flows. It also prevents weed growth along canals, which often competes with crops for resources. Pressurized pipelines, when integrated with micro-irrigation, allow precise and flexible water delivery suited to variable weather conditions. This enhances drought resilience and reduces the risk of crop failure.

Lower Ecological Footprint: The reduction in water loss means less extraction pressure on water sources, supporting sustainable water resource management. Moreover, piped systems have fewer structural requirements such as cross drainage and masonry works, reducing construction impacts and habitat disruption.

Energy and Emission Benefits: In gravity-based piped systems:

- Energy use approaches zero.
- Pumps, if used, operate more efficiently due to minimized friction losses.

Optimized pipe network design aims to reduce pumping requirements and energy consumption, lowering the carbon footprint of irrigation systems.

Economic and Social Sustainability: Canal systems involve high maintenance costs due to frequent desilting, embankment repair, and vegetation control. Pipeline networks require only periodic maintenance of valves and pumps. This results in lower life-cycle costs and reduced use of materials and labor resources.

How Piped irrigation is aligned with United Nations Sustainable Development Goals (SDGs)

Piped irrigation directly supports a number of UN Sustainable Development Goals, which are detailed below, by dramatically improving water efficiency, reducing waste (evaporation, seepage), ensuring equitable water delivery, cutting pollution, boosting food security through higher crop yields, and freeing women/girls from water collection, contributing to gender equality and better health .

SDG 1 – No Poverty

- Stabilizes agricultural income
- Reduces crop failure risk
- Lowers operational costs (less pumping, labour)

Outcome: Economic resilience of rural households

SDG 2 – Zero Hunger

- Reliable on-demand water improves crop yields and cropping intensity
- Enables diversification to high-value crops
- Supports smallholder farmers by reducing dependence on rainfall
- Promotes climate-resilient agriculture

Outcome: Higher farm income and food security

SDG 5 – Gender Equality (Indirect)

- Reduces time spent fetching water
- Enables women's participation in farm decisions
- Improves safety and accessibility

Outcome: Social inclusion and empowerment

SDG 6 – Clean Water and Sanitation

- Reduces water losses (seepage, evaporation) vs open canals (loss reduction approx. 30–40%) Enables volumetric control and equity in distribution
- Facilitates reuse of treated wastewater for irrigation
- Improves integrated water resources management (IWRM)

Outcome: Sustainable withdrawal and efficient water use

SDG 8 – Decent Work and Economic Growth

- Contribution: Increases agricultural productivity per unit of water
- Encourages agro-processing and value chains
- Reduces drudgery, especially for women

Outcome: Efficient resource-based economic growth

SDG 12 – Responsible Consumption and Production

- Precise irrigation reduces overuse of: Water
- Fertilizers (less leaching)
- Promotes micro-irrigation (drip/sprinkler) integration

Outcome: Sustainable agricultural inputs management

SDG 13 – Climate Action

- Reduces vulnerability to droughts
- Supports adaptive irrigation scheduling
- Lower energy use → reduced GHG emissions
- Compatible with solar-powered pumping & SCADA

Outcome: Climate adaptation and mitigation

SDG 15 – Life on Land

- Prevents waterlogging and soil salinization
- Reduces command-area expansion pressure on forests
- Improves soil health

Outcome: Protection of terrestrial ecosystems

Better Sustainability of Metal Pipes

- Metal pipes has a higher initial cost but much lower lifetime cost due to long service life and minimal maintenance.
- Needs far fewer repairs or replacements, saving labour, materials, and reducing system downtime.

Comparative Analysis of Piped Irrigation System

- Smooth interiors reduce pumping energy, lowering annual operating costs for irrigation systems.
- Concrete pipes are heavy, harder to install, and can crack in certain soils, increasing labour and land disturbance costs.
- Plastic pipes can degrade under sunlight, heat, or fire and need more frequent replacement, causing more interruptions.
- Plastic and concrete pipes are more easily damaged by intensive farming activities, increasing long-term costs.

India's policy and climate commitments alignment

- PMKSY – “Har Khet Ko Pani” Focus on micro- and pressurised irrigation; integrates efficiency and climate resilience objectives.
- National Water Mission (NWM) Mission goal: “20% improvement in water use efficiency” — piped systems are a key means.
- India's NDC (Paris Agreement) Target: reduce emission intensity of GDP by 45% by 2030; water-efficient agriculture (via piped & micro-irrigation) reduces both water & energy use per unit yield.
- CADWM & PMKSY-MICAD sub-schemes Include funding for underground pipelines,

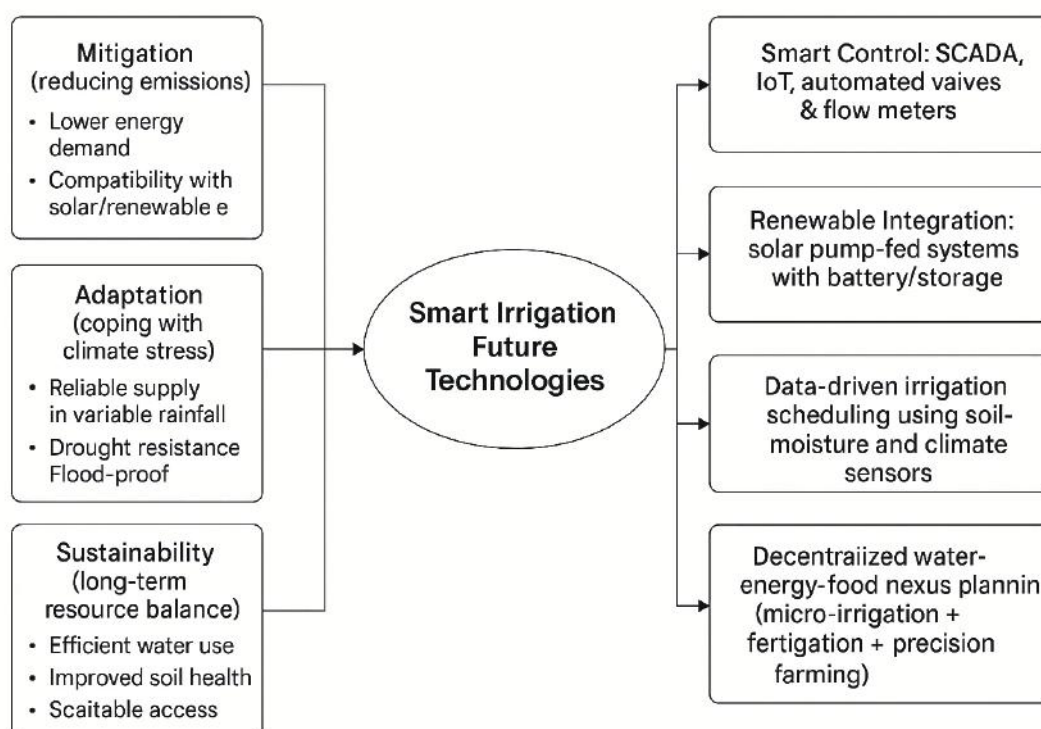
solar pumps, and digitised water monitoring.

- State climate action plans (SAPCCs) Most include piped/micro irrigation as adaptation measures to heat, drought, and erratic rainfall.

Future Outlook — Integrated Climate-Smart Framework

Agriculture, an essential driver of economic expansion, is faced by the issue of sustaining an increasing global population in the context of climatic uncertainty and limited resources. As a result, “Smart Farming”, which uses cutting-edge artificial intelligence (AI) to support autonomous decision-making, has become more popular. This article explores how the Internet of Things (IoT), AI, machine learning (ML), remote sensing, and variable-rate technology (VRT) work together to transform agriculture.

Using sophisticated algorithms to predict soil conditions, improving agricultural yield projections, diagnosing water stress from sensor data, and identifying plant diseases and weeds through image recognition, crop mapping, and AI-guided crop selection are some of the main applications investigated. Furthermore, the precision with which VRT applies water, pesticides, and fertilizers optimizes resource utilization, enhancing sustainability and efficiency.



Comparative Analysis of Piped Irrigation System

To effectively meet the world's food demands, this study forecasts a sustainable agricultural future that combines AI-driven approaches with conventional methods.

- Mitigation (reducing emissions) Lower energy demand, compatibility with solar/renewable energy.
- Adaptation (coping with climate stress) Reliable supply in variable rainfall, drought resistance, and flood-proof infrastructure.
- Sustainability (long-term resource balance) Efficient water use, improved soil health, equitable access, and scalable digital monitoring, transition to net-zero irrigation energy and lower emission intensity per ton of crop.

- Next-generation piped irrigation systems are evolving towards:
- Smart control: SCADA, IoT, automated valves & flow meters.
- Renewable integration: solar pump-fed systems with battery/storage.
- Data-driven irrigation scheduling using soil-moisture and climate sensors.
- Decentralised water-energy-food nexus planning (micro-irrigation + fertigation + precision farming).

These align directly with India's National Mission for Sustainable Agriculture (NMSA) and the Green Growth Roadmap (2023–2030) under Jal Shakti and MoAFW

Comparative Table for selection of sustainable pipe material

Dimension	Ductile Iron Pipe	Concrete Pipe	Plastic Pipe
Environmental	90%+ recycled, ~100yr life, low energy, safe	Shorter lifespan, heavy manufacturing	Lower life, light, sometimes toxic
Social	Reliable, safe, equity for tail-end farmers	More breakage, harder repairs	Prone to leak/fire, lower water quality
Economic	Low O&M, fewer replacements, energy savings	Higher maintenance, installation cost	Cheap upfront, frequent repair/replace

Sustainability Benefits of Piped Irrigation System

Water loss High (evaporation + seepage)	Very low Saves water resources
Land use Very high	Land use Minimal. Less deforestation & displacement
Soil impact Waterlogging, salinity	No impact Protects soil health
Climate resilience Poor	High Long-term sustainability
Energy use: High	Low Reduced carbon footprint
Maintenance Intensive	Minimal maintenance & emissions
Not very compatible with micro irrigation and self fertilizer distribution	High Compatibility with Surface irrigation only Drip, sprinkler 30–60% water saving
Lower project life, high Life cycle cost	Much higher project life and lower life cycle cost

Summary

Piped irrigation systems directly support climate-resilient, water-efficient agriculture, minimize ecosystem disturbance, reduce energy use, and enhance water use efficiency (WUE). This makes them inherently more environmentally sustainable than canal-based systems.

In open canals, it is difficult to measure water volumetrically or monitor usage accurately. Piped systems, however, allow the integration of flow meters, sensors, and SCADA-based automation, enabling transparent and equitable water distribution. This supports accountable water governance and efficient resource management.

Comparative Analysis of Piped Irrigation System

Traditional systems are usually managed centrally by irrigation departments, limiting farmer involvement. Pipeline infrastructure is well suited for decentralized management through Water User Associations (WUAs), supported by digital control tools. This enhances social sustainability, promotes local ownership, and strengthens community-based irrigation governance.

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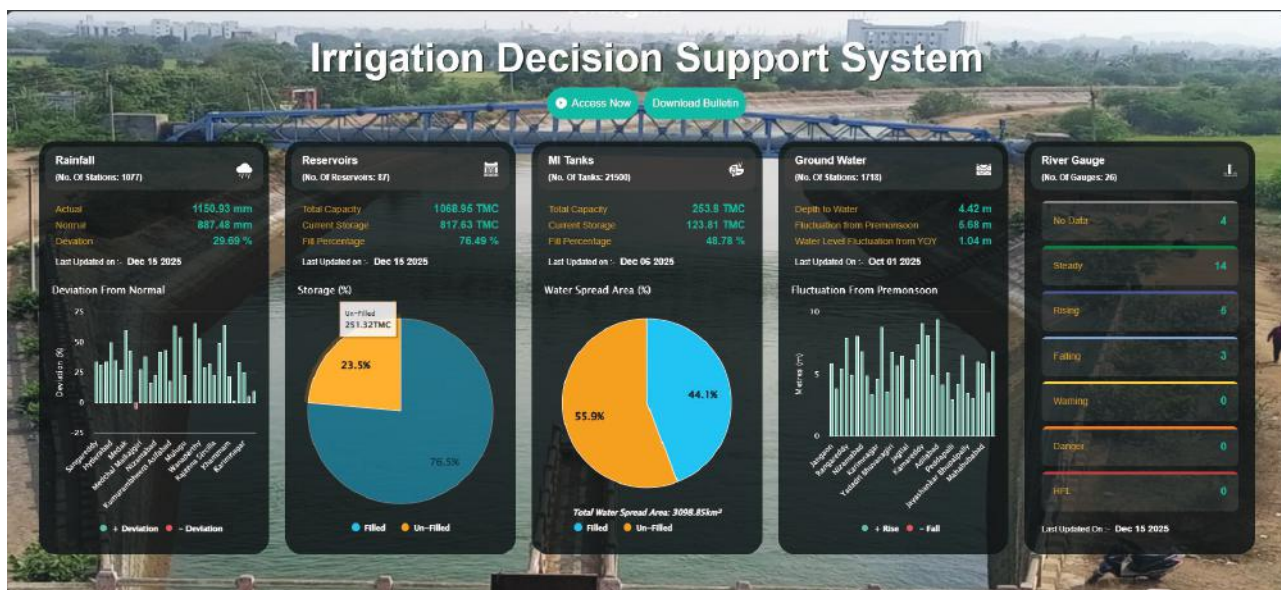
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Integrated Water Resources Management from Reservoirs to Roots

Dr. Rampalli Madhuri



Integrated Water Resource Management (IWRM) is an approach that promotes the coordinated development and management of water, land, and related resources to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Key Principles

- Recognizes the interdependence of all uses of water resources, ensuring that water allocations and management decisions consider the effects of each use on others.
- Emphasizes sustainable, equitable, and efficient water use.
- Encourages participatory decision-making, involving stakeholders from all sectors, including farmers, communities, and environmental groups.
- Applies a basin or catchment-level approach to management, integrating environmental, social, and economic objectives.



Dr. Rampalli Madhuri is a hydrology and water resources expert with over 15 years of experience in integrated water resources management, flood forecasting, and irrigation decision support systems. She holds a PhD in Civil Engineering from BITS Pilani, Hyderabad, with research focused on urban flood risk assessment under climate change. Dr. Madhuri has published multiple SCI-indexed papers and received national recognition, including awards at international conferences. She has worked extensively with premier institutions and government agencies on real-time flood forecasting and hydrologic modeling. Currently, she serves as Project Manager - Hydrology at Vassar Labs, leading large-scale IWRM and irrigation DSS implementations across multiple Indian states.

Challenges

- Requires cross-sectoral coordination and holistic integration of objectives, which can be complex to implement.
- Success depends on adapting IWRM principles to local environmental, social, and economic contexts.
- Faces difficulties in translating high-level principles into concrete, operational actions at the local and regional levels.

Benefits

- Promotes sustainable water use for agriculture, industry, and domestic needs.
- Supports the protection of ecosystems and improves resource efficiency.
- IWRM provides a framework for adapting to climate-related challenges, such as flooding and drought.

IWRM represents a shift from fragmented water management toward a more integrated, systems-based approach, ensuring that human and environmental needs are balanced sustainably over time as shown in Figure 1.

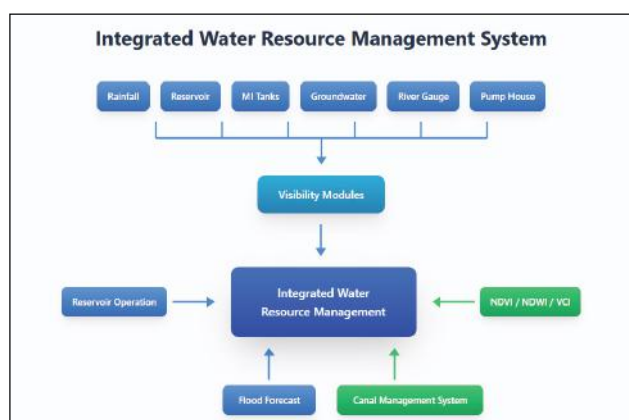


Figure 1. Integrated Water Resources Management

One such example of Integrated Water Resources System is implemented in the state of Andhra Pradesh (APWRIMS) and Telangana (IDSS). A similar system can be seen in Odisha called GOWATER and in the state of Tamil Nadu a water resources Irrigation Management system called (TNWRIMS) where the different modules of rainfall, reservoir, river gauge, groundwater, soil moisture, minor irrigation tanks, pump house information, Inflow forecasting, Canal

management Systems are integrated in one platform in form of dashboard and mobile app.

This integration leads to proper decision making and effective use of water resources. Inflow forecasting module which forecasts runoff for 7days, 15 days, for next 3 months and a seasonal forecast along with nowcast is an important feature of these dashboards. The reservoir operations run at the above places have helped in optimizing the water and using it effectively so as to cater to the needs of agriculture, industry, environment as per requirement. The canal management services are also integrated for the calculation of crop water requirement, crop water availability and crop growth analysis using Remote sensing analysis in the field. The amalgamation of all these modules together constitutes efficient integrated water management.

The modules integrated for water resource management includes:

Rainfall: Rainfall is the primary variable for any hydrological purposes. It has vast functionality in food security, agriculture, industry and economy. Rainfall data helps in understanding the trends, intensity and frequency of an event. It is also helpful in analyzing floods, storms, cyclones with respect to climate change.

The rainfall data can be a point data type/gridded datasets/raster form. The variability in rainfall data is also due to different spatial variation. This diversity is being accounted for by Vassar labs by integrating different data types in one dashboard with features of daily, monthly and weekly rainfall data for each datatype.

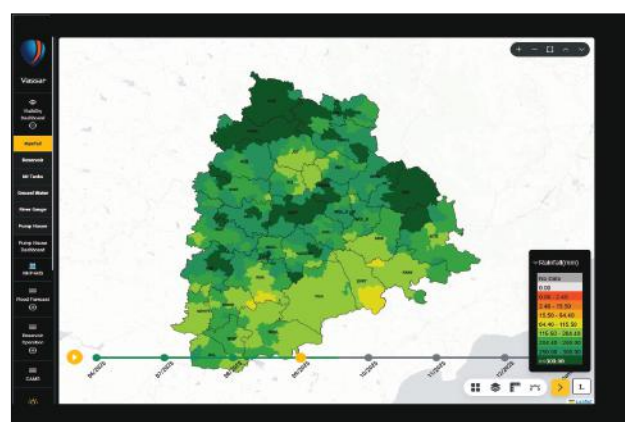


Figure 2. Rainfall module

Keeping this in view, a rainfall dashboard is prepared which consists of daily, weekly, and monthly time periods. Rainfall is monitored using gridded IMD data, state agencies and remote sensing satellites of various space agencies globally. In addition to this, actual, normal, forecast and nowcast rainfall are included with deviation from normal. Heat maps are generated for the selected time frame, source and place. The basemap layers are also added for better visualisation. The rainfall data is confined to admin, and basin boundaries. The rainfall data has flexibility to toggle between heat map and stations for different time periods. The above features make this rainfall module a very comprehensive one. Nowcast is one of its kind where the Rainfall Nowcast data for +5 hrs is predicted using the IMD radar and MLP models for both admin & basin views. The data tab has the option to switch between the District/Mandal view for admin selection and basin/sub basin view for basin selection from the filter panel.

Reservoir: Reservoirs are the major storage banks of water and reserved resources during the water deficit and hence it is mandatory to understand the availability, levels of water, in the reservoirs for various purposes like flood planning, crop planning etc.

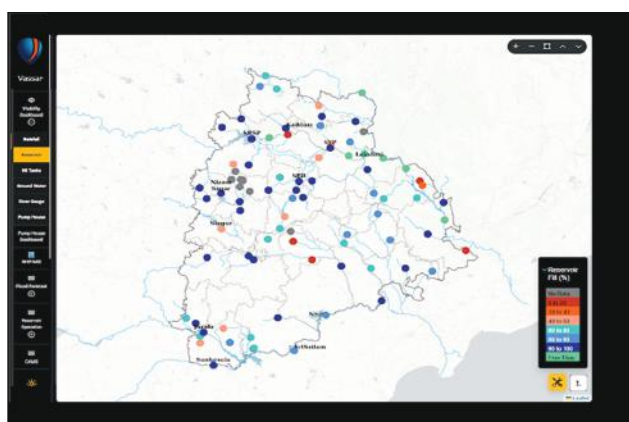


Figure 3. Reservoir module

The planning of storage and release of water at appropriate timing is essential for optimum use of water. This is governed by pump operations, reservoir planning and operations, decisive water distribution in canals, waterbodies and industrial purposes. They are the powerhouse of irrigation, agriculture and power generation.

The reservoir operation hence plays a very important role in any water resource management. Vassar labs bring into account the various features relevant to the reservoir and its function which are important for proper functioning of any government. The reservoir data consists of location, full reservoir level, dead storage level, elevation storage area table, reservoir shapefile, different water draws, catchment and command area. Near real time data is being captured through IOT sensors and mobile apps which are entered by the department. Reservoir inflow and outflow data is updated through mobile app. The report can be downloaded in the form of current water availability of reservoirs, inflow and outflow status and historical reservoir details. These are easy to understand the change in levels.

River Gauge: River Gauge data gives an in-situ measurement of the depth of the river stream. These gauges give real time information and monitor the flood and water supply. For planning and rescue operations the water discharge value plays an important role.

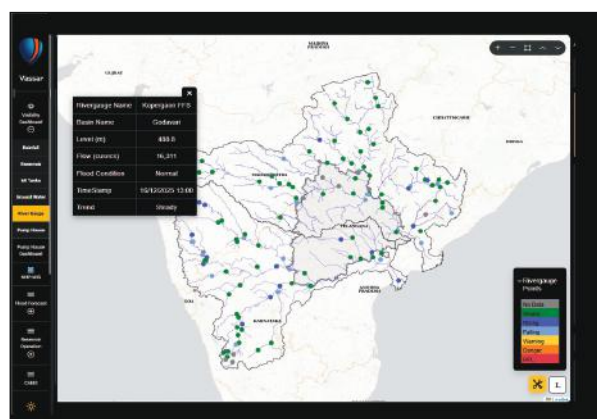


Figure 4. River Gauge module

Hence, keeping these points in view, the gauge locations, stream values are provided which will also be used for providing advisories. The river gauge hence helps in monitoring the flood flow across streams, in addition to it the real time visibility of levels and flows can also be calculated. The river gauge data can be visualized across different boundary layers.

Groundwater : Groundwater levels are crucial for drinking water supply, irrigation and ecosystem maintenance. They are measured using digital water level recorders or observation well data.

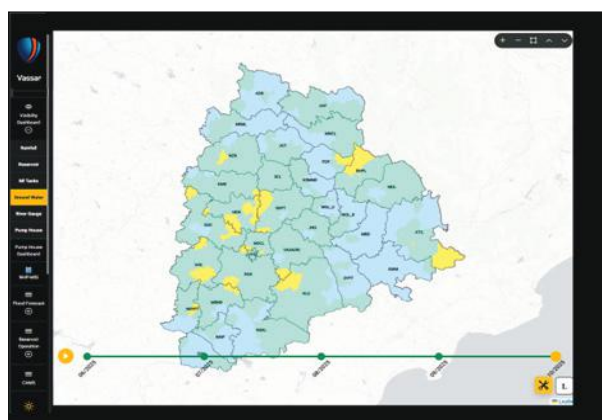


Figure 5. Groundwater module

Groundwater level is measured below the ground or above a reference datum like mean sea level.

They vary from place to place and depend on variation of rainfall, groundwater and natural recharge processes. This is useful as scarcity in the levels can lead to water scarcity and drought impacts. Groundwater information provided by Vassar labs includes the geo location of observation and agriculture borewells, depth of borewell, current groundwater levels based on piezometer levels.

Minor Irrigation Tanks: Minor Irrigation tanks are the vital storages of water which are very useful in agricultural practices. This is useful for farmers for crop planning. The storage capacity and fill percentage data helps in understanding the current capacity of MI tanks for crop planning.

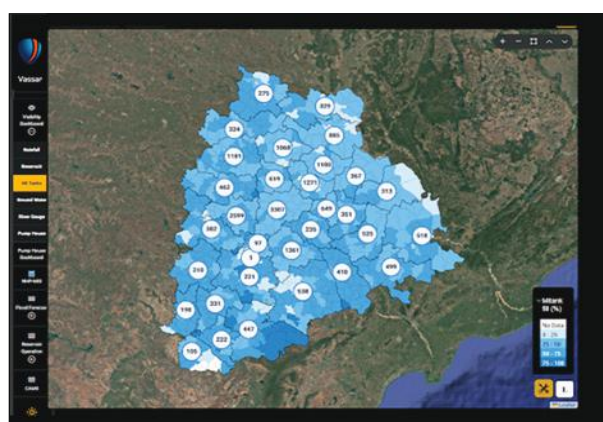
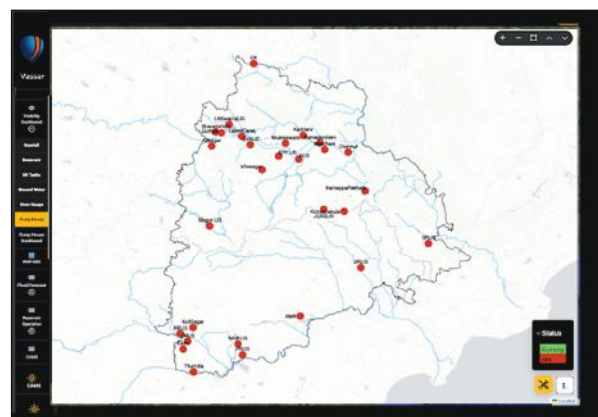


Figure 6. Minor Irrigation Tanks module

The AI enabled assessment using satellite technology of the water spread area of MI tanks and its volume calculation are very essential to enable the real time monitoring of MI tanks. Keeping in view the above requirements, Vassar

labs had built a real time visibility system of MI tanks to understand irrigation potential for any region. The MI tanks data helps in monitoring the tank performance with respect to its capacity on a regular basis. The MI tanks' need to be properly geotagged in order to clear the vegetation to enhance the capacity. This will help in restoration of actual capacity of MI tanks there by rejuvenating the water bodies. A provision for monitoring the actual and observed water spread area over the season is done for specified duration to violate the trespass.

Pump House: The number of lift irrigation schemes in a state with the number of pumps and its capacity helps in understanding the amount of water which can be lifted from a system. Tabular view of the project wise pump details including water lifted, energy consumed and run time across each project with an option to drill down to pump level is provided. Mobile app integration is done to enter the pump running details.



Figures 7a. Pump House module and **7b.** Scada view

SCADA integration is done across different pumphouses and real time pump information which consists of 51 parameters which can

be tracked and monitored on a real time basis like temperature, pressure, frequency, voltage, vibration, current, power factor etc. Health status alarmed can be enabled and sent to the customer and client or pump house operator if it crosses a certain threshold to overcome any unforeseen events.

Inflow Forecasting System: Flood forecasting represents a fundamental aspect of water management, depending significantly on precipitation measurements and digital elevation models (DEMs), which furnish the geospatial information required for precise computational modeling.



Figure 8. Inflow Forecasting System module

Land use and land cover (LULC) classifications, soil properties, stream gauge observations, and comprehensive hydrological inflow and outflow data all play vital roles in constructing and enhancing model accuracy. Through the incorporation of historical datasets, the model achieves improved precision, a prerequisite for dependable forecasting capability. Reconstructing flood dynamics using historical precipitation patterns, terrain and soil conditions, and river flow measurements empowers decision-makers to anticipate potential flood occurrences and formulate mitigation strategies that safeguard populations and build infrastructure.

Reservoir and Pump Operation: Developing customized operation scenarios for reservoirs and pump stations throughout the Godavari basin, Narmada basin and other few basins of Odisha and Kerala to enhance water distribution and resource utilization.

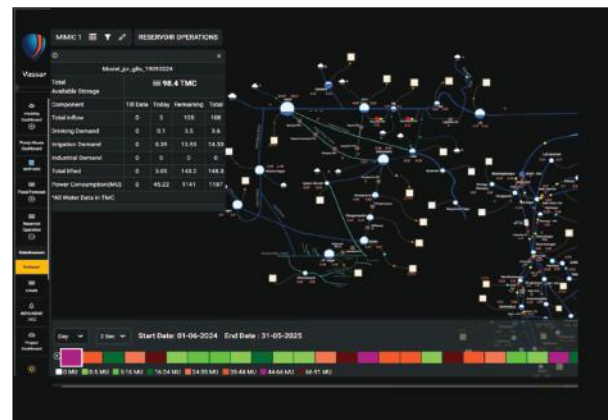


Figure 9. Reservoir and Pump Operation module

This dashboard is crucial for assisting stakeholders in allocating water resources effectively by reconciling multiple goals, including fulfilling agricultural, industrial, and irrigation demands, reducing flood hazards and optimising the power requirement by predicting the pumphouse operation based on water availability, forecast and demands (for lifting water from pumphouse). The optimization algorithm incorporated into this dashboard addresses numerous constraints, including water balance continuity, storage capacity limits, and mandatory environmental flow requirements, promoting sustainable reservoir management. By tracking measured and predicted rainfall, the dashboard evaluates water availability, assisting users in resource allocation during normal and critical situations. It supports strategic decision-making for managing discharges efficiently, optimizing water usage while mitigating potential flood consequences in downstream regions.

Canal Management System: The Canal and Command Area Irrigation Monitoring and Management System is another vital module of

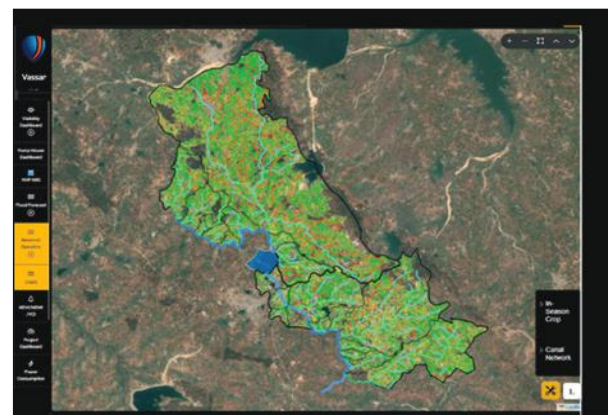


Figure 10. Canal Management System module

Integrated Water Resources Management

IWRM, aimed at improving irrigation efficiency across state-managed irrigation command areas.

This system features an advanced Decision Support System (DSS) that leverages near real-time satellite imagery to track crop-sown extents, evaluate water requirement based on the type of crop considering the crop growth cycle with information of planned and actual crop dates and actual releases within the command area. By integrating crop patterns, seasonal rainfall forecasts, observed rainfall data, and groundwater availability, soil moisture the system precisely determines water deficits. It further estimates water requirements through the canal network. MI tanks filling status from the canal network can be monitored from the data provided by the department through the mobile app. The DSS consolidates information from individual farms through sub-minor and minor canals up to the main canal and ultimately to the water source, generating an end-to-end view of water distribution needs across the irrigation system. This integrated data flow supports accurate irrigation scheduling and ensures optimal water allocation, enhancing water use efficiency and minimizing losses throughout the canal network as shown in Figure 9.

Conclusion

IWRM is a comprehensive decision support system which will help in water resources planning and management. The inputs of all the visibility modules help in predicting an efficient inflow forecasting, management of canals and operating the reservoir optimally. The efficient monitoring, mapping and management of irrigation and agriculture helps in proper usage of natural resources. The journey of rainfall to storages in the form of reservoirs and efficient supply of water to canals paves way to a proper management and integrated system. The prediction of rainfall to proper inflow forecasting with provided alerts and notifications to the stakeholders and policy makers gives a preparedness to any catastrophic situations.

The purpose of IWRM was fulfilled by an irrigation decision support system in the states of Andhra Pradesh, Telangana, Odisha, and Tamil Nadu, with 30 projects, covering roughly 120 Mha. The platform has onboarded over 30 million farmers and has helped 1,200 government officers. Collectively, this has strengthened climate resilience, improved water-use efficiency, and enhanced food security at scale.



Minutes of ICID's First International Executive Council (IEC) Meeting, 1951

OFFICE BEARERS

June 24, 1950 January 12, 1951

President . . Mr. A.N. Khosla (India).
Vice-Presidents . . Prof. Ir. S.H.A. Begemann (Netherlands).
 Mr. Engr. Bozider Nesovic (Yugoslavia).
 Mr. Hamid Bey Suleiman (Egypt).
Secretary-General . . Mr. N.D. Gulhati.

From January 13, 1951.

President . . Mr. A.N. Khosla (India) (re-elected for three years).
Vice-Presidents . . Mr. Hamid Bey Suleiman (Egypt) (Elected for three years).
 Prof. Ir. S.H.A. Begemann (Netherlands) (Re-elected for two years).
 Mr. G. Drouhin (Algeria) (Elected for one year).
Secretary-General . . Mr. N.D. Gulhati (Elected for three years).

From September 9, 1952.

Vice-President . . Mr. G. Drouhin (Algeria) (Re-elected for a further term of three years).



H. Suleiman



Ir. S.H.A. Begemann



A. N. Khosla



George Drouhin



N. D. Gulhati

MINUTES OF THE FIRST MEETING OF THE INTERNATIONAL EXECUTIVE COUNCIL HELD AT SIMLA (INDIA) ON SATURDAY, THE 24TH JUNE, 1950

PRESENT—

The following 'participating countries' were represented* by:—

Canada	.. Mr. P.A. Bridle	.. Observer
India ✓	.. Shri A.N. Khosla	.. Delegate ✓
Italy ✓	.. Mr. M. Serafini	.. Observer
Netherlands ✓	.. Dr. J. H. Zeeman	.. Delegate ✓
Pakistan ✓	.. Pir Mohd. Ibrahim	.. Observer
Switzerland ✓	.. Dr. Jurg Iselin	.. Observer
Thailand ✓	.. Mr. Chalieu Tongudai	.. Delegate ✓
Turkey ✓	.. Mr. O. Kutlu	.. Observer
Yugoslavia ✓	.. Mr. Edward Jardas	.. Observer

The following other countries and Institutions were also represented by observers:—

Australia	.. Mr. S.H. Stuart	(Arrived towards the end of the meeting.)
ECAFE	.. Mr. B.K. Kapur	
France	.. Mr. de Lisle	
Nepal	.. Mr. Medini Nath Bhattarai	
Norway	.. Mr. P.C. Proitz	
Unesco	.. Dr. H.C. Yin	
United Kingdom	.. Mr. E.A. Midgley	
United States of America	.. Mr. H.L. Deimel	

Some officers of the Government of India and members of the Indian National Committee for the International Commission on Irrigation and Canals were also present as observers.

2. Opening the proceedings Mr. A.N. Khosla (India) said—

" Gentlemen:

" On behalf of my country and the Indian National Committee for the International Commission on Irrigation and Canals, I have great pleasure in welcoming to this meeting representatives of many great Nations of the World. It is also my pleasant duty to welcome the representatives of the United Nations Educational and Scientific Organisation and of the Bureau of Flood Control of the Economic Commission for Asia and the Far East.

* On account of a comparatively short notice, it was not possible for some of the participating countries to send technical delegates and observers were sent instead.



3

"I must apologise for the rather short notice in connection with this, the first meeting of the International Executive Council. The response to our invitation has, however, been generous and we are most grateful to the countries and institutions who have sent their representatives.

"The problem of irrigation is essentially the problem of arid areas which form a large part of the land surface of the Earth. It is also the problem of other extensive areas which, though humid, suffer from lack of rainfall at critical times of agricultural operations. The practice of irrigation brings in its wake the problems of water logging, malaria and drainage, of saline and alkaline lands, of engineering and economics and many more in the general social structure of the community. The artificial application of water for the production of crops has been practised from times immemorial in most parts of the World. In certain regions, where rainfall is scarce or unseasonable, the very existence of the people depends upon irrigation. With the growth of population and the need for more food, more and more attention has been paid during the last century to the development of large scale irrigation works on progressively modern lines. In the development of the science and technique of irrigation, India, among many other countries, has made a notable contribution.

"About 20 years ago, we, in this country discovered that engineers in one part were generally ignorant of the developments taking place in the other parts. That resulted in a good deal of wasteful duplication in some cases and the prevalence of out of date and expensive designs and methods of operation in others. We then decided to set up the Central Board of Irrigation with a view to pooling of existing knowledge, coordinating research, collecting and disseminating information and bringing together irrigation engineers and allied workers from all parts of the country. During the last 20 years, this Board has done most valuable work in our country. Its publications and literature have also been found of interest in many other countries. The achievements of this organisation pointed to the necessity for the pooling and dissemination of the knowledge of irrigation and allied problems at the International level, somewhat on the lines of the World Power Conference and the International Commission on Large Dams. During the last 30 years or so, a large number of international technical and scientific organisations have come into being in respect of various specialized problems. Not one of these, however, deals with this most important problem of irrigation, on the proper understanding and successful handling of which depends the present and future food supply of the world. It is with this background that the Government of India, with its great interest in irrigation, sponsored a proposal to invite all countries of the world, similarly interested, to cooperate and set up a forum where matters relating to the science and technique of irrigation and allied practices could be discussed for mutual benefit. The response to this invitation has been very encouraging indeed. The need for international cooperation in this field has been universally accepted. Twelve Nations of the World have already agreed to cooperate in this endeavour and we trust that before long many others will join.

"At a meeting of the Committee of Experts and Delegates of Specialized Agencies held at the invitation of Unesco, in Paris in December 1949, in connection with the proposal for the establishment of an International Institute of the Arid Zone, considerable emphasis was laid on the important role which the International Commission on Irrigation and Canals will play in solving the many problems of the Arid Zone.

4

Also, at a meeting of the Committee set up by Unesco to consider proposals for the creation of a Union of International Engineering Organisations held in Paris in March, 1950, it was decided to include the International Commission on Irrigation as one of the 15 International Engineering Organisations to be invited to send delegates to the General Meeting to be held in this connection by Unesco in October 1950. Since then, a formal invitation has been received and we shall today be nominating three delegates to represent this Commission at the said Meeting.

"It is my earnest hope and prayer that the deliberations and activities of this newly formed International Organisation may materially contribute to the drive for production of more food for the growing populations of the world, help in the solution of many problems connected with or arising from the practice of irrigation and thus lead to the common advance of humanity towards World peace and prosperity. We are embarking on a noble mission in the service of mankind. May success crown our efforts!"

3. Mr. Khosla then read out extracts from some of the messages received.

From Morris E. Dodd, Director-General, Food & Agriculture Organisation of the United Nations

* * * * *

"I regret that in view of the necessity for strict economy in our expenditures for travel at this time it will not be possible for an FAO officer to attend this meeting. Although it will not be possible for us to send an observer to this meeting of the International Commission on Irrigation and Canals, I wish to assure you that FAO, as an international agency already actively engaged in work in the field of irrigation as a means of agricultural improvement, will be much interested in the activities that the Commission may undertake in this field.

* * * * *

From Mr. Edy Velander, Hydraulic Academy, Stockholm

"Thanking unfortunately delayed invitation irrigation meeting regret unable send representative but express great interest wish you success greetings."

From the Government of Netherlands

"The Netherlands have accepted the proposal to co-operate with other countries which are interested in irrigation and canals as they have a real interest in the aims of this Committee.The Netherlands are very willing to assist the Committee in the execution of the task it has set itself.

"No doubt India has, as compared with the Netherlands a very much larger area under irrigation but none the less my country has gathered an experience based on an age-long fight against the sea and against fresh water.

"As you are undoubtedly aware, about one-third of the Netherlands are situated below sea-level so that even in peace time and without any breach of the dikes, be it through war, be it through natural calamities, the ground water has to be kept at an acceptable level.



"Moreover the Netherlands have in their three centuries of constructive work in Indonesia done very much to introduce modern systems of irrigation, to build dams and dikes in order that no floods should happen and generally speaking have worked with considerable success in the fields in which this Committee is interested."

* * * * *

From the Embassy of the Federal People's Republic of Yugoslavia, New Delhi.

"The Embassy of the Federal People's Republic of Yugoslavia, expressing the wishes of the Water Works Economy Committee of the Federal People's Republic of Yugoslavia, has the honour to transmit herewith to the President of the Conference of the International Commission on Irrigation and Canals the following:—

- (1) The Water Works Economy Committee of the Federal People's Republic of Yugoslavia in spite of its great interest for the work of the Conference regretfully states that owing to the shortness of the time at disposal, it is not able to take part in the work of the conference in June 1950, at Simla, and to be represented by expert delegates at the same.
- (2) In connection with the above the Water Works Economy Committee of the Federal People's Republic of Yugoslavia has the pleasure to inform the Conference of the International Commission on Irrigation and Canals that a decision has been taken in Yugoslavia to establish a National Committee of the International Commission on Irrigation and Canals.
- (3) The Water Works Economy Committee takes this opportunity to point out that the Federal People's Republic of Yugoslavia will participate in the work of the International Commission on Irrigation and Canals at its next January session in 1951, at which it shall be represented by the experts. On that occasion the representatives of the Federal People's Republic of Yugoslavia will submit to the Conference one or two reports concerning general water problems in the Federal People's Republic of Yugoslavia and also describe two amelioration plans which are being constructed in F.P.R. of Yugoslavia.

* * * * *

Mr. Michael Straus, Commissioner, Bureau of Reclamation, U.S.A., regretting his inability to accept the personal invitation extended to him, wrote:

* * * * *

"The best I can do at the moment is to convey to you my best wishes for the success of the valiant efforts which you and your colleagues are making to extend the good word of Reclamation throughout your land, and to convey to you my belief that the utilization of modern irrigation practices under competent direction in arid lands may easily make the difference between the "good life" and poverty.

In the meantime, I look forward with hope that circumstances will allow me and some of my staff to be present at the coming irrigation meetings in India in January."

From Mr. L.R. East, Chairman, State Rivers and Water Supply Commission, Victoria, Australia.

* * * * *

It is, therefore, with very great regret that I have to tell you it will not be possible for me to accept your invitation on this occasion.

* * * * *

I wish your Committee every success. I believe that the Meeting at Simla will be an historic one and that foundations will be laid for far reaching international collaboration and cooperation in the field of irrigation."

Item 1.—(a) Mr. A.N. Khosla was unanimously elected as Chairman of the meeting, and Mr. N.D. Gulhati (India) as reporter.

(b) The notice of the meeting was read by the Chairman and its agenda approved.

Item 2.—To consider the draft Constitution of the Commission (Annexure I)*

The Chairman said that since on account of a comparatively short notice it had not been possible for many participating countries to send regular delegates to this meeting, and since the National Committees in many countries had yet to be set up, it would perhaps be better if after incorporating such amendments in the draft Constitution (Annexure I) as may be proposed and accepted at this meeting, the Constitution is treated as provisional and an opportunity is given to the National Committees and/or Participating Countries to examine the provisional Constitution further and suggest any modifications that they would like to make with a view to further the objects of the Commission. The Constitution should be adopted finally at the Second Meeting of the International Executive Council.

Mr. Gulhati explained that the Constitution of the Commission as originally proposed by the Indian National Committee had been circulated to all interested countries about two years ago. Some of them had proposed certain changes which had been incorporated and a new draft Constitution had been prepared (Annexure I). This draft Constitution had been supplied to all participants at this meeting.

The Chairman said that he proposed to read the Draft Constitution para by para and that he would welcome criticism and suggestions from both delegates and observers.

Articles 1 to 8 of the Constitution were adopted without any change.

Dr. Zeeman suggested that Article 9 be deleted as the provision in it was against the spirit of Articles 3 and 7. He was supported by Mr. Serafini and after a brief discussion it was decided to delete this Article.

* See pages 37 to 41

With regard to Article 10, it was explained that Presidents, Vice Presidents and Secretaries-General would not vote, but they would participate in meetings of the International Executive Council only in an advisory capacity. With this explanation Article 10 and Articles 11 to 15 were adopted.

On the motion of Dr. Zeeman, the words "National Committee" occurring in lines 4 and 7 of Article 16 were changed to "Participating Countries".

On the motion of Mr. Kutlu, it was decided to insert a new Article as follows:—

"The accounts of the Commission shall be audited regularly in a manner to be determined by the International Executive Council."

Articles 17 and 18 were adopted without amendment and on the suggestion of Mr. Deimel the word 'following' was inserted between the words "the" and "four" in Article 19.

Articles 20 to 28 were approved.

Article 29 was approved after replacing the words "National Committee" by "participating country".

Articles 30 to 32 were approved without amendment and in Article 33, at the instance of Mr. Serafini, the word "Commission", in the second line, was changed to "Council".

Article 34 was approved and in Article 35, on the motion of Mr. Edward Jardas, the words "The Council may issue a bulletin" were changed to "The Council shall issue a bulletin".

Articles 36 and 37 were accepted and the first part of Articles 38 was altered to read as follows:—

"The Central Office shall be authorized to receive and to handle as funds of the Commission, any contribution that may be made in the interests of the objects of the Commission or of research, special investigational or experimental work; and....."

In Article 39, the words "or participating country" were added at the end of the first sentence and "or participating countries" after "National Committees" in the fifth line. Also the period of two months specified in the fifth line was altered to three months.

It was decided that the draft Constitution, as amended at the meeting, be treated as the Provisional Constitution of the Commission which would govern the activities of the Commission until the second meeting of the International Executive Council when the Provisional Constitution would be finalized after making such modifications as may be proposed by the various National Committees or participating countries and accepted at that meeting. The Provisional Constitution is at Annexure II*.

*See pages 42 to 47

Item 3.—To consider an invitation from the Indian National Committee to hold the first plenary session of the Commission in India in January 1951

The invitation from the Indian National Committee was read out by the Chairman and was accepted.

Item 4.—To approve subjects for discussion at the first plenary session of the International Commission on Irrigation & Canals

The Chairman asked for suggestions from those present. He said that in view of the fact that there was not much time between now and the plenary session to be held in January 1951, it would be desirable to select subjects of a general nature. Also it was desirable that at its first meeting each National Committee should acquaint the Commission with the developments in irrigation that had taken place in its country and their present problems. After this overall survey at the first plenary session, it would be possible to take up studies on specific subjects and hold discussions thereon.

Accordingly the following two subjects were approved:—

- (1) National review of irrigation development and practice;
- (2) Present-day problems in irrigation and drainage.

At the motion of Dr. Zeeman, it was agreed that communications on other subjects would also be accepted.

Item 5.—To fix the subscription to be paid to the Central Office

The Chairman said that under Article 36 of the Provisional Constitution, the International Executive Council had to determine the rate of subscription to be paid by National Committees or participating countries to meet the expenses of the Commission. He suggested for consideration that a uniform nominal subscription be fixed which should operate until the International Executive Council after some experience of the working of the organization, could determine the amount necessary to run the activities of the Commission and its allocation among different participating countries or National Committees.

After a brief discussion it was decided that the subscription for the current calendar year be fixed at \$ 600 or its equivalent and that the matter be taken up for further consideration at the second meeting of the Council.

Item 6.—To fix date and place for the second meeting of the International Executive Council

It was decided that the second meeting of the International Executive Council be held at the same time and place as the first plenary session of the Commission. The 9th of January 1951 and New Delhi (India) were provisionally agreed upon, subject to a possible modification of the date by the Indian National Committee.

Item 7.—Election of Office bearers

At the instance of the Chairman, it was decided that office bearers be elected for the present only for the period between now and the second

meeting of the International Executive Council, when office bearers would be elected for the periods specified in Article 20 of the Provisional Constitution.

Mr. A.N. Khosla was unanimously elected as the first President of the Commission.

It was decided that the three vice-presidentships be offered to Egypt, Netherlands and Yugoslavia. The National Committees in the countries concerned would nominate the individuals. The representatives of Netherlands and Yugoslavia present undertook to convey the invitation to their respective Governments.

Mr. N.D. Gulhati (India) was elected as Secretary-General.

Item 8.—To nominate three delegates to represent the Commission at the Conference called by the Unesco, of representatives of International Non-Government Engineering Science Organizations to be held in October 1950, at Unesco House, Paris, to consider the desirability of the formation of a Union of International Engineering Organizations. (See Annexure III)

It was decided that the National Committees in India, Yugoslavia and Netherlands be requested to nominate a representative each to that meeting.

After a vote of thanks to the Chair the meeting was declared closed.

The Indian National Committee then held a reception in honour of the participants to the meeting followed by a luncheon, at the Cecil Hotel.



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The year 2025 marked a significant milestone for the International Commission on Irrigation and Drainage (ICID), celebrating its Platinum Jubilee (75 years) of dedicated service to global sustainable agricultural water management. With a theme focused on "Best Irrigation Practices for Water and Food Security," the organization accelerated its efforts toward climate-resilient agriculture, digital transformation in water management, and the preservation of heritage irrigation structures.

ICID President Dr. Marco Arcieri attended a Workshop Organized by National Water Authority (Autoridad Nacional del Agua), Peru and UN-FAO 4 – 6 February, 2025, Lima, Peru

ICID President Dr. Marco Arcieri attended the International Workshop "Taller sobre caudales ambientales y desagregación del nivel de estrés hídrico (ODS 6.4.2) a nivel de cuenca y subcuenca hidrográfica", which took place in Lima, Peru, from 4 to 6 February 2025. The event was jointly organized by FAO (Food and Agriculture Organization of the United Nations) and ANA (Autoridad Nacional del Agua) of Peru, bringing together representatives from six Latin American countries (Brazil, Chile, Colombia, El Salvador, Mexico, and Peru). The workshop was



conducted in Spanish, reflecting the delegates' origins. The Workshop focused on disseminating and sharing knowledge of the methods and tools used by the Autoridad Nacional del Agua (ANA) of Peru to assess environmental flows and disaggregate the SDG 6.4.2 indicator (level of water stress) at the basin and sub-basin levels.

ICID President Dr. Marco Arcieri Addressed Italian Parliament

A great initiative at the Chamber of Deputies of the Italian Parliament, where ICID President Dr. Marco Arcieri was invited to speak at the presentation of a Bill regarding the use of AI for the optimal management of water resources, aiming to reduce waste and increase water use efficiency.



ICID celebrates International Women's Day with Special Webinar, 8 March, 2025

To mark International Women's Day 2025, ICID organized a webinar on the theme "Water, Women, Nexus—Stronger Together, More Inclusive Forever" on 8 March 2025. The webinar featured

moderated by Dr. Narges Zohrabi, Chairperson of ICID's Task Force on Women Empowerment and Water Management (TF-WEWM) and Associate Professor at IAU University, Iran.



distinguished speakers, including Hon. Karlene Maywald, South Australia Water Ambassador (Australia); Dr. Ravinder Kaur, Principal Scientist, ICAR (India); Ms. Patricia Mejias Moreno, FAO; Dr. Manohara Khadka, Country Representative, IWMI (Nepal); and Dr. Veena Khanduri, Executive Secretary, GWP-IWP (India). The session was

The webinar served as a significant platform to highlight women's leadership in water-related sectors and to inspire continued progress toward gender equality in these areas. The speakers' contributions underscored how gender equality and women's empowerment can drive positive and transformative change in global water

ICID President Dr. Marco Arcieri Participated in the 41st UN-Water Meeting, April 2–3, 2025, Rome, Italy



Dr. Marco Arcieri, President of the International Commission on Irrigation and Drainage (ICID), participated in the 41st UN-Water Meeting held at the International Fund for Agricultural Development (IFAD) Headquarters in Rome during April 2–3, 2025. The meeting focused on implementing the UN System-wide Strategy for Water and Sanitation and preparing for the UN Water Conference 2026, co-hosted by Senegal and the UAE.

During the event, Dr. Arcieri interacted with Dr. Alvaro Lario, President of IFAD and Chair of UN-Water, to discuss potential joint initiatives supporting the achievement of Sustainable Development Goal 6 (Clean Water & Sanitation).

SG, ICID participated in Samarkand Climate Forum, 4–5 April, 2025, Tashkent, Uzbekistan

Under the theme “Central Asia Facing Global Climate Challenges – Consolidation for Common Prosperity,” the Samarkand Climate Forum 2025 was held from April 4–5, 2025, in Tashkent, Uzbekistan. The event marked the presence of high-level delegations from all five Central Asian nations—Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan—alongside



representatives from the European Union, the United Nations, international financial institutions, and major environmental organizations. A



collective commitment emerged to accelerate green transformation and sustainable development in the region.

Representing the International Commission on Irrigation and Drainage (ICID), Secretary General Dr. R.K. Gupta participated in the Plenary Session on Integrated Water Resources Management (IWRM) under Climate Change in Central Asia, contributing to crucial discussions on water sustainability amid shifting climatic conditions.

ICID President Dr. Marco Arcieri participated in the "OMAN WATER WEEK", 6–10 April, 2025, Muscat, Oman

ICID President Dr. Marco Arcieri participated as Keynote Speaker at the prestigious Oman Water Week held in Muscat from 6–10 April 2025. During the event, he held a bilateral meeting with H.E. Eng. Ali Mohammed Al Abri, Undersecretary of Water Resources at the Ministry of Agriculture, Fisheries



Wealth & Water Resources, Oman. The discussions focused on future collaboration between ICID and the Sultanate of Oman on sustainable water resource and irrigation management.

ICID's 6th African Regional Conference 14–18 April, 2025, Abuja, Nigeria



The 6th African Regional Conference on Irrigation and Drainage (ARCID) of the International Commission on Irrigation and Drainage (ICID) was successfully held at the Shehu Musa Yar'Adua Centre, Abuja, Nigeria, West Africa, from 14th to 18th April 2025. The Conference was organized by the Nigerian National Committee on Irrigation and Drainage (NINCO), under the auspices of the Federal Ministry of Water Resources and Sanitation (FMWRS), in collaboration with the African Regional Working Group (AfRWG) of ICID. The overarching theme of the Conference



was: “Tackling Irrigation Development and Water Management Crisis in Africa.”



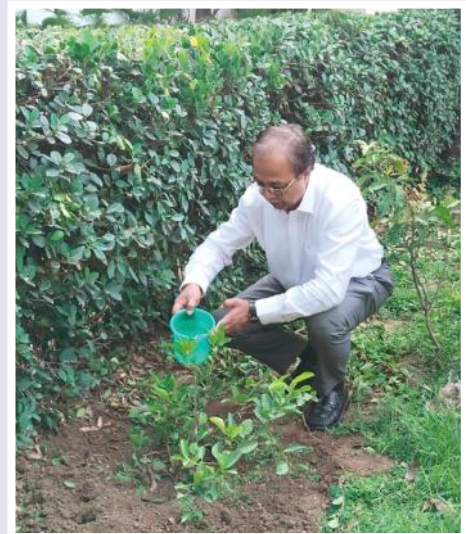
The International Commission on Irrigation and Drainage (ICID) was represented by its President, Dr. Marco Arcieri, and Secretary General, Dr. R.K. Gupta. Dr. Arcieri delivered the Welcome Address at the Opening Ceremony and participated in a High-Level Dialogue on: “Achieving SDGs in the Context of Transboundary Water Resources, Governance, Irrigation Funding, and Scale in Africa.” Dr.

Arcieri also held discussions with HE Senator Dr. Abubakar Kyari, Minister of Agriculture and Food Security. The 6th ARCID served as a valuable platform for experience sharing, partnership building, and charting a strategic path toward resilient and sustainable irrigation development across Africa.

ICID Celebrates International Earth Day with Tree Planting and Sustainability Commitment, 22 April, 2025

On 22 April 2025, the International Commission on Irrigation and Drainage (ICID) marked International Earth Day with a special tree-planting ceremony led by Secretary General Dr. R.K. Gupta alongside the ICID Central Office staff. This event symbolized ICID's ongoing dedication to environmental stewardship and combating climate change.

In his remarks, Dr. Gupta emphasized the critical importance of increasing the number of carbon-absorbing plant species, especially within forest and sub-forest ecosystems, as a natural strategy to help reverse the adverse impacts of climate change. He highlighted how such green initiatives contribute to carbon sequestration, improve biodiversity, and enhance ecosystem resilience.



33rd SANCID Symposium, 6-8 May, 2025 Bloemfontein, South Africa



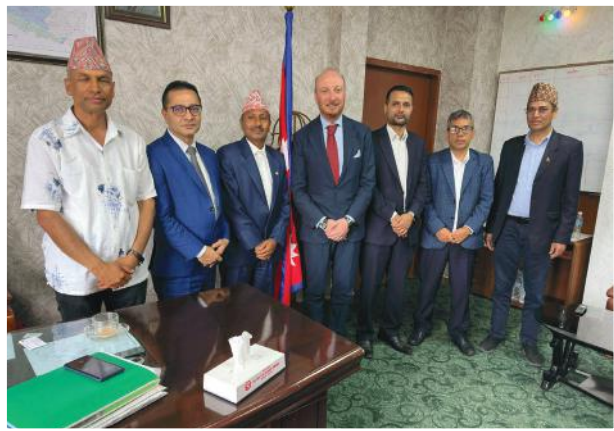
The South African National Committee on Irrigation and Drainage (SANCID) successfully organized the 33rd SANCID Symposium from 6th to 8th May 2025 at Monte Bello Estate, Bloemfontein, in the Free State Province, South Africa. The event brought together 92 participants, primarily from Provincial Departments of Agriculture, the Department of Water and Sanitation, commodity groups, and universities. The theme of the Symposium was: “Sustainable Irrigation Towards Food and Water Security in an Era of Increasing Climate Change Threat.”



The Symposium was organized in partnership with the Water Research Commission (WRC) of South Africa and Agriculture South Africa (formerly known as AgriSA). The theme aligned with both South Africa's National

Development Plan and the United Nations Sustainable Development Goals (SDGs), highlighting the event's relevance to broader national and international policy frameworks.

ICID President Dr. Marco Arcieri participated in National Seminar on “Water for Agri-Food System Transformation”, 15 May, 2025, Kathmandu, Nepal



The Department of Water Resources and Irrigation (DWRI), Government of Nepal, in collaboration with the Nepal National Committee on Irrigation and Drainage (NeNCID), organized a one-day national seminar titled “Irrigation Seminar 2025: Water for Agri-Food System Transformation” on 15 May 2025 in Kathmandu.

The event was co-hosted in collaboration with the International Commission on Irrigation and Drainage (ICID), the International Water Management Institute (IWMI), and the Centre for Applied Research and Development (CARD) at the Institute of Engineering (IoE).

The primary objective of the seminar was to explore strategic pathways for transforming Nepal’s agri-food systems through enhanced irrigation and water resource management. Mr. Marco Arcieri, President of ICID, delivered a keynote speech highlighting global advancements in irrigation technologies and the critical need for smarter water management practices to enhance efficiency and productivity in the sector.

ICID President Dr. Marco Arcieri participated in the 93rd Annual General Meeting and the 28th ICOLD Congress 16–23 May, 2025, Chengdu, China



Glimpses of ICID in 2025

Dr. Marco Arcieri, President of the International Commission on Irrigation and Drainage (ICID), actively participated in the 93rd Annual General Meeting and the 28th Congress of the International Commission on Large Dams (ICOLD), held from 16–23 May 2025 in Chengdu, China.

The high-level international event was attended by several distinguished Chinese officials, including H.E. Mr. Wang Bao'en, Vice-Minister of the Ministry of Water Resources (MWR), and others. The event saw the participation of representatives from international hydropower companies and sister organizations across the globe.

During the event, Dr. Arcieri held meetings with H.E. Mr. Li Guoying, Minister of Water Resources of China, and H.E. Mr. Wang Bao'en, Vice Minister of the Ministry of Water



Resources (MWR). Their discussions focused on strengthening international cooperation in the fields of irrigation, water resources management, and climate-resilient agriculture. They also explored opportunities for technical exchange, joint research, and active engagement of China in ICID's global initiatives and platforms.

5th International Baghdad Water Conference & 11th Micro Irrigation Conference of ICID 24-26 May 2025, Baghdad, Iraq

The 5th International Baghdad Water Conference and the 11th International Micro Irrigation Conference were held from May 24 to May 26, 2025, in Baghdad, Iraq. The event was organized under the patronage of the Iraqi Prime Minister, H.E. Mr. Mohammed Shia' Al-Sudani, and hosted



by the Ministry of Water Resources. The event was graced by the presence of several high-ranking dignitaries. The conference aimed to address critical water resource management challenges in the region, with a focus on sustainable development and technological innovation.

During the opening ceremony, Dr. Marco Arcieri, President of ICID, delivered the inaugural speech. In a special session held during the Conference,



Dr. Arcieri and Dr. R.K. Gupta, Secretary General of ICID, gave presentations on the topics "Turning Adversaries into Opportunities" and "Best Irrigation Practices," respectively.

ICID Platinum Jubilee Celebration and Indo-Global Irrigation Summit - 2025, 24-25 June, 2025, New Delhi, India

As part of its Platinum Jubilee celebration, the International Commission on Irrigation and Drainage (ICID), under the aegis of the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation, Government of India, organized the Indo-Global Irrigation Summit (IGIS) 2025. The summit was held from 24-25 June 2025 at Dr. Ambedkar

International Centre, New Delhi, India. Themed “Best Irrigation Practices for Water and Food Security,” the summit brought together over 300 global water professionals, including irrigation experts, engineers, policymakers, international and national financing agencies, and government representatives.



Glimpses of ICID in 2025

The summit was inaugurated by Ms. Debashree Mukherjee, IAS, Secretary, Ministry of Jal Shakti, Government of India. Distinguished guests included: HE Hon. Ms. Frances Adamson AC, Governor of South Australia, Mr. Mukesh Puri, IAS, CMD, Sardar Sarovar Narmada Nigam Ltd (SSNNL) and Dr. Marco Arcieri, President, ICID & Dr. R.K. Gupta, Secretary General, ICID.

The commemorative session included presentation by: Dr. Marco Arcieri (Italy): On transforming



traditional systems like KHETTARA.

On the second day of the summit, four technical sessions were conducted, showcasing a wide range of expertise and innovation. In his concluding address, Dr. R.K. Gupta, Secretary General, ICID, expressed heartfelt gratitude to all dignitaries, partners, organizations, and industry stakeholders for their valuable

contributions. He emphasized the Summit's role in fostering global cooperation, technological modernization, financing strategies, and nature-based solutions for irrigation and water management.

irrigation challenges into opportunities; Prof. Dr. Chandra A. Madramootoo (Canada): On modernization and expansion of irrigation in Canada; Eng. Felix Reinders (South Africa): On celebrating irrigation technology; Prof. El Houssine Bartali (Morocco): On conserving



4th World Irrigation Forum and 76th International Executive Council Meeting of ICID 7-13 September, 2025, Kuala Lumpur, Malaysia

The ICID in association with Malaysian National Committee on Irrigation and Drainage (MANCID) organized the 4th World Irrigation Forum and the 76th International Executive Council Meeting from 7-13, September 2025, Kuala Lumpur, Malaysia. The forum was centered around the theme “Is Irrigation a Sunset Industry?” along with Four Sub-themes: (ST-1): Challenges of irrigation and drainage for food security in the changing



world; (ST-2): Technology and modernization in the agricultural sector towards food security; (ST-3): Innovation policy, service delivery, and financing mechanisms to meet the challenges of the future; and (ST-4): Nature-based solutions in agriculture to foster ecological resilience. There was an inaugural session, five Plenary Sessions,

sixteen Technical Sessions during which more than 100 technical presentations were made. Besides, 16 side events, four international workshops and four technical visits were also held.

The Conference was inaugurated by Hon'ble Minister Datuk Seri Haji Mohamad bin Sabu,



Winners of WatSave Award 2025



Ministry of Agriculture and Food Security Minister, Malaysia.

The third High-Level Advisory Group Meeting was held on the theme “Resilient Agriculture for a Secure Future: Modernizing Irrigation, Revitalizing Infrastructure and Safeguarding Communities” on 8 September 2025. The HLAG was attended by the H.E. Datuk Seri Haji Mohamad bin Sabu, Minister of Agriculture and Food Security, Govt. of Malaysia, H.E. Dr. Shavkat Rakhimovich Khamraev, Dy. Minister of Water Resources, Ministry of Water Resources, Republic of Uzbekistan, Senior Officers from Iran, Nepal, Japan, Korea, China, Tajikistan, Iraq, Zimbabwe, South Africa, World Bank, Asian Development Bank, UN-Food and Agricultural Organization, World Water Council, International water Management Institute and ICARDA. A Joint Declaration “Kuala Lumpur Joint Declaration” was signed.

An MoU between ICID and IFAS was also signed during the event. Four ICID publications were released during the event namely: Road Map to

ICID Vision 2030- and Three-Year Rolling Plan, Guidelines for Irrigation with Reclaimed Water, Environmental Drainage, and Guide to Innovated Irrigation and Drainage Management under the Changing Climate.

During the plenary session of 76th IEC meeting, various ICID awards were distributed. This year’s WatSave Award was awarded in the Category of Technology, Innovative Water Management, Young Professional and Farmer.

The winners of WatSave awards were Ms. Hong Li, Professor, Vice Principal, Jiangsu University, China, for her work on "Intelligent sprinkler irrigation equipment and systems assist water-saving in agriculture", Dr. Sebinasi Dzikiti, Senior Researcher, Stellenbosch University (South Africa) for his work on "Decision support system for water use of irrigated tree crops", Mr. Khaldoun Ibrahim Abbas, Director of the Al-Rated Research Station, Iraqi Ministry of Water Resources, Iraq for his work on "Soil and crop service machine and subsurface drip irrigation pipe installation" and Mr. Mahmood Rahdari,



Mrs. Fereshteh Moradi Kahre, Mr. Mohammad Amin Rahdari, Mr. Abolfazi Rahdari from Iran, for their work on "The Comprehensive Knowledge Flow and Transition from Traditional Agriculture to Innovative and Exemplary Agriculture".

During the 76th IEC Meeting, the Best Paper Award 2025 was presented to Edson Costa-Filho, José L. Chavez, and Huihui Zhang from USA for their outstanding paper entitled 'Assessing multi-sensor hourly maize evapotranspiration estimation using a one-source surface energy balance approach, published in Volume 73 Issue 3 (July, 2024) of Irrigation and Drainage - the Journal of ICID.

During the Opening Ceremony of WIF4, H.E. Datuk Seri Haji Mohamad bin Sabu, Minister of Agriculture and Food Security, Malaysia, and Dr. Marco Arcieri, President ICID, besides other

dignitaries presented the 4th World Irrigation and Drainage Prize, 2025 to Dr. Gao Zhanyi (China) for his extraordinary contributions to the global advancement of irrigation and drainage during his illustrious career, spanning over 36 years, exemplifying unparalleled leadership, innovation, and commitment to the field of agricultural water management.

ICID identifies, recognizes and maintains a record of World Heritage Irrigation Structures of archival value that are more than a century old and help understand the evolution of irrigation systems among civilizations across the world. Total twenty-three World Heritage Irrigation Structures have been recognized by ICID in the year 2025. For details please visit: <<https://icid-ciid.org/award/whis>>

Dr. Marco Arcieri participated in the Symposium on Conservation and Utilization of China's World Heritage Irrigation Structures, 27-28 September, 2025, Ningbo, China

The 2025 Symposium on the Conservation and Utilization of China's World Heritage Irrigation Structures was successfully held in Ningbo, China, from September 27 to 28.

Organized by the Chinese National Committee on Irrigation and Drainage (CNCID) and hosted by the China Institute of Water Resources and Hydropower Research (IWHR), the event brought together over 130 participants. Representatives included officials from local water resources departments, management agencies of World Heritage Irrigation Structures, sites preparing for WHIS nomination, technical support

institutions, research academies, universities, and media outlets, all gathering to discuss strategies for preserving this vital heritage.

The symposium featured keynote speeches by renowned experts, covering a wide range of topics, such as the intrinsic value and cultural influence of water, understanding and conservation practices for water heritage, the historical evolution and scientific value of the Yuanyang Hani Terraces, archaeological explorations of prehistoric water management systems, and the current status and challenges facing World Heritage Irrigation Structures. These presentations provided in-depth theoretical guidance and case studies for attendees.



7th Pan African Conference of Agricultural Engineering 22 – 24 October 2025, Fes, Morocco

The ANAFIDE in association with Pan African Society of Agricultural Engineering (PASAE) and Alliance for Modernization African Agrifood Systems (ASABE) organized the 7th Pan African Conference of Agricultural Engineering focus on the theme “Water Management for a Sustainable and Resilient Agriculture in Africa” from 22-24 October 2025 at Fes, Morocco.. The theme reflects the challenges that Morocco, like other African countries, faces from water scarcity linked to climate variability, which also impacts water availability for agriculture.



The hybrid conference brought together experts, researchers, policymakers, and partners from at least 15 countries across the continent to tackle the pressing challenges of agricultural water management under climate change. Over three days, participants engaged in a rich program featuring plenary sessions and side events, exchanging experiences and showcasing practical solutions to

improve water use efficiency, strengthen resilience, and promote sustainable agriculture in Africa.

The ICID in the event was represented by President Hon. Prof. Chandra A. Madramootoo, President Hon. Eng. Felix Britz Reinders, President Hon. Prof. Dr. Ragab Ragab, Vice President Hon. Dr. Mohamed Abd El Moneim Wahba and Secretary General, Dr. R.K Gupta. The conference served as a valuable platform to exchange knowledge, strengthen partnerships, and support the region’s transition toward resilient, inclusive, and water-secure food systems.



ICID Secretary General, Dr. R.K Gupta Participated in the International Water Conference, 17 November, 2025 Tashkent, Uzbekistan





Dr. R.K. Gupta Secretary General ICID participated and delivered the keynote address during the inaugural session of the Conference on "International Water



Cooperation and Improvement of Water Legislation of the Republic of Uzbekistan" held in Tashkent on November 17, 2025. The Conference was organized by Uzbekistan's Ministry of Water Management with partners like the Asian Development Bank (ADB), World Bank etc. The conference focused on water reforms, governance, transboundary issues, and sustainable management, bringing together national bodies, international experts, and donors to address Uzbekistan's severe water stress and legislative needs.

Inauguration of Saïss Plain Irrigation Project by Moroccan Minister of Agriculture and ICID Hon. Vice President Mr. Ahmed El Bouari

Mr. Ahmed El Bouari, Minister of Agriculture of Morocco and Hon. Vice President of ICID, inaugurated the first operational segment (10,000 hectares) of the Saïss Plain Safeguarding Irrigation Project near the city of Fès, Morocco. The project is a key milestone in Morocco's national strategy to secure water resources for agriculture and



reduce reliance on overexploited groundwater reserves in the region. Once fully completed, the project will provide sustainable irrigation to over 30,000 hectares of farmland by using surface water sourced from the M'Dez Dam.

This project reflects Morocco's strong commitment to climate-resilient agriculture, water conservation, and food security — values

deeply aligned with ICID's global mission of promoting sustainable agricultural water management. Mr. El Bouari emphasized the strategic importance of the project in enhancing agricultural productivity, climate resilience, and socioeconomic development in the region, while also serving as a model for other arid and semi-arid countries facing similar water challenges.



CTCID Celebrates 55th Anniversary with Informative Forum



The Chinese Taipei Committee of ICID (CTCID) marked its 55th anniversary with a commemorative celebration highlighting 55 years of contributions to sustainable water management and regional cooperation since its establishment in 1970. The milestone event brought together irrigation professionals from Japan, Korea, and Indonesia, honored by the presence of VPH Prof. Choi from KCID and VPH Prof. Watanabe from JNC-ICID, who graciously shared their wisdom at the forum. Participants engaged in presentations on cooperation, policies, and innovative approaches to irrigation and drainage challenges across Asia. The event exemplified CTCID's ongoing commitment to facilitating cross-border knowledge exchange and professional dialogue.

The celebration also included field visits to two historically significant sites. Participants toured the Pingding New Canal in Taipei, a landmark of early irrigation engineering that demonstrates the integration of human innovation with natural water systems. The group also visited the Ewei Mountain Terraces, showcasing traditional hillside agricultural practices developed through generations of local farming wisdom. These activities reinforced CTCID's dual mission of preserving traditional water management wisdom while embracing modern innovations.







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Motor Rating (kW) : upto 2,500



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Q (m³/hr) : upto 9,500
H (m) : upto 85
Motor Rating (kW) : upto 2,500



Submerged Elbow Pumpset (AES)

Q (m³/hr) : upto 3,500
H (m) : upto 20
Motor Rating (kW) : upto 110



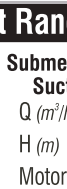
Non Clog Flood Proof Submersible Pumpset (ANFP) Aqua Slurry Flood Proof Submersible Pumpset (ASFPP)

Q (m³/hr) : upto 9,500
H (m) : upto 85
Motor Rating (kW) : upto 2,500



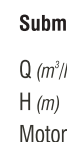
Submersible Dredging / Slurry Pumpset (ADSJ)

Q (m³/hr) : upto 400
H (m) : upto 40
Motor Rating (kW) : upto 90



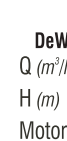
Submerged Centrifugal Double Suction Pumpset (ARSDS)

Q (m³/hr) : upto 9,000
H (m) : upto 400
Motor Rating (kW) : upto 2,500



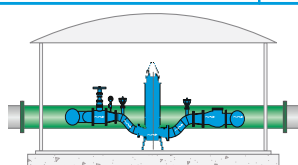
Submerged Tubular Column Pumpset (ATBX)

Q (m³/hr) : upto 25,500
H (m) : upto 40
Motor Rating (kW) : upto 2,500



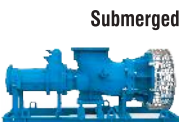
Portable, Electric; Dewatering pumpsets (PD)

Q (m³/hr) : upto 180
H (m) : upto 55
Motor Rating (kW) : upto 18.3



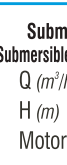
Submerged Inlined Flood Proof Pumpset (AILFP)

Q (m³/hr) : upto 462
H (m) : upto 45
Motor Rating (kW) : upto 75



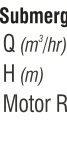
Non Clog Submersible Sewage Pumpset (ANS)

Q (m³/hr) : upto 9,000
H (m) : upto 90
Motor Rating (kW) : upto 2,500



Submersible Slurry Pumpset (ASS) Submersible Slurry Hydro Electric Pumpset (ASSHE)

Q (m³/hr) : upto 2,500
H (m) : upto 100
Motor Rating (kW) : upto 355



Submerged Mine Dewatering Pumpset (AMS)

Q (m³/hr) : upto 2,000
H (m) : upto 450
Motor Rating (kW) : upto 1200

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Date: 1-2 April 2026

International Conference on Water Management and Irrigation Technologies in Agriculture (ICWMITA-26), Istanbul, Turkey

This event will bring leading scientists, academicians, industry professionals, speakers, and experts of to one platform. The informative discussions will highlight solutions, achievements, trending issues, and future strategies. <https://iser.org.in/conf/index.php?id=100175683>

6-8, April 2026

7th Arab Water Forum (AWF7), Jeddah, Kingdom of Saudi Arabia

Arab Water Council is organizing a forum on theme “Arab Water: Accelerating Actions for a Resilient Future”. For more details: <https://www.arabwatercouncil.org/index.php?lang=en>

1-5 June 2026

The 20th IWA Leading Edge Conference on Water and Wastewater Technologies

Resilient Water in a Changing World, Houston, Texas, USA. <https://iwa-let.org/>

15 – 18 June 2026

Singapore International Water Week 2026

The Global Platform to share and co-create innovative water, coastal and flood solutions. Sands Expo & Convention Centre Marina Bay Sands, Singapore. <https://www.siww.com.sg/home>

17-19, June 2026

Euro-Mediterranean Conference on Water Reuse 2026, Madrid, Spain

Co-organized by I-ReWater Interreg SUDOE consortium, the ‘Asociación Española de Riegos y Drenajes-AERYD’ & Projects and Planning research group-PROePLA (USC) on themes Legal aspects and Governance, Sanitary and Environmental risks, Water reuse for irrigation and agriculture, Water treatment technologies & other

reclaimed water uses and Socio-economic aspects. For more details: https://server.matchmaking-studio.com/en/REUSE_EuroMed_Madrid_2026/

24-25 June 2026

2nd Indo – Global Irrigation Summit, New Delhi, India

ICID is organizing the summit on the theme “Smart Irrigation Management”. For more details: <https://igis.icidonline.org/>

8-10, July 2026

19th THAICID National Symposium 2026 and the THAICID Network Week, Nakhon Pathom, Thailand

Thai National Committee on Irrigation and Drainage (THAICID) is organizing the conference on the theme “How Can Irrigation and Drainage Innovations Drive Climate-Resilient Water and Agriculture through Smart Management, Technology, and Community Action?”. For more details: <https://www.rid.go.th/Thaacid/>

8-10, July 2026

10th International Conference on Agricultural Statistics, Kraków, Poland

Statistics Poland, in coordination with the Food and Agriculture Organization of the United Nations (FAO), the World Bank and the United States Department of Agriculture (USDA) is organizing the conference on the theme “Innovative Data Approaches: Shaping Resilient and Sustainable Agri-Food Systems in the Digital Age”. For more details: <https://www.isi-next.org/conferences/icas-x-2026/>

4-5, August 2026

7th International Conference on Agriculture, Kuala – Lumpur, Malaysia

Agro Food is organizing the conference on the theme “Focused on addressing food security, climate-smart agriculture, and sustainable food systems”. For more details: <https://agrofoodconference.com/>

23-27 August 2026

World Water Week 2026, Stockholm, Sweden

Stockholm International Water Institute is organizing the conference on the theme “Water for People and Progress”. For more details: <https://worldwaterweek.org/programme/theme>

26 August 2026

Special Technical Meeting of THAICID, Pak Kret, Thailand

Thai National Committee on Irrigation and Drainage (THAICID) is organizing the meeting. For more details: <https://www.rid.go.th/Thaacid/>

26 August 2026

THAICID Annual Meeting 2026, Samsen, Thailand

Thai National Committee on Irrigation and Drainage (THAICID) is organizing the annual meeting. For more details: <https://www.rid.go.th/Thaacid/>

Co-hosting the Thailand STEM Project Competition, Chonprathan Wittaya School, Thailand. Thai National Committee on Irrigation and Drainage (THAICID) is organizing the workshop. For more details: <https://www.rid.go.th/Thaacid/>

14-16, September 2026

6th Edition of the Global Conference on Agriculture and Horticulture (AGRI-2026), Rome, Italy

Magnus Group is organizing the conference on the theme “Frontiers and Advances in Agriculture and Horticultural Science”. For more details: <https://agriculturemeetings.wordpress.com/>

22-26, September 2026

9th India International Water Week 2026, New Delhi, India

Ministry of Jal Shakti, Government of India is organizing the conference on the theme “Climate Resilient Water Management”. For more details: <https://www.indiawaterweek.in/Default.aspx>

4-8, October 2026

IWA World Water Congress & Exhibition, Glasgow, UK

The International Water Association (IWA) is organizing the conference on the theme “Water action – the path to resilience and prosperity”. For more details: <https://worldwatercongress.org/>

12-17, October 2026

26th ICID International Congress on Irrigation and Drainage & 77th International Executive Council Meeting, Marseille, France

ICID is organizing the conference on the theme “Water and agricultural resilience in the face of climate change”. For more details: <https://icidcongress2026.org/>

2-4, December 2026

2026 UN Water Conference, United Arab Emirates (UAE)

United Nation along with Senegal and the UAE is organizing the conference on the theme “Accelerate the Implementation of Sustainable Development Goal 6: Ensure availability and sustainable management of water and sanitation for all”. For more details: <https://www.unwater.org/news/2026-un-water-conference>

22-28, March 2027

11th World Water Forum, Riyadh, Saudi Arabia

World Water Council (WWC) is organizing the conference on the theme “Action for a Better Future”. For more details: <https://www.worldwatercouncil.org/en/11th-world-water-forum-saudi-arabia-and-riyadh-host-11th-world-water-forum-2027>

26th ICID International Congress and 77th IEC Meeting

12-17 October 2026, Marseille, France



Theme: Water and agricultural resilience in the face of climate change



Question 66

In the face of climate change, how can irrigation and drainage contribute to the agro-ecological transition?

[More information](#)



Question 67

Innovative technology and practices for increasing water use efficiency. Irrigation management and services, remote sensing, irrigation equipment... where do we stand?

[More information](#)



Question 68

Non-conventional water (REUSE, desalination): can we really loosen the grip on the resource and for what uses?

[More information](#)

Contact: For more information, please visit: <https://icidcongress2026.org/>

Workshop & Side Events during the 26th ICID Congress

International Workshop on “Implementation of the Water-Energy-Food (WEF) Nexus at different scales for Socio-Economic Development”

13 October 2026, Marseille, France

The Workshop is being organized by the ICID's Working Group on Water Food Energy Nexus (WG-WFE_N) as part of the 26th ICID International Congress and 77th International Executive Council and will be held on October 13, 2026, in Marseille, France. The Workshop is jointly Organized with IWMI and FAO.

Call for papers

Abstracts/papers are invited and encouraged from professionals, researchers, experts, practitioners, managers, policymakers and students. The papers should show examples of application and must include the three elements of the Nexus: Water, Food and Energy.

Schedule for Submission of Abstracts/ Full Papers

- Submission of abstracts (max. 600 words) : 28 April 2026
- Abstract acceptance & invitation to submit full paper: 07 May 2026
- Deadline for Submission of Full Papers (max. 10 pages of A-4 size): 07 June 2026
- Notification of acceptance of full papers: 1 August 2026

Important

Send your abstract by E-mail using the provided template to PH Ragab Ragab at ragab@icid.org with CC to VPH Dr. K. Yella Reddy Vice Chairman of the WG-Nexus at yellark@gmail.com and to Dr. Ming-Che HU, Secretary of the WG-Nexus at mchu@ntu.edu.tw and to ICID Central Office at icid@icid.org

For further details please visit the link: <https://icidcongress2026.org/nexus-workshop/>

Workshop & Side Events during the 26th ICID Congress

International Workshop on “Climate-Resilient Coastal Irrigation and Groundwater Management under Land Subsidence and Salinization Risks”

13 October 2026, Marseille, France

The Workshop is being organized by the ICID's Working Group on Sustainable Coastal Environment Regeneration (WG-SCER) as part of the 26th ICID International Congress and 77th International Executive Council and will be held on October 13, 2026, in Marseille, France. The Workshop is jointly Organized with NCKU and CTCID and will invite ITAL-ICID, JNC-ICID, MNICID, INACID, and THAICID.

Call for papers

Abstracts/papers are invited and encouraged from professionals, researchers, experts, practitioners, managers, policymakers and students. The workshop will feature oral and poster presentations, as well as a panel discussion linked to the workshop theme and sub-theme.

Schedule for Submission of Abstracts/ Full Papers

- Submission of abstracts (max. 600 words) : 30 April 2026
- Notification of acceptance: 30 May 2026
- Submission of full papers (max. 10 pages, A4 size): 30 June 2026
- Notification of acceptance of full papers: 15 July 2026

Important

Send your abstract by E-mail to Dr. Ruey-Chy Kao, Chair, WG-SCER at sigmayk@gmail.com with CC to VPH Dr. Nor Hisham Bin Mohd Ghazali, Vice-Chair, WG-SCER at hisham.ghazali@gmail.com, Er Paavan Kumar Reddy Gollapalli, Secretary, WG-SCER at paavankrg@gmail.com and to ICID Central Office at icid@icid.org.

For further details please visit the link: <https://icidcongress2026.org/nexus-workshop/>

Workshop & Side Events during the 26th ICID Congress

International Workshop on “2nd World Heritage Irrigation Structures Conference”

13 October 2026, Marseille, France

The Workshop is being organized by the ICID's Working Group on History of Irrigation, Drainage and Flood Control (WG-HIST) as part of the 26th ICID International Congress and 77th International Executive Council and will be held on October 13, 2026, in Marseille, France. The Workshop is jointly Organized with Food and Agriculture Organization of the United Nations - Globally Important Agricultural Heritage Systems (FAO-GIAHS)

Call for papers

Abstracts/papers are invited and encouraged from professionals, researchers, experts, practitioners, managers, policymakers and students.

Schedule for Submission of Abstracts/ Full Papers

- Submission of abstracts (max. 500 words) : 31 April 2026
- Notification of abstract acceptance & invitation to submit full paper : 30 May 2026
- Deadline for Submission of Full Papers: 31 June 2026
- Notification of full paper acceptance & oral presentation invitation : 30 July 2026
- Final revised paper submission for Irrigation and Drainage special issue: 30 September 2026

Important

Please send the complete documents to Dr. Yutaka Matsuno (Chair of WG-HIST) at matsuno@nara.kindai.ac.jp, with CC to Mr. Gao Lihui, (Vice Chair of WG-HIST) at gaoh@iwhr.com

For further details please visit the link: <https://icidcongress2026.org/registration/>



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International Commission on Irrigation and Drainage

Under the aegis of



**Government of India
Ministry of Jal Shakti**

Department of Water Resources
River Development and Ganga Rejuvenation

is organizing

2nd Indo-Global Irrigation Summit 2026

**Theme: Smart Irrigation
Management**

24-25 JUNE, 2026

VENUE:

**Dr. Ambedkar
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Invitation to Join ICID *As* Direct Member



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Invitation to Join!

The International Commission on Irrigation and Drainage (ICID) is a leading scientific, technical, and professional not-for-profit international organization established in 1950 with headquarters in New Delhi, India; working in the field of irrigation, drainage, and flood management to promote and achieve 'sustainable agriculture water management' through its vision "A water secure world free of poverty and hunger through sustainable rural development".

ICID's Membership is open to **Private Companies, Institutions, and Individuals** involved in agriculture water management to join as a 'Direct Member'. By joining ICID as a "DIRECT MEMEBR", companies, institutions, and individuals working or dealing with irrigation, drainage, flood-related issues, and other allied fields would be part of an international network that offers opportunities to exchange knowledge and experience, establish partnerships; stay informed on recent irrigation, drainage and flood management news and events through Commission's publications; make their voice heard and contribute to improved understanding among stakeholders, enabling new ideas on water policy; benefit from worldwide exposure of their organization's activities by using the Commission's communication tools and by participating in the Commission's activities;

and influence policymakers to develop sound irrigation-related policies and give it higher priority in the political agenda.

ICID organizes triennial International Congress on Irrigation and Drainage – addressing specific questions; World Irrigation Forum, Regional Conferences, International Drainage Workshops, International Micro Irrigation Conferences, etc. regularly. The Commission brings together experts from different parts of the world to share their experiences and knowledge on specific issues through the ICID technical workbodies. The workbodies bring out manuals, guidelines, and special publications from time-to-time.

For more information related to Direct Membership, please visit: https://icid-ciid.org/member/direct_member

Apply Online for Direct Membership: https://icid-ciid.org/member/dm_membership_form

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To Our Readers!

Thank you for reading! If you enjoyed this publication, please consider sending a honest review. We are asking your valuable feedback to ensure we publish quality content that meets your needs and aspirations. Please let us know what topics or themes would you like to see featured more often. What one change would improve your digital reading experience the most. Please

feel free to suggest areas of improvements in order to make this publication more informative and interesting.

Please send your feedback through email at icid@icid.org.

Your feedback means a world to us!

Call for Articles for ICID Digest

ICID Digest aims to provide valuable insights and updates in the field of water resources and irrigation.

Each issue of the ICID Digest will feature technical articles on topics such as water conservation, irrigation and drainage management, water-food-energy nexus, integrated water resources management (IWRM), reservoir operations, basin planning, remote sensing applications, advanced technologies (e.g., AI, machine learning, canal automation, hydrology, micro-irrigation, smart irrigation, IoT, and sensors), flood and drought management, dam safety, water recycling and reuse, treated wastewater for irrigation, environmental management, and case studies. Contributions from distinguished experts, international organizations, and leading industries highlighting the latest advancements, including case studies and practical examples will also be covered.

It will include our regular features like World Heritage Irrigation Structures, International News and Updates on initiatives and activities undertaken by National Committees of ICID.

Considering the vast experience in industrial sector related to water resources management,

irrigation, drainage, latest technological advancements, etc ICID invites all National Committees, experts and professionals and industries associated in the field of agricultural water management to contribute articles and share experiences on the topics listed above or any other relevant subject within the broader water sector.

The format of Articles is given below:

- (a) MS-Word file
- (b) 6-8 pages (A-4 size)
- (c) Title of the paper: Bold Font-Calibri, font size-16
- (d) Para headings: Bold Font-Calibri, font size-14
- (e) Text: Justify, Font Times New Roman, font size 12, 1.2 line spacing
- (f) All margins: 1 inch
- (g) Brief Profile of author (about 100 words)
- (h) Photo of author: .jpg file

ICID greatly appreciates your time and valuable contribution to the ICID Digest. Your expertise will enrich this publication and foster knowledge-sharing within our global community.

Please send your contribution to **icid@icid.org**.



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