

innovation and growth in the irrigation sector is immense. Together, we can ensure that irrigation continues to be a vital component of agricultural development and food security in Southeast Asia and beyond.

Given the above, papers are invited and discussed under the following Sub-themes.

B. Sub-Themes:

1. Challenges of Irrigation and Drainage for Food Security in the Changing World

The challenges of irrigation and drainage for food security in the changing world are multifaceted and increasingly complex. Climate change significantly impacts irrigation systems by altering weather patterns and increasing the frequency of extreme weather events, thereby affecting water availability and irrigation practices. This necessitates innovative approaches to sustainable water management, especially in arid and semi-arid regions where water scarcity is a persistent threat. Strategies to enhance water use efficiency in these regions are critical to ensuring long-term food security. Furthermore, addressing soil salinity and degradation in irrigated agriculture is essential for maintaining soil health and agricultural productivity. Combatting soil salinization requires effective methods that not only prevent further soil degradation but also rehabilitate affected areas. Additionally, integrating traditional and modern irrigation practices offers promising solutions for effective water management. Case studies have demonstrated that combining indigenous knowledge with modern technologies can lead to more resilient and efficient irrigation systems. These integrated approaches are vital for adapting to the evolving challenges posed by a changing climate and ensuring sustainable food production.

Topics:

- 1.1 Adapting Irrigation Systems to Climate Change
- 1.2 Sustainable Water Use in Arid and Semi-Arid Regions
- 1.3 Treated waste Water Reuse for Irrigation – “use of non-conventional water as a sustainable water source for irrigation”
- 1.4 Integrating Traditional and Modern Irrigation Practices
- 1.5 Optimizing Water Use Efficiency for Food Security
- 1.6 Definition of potential & needs for irrigation expansion
- 1.7 River Basin Organization (RBO) approach for water governance

2. Technology and Modernization in the Agricultural Sector towards Food Security

The modernization of the agricultural sector through technology is pivotal for enhancing food security.

Precision agriculture and smart irrigation technologies, which utilize data analytics, sensors, and automation, play a crucial role in optimizing water usage and maximizing crop yields. These technologies enable farmers to make informed decisions based on real-time data, thereby improving efficiency and productivity. Remote sensing and Geographic Information Systems (GIS) further enhance modern irrigation management by providing advanced spatial technologies for better planning and monitoring. These tools allow for accurate mapping and analysis of irrigation needs, leading to more effective water distribution. Digital farming solutions also have a significant impact on food security by improving agricultural productivity through various digital tools and platforms. These solutions facilitate better resource management, crop monitoring, and yield prediction, contributing to overall farm efficiency. Additionally, the adoption of solar-powered irrigation systems presents a sustainable approach by utilizing renewable energy sources for irrigation. While this transition offers numerous benefits, including cost savings and reduced carbon footprint, it also poses challenges such as the initial investment costs and the need for technical expertise. Nonetheless, the integration of these technologies and modernization efforts is essential for advancing agricultural practices and ensuring food security in the face of growing global demands.

Topics:

- 2.1 The Role of Precision Agriculture in Enhancing Crop Yields and Resource Efficiency
- 2.2 Smart Irrigation System for Sustainable Water Management
- 2.3 Digitalization in modern agriculture for Sustainable Water Management (use of ArcGIS, Drone Technology & AI etc.)
- 2.4 Desalination as a Sustainable Water Source for Irrigation
- 2.5 Digital Farming Solutions for Improved Agricultural Productivity
- 2.6 Solar-Powered Irrigation Systems: Opportunities and Challenges

3. Innovative Policy, Service Delivery, and Financing Mechanisms to Meet the Challenges of the Future

Innovative policy, service delivery, and financing mechanisms are crucial for addressing the future challenges of agricultural water management. Public-private partnerships (PPPs) in this sector demonstrate successful models of collaboration that leverage the strengths of both sectors to enhance water management practices. Case studies of these partnerships reveal how they can effectively mobilize resources, share expertise, and foster innovation in

irrigation and drainage systems. For small-scale farmers, access to innovative financing solutions, such as microcredit and investment mechanisms, is essential for implementing sustainable irrigation and drainage projects. These financial tools enable farmers to invest in necessary infrastructure and technologies, promoting long-term agricultural sustainability. Policy frameworks that promote efficient water use and environmental sustainability are also critical. Developing and implementing these policies ensures that irrigation practices are aligned with broader environmental goals and resource conservation strategies. Furthermore, improving governance and institutional capacity in water resource management is vital. Strengthening institutions to better manage and deliver irrigation services enhances their ability to respond to emerging challenges and effectively allocate water resources. Together, these innovative approaches in policy, service delivery, and financing mechanisms are fundamental for advancing agricultural water

Topics:

- 3.1 Public-Private Partnerships (PPPs) in Agricultural Water Management
- 3.2 Innovative Financing Solutions for Irrigation.
- 3.3 River basin approach as backbone for strengthening governance institutional capacity
- 3.4 Enhancing water resource management by strengthening governance, institutional capacity, and leveraging technology & innovation to improve service delivery.
- 3.5 O&M issues and management of irrigation structures
- 3.6 Water Governance & reforming institutions for water service deliveries
- 3.7 Gender equality and Social Inclusion (GESI) for sustainable irrigation management and ensuring food security in the future.

4. Nature-Based Solutions in Agriculture to Foster Ecological Resilience

Nature-based solutions in agriculture play a crucial role in fostering ecological resilience and sustainability. Utilizing natural wetlands for water purification and irrigation exemplifies how wetlands can support sustainable agriculture by filtering pollutants and providing a reliable water source. Agroforestry practices, which integrate trees and shrubs into farming systems, significantly enhance water retention and soil health, offering both ecological and agricultural benefits. These practices help maintain soil structure, improve nutrient cycling, and reduce erosion. Constructed wetlands are another innovative solution, serving as effective systems for treating agricultural runoff and reusing water for irrigation. Case studies have shown that these engineered ecosystems can significantly reduce contaminants and provide a sustainable water source for crops. Additionally, promoting biodiversity conservation within irrigated agricultural landscapes

is essential for enhancing ecosystem services and agricultural resilience. Biodiverse systems support pest control, pollination, and nutrient cycling, which are critical for maintaining productive and resilient agricultural systems. Together, these nature-based approaches not only bolster ecological health but also contribute to sustainable and resilient agricultural practices.

Topics:

- 4.1 Utilizing Natural Wetlands for Sustainable Water Management in Agriculture
- 4.2 Agroforestry Practices for Improved Water Retention and Soil Health from Source to Sea
- 4.3 Constructed Wetlands for Treating Agricultural Runoff and Reusing Water
- 4.4 Promoting Biodiversity Conservation in Irrigated Agricultural Landscapes
- 4.5 Integrating Nature-Based Solutions in Climate-Resilient Agricultural Strategies
- 4.6 Incorporation of Shallow Ground Water in nature based solution

C. Schedule for submission of abstracts/ full papers

- i. Submission of extended abstracts (max. 500 words) — **1 Feb. 2025**
- ii. Notification of Acceptance — **15 March 2025**
- iii. Submission of full paper (10 pages of A4 size) — **15 May 2025**
- iv. Notification to the authors regarding oral/poster presentation — **1 June 2025**

D. Online paper submission

- (a) Online 'Extended Abstract' submission is now open. New Users are expected to create their own account. The procedure for creating a new account is available at: https://wif.icidevents.org/Register_Modify.aspx
- (b) Please note that only the 'Extended Abstracts' of the papers are required in first stage of submission to enable peer review by an International Review Committee. **PLEASE DO NOT SUBMIT THE FULL PAPERS AT THIS STAGE** as they would not be reviewed now.
- (c) Upon receiving acceptance letter from ICID Central Office, authors are required to provide/upload an electronic version of the full length papers in Microsoft Word format (**file size limited to 10 MB**) by strictly following the guidelines available at: <https://wif.icidevents.org/PaperNew.aspx>

Contact coordinates:

WIF4 Secretariat:

Dr. Goh Hui Weng
Senior Lecturer and Forum Manager
River Engineering and Urban Drainage Research
Centre (REDAC)
Engineering Campus, Universiti Sains Malaysia,
14300 Nibong Tebal, Penang, Malaysia
Email: redac_gohhuiweng@usm.my
Website: <https://wif4.org/index.php/en/>

For all paper-related queries:

ICID Central Office (<https://icid-ciid.org>)
Mr. Hari Prakash Chaurasia
WIF4 Coordinator
48 Nyaya Marg, Chanakyapuri,
New Delhi 110 021, India
Phone: +91-11-26116837, 26115679
E-mail: icid@icid.org

For participation and other information, visit:

<https://wif4.org/index.php/en/>

