

Sub-Theme: Technology and Community for Water Security

Topic: Forecasting and Modelling for Water Security

Background:

India faces complex challenges related to floods, droughts, groundwater depletion, and water quality degradation, hence water security has emerged as a critical global and national priority. Forecasting and modelling tools such as hydro-meteorological forecasting systems, hydrological and groundwater models, climate impact models, water quality simulations etc. provide critical insights for anticipating water-related risks and optimizing resource allocation. These tools are increasingly essential for strengthening early warning systems, improving reservoir operations, managing transboundary waters, and enhancing climate resilience. However, their effectiveness in ensuring water security ultimately depends on how well these technologies are translated into actionable information for communities, local institutions, and decision-makers. This session is to highlight how innovative forecasting and modelling approaches can bridge the gap between science, policy, and practice, thereby contributing to sustainable & secure water management at local, basin and national scales.

Objective:

- To showcase state-of-the-art forecasting and modelling tools for water quantity, quality, and extreme events (floods and droughts).
- To explore the role of climate-informed models, AI/ML, remote sensing, and data assimilation in improving water security planning.
- To share case studies and best practices demonstrating the application of modelling outputs in policy formulation, operational decision-making, and risk management.
- To foster dialogue among policymakers, researchers, practitioners, and technology providers on integrating modelling frameworks into water governance and planning.

Expected Outcome:

- Enhanced understanding of emerging forecasting and modelling technologies and their relevance to water security challenges.
- Practical insights into translating model outputs into actionable strategies for water resources planning, disaster risk reduction, and climate adaptation.
- Identification of gaps in data, capacity, and institutional frameworks, along with potential pathways for strengthening modelling capabilities.