



जल शक्ति मंत्रालय
भारत सरकार
MINISTRY OF JAL SHAKTI
GOVERNMENT OF INDIA



8th INDIA WATER WEEK- 2024

Partnerships and Cooperation for Inclusive
Water Development and Management

17-20 SEPTEMBER, 2024

BHARAT MANDAPAM & HALL 12-A, NEW DELHI

RECOMMENDATIONS



Multi-Disciplinary Forum

4,800 sq.m. Exhibition

Promotional Facilities

4500+ Delegates

INDIA'S INTERNATIONAL WATER RESOURCES EVENT

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**Director General NWDA &
Member Secretary, Organising
Committee 8th IWW-2024
National Water Development Agency
Department of WR, RD&GR
Ministry of Jal Shakti
Government of India**

Preface

India Water Week (IWW) is India's flagship international event organized by National Water Development Agency (NWDA) under the Department of Water Resources, River Development & Ganga Rejuvenation (DoWR, RD&GR), Ministry of Jal Shakti, Government of India since 2012.

The 8th India Water Week-2024 (IWW-2024) was organized from 17-20 September 2024 at Bharat Mandapam, Pragati Maidan, New Delhi with the theme "**Partnerships and Cooperation for inclusive Water Development and Management**". The four-day multi-disciplinary conference comprises of Ministerial Plenary, Global Water Leaders' Plenary (2), Country Forum (4), Water Leaders Forum (9), Practitioner's Forum (8), Startup Forum, Youth Forum, Water Convention (18) one-day study tour and concurrently organised exhibition. Denmark, Australia and Israel were the Partner Countries. There were 15 Partner States viz: Tamil Nadu, Odisha, Bihar, Chhattisgarh, Kerala, Haryana, Andhra Pradesh, Gujarat, J & K, Madhya Pradesh, Uttarakhand, Rajasthan, Uttar Pradesh, Karnataka and Telangana.

More than 4500 delegates from India & abroad participated in the IWW-2024. About 215 delegates from 40 countries participated in the conference. Parallel to the conference, in the exhibition 143 Exhibitors from Central, States government, Public Sector undertakings, Private Firms, NGOs, Startups and Schools etc showcased their technologies.

I would like to acknowledge the contribution and guidance of Ms. Vini Mahajan, Secretary, DoDW&S; Ms. Debashree Mukherjee, Secretary, DoWR, RD & GR and Chairman of the Organizing Committee; Shri Rakesh Kumar Verma, Additional Secretary, DoWR, RD & GR; Shri Chandra Bhushan Kumar, Addl. Secy. & MD, DoDW&S, Smt. Archana Varma, AS & MD (NWM), Shri Subodh Yadav, Additional Secretary, DoWR, RD & GR; Shri K. Vohra, the then Chairman, CWC & Chairman of the technical Committee of IWW – 2024 and Shri Bhopal Singh, the then Director General, NWDA.

I would also like to express my sincere gratitude to Chair, Co-Chair, Moderators and Keynote Speakers of all the sessions who guided and supported during the sessions.

I hope the recommendations emerged during IWW-2024 and presented here, would be adequately useful for policy framing and implementation of user's agencies, stakeholders and general public.

(Baleshwar Thakur)

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8th INDIA WATER WEEK- 2024

Highlights

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1	MINISTERIAL PLENARY
2	GLOBAL WATER LEADERS' PLENARY
9	WATER LEADERS' FORUM
1	STARTUP FORUM
8	PRACTITIONERS' FORUM
4	COUNTRY FORUM
1	YOUTH FORUM
18	WATER CONVENTION

PARTICIPATIONS'	
4596	DELEGATES
215/ 40	FOREIGN DELEGATES/ COUNTRIES
26	STATES/ UTS
6	KNOWLEDGE PARTNERS
45	KEYNOTE SPEAKERS
110	PAPER PRESENTATIONS
143	EXHIBITORS

Inauguration of 8th INDIA WATER WEEK 2024



Ministerial Plenary



Global Water Leaders' Plenary-I



Global Water Leaders' Plenary-II



Water Leaders' Forum





Country Forum



6th India EU Water Forum event was organized by our partner organization European Union



Country Forum events were organized by **our partner countries Denmark & Israel**

Practitioners' Forum





Inauguration of Exhibition



Youth Forum



Water Convention



Cultural Evening



SANGEET NATAK AKADEMI

The background features a light blue world map at the top, with a large, dynamic water splash in shades of blue and white at the bottom. The splash is centered and creates a sense of movement and freshness.

Global Water Leaders' Plenary-I

SESSION: GLOBAL WATER LEADERS' PLENARY - I (GWLP-I)

DATE: 17.09.2024, TIME: 14:00 HRS TO 15:15 HRS

Chairperson – Ms. Debashree Mukherjee, Secretary, DoWR, RD&GR
Co-Chair – Ms. Mridula Ramesh, Founder Sundaram Climate Institute, Madurai

Recommendations:

- ◆ Development of Irrigation has to be viewed as a response to the climate and food security challenges being posed. Food security should be achieved by modernizing techniques, innovation and increased irrigation efficiency.
- ◆ Irrigation potential planning and creation should be in tune with the land, environmental, socio-economic sustainability and water availability.
- ◆ Mapping of the irrigation development and balance potential assessment and inventorization can contribute to monitoring and achieving SDG 2 and SDG 6 at the same time.
- ◆ Rapid strides in modern technologies like sub-surface drip and Ultra Low Precision irrigation and adoption of expert systems in irrigation scheduling greatly contribute to reducing water waste and preservation of water.
- ◆ To ensure water security, India must continue to address inefficiencies in urban water systems, agricultural irrigation, and sanitation services, focusing on reliable service delivery and enhancing collaboration with the private sector and development partners to scale impactful solutions.
- ◆ Tanks to store rain water are good source of recharging the groundwater table in the vicinity of such tanks. Further, with the right infrastructure and marketing, tanks (lakes and reservoirs) can become potent job-creation engines as local tourism magnets.
- ◆ India needs to Invest in technologies like desalination, reverse osmosis, and large-scale wastewater recycling to improve water availability and quality. Embrace digital innovations to optimize water use and efficiency.
- ◆ There is an emerging need to encourage and involve the youth in water conservation efforts and innovative solutions. Foster their role as 'water warriors' to drive sustainable practices and inspire future generations to continue the fight for water security.
- ◆ Planning for increased water demand due to population growth by improving water efficiency and developing strategies for sustainable resource management. Utilize data-driven approaches to forecast and address future needs.
- ◆ Implement water resource management through decentralized, locally-driven approaches. Empower local authorities and river basins with direct access to financing to better address regional needs.
- ◆ Tackling Global and Local Water Challenges through partnerships and cooperation, update cooperation framework for systems change, devise a collective action for problem solving which should be deliberative and adaptive.

The background features a light blue world map at the top, with a large, dynamic splash of water in shades of blue and white at the bottom. The text is centered in a bold, dark blue font.

Global Water Leaders' Plenary-II

SESSION: GLOBAL WATER LEADERS' PLENARY - II (GWLP-II)

DATE: 17.09.2024, TIME: 15:30 HRS TO 17:00 HRS

Chair – Shri K. Vohra, Chairman, Central Water Commission

Co-Chair – Additional Secretary, DoWR, RD&GR

Recommendations:

Mr. K. Vohra, Chairman, CWC

- ◆ Collaborative effort and partnership in water sector
- ◆ Water management in integrated way
- ◆ Proactive role of Central Water Commission in Water Resource Project development
- ◆ Water cooperation among states
- ◆ Effective dispute resolution mechanism
- ◆ Participatory approach in water management
- ◆ Bi-lateral cooperation of data sharing
- ◆ Vision 2047 – addressing climate change impacts and future challenges

Mr. Saroj Kumar Jha, Global Director, World Bank

- ◆ Focus on inclusive water management- base of social development
- ◆ Governments to give priority to water sector with substantial resource
- ◆ Enhanced role of Private partnership in water sector
- ◆ Global conversation on water issues

Dr. Kalanithy Vairavamoorthy, CEO, IWA

- ◆ We should start thinking about water globally
- ◆ Adaptation- supply chain resilience
- ◆ Designer water approach which focusses on water of different flavors
- ◆ From waste water to wealth approach
- ◆ Technology readiness

Ms. Noa Amsalen, Water Attachee, Israel

- ◆ Replication of India-Israel collaboration in water technology to other places
- ◆ Large scale re-use of water
- ◆ Metering of water for effective management and its equitable distribution
- ◆ Reduction of non-revenue water

Ms. Aarti Mehra, Deputy Country Director, ADB

- ◆ Stressed on India-ADB collaboration
- ◆ Strong investment in Climate action
- ◆ Private sector role in water management
- ◆ Regional cooperation in water sector
- ◆ Digital transformation in water sector
- ◆ Developing Resilient water systems

Prof. Asit K. Biswas, University of Glasgow, UK

- ◆ Indian water problems must be solved and looked into with Indian characteristics

Mr. Jesper Hannibalsen, Head of Ground Water Division, DEPA

- ◆ Role of Ground water in overall water management
- ◆ Government to government collaboration
- ◆ Utilizing ground water in sustainable water development
- ◆ Reduction in non-revenue water.

Country Forum



SESSION: COUNTRY SESSION BY DENMARK (CFI)

DATE: 17.09.2024, TIME: 17:00 HRS TO 18:30 HRS

Recommendations:

1. Mr Soren Kannik, Minister Counsellor & Head of Trade, Royal Danish Embassy, New Delhi):

Strategic Partnership

- The Speaker emphasized on water being one of the areas of fostering strong partnership between India and Denmark, while celebrating 75 years of Green Strategic Partnership.
- The main focus was on demand side management and wastewater treatment.
- The opportunity of large scale application offered in India was highlighted with an example of National Jal Jeevan Mission.

2. Mr Chandra Bhushan Kumar, Addl. Secy. & MD, DoDW&S

Keynote Speech

- Two flagship Schemes of GoI were highlighted viz. Namami Gange and Jal Jeevan Mission (JJM) and their achievements with integrated community participation and capacity building aspects.
- He stressed on learning from each other and technology transfer as a step towards more fruitful collaboration.

3. Mr Jesper Hannibalsen, Head of the Groundwater Division, Danish Environmental Protection Agency

- Innovative, scalable & sustainable water management solutions. Strategic Sector Collaboration on Water & Environment.
- The case study of JJM towards providing safe and reliable drinking water especially in rural areas was very much appreciated.

4. Lars Mattson, Representative Mayor's Aarhus Kommune

- He explained the Triple Helix Model on Public Private Partnerships and recommended to collaborate with knowledge institutions and private companies thus promoting Solutions rather than Products

5. Panel Discussion-1 (Tech-driven Wastewater Management: From Treatment to Resource Recovery)

Panellists:

1. Eline Suijlen, Water Industry Manager, Alfa Laval
2. Anubhav Jha, Regional Manager, Danfoss
3. Sanjeev Sirsi, Head Sales, WU- Municipal, Grundfos India
4. Vidyavati Basarkod, Managing Director, Ramboll
5. Nitin Bassi, Senior Programme Lead , CEEW
6. Rohit Kakkar, Deputy Advisor, Central Public Health and Environmental Engineering Organisation
7. Nalin Srivastava, Deputy Director General, National Mission for Clean Ganga

Outcome:

- a. The session recognized wastewater as a robust resource, while focusing on sustainable, carbon-neutral, and energy-efficient technologies for treatment, with large-scale applications and special focus on sludge dewatering/recycling/management and pressurized sewage transport.
- b. Comprehensive Framework needs to be designed for treated wastewater management at both Central and State levels to ensure efficient water governance.
- c. Innovative applications of treated wastewater in areas such as power plants, construction industry, peri-urban agriculture, road cleaning and landscaping were recommended. The need to create demand for treated wastewater across various sectors was stressed upon to promote sustainable practices.
- d. The challenges of treating large volumes of wastewater generated in urban centres were highlighted, with a focus on reusability and cost recovery. Sludge management was also identified as a key component in this effort.

6. Panel Discussion-2 (Beneath and Above the Surface: navigating strategies for sustainable surface and ground water management, protection and opportunities)**Panellists:**

1. Choukri Karabach, Product line leader and Sales Manager Afinitas
2. Dr. Shresth Tayal, Head of Water Resource, DHI
3. Per Gissel, Head of Operations, Skytem Surveys Aps
4. Niels Esben Auken, CEO, TEMcompany ApS
5. Philip Grinder Pedersen, Chief advisor, Danish Environmental Protection Agency
6. Dr. Ranjan Ray, Scientist, CGWB
7. D.P Mathuria, Chief Engineer, CWC
8. Prof. Karsten Høgh Jensen, Copenhagen University
9. Ravi Solanki Chief Engineer, Department of Water Resources, Government of Rajasthan

Outcomes:

- a. Discussions were focused on enhancing surface and groundwater resources, improving Decision Support Systems (DSS), promoting and involvement of and promoting research and educational collaboration. The need for advanced technologies for mapping, monitoring, and managing water resources as well as integrated hydrological modelling was highlighted.
- b. Private Sector representatives stressed the importance of innovation, knowledge exchange and technology transfer to address water-related challenges effectively with more exposure visits for capacity building.
- c. The forum emphasized the importance of utilizing large data repository for informed decision-making and recommended the establishment of open databases to support research and consultancy in the water sector.
- d. Upgrading the flood forecasting systems and operational flood inundation forecasts were also stressed upon along with Extended Hydrological Prediction and creation of institutional mechanism/strengthening.

SESSION : COUNTRY SESSION BY AUSTRALIA AND ISRAEL (CF2)

DATE: 18.09.2024, TIME: 10:00 HRS TO 11:45 HRS

Recommendations:

I Australia:

- Alluvium Group, based in Australia, specializes in providing advisory services to address the complex and interconnected challenges facing society and the environment. Their expertise lies in supporting both governments and businesses in solving issues related to the natural and built environments. They focus on sustainable solutions, working across water, land, biodiversity, rural and urban landscapes, aiming to make a positive impact on communities and ecosystems.
- Austrade group is associated with Basin planning In Krishna River and Narmada river basin for integrated reservoir operation.
- Austrade is also associated with Guwahati, Assam Silsako Beel River.
- SCADA based Autonomous canal automation solutions that are designed and developed with a lot of research with Melbourne University over a period of 25 years using cutting edge innovations such as solar power and marine grade components. The autonomous operations in the canal operations are state of the art and are future proof for India for the next 20 years with manufacturing, execution and support from India.
- Rubicon has been associated with the Vande Bharat train(India's high speed rail technology)
- Smec is a leading engineering and environmental Consultancy firm in India. Working since 1975, have completed 400+ projects. Projects working include Desalination plants, Dam Rehabilitation Improvement Programme, Design for tunnels and dams, Urban development, renewable energy and power line distribution, metro etc.

II Israel :

1. Irrigation is key to clever use of water example of drip irrigation- irrigation, purification, leakage proofing, carbonization, reuse & recycling of existing water resources must be looked into.
2. Irrigation potential planning and creation should be in tune with the availability of land, environmental, socio-economic sustainability and water availability.
3. Water pricing, manuals, rules and regulation for conservation of water.
4. Rapid strides in modern technologies like sub-surface drip and Ultra Low Precision irrigation and adoption of expert systems in irrigation scheduling greatly contributed in preservation of water and reducing quantum of waste water.
5. Micro-irrigation is a step towards smart digital farming. Importance of micro irrigation along with fertigation and resource use efficiency have been elaborated.
6. India needs to Invest in technologies like desalination, reverse osmosis, and large-scale wastewater recycling to improve water availability and quality. Embrace digital innovations like smart sensors, meters etc to optimize water use and efficiency.

SESSION : COUNTRY SESSION BY OTHER COUNTRIES (CF3)
(Indonesia, Cambodia, Morocco, Singapore, Guiana, Denmark and Zimbabwe)
DATE: 18.09.2024, TIME: 14:15 HRS TO 15:45 HRS

Recommendations:

1. Denmark's Delegate elaborated on use of 3D mapping of ground water and drone technology for managing the irrigation and other requirements in their country.
2. The presenter further elaborated on the regulatory framework covering food security and dam construction in their country for water resources management.
3. Indonesia also elaborated on river basin territory management, integrated water resources development, rehabilitation of existing dams, and construction of new dams and modernization of irrigation systems.
4. Cambodia's representative spoke about the need to collectively combat the water security challenges citing example of Mekong river. He focused on Variability of surface water and Ground Water, monitoring water supply, farmer user community, optimum water use, long term climate change, water availability issues, mitigating risk of flood and drought, dam safety, flood forecasting, twin challenge of climate change & population growth.
5. Speaker from Morocco stressed on the major constraint of 'Climate Change' and occurrences of consecutive droughts in their country. He elaborated on the need to strengthen Public Private Partnership through private sector engagement in water resources management. He also elaborated on various schemes/ programmes and policies such as National Water Policy, Emergency Programs, Reuse of Wastewater and strengthening of drinking water supplies to rural area etc are adopted by their government for mitigation of challenges faced by them.
6. Singapore elaborated their journey from starting from humble background to the present advanced stage of water management within a short span of time. Main constraints of their country facing are climate change, rising sea level, carbon emission. For carbon emission they are targeting zero carbon emission in future. For supply demand management they are adopting various instruments like pricing, public education etc.
7. Guiana's speaker deliberated on best practices in water governance must address climate change and competing demands. Recent information and communication technology (ICT) and Internet of Things (IoT) advancements enable real-time monitoring of water infrastructure, while smart water management technologies promote efficient and sustainable water use through innovative tools like sensors and data systems.
8. Zimbabwe's speaker deliberated on its actively pursuing to enhance various sectors, including borehole drilling, for which they have received 30 new rigs. They aim to improve water supply by acquiring pumps and accessories for over 300 stations managed by national Water Authority (ZINWA). Additionally, they seek irrigation technologies to modernize over 450 schemes and are focused on constructing dams and treatment plants. Lastly, they emphasize the importance of research and new technologies to modernize the economy. The Zimbabwean government is foreseeing partnerships with India in several key areas in water sector including borehole drilling and dam rehabilitation etc.

SESSION : 6th INDIA-EU WATER FORUM ON WATER COOPERATION (CF4)

DATE: SEPTEMBER 18, 2024 TIME: 09.30 TO 17:00 IST

Recommendations:

The 6th India-EU Water Forum has witnessed the presence of high-level participation from Ministry of Jal Shakti, its allied institutions, namely Central Water Commission (CWC), Central Ground Water Board (CGWB), National Mission for Clean Ganga (NMCG) and Brahmaputra Board (BB); European Union Delegation; Embassy of Germany, France, Slovakia, Finland, Denmark, The Netherlands, Hungary and Belgium. More than 100 participants attended the Forum.

Background:

The India-EU Water Partnership (IEWP) is an outcome of the 'Joint Declaration on an India-EU Water Partnership (IEWP)' adopted by the EU and the Government of India during the 13th EU-India Summit in Brussels, in March 2016 and the Memorandum of Understanding on Water Cooperation between the EU and the Government of India, signed in October 2016.

The IEWP Action has been implemented in three phases. Phase I was implemented from 1 July 2017 to 31 October 2020 (40 months), and Phase II was implemented from 1 November 2020 to 30 November 2023 (37 months). The ongoing Phase III, India-EU Water Initiative (IEWI), commenced in March 2024 and will continue until February 2027 (36 months).

SESSION-1: INDIA-EU WATER FORUM PLENARY focussed on the Water Cooperation established between the Ministry of Jal Shakti and the European Union and its Member States.

The highlight of the Session is as follows:

Shri Raj Bhushan Choudhary, Hon'ble Minister of State, Jal Shakti:

The Hon'ble Minister of State, Jal Shakti, graced the occasion. He stated that the India-EU Water Partnership has contributed significantly to India's water sector by supporting the strategies devised by the Ministry of Jal Shakti towards holistic management of water resources in India.

He briefly touched upon the genesis of this India-EU Water Partnership (IEWP) which is an outcome of the 'Joint Declaration on India-EU Water Partnership (IEWP)' adopted by the EU and the Government of India during the 13th EU-India Summit in Brussels, in March 2016 and the Memorandum of Understanding on Water Cooperation between the EU and the Government of India, signed in October 2016.

The IEWP Action has been implemented in three phases. Phase I was implemented from 1 July 2017 to 31 October 2020 (40 months), and Phase II was implemented from 1 November 2020 to 30 November 2023 (37 months). The ongoing Phase III, India-EU Water Initiative (IEWI), commenced in March 2024 and will continue until February 2027 (36 months).

He also expressed his satisfaction on the achievements so far over the years in different aspects of water resources.

Hervé DELPHIN, EU Ambassador to India:

He stated that The EU and Team Europe are glad to join the 8th India Water Week and are hosting the 6th EU-India Water Forum today. Eight years of collaboration have shown us that when we share expertise, we can bring innovative solutions and tackle even the most pressing water challenges. Team Europe is eager to further deepen its partnership with India under the existing water cooperation framework. Today's forum is a testimony to the growing ties. While we have developed a successful Partnership for solutions in India, we are also keen to work together with Africa to bring our respective expertise and develop innovative water management strategies and foster Regional Water Security.

Ms. Debashree Mukherjee, Secretary, DoWR, RD&GR, MoJS:

The Secretary expressed her happiness that the 6th India EU Water Forum could take place together with the 8th India Water Week 2024, which are having the same objectives. She mentioned that as Water is a State Subject, so EU Member States, Govt. of India and State Governments are collaborating in this unique way of partnership for working together towards solving the water related problems. She also stressed upon the climate change phenomenon and the disasters associated therewith while focusing the attention towards strategies like developing storages of ground water and surface water as well as strong protocol for enhancement of life and resilience of all the water assets/structures in India. Transforming irrigation with a service orientation as well as improving health of river and its ecosystem thus creating value for all was emphasized by the Secretary. She ended with the importance of Capacity Building for robust partnerships and holistic management of water resources.

Shri Kushvinder Vohra, Chairman, CWC:

The Chairman, CWC welcomed all the participants from various Indian Ministries, the EU Member States, and International Organizations and briefed about the journey of the India-EU Partnership with the milestones achieved since its inception in March 2016. It was stated that the partnership, formalized through a Memorandum of Understanding in October 2016, aims to enhance technological and management capabilities in water management through collaborative efforts.

The Key Phases of the Partnership was presented during his special address. The Phase I (2017-2020) focused on the foundational work, including Development of a River Basin Management Plan for the Tapi River, Guidance for environmental flows assessment and wastewater reuse, Completion of a Handbook for isotope data analysis, Conducted environmental flow assessments for key rivers. The Phase 2 (2020-2023) consolidated on earlier successes and introduced Water Allocation modelling, Flexible action plans centred on thematic pillars like River Basin Management & Wastewater Reuse and Emphasis on training and knowledge sharing among stakeholders. He further stated that the Phase 3 (2024 and beyond) will focus on continued efforts in existing thematic areas with the addition of Urban Hydrology to address water demands and flooding in urban settings and Climate Change Impact to study how climate variability affects water resources.

The Brahmaputra Basin will also be integrated into the initiative, focusing on sustainable water management in north-eastern India. He concluded that the India-EU Water Partnership is crucial for addressing global water security challenges, fostering mutual trust and collaboration. The upcoming phase aims for greater achievements in water management amidst evolving urban and climatic challenges.

All the Dignitaries on Dais have lauded the partnership's accomplishments and emphasized on collaborating towards Integrated Water Resources Management and a sustainable future. It was mentioned that there is emergent need to focus on issues like urban flooding, climate change and supporting Brahmaputra Board towards improved Governance at River Basin Level involving all the North Eastern States of India. All the dignitaries also emphasized on building capacities and knowledge exchange thus enabling effective decision making.

SESSION-2A: STRENGTHENING INDIA-EU WATER POLICY DIALOGUE AND ADVANCING TOWARDS TRILATERAL COOPERATION

The main points that were discussed and emphasized by the Panellists are as below:

1. Mr. Thomas McClenaghan, Head of Section, Sustainable Modernization, EU Delegation:

The collaborative strategies are necessary to achieve the set objectives for Water Sector. The focus is on achievement of targets set for various water related Sustainable Development Goals (SDGs) and global commitments for conservation of water resources. It was also remarked that all the countries of the world are sharing the same challenges in Water Sector and therein lies the relevance of collaboration for mutual benefits.

2. Mr. George Peters, nominated representative of the Embassy of the Kingdom of the Netherlands:

The panelist shared about the Indo-Dutch bilateral projects in Sundarbans (largest delta in the world) in West Bengal and the unique challenges posed. The emphasis is on the EU approaches, that can serve as a solution after adapting them to Indian context and circumstances. It was specifically highlighted on the need for delineating short term and long term targets.

3. Ms. Rajni Dhiman, Head of Department, HEC Water at Ramboll, nominated representative of Embassy of Denmark:

The importance of sharing experiences, adapting approaches, and scaling up solutions between Europe and India was highlighted. Emphasis was placed on the need for innovative solutions and collaborative approaches.

4. Mr. Levente Kardos, Economic and Commercial Counsellor, Embassy of Hungary:

The partnership established between Hungary and India was shared, with a focus on groundwater resources management and educational exchange programs.

5. Sh. Ranbir Singh, Chairman, Brahmaputra Board, Ministry of Jal Shakti:

The importance of collaboration and knowledge exchange for the institutional development of the Brahmaputra Board as a River Basin Organization was stressed. The unique geographical and climatic conditions prevailing in the northeastern states of India were discussed, along with the incorporation of similar experiences from partnerships and collaborations (IEWP/IEWI) toward the development and management of water resources in the region.

SESSION-2B: JOINT GROUP DISCUSSION: ADVANCING TRILATERAL COOPERATION BETWEEN AFRICA, EU AND INDIA

The main points that were discussed and emphasized by the Panellists are as below:

- 1. Mr. Franck Viault, Minister Counsellor, Head of Cooperation, EU Delegation:**
It was mentioned that under the framework of the India-EU Water Partnership, a promising opportunity exists for Indian Water Authorities to share their extensive technical and managerial expertise in Water Resources Management with interested countries, specifically with the Lake Victoria Basin Commission (LVBC) and the Lake Tanganyika Authority (LTA). Both Indian and African institutions have expressed a strong desire to contribute their knowledge and experience to managing water resources. The potential for trilateral cooperation was emphasized as an opportunity for joint efforts to address common challenges, develop affordable solutions in identified areas of interest, and add value to existing practices.
- 2. Sh. Anand Mohan, Joint Secretary, (RD & PP), DoWR, RD&GR, Ministry of Jal Shakti, Govt. of India:**
Establishing and strengthening the existing cooperation with African countries is a priority for the Government of India. Various thematic areas were highlighted where India and African nations are working together on natural resource planning and management. The challenge of maintaining efficiency of output, along with the large scale of application, was acknowledged. It was indicated that the Government of India intends to support the proposed trilateral cooperation with LVBC and LTA for improved transboundary water resources management.
- 3. Mr. S.S. Bakshi, Chief Engineer (EMO), CWC:**
The expertise available with Indian Water Authorities, such as the Central Water Commission (CWC), in the fields of Water Resources Assessment, Planning, Development, and Management was highlighted. Emphasis was placed on the application of the latest space technologies in the water sector and the robust mechanisms for handling and managing large databases. It was suggested that the dissemination of knowledge is necessary to ensure that achievements occur at the ground level.
- 4. Ms. Rumi Mukherjee, Scientist D, CGWB:**
The importance of developing a pilot project with defined objectives and timelines was emphasized, outlining contributions from all partners and allowing for upscaling or standardization in later stages based on lessons learned during execution. The proposed trilateral project will also offer an opportunity to adopt or adapt established approaches in similar or different climatic and geographic terrains.

5. Mr. Abhay Kumar, General Manager, Brahmaputra Board:

The need for advanced and state-of-the-art technical solutions to manage river basins was highlighted. Emphasis was placed on the development of a River Basin Level Master Plan through mutual learning experiences and technology transfer. The protection of Majuli Island on the Brahmaputra River, the largest riverine island in the world, was also discussed.

6. Ms. Hilda Luoga, Projects Development Officer, LVBC:

It was highlighted that many East African countries are collaborating under the framework of Lake Victoria Basin Governance. The proposed trilateral project between India, Africa, and the EU is expected to bring opportunities for exchanging policies, frameworks, and technologies, involving a broad range of stakeholders.

7. Mr. Simon Otoung, WRM, Officer, LVBC:

Collaboration was emphasized as a necessity rather than an option. All partners need to come together to achieve common goals and interests in the water sector, including both surface water and groundwater.

8. Mr. Kwibisa Liywalii, Director of Monitoring and Evaluation of LTA:

The participants were informed about the unique biodiversity of Lake Tanganyika. There is significant interest in establishing trilateral cooperation with India and the EU in areas such as solid and liquid waste management, water quality monitoring, basin-level management planning, multisectoral partnerships, and capacity building.



SESSION-3: CHARTING THE FUTURE OF WATER RESOURCES

MANAGEMENT: TOWARDS NEW HORIZONS (14:00 to 15:20)

Shri Kushvinder Vohra, Chairman, CWC, MoJS

The presentation titled “Climate Resilient Water Infrastructure” by Kushvinder Vohra, Chairman of the Central Water Commission, focused on the challenges climate change poses to India’s water resources and the need for resilient infrastructure. Increasing variability in rainfall, melting glaciers, frequent floods, and cyclones were highlighted as factors affecting water availability and quality. Rising sea levels and salinity ingress were also noted as significant concerns. With water demand, especially in agriculture and food production, expected to rise by 2050, modernizing infrastructure such as dams, canals, and reservoirs is imperative. India’s water storage capacity remains lower than that of many other nations, necessitating increased storage facilities and better resource management.

Groundwater management is crucial, as many of India’s assessment units are over-exploited. Interventions such as artificial recharge, rainwater harvesting, and community-led groundwater management through the Atal Bhujal Yojana were stressed upon. Technology, including SCADA and IoT systems for monitoring and optimizing water distribution, along with remote sensing and GIS tools for flood forecasting and resource assessment, plays a critical role.

Community involvement through Water Users Associations, policy initiatives like the Dam Safety Act 2021, and inter-state cooperation for river basin management were underscored as essential for sustaining water resources. Wastewater treatment and reuse, particularly in agriculture, were emphasized under initiatives like Arth-Ganga, which aims to monetize and recycle treated wastewater and sludge for revenue generation and conversion into usable products. The National Framework on Safe Re-use of Treated Water (2022) has been adopted by MoJS, with MoUs signed with the Ministry of Power, Ministry of Railways, and Ministry of Agriculture for treated wastewater reuse.

Urban drainage issues, required measures, and advancements in R&D and capacity building were also discussed. Strategies like the Sponge City concept aim to mitigate urban flooding from unplanned development and intense rainfall. Challenges in natural water systems, such as encroachment and sedimentation, were highlighted, along with the need for regular water quality and quantity monitoring, and public display of results. The presentation concluded by calling for an integrated approach that combines legal, institutional, financial, and technological measures to ensure sustainable and resilient water management in the face of climate change.

Shri. Rajeev Kumar Mital, Director General, NMCG, MoJS

The GIZ-supported cyclic approach for developing River Basin Management Plans, based on the EU Water Framework Directive, was discussed. A detailed framework for developing these plans has been jointly created with support from IEWP and GIZ. Institutional development aspects were also covered, focusing on the recently established RBM unit at NMCG.

The five pillars of the Namami Gange Project were outlined: Nirmal Ganga, which aims for an unpolluted river; Aviral Ganga, focused on maintaining the river's flow; Jan Ganga, which emphasizes people's participation in river rejuvenation; Gyan Ganga, which focuses on research and knowledge to guide interventions; and Arth Ganga, which connects people to the river through economic initiatives.

Dr. A. Asokan, Member (HQ), CGWB, MoJS

The groundwater scenario and management strategies in India were outlined, focusing on aquifers, groundwater levels, resources, and quality. Aquifers in India are categorized into hard rock and soft rock types, with the National Aquifer Mapping and Management Programme (NAQUIM) working to map aquifers and create management plans. Groundwater extraction data indicates that India's annual recharge is 449.08 billion cubic meters, with a 59.26% extraction rate, though over-exploitation remains a concern in some areas.

Geophysical surveys and exploratory drilling are key tools for mapping aquifer properties, with high-resolution surveys, including heli-borne methods, used to collect data across large areas. Groundwater quality varies, with contamination from arsenic, fluoride, and salinity reported in certain regions.

Groundwater management through artificial recharge interventions, such as rainwater harvesting and check dams, was highlighted. Initiatives like Atal Bhujal Yojana and Jal Shakti Abhiyan focus on sustainable groundwater management, emphasizing community involvement, water conservation, and regulation of groundwater extraction. These efforts have led to improved water levels in some regions and a reduction in over-exploited areas.

SESSION-4: WATER NEXUS: EU-INDIA INNOVATIONS IN RESEARCH AND SOLUTIONS (16:00 to 17:00)

The following 4 participants from the Horizon 2020 Water Cooperation Projects between the EU and India have presented an overview on the technical recommendations made by the projects:

1. Mr. Makarand GHANGREKAR, Professor, IIT Kharagpur, India, Saraswati 2.0 project
2. Ms. Sanjukta PATRA, Professor, IIT Guwahati, SPRING
3. Dr Anshuman, TERI, New Delhi, Pavitra Ganga
4. Dr Anurag Mudgal, PDE University, Gandhinagar, INDIA-H2O

The above-mentioned projects recommended the technologies for wastewater treatment, solutions for drinking water. The technologies presented were focused on drinking water purification, wastewater treatment and real-time monitoring & control systems. All technologies are cost-effective and have demonstrated energy efficiency. The IEWI aims to support the technical interventions recommended by the Horizon 2020 Projects to the Indian partners and EU businesses for a possible market uptake.

Mr. John Thomas, presented about the concept of Solution Forum to be established in Phase 3 of India EU Water Initiative. The Solution Forum will serve as a platform to facilitate the implementation of measures recommended in the Tapi River Basin Management Plan developed under the framework of India EU Water Partnership.

The forum ended with a Vote of Thanks from Mr. Laurent le Danois, Team Leader, Cooperation section, Delegation of the European of the European Union to India and a group photograph at the end.

Water Leaders' Forum



SESSION : INTEGRATED SURFACE & GROUND WATER STORAGE MANAGEMENT (WLF1)

DATE: SEPTEMBER 18, 2024 | TIME: 11:45 TO 13:15 HRS.

Moderator : Dr. Alok Sikka, Country Representative, IWMI
Key Note Speaker : Dr. Jonathan Lautze, Research Group Leader- Integrated Basin and Aquifer Management, IWMI

Recommendations:

- The major water user sector in India, i.e. agriculture and its allied needs to be emphasized and the panel expressed that there is an urgent need for its regulations and that can be achieved through proper modelling of water resources.
- The scientific scope and opportunities of linking surface and groundwater and their interaction were highlighted. Solutions to minimize groundwater overexploitation and scope of augmentation of Groundwater needs to be adopted by all the agencies. State wise discrepancy of the abstraction and recharge rate needs to address including the water quality.
- The divided responsibility of different stakeholders of the water must be assigned and followed. Inter-sectoral implications must be studied in detail before forming any policy related to water.
- Infrastructural interventions and use of AI and IoT (automation SCADA system) must be promoted and seen as an opportunity to enhance water use efficiency. The monitoring system in the canal command needs to modernize. The On-Farm Water Management (OFWM) practices must be adopted.
- Adoption of best global practices and used cases must be followed to achieve better water productivity and land productivity. This can be achieved through adaptation of various activities such as modern precise irrigation techniques, crop-diversification, drought-resistant varieties, checks on the conveyance efficiencies, adaptation of IoT and sensor-based automation in command, etc.

SESSION : DEMAND MANAGEMENT AND WATER USE EFFICIENCY (WLF 2)

DATE: SEPTEMBER 18, 2024 TIME: 16:00 TO 17:30 HRS.

**Chair : Shri Syamal Sarkar, Distinguished Fellow and Director,
Water Resources Division, TERI**

Co-Chair : Dr. Alok Sikka, Country Representative, IWMI

Recommendations:

1. States may promote integrated water resource action plan on annually/biannually basis which will ultimately reduce water gap.
2. Regular monitoring through the dash board to track water availability may be introduced.
3. Water sector related Department wise water saving targets may be adopted by the states.
4. Identifying the gaps between present practices and best practices with targeted WUE across all sectors which ensure water saving.
5. There is urgent need to promote efficient water use techniques in all sectors.
6. Benchmarking studies and baseline studies needs to be carried out for addressing better demand side water management.
7. Pressurized pipe irrigation system may be adopted for enhancing water use efficiency.
8. Smart irrigation system may be adopted for enhancing water use efficiency.
9. WPDSS (Water productivity decision support system) tool may be adopted for enhancing WUE.
10. There is need to adopt online irrigation benchmark system.
11. Institutional, Governance, Policy interventions for improving WUE may be adopted.
12. "Incentivization is better than subsidization" for improving WUE in all sectors.
13. Water may be treated as an economic resource.
14. Water and waste circularity needs to be addressed to achieve net zero goal by 2070. (PM commitment).
15. Mandate the low flow fixtures for improving WUE in domestic water supply sector etc.
16. Certification programme for water auditors in all sectors may be introduced by Government for enhancing water use efficiency.
17. BWUE has been setup by MoJS and now there is urgent need to provide legal status to BWUE as a National Bureau of Water Use Efficiency for achieving goal of increasing Water Use Efficiency by 20% in all sectors.

SESSION : PARTNERSHIP FOR ACCELERATING INNOVATION IN WATER SECTOR (WLF3)

DATE: SEPTEMBER 19, 2024, TIME: 09:30 – 11:00 HOURS

Moderator : Mr. Saroj Jha, Water Global Director, The World Bank
Keynote Speaker : Mr. Nagaraja Rao Harshadeep,
World Bank Group

Recommendations:

1. India has done good work with regard to improving the water sector over the years. However, there is still a long way to go and several areas that can be improved using a multi-stakeholder approach. The need to create a collaborative ecosystem for innovations in water was highlighted particularly to also look at tech as a demand driven service rather than only focusing on supply side. Reforms need to be made at all levels starting from the government who needs to strengthen last mile delivery service and the private sector who can help bridge the gap between innovators and venture capital to support these
2. The water sector needs to be organized in a systematic way to be able to identify the right sets of innovations and to be able to deploy these at a ground level. Private sector with support from the MoJS can help leverage capital, expertise and innovation whereas the government can provide support required to scale opportunities with adequate policy level support
3. Funding is a key issue in sustainability of start-ups across India. There is no shortage of innovations but most entrepreneurs lack adequate funding to survive beyond the pilot stage. There is a need for government to step up and support the startup ecosystem, promote innovations and initiate policy direction
4. Building capacities of key stakeholders through trainings and knowledge sharing platforms will be critical in enabling people to embrace technology and use it for larger impact in the water sector. Cross learning and leveraging intelligence available with academia and research institutions will be key in transforming the water sector to make it more tech savvy and contemporary
5. As next steps it may be a good idea to think about commitments required from major stakeholders including the GoI, World Bank and others to come up with a concerted plan on the way forward. A water innovation/hub housed under the Ministry and supported by key partners could be designed to promote innovation, entrepreneurship and sustainable solutions in India's Water Sector.

SESSION : INTEGRATED FLOOD MANAGEMENT (WLF4)

DATE: SEPTEMBER 19, 2024, TIME: 09:30 TO 11:00 HRS.

Moderator : Shri A. S. Goel, Member (RM), CWC

**Keynote Speaker : Shri Sharad Chandra, Commissioner (FM),
DoWR,RD&GR**

Recommendations:

1. Flood hazard mapping should be conducted at the municipal level to enhance the effectiveness of flood management operations across the country. Additionally, bio-engineering measures should be implemented at the basin scale to support flood management and mitigate soil erosion.
2. Flood management tools (both structural and non-structural) should be applied in an integrated approach for comprehensive flood control and risk reduction. Hydrodynamic simulations of flood events should focus on adopting dynamic strategies to address the evolving nature of floods.
3. Flood Forecasting and Early Warning System models should be developed for each river basin, incorporating cyclone-induced floods, and utilizing a fully automated web-based system. Flood inundation extents for specific events should be compiled (utilizing drone and remote sensing technologies) to validate flood inundation models.
4. High-resolution digital terrain models are necessary for effective flood alert dissemination and to develop an emergency action plan that mitigates flood risks in a timely manner.
5. The Central Water Commission (CWC) should prioritize data sharing related to floodplain areas to facilitate high quality research and development in the country.
6. A robust Early Warning System and comprehensive protocol should be established for Glacial Lake Outburst Flood (GLOF) incidents, ensuring the involvement of all stakeholders and monitoring of potentially hazardous glacial lakes.
7. Water volume reduction in moraine-dammed glacial lakes, through siphoning or the construction of drainage channels, should be considered wherever feasible. Furthermore, Adequate spillway capacity, incorporating GLOF scenarios along with rainfall-induced floods, should be ensured by using fast-acting hydraulic gates of appropriate size and enabling remote gate operation where necessary.

SESSION : SUSTAINABLE WATER MANAGEMENT FOR INDUSTRY AND BUSINESSES (WLF5)

DATE: SEPTEMBER 19, 2024 TIME: 11:15 TO 12:45 HRS.

Moderator : Dr. Kapil Kumar Narula

Keynote Speaker : Mr. Ankur Patni, Chairman, ICC

Recommendations:

- Water consumption and economic growth needs to be decoupled with improvement in water use efficiency
- Water neutrality is the need of the hour for Indian industries
- To fix the ambitious goal to achieve in respect of water usages by the industries in a limited time line
- Water reform and water regulatory framework is must for participation of private sectors in water sector in a big way
- Community participation is must for success if PPPs model
- Consultation with manufacturers, suppliers etc may be done before launching any scheme considering the existing constraints in the system

SESSION : PARTNERSHIPS FOR CLIMATE ACTION IN THE WATER SECTOR (WLF6)

DATE: SEPTEMBER 19, 2024 TIME: 11:15 TO 12:45 HRS

Chair: Shri Thiru Tenkasi S Jawahar, Additional Chief Secretary & Project Director, Govt. of Tamil Nadu & Ms. Anu Garg, ACS, Water Resources Department, Govt. of Odisha

Recommendations:

1. There is a need to strengthen the public community partnership programs such as WUAs to manage the water supply and demands at the local levels, and such local management should be promoted.
2. India has more than 6000 large dams. In the light of changing climate, dam safety must be periodically reviewed against their hydrological, hydraulic, and structural designs to ensure the safety of the community at the downstream and regulated water availability.
3. The panel also emphasizes the need for both structural, non-structural, and functional adaptations to existing dams to withstand climate change impacts.
4. There is an urgent need for the adaptation of more efficient confidence-building measures between union and state governments for sharing data, information, policy, and project related planning.
5. It is also recommended to enhance the water use efficiency (at least 20%) by adapting various majors such as efficient irrigation techniques, drought resistance crop varieties, the lining of earthen canals, etc.
6. Water is a social, institutional subject; there should be the involvement of all the stakeholders when it comes to hierarchical decision-making. The network modeling can be adapted to achieve this.
7. Breaking the silos in the water sector in the context of climate change is essential, and it can be achieved through empowering both horizontal and vertical governance that can start taking on this challenge seriously and convert the competition to cooperation and collaboration among the various stakeholders.

SESSION : PARTNERSHIP AND CO-OPERATION FOR INTEGRATED WATER RESOURCES MANAGEMENT (WLF7)

DATE: SEPTEMBER 19, 2024 TIME: 13:30 TO 15:00 HRS.

Moderator : Mr. AK Kharya, Chief Engineer, BPMO, CWC

Co-Moderator : Mr. Shawahiq Siddiqui, Governance Expert, Indian Environment Law Organization

Keynote Speaker : Mr. Alan Atkission, GWP Executive Secretary and CEO

Recommendations:

1. Addressing global water challenges requires a coordinated and adaptive strategy within an international framework to ensure the long-term sustainability of water resources, in line with Integrated Water Resources Management (IWRM).
2. Initiatives such as community-driven interventions, carbon offset mechanisms, ecosystem service compensation, and capacity-building programs should be promoted from local to regional levels to strengthen Integrated Water Resources Management (IWRM).
3. Priority should be given to research on wetland structures and their influence on local hydrological regimes, with a focus on enhancing biodiversity, maintaining ecological balance, and promoting environmental sustainability.
4. Water planning should be done considering the women at the centre so that policies can address the practical challenges they face in accessing clean and reliable water, which reduces their burden and improves the overall efficiency of water use. Furthermore, Women's involvement in decision-making about water governance can also lead to more sustainable and effective outcomes, as they bring different perspectives and solutions based on their experiences.
5. The government should consider implementing a "Blue Credit" system, similar to the carbon credit model, to incentivize the conservation and sustainable management of the nation's water resources.
6. By establishing a market-driven framework, such an initiative could promote responsible water usage, reward stakeholders who invest in water-saving technologies, and enhance efforts to preserve this critical natural resource. A Blue Credit system would not only address water scarcity but also align with long-term environmental sustainability goals, supporting equitable access to clean water for future generations.

SESSION : PUBLIC PRIVATE PARTNERSHIPS IN WATER (WLF8)

DATE: SEPTEMBER 19, 2024 TIME: 13:45 HALL 3

Moderator : Dr. Sumila Gulyani, The World Bank

Keynote Speaker : Mr. Baldeo Purushartha, JS, DEA Infra Divison

Mr. Auguste Kouame, Country Director, The World Bank

Recommendations:

India's needs are too massive for the public sector to meet the demand, so private sector will have to come in. Despite significant increase in access to tap water and irrigation, challenges remain in improving service quality and addressing broader water security.

Key to private sector participation is balancing the risks between public and private sectors. Careful Contract Design is crucial. Contracts need to be meticulously designed to minimize risks, with provisions such as land pre-insurance and advance payments ensuring smoother implementation. Pricing is a public decision and subject to political choices, and in the Indian context, the public sector needs to bear financing risk for PPPs to work, using contractual models like hybrid-annuity (HAM).

Examples:

Urban water supply: Private sector has been able to achieve significant improvements in billing, collection and loss reduction in urban water supply systems e.g. in Delhi through 12-year contract issued by Delhi Jal Board. Even where water is free in Kolkata, city awarded a PPP to improve operating efficiency and reduce loss.

Wastewater: NMCG HAM model has been successful in improving operating efficiency and linking contractual payments with performance. Public sector has taken financial risk but distributed operating risk to the private sector through 15 year contracts that incorporate: indexation, government making payments, escrow mechanisms, and government availing the land to private sector.

Irrigation: Huge potential for private sector to add value through innovation focusing on water savings and increasing yields, which will multiply farmer income. Government needs to intervene and take some payment risk, as there is no incentive to save water as it is mostly free. Yet in era of water scarcity, same volume of water can irrigate 2 or 3 times current levels.

Improving accountability for irrigation: For successful private engagement, there must be an improvement in accounting of water volumes and flows – there cannot be accountability without basic metering and accounting.

SESSION: CIRCULARITY IN WASTEWATER MANAGEMENT (WLF-9)

DATE: SEPTEMBER 19, 2024 TIME: 15:30 TO 17:00 HRS.

Keynote Speaker/Moderator: Mr. Nitin Bassi, Senior Programme Lead, CEEW

Recommendations:

- Need for state governments to adopt reuse policies aligned with the national framework for the reuse of treated wastewater (TWW).
- The role of technology in improving water quality from STPs and the necessity for horizontal collaboration, i.e., at the ministry level, and vertical collaboration, i.e., at the federal, state, and ULB levels.
- Carefully consider financing aspects of TWW reuse plans to ensure that consumers are not burdened with unnecessary costs.
- Need for exploring benefits of modern technology in wastewater treatment, such as recovering nutrients and saving electricity, describing it as a "money-making machine" for communities, promoted lake rejuvenation, providing an example of the use of microscale STPs and Finnish oxidation technology combined with Indian enzymes to clean water bodies and recharge groundwater.
- Need for developing, commercializing, and scaling up technologies, like TADOX, that are energy and water-efficient.
- Stakeholder engagement, e.g., with chief engineers of STPs, to ensure that technology is implemented effectively.
- Need for the shift to larger, modular STPs to gain better economies of scale and environmental efficiency and the importance of separating rainwater from wastewater to prevent contamination during floods and ensuring drinking water remains uncontaminated.
- A holistic approach is need for Urban River Management Plans (URMP), focusing on both the social and economic aspects of river management and the importance of context-specific models for reuse.
- Need for sustained citizen engagement to foster behavioral change towards treated wastewater reuse, drawing examples from successful international initiatives; "Behavioral change is not an outcome it is a process."
- There is a need for active collaboration between river cities through the River Cities Alliance to ensure that key learnings are shared and to promote robust pathways for professional development programs in river science and river planning.

Practitioners' Forum



SESSION : SUSTAINABLE RIVER HEALTH MANAGEMENT (PF1)

DATE: SEPTEMBER 17, 2024 TIME: 15:30 TO 17:00 HRS

Chair: Shri Dana Kishore, Principal Secretary, Telangana Govt. Municipal Administration and Urban Development Department.
Co-Chair: Shri Raj Sekhar, Secretary, Namami Gange and Rural Water Supply Department, Uttar Pradesh

Recommendations:

1. To ensure successful riverfront development, it is essential to adopt proven international models and innovative financing strategies like Hybrid Annuity Models (HAM) for long-term sustainability.
2. Strengthening regional water management, particularly through inter-basin water transfers, should be prioritized to improve water security.
3. Incorporating urban mobility solutions and heritage conservation into development plans will foster holistic, sustainable urban growth.
4. Additionally, seeking global funding, such as from the Green Climate Fund and development banks, will provide crucial financial support for these initiatives.
5. Prioritize comprehensive, basin-wide strategies for river management rather than isolated efforts, ensuring holistic restoration and conservation.
6. Incorporate river management into urban master plans, aligning development with ecological preservation to maintain healthy river systems.
7. Implement decentralized wastewater treatment plants to address pollution locally, reducing the burden on centralized systems and improving water quality.
8. Foster circular economic models that promote resource reuse and sustainability in river basin management.
9. Strengthen public engagement and participation in river management initiatives, encouraging local communities to take active roles in preserving river ecosystems.
10. Implement coordinated planning and development strategies for comprehensive water resource management.
11. Prioritize resilience and ecosystem health in river basin management plans.
12. Incorporate flood control, disaster risk management, irrigation modernization, and water quality improvements.
13. Adopt adaptive and participatory governance approaches to involve all relevant stakeholders in decision-making.
14. Implement river deepening and dam construction, promote sustainable agriculture, and engage communities to boost productivity, improve water levels, and support socioeconomic benefits.
15. Expand river quality monitoring, improve municipal action plans, and adopt cleaner technologies and circular wastewater management for effective river pollution control.
16. Focus on timely completion of STP and CETP projects with strict adherence to deadlines to improve river health.
17. A commitment to restoring and protecting rivers is essential for both environmental and economic prosperity, ensuring that future generations can continue to benefit from these ecosystems.

SESSION : PARTNERSHIPS WITH COMMUNITY FOR CONVERGENT ACTION (PF2)

DATE: SEPTEMBER 17, 2024 TIME: 17:00 TO 18:30 HRS.

Chair: Mr. Roshni Sen, ACS, Water Resources Investigation & Development Department, Govt. of West Bengal

Co-Chair: Dr. P. Shakil Ahmmed, ACS, WRD, Govt. of Meghalaya

Recommendations:

1. Successful implementation of water related projects in partnership with community and NGOs shall include “political will, executive support and community participation is right mantra that can work successfully in water conservation projects.
2. Community is the fulcrum of water conservation with involvement from planning, implementation, monitoring & evaluation and follow up.
3. Need for long-term planning minimum 20-30 years with clear inter-sectoral collaboration and sharing of responsibilities with sense of team spirit and community involvement.
4. WUAs can receive 50% rebate on water charges collection which can be retained by WUAs (30% towards maintenance and 20% towards advanced tax collection). The rebate can be retained up to 70% if WUA is formed at the level of branch/distributaries, and up to 90% rebate if WUA is formed at main canal level.
5. Community shall be owners, stakeholders, beneficiaries etc. of community driven projects, this will ensure that the funds for the project never exhaust and rather it runs forever.
6. Use of GIS, RS, (SALT, OLC) are improved approaches and may be encouraged for better management of water resources.
7. Community based small lift schemes (IDC) may be encouraged as it controls water flow particularly in irrigation, focus on efficient water use.
8. “Bhujal Saheli” women warriors an initiative in Haryana state empowering women to manage ground water resources and may further also promoted across the nation as it reflects role in community engagement.
9. Collaboration may be facilitated between different sectors (e.g., agriculture, fisheries, horticulture) to ensure comprehensive water management.
10. Water management should be prioritized as a key sector for addressing climate change.
11. Strengthening of community involvement in decision-making should be facilitated to ensure ownership and responsibility.
12. Development of robust monitoring systems should be a priority to track water usage and resource availability.
13. Regularly assess the outcomes of water management initiatives to make data-driven improvements.

14. Encourage farmers to choose crops based on water availability and seasonal resources.
15. Provide guidance and support for crop diversification and management practices.
16. Implementation of similar practices as seen in Gujarat, including canal rehabilitation, transferring irrigation management to Water Use Associations (WUAs) and ensuring successful people participation in irrigation management.
17. Leverage natural farming methods and explore innovative solutions such as using non-fertile silt for infrastructure projects.
18. Form and strengthen WUAs in other states, focusing on the broader water sector and ensuring practices are adaptable to local needs.
19. Sufficient resources should be allocated to support community-driven water management projects.
20. Use technological advancements to find innovative solutions for water conservation and management.
21. Continuously seek and implement new ideas and practices to improve water resource management.



SESSION : INTEGRATED WATER MANAGEMENT IN AGRICULTURE - IRRIGATION 4.0 (PF3)

DATE: SEPTEMBER 18, 2024 TIME: 10:00 TO 11:30 HRS.

**Chair: Shri John Kingsly, Secretary, Govt. of Madhya Pradesh
Co-Chair: Shri Rajesh Sukumar, Toppo Secretary, WRD,
Govt. of Chhattisgarh**

Recommendations:

- Adoption of Pressurized Pipe Irrigation Systems leads to remarkable & unprecedented improvement in Water Use Efficiency
- Pressurized Pipe Irrigation Systems help to implement Integrated Water Resources Management. Water savings with pressurized piped systems in agriculture sector can be used for other uses
- Pressurized piped systems are more adaptable to changes in cropping pattern
- Policy Measures for PPP (rental model) to provide drip/sprinklers to farmers; Direct incentive for adopting water efficient crops; Disincentivizing use of farm electricity
- As manual tasks decrease with adoption of automated irrigation systems, powered by IoT sensors and AI; demand will rise for skilled farm-workers to operate and troubleshoot digital systems
- Smart irrigation systems will create jobs for skilled technicians to install and maintain hardware like sensors, pumps, and controllers in rural areas.
- As farmers will need technical support to manage IoT networks and AI systems, demand will increase for consultants, trainers, and educators to help them use the new technologies effectively.
- Irrigation 4.0 will drive innovation, prompting entrepreneurs to create solutions like data analysis, farm management software, and IoT system development.
- Develop training programs to bridge the digital divide, especially for small-scale farmers and to enhance their understanding of Irrigation 4.0.
- Foster collaboration and promote partnerships between governments, private sectors, and researchers to scale up Agriculture 4.0 adoption globally and solution for water development research institutions.
- Documentation and dissemination of successful models/strategies is needed to promote best practices.
- Piped distribution network is a feasible solution to land acquisition and R&R issues in many cases.
- Redesigning of CADWM Program is needed.
- Mobile app based demand generation and SCADA automation system for efficient and accessible irrigation network.
- Community based participatory groundwater management and demand side groundwater management is needed.
- Need of water budgeting uses of treated water and desalinated in water subsidy to farmers provide incentives to farmers to shift from water-intensive crops to less water-demanding, climate-resilient varieties.
- Develop irrigation infrastructure that can withstand extreme weather events, ensuring uninterrupted water supply.
- Need of AI-driven tools for predictive analytics in water availability and crop requirements and leverage big data for real-time monitoring.
- Need of block chain system to track water uses and equitable distribution.

SESSION : SPRINGSHED MANAGEMENT AND CONSERVATION INITIATIVES FOR HILLY STATES (PF4)

DATE: SEPTEMBER 18, 2024 TIME: 11:45 TO 13:15 HRS.

**Chair: Shri Anand Bardhan, Chief Project Director & CEO, SLNA,
Govt. of Uttarakhand**

**Co-Chair: Dr. P Shakil Ahmmed, ACS, Water Resources
Department, Govt. of Meghalaya**

Recommendations:

1. Baseline studies shall be carried out since a large number of springs have dried or become seasonal in Himalayan regions and across India as well.
2. Inter-sectoral convergence of line departments is necessary for breaking the silos in the management of springs.
3. It is recommended to use technologies such as GIS, UAV, GPS, CLART in capacity building programs for community members.
4. It is recommended to have web enabled databases, dedicated web portal inventory, mapping of every spring in each village, and identification of dying spring and its recharge zones. A systematic database using web based GIS application is necessary for monitoring and protection of springs.
5. Policy and convergence of all financial management for springshed conservation shall be carried out at district levels including capacity building of locals by making them para-hydrogeologist (like in Sikkim) to activate participation of community members.
6. Since, management of springs has been a blind spot in India's Water Management, hence demanding springs to be placed in National Water Policy (NWP).
7. It is recommend that spring conservation and its management may fall under the scope of CGWB, since spring water is sourced from GW. It is also vital to note that framing of rules, regulations and policies regarding sustainable use and for prevention of over-exploitation of spring water mainly carried out through commercialized water bottle industry etc.
8. States/UTs may be encouraged to seek NITI Aayog's funding for conducting studies in the field of springshed management.
9. Jal Jeevan Mission may consider funding of sustenance of spring sources to ensure their protection and CGWB can be the custodian of springs.
10. It should be encouraged to bring back the divinity and cultural connection with springs to involve the community in the protection of springs.
11. Six steps protocol for spring rejuvenation may be adopted by all States/UTs.
12. It is recommended to setup a dedicated single regulatory authority at State Level so that ownership and prioritization of spring revival at political and administrative levels can be regulated and ensure better management of springsheds.

SESSION : OPEN, INTEGRATED AND SHARED WATER DATA AND INFORMATICS (PF5)

DATE: SEPTEMBER 18, 2024 TIME: 14:15 TO 15:45 HRS.

Chair: Shri Gaurav Gupta, ACS, Energy Department, Govt. of Karnataka
Co-Chair: Dr. Alok Sikka, Country Representative, IWMI

Recommendations:

- Water Productivity (WP) and Water Footprints Atlas can help identify hot spots for optimizing water productivity and minimizing water footprints
- A decision tool/framework like WP Atlas can help identify and highlight the linkages among the policies/programs that need to be addressed to reap synergistic gains among the programs
- Proliferation and intensification of state-of-the-art IoT devices like RTDAS, SCADA, Dams & Barrage monitoring is vital for development of a robust and reliable database for targeted water resources management.
- Water Resources Information System can be useful in timely, rigorous and useful data analysis for decision support
- Development & Strengthening of a sound Information System based on "One Nation, One Database" concept through collaborative participation between National Water Informatics Centre (NWIC) and State Water Informatics Centre (SWIC).
- Globally, investments have been made in generating hydro-information products and services. More Focus is needed for dissemination and utilization of generated services.
- Remote sensing-based information have demonstrated to be good supplement to ground based observations, save time and resources, and provide rapid assessment for various water resources applications.
- Enhance the timelines of data dissemination by ensuring real-time information is available for flood and irrigation management.
- Develop mobile and web applications to increase accessibility and usability of flood and irrigation data for all stakeholders.
- Water data should be easily accessible. Incomplete, inaccurate, or poorly documented data can limit its usability
- Standardized protocols for collecting, managing, and sharing water data leads to consistency and seamless integration into decision-making.

SESSION : ACHIEVING UNIVERSAL ACCESS TO DRINKING WATER IN RURAL AREAS (PF6)

DATE: SEPTEMBER 19, 2024 TIME: 9.30 to 11.00 HRS.

Chair: Ms. D. Thara, Additional Secretary, MoHUA
Co-chair: Sh. Chandra Bhushan Kumar, AS & MD, DDWS (JJM),
Ministry of Jalshakti

Recommendations:

To achieve universal access to drinking water in rural areas, key strategies include:

1. There should be strong political commitment and supportive policies to prioritize rural water access.
2. Establishment of clear regulations and standards for water quality should be ensured.
3. Participatory decision-making with local communities should be implemented.
4. Infrastructure Development through Construction of piped water supply systems to reach remote villages.
5. Boreholes and protected wells to access groundwater shall be installed.
6. Rainwater harvesting systems in areas with seasonal rainfall shall be installed.
7. Community Engagement by Empowering local communities to manage water systems through training and capacity building shall be explored.
8. Maximum number of water user committees to ensure equitable distribution and maintenance shall be established.
9. Awareness about water hygiene and sanitation practices need to be promoted.
10. Source sustainability through rain water harvesting, recharging etc shall be ensured.
11. Technology and Innovation by exploring new water treatment technologies suitable for rural settings, utilizing solar-powered schemes for sustainable water extraction, developing cost-effective and efficient water distribution systems using SCADA & automation etc. shall be implemented.
12. Financial Sustainability by securing funding from government, international organizations, and private sector need to be ensured.
13. Robust O& M policy, multi modal grievance redressal system needs to be implemented.
14. Regular water quality monitoring and surveillance has to be achieved.
15. Frequent interaction with stake holders has to be emphasised.

SESSION : PARTNERSHIPS AND COOPERATION WITH NGO SESSION FOR INCLUSIVE WATER DEVELOPMENT AND MANAGEMENT (PF7)

DATE: SEPTEMBER 18, 2024 TIME: 16.00 to 17.30 HRS.

Chair: Shri Krishan Jindal, Advisor, DHAN Foundation
Moderator: Shri Divyang Waghela, Head (Water), Tata Trusts

Recommendations:

1. To enable effective engagement between government and civil society organizations (CSOs) in water management programs, it is recommended to establish a National Water Management Platform. This platform would serve as a central hub for dialogue, knowledge sharing, and collaborative action. The National Water Mission take the lead in creating and overseeing this platform, ensuring its neutrality and inclusivity.
2. An institutional structure is needed to facilitate effective collaboration with CSOs in development projects.
3. Given the critical role of springs in water security, particularly in mountainous regions, it is recommended that to build/ strengthen framework / policy guideline on springshed management. This framework should outline the government's commitment to protecting and restoring springs, and provide a framework for coordinated action at national and state levels.
4. A comprehensive documentation process is essential to capture valuable lessons that can inform future initiatives and prevent duplication of efforts. NWM can anchor the process to create a knowledge repository to capture success and failures.
5. To ensure successful water management, it is essential to capture and share effective behavioral change communication tools that can be used to mobilize communities.

SESSION : WATER PROSPEROUS WORLD: SYNERGISING HRIT ACTIONS FOR ECOLOGICAL SUSTAINABILITY AND HUMAN WELLBEING (PF8)

DATE: SEPTEMBER 19, 2024 TIME: 11:15 TO 12:45 HRS.

Moderator: Shri Santosh Gupta, CEO, Indian Social Responsibility Network (ISRN)

Recommendations:

1. Adopt a holistic approach to water management by integrating spiritual, cultural, and ecological values, treating water as a vital, sacred resource for life and sustainability.
2. Promote eco-centric practices through HARIT initiatives, prioritizing collaboration, ecological growth, and circular ecology over traditional economic and anthropocentric models.
3. Integrate cultural aspects into water management frameworks, combining traditional knowledge with modern technology for sustainable resource use.
4. Empower communities through active participation in decision-making processes, enhancing governance and fostering local ownership of water resources.
5. Encourage widespread adoption of the Seechewal Model for sustainable water management and sewage systems in rural areas.
6. Promote environmental education and moral values among children, engaging them in community service projects like waterway clean-ups.
7. Support afforestation initiatives by distributing free plants to make regions greener and more environmentally sustainable.
8. Adopt sustainable water management practices using smart sensors and citizen involvement.
9. Improve water quality and prepare for climate adaptation with enhanced hydrological modeling.
10. Engage communities and stakeholders in data collection for better water resource management.
11. Encourage collaboration across governments, civil society, private sector, and international organizations for sustainable water management.
12. Leverage innovative technologies to promote ecological sustainability and ensure equitable access to water for all.

Water Convention



WC-1 COLLABORATION AND COOPERATION FOR WATER SECURITY.

1. Public Private Partnership (PPP) for Efficient Water Management in Urban and Rural Areas.
2. Need for Cooperation and Coordination for Water Security keeping in view of the Climate Change Scenario.

DATE: SEPTEMBER 17, 2024 TIME: 15:30 TO 17:00 HRS.

Chair: Prof. Asit Biswas, Visiting Professor, University of Glasgow, UK

Co-Chair: Dr. Marck Arcieri, President, ICID, Italy

Recommendations:

- Establish tailored PPP models for urban water projects based on local needs.
- Strengthen community involvement in water supply projects and invest in training local officials for better contract management and oversight.
- Enforce environmental safeguards for equitable access and source protection.
- Develop long-term asset management plans for infrastructure sustainability.
- Invest in climate-resilient water infrastructure and seek international funding for sustainable water infrastructure.
- Improve water management through better data and monitoring.
- Implement IWRM for sustainable water management practices.
- Encourage India-Nepal collaboration for water management and flood control in the Rapti river / Ganga basin.
- Formulate adaptive water management strategies for varying global warming scenarios.
- Develop climate-resilient infrastructure like water storage and flood defences.
- Establish a joint data-sharing platform for real-time precipitation and hydrological monitoring.
- Increase local awareness and preparedness for extreme weather events in vulnerable areas.

WC-2 COLLABORATION AND COOPERATION FOR WATER SECURITY.

3. Synergizing Cooperation Across Boundaries
4. From Water Conflicts to Cooperation.

DATE: SEPTEMBER 17, 2024 TIME: 17:00 TO 18:30 HRS.

Chair: Prof. Asit Biswas, Visiting Professor, University of Glasgow, UK
Co-Chair: Dr. Marck Arcieri, President, ICID, Italy

Fostering Cooperation across shared Waters: A case study of Brahmaputra Basin

Recommendations:

1. A coordinated action among the riparian states, as well as the involvement of local communities and international organisations is desired for a comprehensive approach in the Brahmaputra basin on various aspects such as climate change, ecological health and socio-economic well-being under environmental management.
2. A tripartite water-sharing agreement between China, India, and Bangladesh may be established to include provisions for regular data-sharing, joint infrastructure projects, and mechanisms for dispute resolution. This agreement would provide a framework for joint management of the Brahmaputra's water resources, ensuring the interests of all riparian states are considered.
3. It is recommended that the riparian states undertake trust-building measures to build trust among the countries, reduce potential conflicts, and demonstrate the benefits of cooperation.
4. There is a need for additional research on the long-term impacts of climate change on the Brahmaputra basin.

WC-3 INTEGRATED WATER RESOURCES DEVELOPMENT & MANAGEMENT.

1. Integrated planning and conjunctive use of Surface Water and Ground Water.
2. Role of Inter Basin Water Transfer in Water Resources Development.

DATE: SEPTEMBER 17, 2024 TIME: 15:30 TO 17:00 HRS.

Chair: Shri S. Masood Hussain, Former Chairman, CWC
Co-Chair: Ms. TS Anitha Shyam, Member (S), CGWB

Recommendations:

- Inter Basin Water Transfer (IBWT) can significantly increase water availability in arid or water-scarce regions, supporting agriculture, industry, and domestic needs thus boosting economic activities.
- Large-scale transfers require significant investment, infrastructure, and maintenance; therefore, economic feasibility and long-term sustainability need careful planning.
- Combining IBWT with integrated water resource management approaches along with climate change research studies can optimize overall water use and sustainability.
- Conjunctive use of both surface water and groundwater resources to meet water demands and enhance resource sustainability is essential. It helps in balancing the availability and quality of water.
- Effective integrated management can improve water supply reliability, enhance ecosystem health, reduce costs, and increase resilience to climate change.
- Collaboration between stakeholders can lead to innovative solutions and shared resources, enhancing the effectiveness of water management efforts.

WC-4 INTEGRATED WATER RESOURCES DEVELOPMENT & MANAGEMENT.

3. Inclusive Water Planning.
4. Issues in Water Scarcity and way forward.
5. Water Quality — Issues and Challenges.

DATE: SEPTEMBER 17, 2024 TIME: 17:00 TO 18:30 HRS.

Chair: Shri Navin Kumar, Member WP&P, CWC

Co-Chair: Shri Anup Kumar Srivastava, Executive Director, (Technical), NMCG

Recommendations:

1. Synchronized reservoir operations in River basins to control floods, address coastal issues, and maintain river e-flow with adaptive water management strategies to tackle issues arising due to climate change.
2. Proactive drought management with involvement of public, rainwater harvesting, climate-friendly agriculture, and eco-tourism for climate change resilient water resources management
3. Development and use of latest cutting-edge technologies like:
 - nanostrip assays for quicker, more accurate water quality testing and making these testing technology accessible to public for regular use.
 - using graphene and carbon nanotubes for efficient detection of waterborne pollutants, recommending further research to enhance these materials for water monitoring.

WC-5 INTEGRATED WATER RESOURCES DEVELOPMENT & MANAGEMENT.

6. Knowledge Transfer and Skill Development in Water Sector.
7. Designing Optimal Cropping Pattern for Efficient Water Resource Utilization.

DATE: SEPTEMBER 18, 2024 TIME: 10:00 TO 11:30 HRS.

Chair: Dr. Girija Bharat, MD, Mu Gamma Consultants Pvt. Ltd.
Co-Chair: Shri DS Chaskar, National Water Academy, CWC, MoJS

Recommendations:

- Integrating citizen science into water resource management planning could significantly enhance the conservation of the basin's ecohydrology and contribute to sustainable water management practices.
- The Advance ICT techniques along with 5G technologies and IoT give the excellent solution to collect process and analyze the water resources data without visiting the sites. The high-speed reliable data transmission pertains to water resources may effectively help to potentially improve the management of water resources.
- The integration of advanced technologies like remote sensing and artificial intelligence with Linear Programming, Non-Linear Programming, Dynamic Programming, and Genetic Algorithms models enhances their effectiveness, paving the way for more resilient and adaptive irrigation strategies. Effective integrated management can improve water supply reliability, enhance ecosystem health, reduce costs, and increase resilience to climate change.
- Community-centric approach led to significant and measurable improvements in water availability, agricultural productivity, and ecosystem health. These approaches have increased groundwater levels and surface water resources, ensuring reliable sources for agriculture and domestic use.
- Cropping pattern optimization is a critical component of integrated water resource management since it could substantially improve agricultural water use efficiency. Advanced irrigation techniques optimize water application, while integrating surface and groundwater resources enhances water availability and reliability.

WC-6 CHALLENGES IN WATER SECTOR INFRASTRUCTURE

1. Expansion of Micro Irrigation Infrastructure.
2. Water Infrastructure Development – Technological, Ecological, Financial Challenges etc.
3. Waste Water Management — Recycle, Reuse and Circular Economy.

DATE: SEPTEMBER 18, 2024 TIME: 10:00 TO 11:30 HRS.

Chair: Shri Avinash Mishra, Forme Adviser (Water Resources, Environment & Forest, Climate Change, Tourism & Culture) NITI Aayog
Co-Chair: Shri Brjendra Swaroop, ED Projects, NMCG

Recommendations:

Paper: Accelerating coverage of Micro Irrigation in India:

- (i) Adoption of water saving techniques such as drip/sprinkler irrigation to enhance the Water Use Efficiency in agriculture.
- (ii) Recent advances in the science of sensor technologies and the internet of things (IoT) can be useful in the automation of drip irrigation systems; this automation can help in addressing the emerging challenges of labour shortages and inefficiency of water use in agriculture.
- (iii) Micro irrigation has multiple benefits that is efficient irrigation water application , fertilizer application, enhanced production .

Paper: Risk Screening Tool, IWW 2024:

- (i) Risk assessment of more than 6000 dams in India will help in making informed decisions on prioritization of the rehabilitation of the dams in coming 5 years.
- (ii) Provides better understanding of individual issues at a dam
- (iii) Allows transparent assessment and prioritization of dam safety aspects

Paper: An initiative to modernize irrigation infrastructure of Jharkhand:

- (i) To enhance irrigation efficiency; substituting the traditional canal system with pipe line projects and promoting field application of water through micro irrigation methods have become the necessity in the State to achieve full irrigation potential in the State.
- (ii) Some pipeline projects have been launched in the Dumka, Deoghar, Jamtara, Giridih, Saraikella-Kharsawan districts that possess substantial portion of High Patch (Tand) irrigable land remaining unutilized every year.

Paper: Modernizing water infrastructure with innovative Rubber Dams Technology, as Cutting -Edge Solution to water scarcity:

- (i) The Bandhara (i.e. Check dam in Marathi language) project, initiated as a pilot endeavor, showcases the efficacy of Rubber Dams in addressing acute water shortages in eastern Maharashtra.
- (ii) Leveraging Collapsible Rubber Dam technology, the project demonstrates a sustainable, technologically feasible, and financially viable approach to water conservation and management.
- (iii) Bandhara project implementation in Maharashtra exemplifies the successful integration of innovative, indigenous technology and strategic decision-making to address water scarcity challenges.

Paper-5: Collaboration Strategies for addressing water scarcity: Insight from India-Tanzania Partnership:

- (i) GoI, through WAPCOS, is spearheading initiatives to bolster water infrastructure and alleviate scarcity in Tanzania through strategic deployment of resources and meticulous planning.
- (ii) WAPCOS has emerged as a key player in Tanzania's water sector, bringing to bear its technical prowess and innovative approaches to overcome complex challenges.
- (iii) This paper serves as a testament to the power of strategic partnerships and technical ingenuity in confronting complex global challenges.

Paper: Radhakunj Lake-A study of nature based solution to mitigate water pollution:

- (i) The combination of boulder checks, plant-based remediation, microbial action, an enhanced growth of algae and aeration system at the lake proved effective in mitigating pollution and restoring the health of the water body.

Paper: Enhancing Urban Resilience through the Circular Economy in Used Water Management:

- (i) Enhancing Urban Resilience through the Circular Economy in Used Water Management, as improved urban Sanitation leading to more waste water generation and thereby enhancing treated wastewater reuses.

WC-7 CHALLENGES IN WATER SECTOR INFRASTRUCTURE

- 4. Operation and Management of Water Assets and Infrastructure.
- 5. Source Sustainability Irrigation, Domestic Use etc.

DATE: SEPTEMBER 19, 2024 TIME: 15:30 TO 17:00 HRS.

Chair: Shri K Vohra, Chairman, CWC

Co-Chair: Shri Sanjay Belsare, Secretary, Govt. of Maharashtra

Recommendations:

1. In desiltation of reservoirs due weightage should be given to the benefits such as enhanced storage, water security and flood cushion along with adoption of efficient water management strategies.
2. Automatic weather stations, water level sensors, flow sensors, data loggers, telemetry, control panels, enclosures etc, have to be tested for ingress protection (IP XX) rating prior to the field installation to ensure their reliability and accuracy in various environmental conditions
3. Implementing magnetic testing for wire ropes ensures adherence to safety, minimizing risks of equipment failure in critical operations for the identification of internal defects and corrosion in wire ropes, enabling timely maintenance and reducing the likelihood of accidents.
4. Develop and design a framework to integrate Orange with real time data from sensors, SCADA systems and weather forecasts.

WC-8 CHALLENGES IN WATER SECTOR INFRASTRUCTURE

6. Water Sanitation and Hygiene (WASH).
7. Improvement in Water Use Efficiency in Existing Water Infrastructure.

DATE: SEPTEMBER 18, 2024 TIME: 14:15 TO 15:45 HRS.

Chair: Ms. Dina Umali-Deining, Regional Director, Sustainable Development, The World Bank
Co-Chair: Shri Anshuman, Director, TERI

Recommendations:

1. Implement modern technologies such as Piped Distribution Networks (PDN), SCADA technology, IoT platforms, and micro-irrigation systems to enhance WUE when needed to improve water productivity and save water in areas with limited water availability.
2. Develop mobile apps and use advanced monitoring tools like Agri-Drones for monitoring results, and at the same time ensure a good quality of field information for ground truthing.
3. Develop policies to support the adoption of latest technologies and practices, including PIM, fertigation, and mulching techniques, as well as policies that will put the right incentives for farmers to grow the adequate crops based on water endowment and land availability.
4. Innovative water distribution chambers and PDN can boost WUE and help with improving quality of service: timely delivery of water, flexible, equitable, and transparency.
5. Use innovation such as integration of MFCs in wastewater treatment plants for sustainable energy generation and pollutant removal to encourage circular economy and improve recovery of resources from wastewater Applying the principle of moving from waste to resources.
6. Infrastructure is important but not sufficient, we need policies and incentive to value water, including pricing, for users to rationalize the use of water, water conservation and protecting water quality, and keeping the farmers at the center of the system to ensure adoption of technology and adequate use of resources for sustainability and improving their livelihood.

WC-9 RISKS AND NEW APPROACHES TO CLIMATE RESILIENCE

1. Role of Advanced Technologies in Water Security.
2. Managing Climate Uncertainty in Water Sector.
3. Risks in Water Sector due to Climate Change.

DATE: SEPTEMBER 18, 2024 TIME: 11:15 TO 13:15 HRS.

Chair: Prof. A. K. Gosain. Ex. Prof. IIT Delhi.

Co-Chair: Dr. Surjeet Singh, Scientist G, NIH, Roorkee

Recommendations:

1. GIS software can be combined with existing methodologies, e.g., the Universal Soil Loss Equation, machine learning tools for river basin mapping, and flood management, to increase the granularity and efficacy of water interventions.
2. Studying the movement and dispersal of stable water isotopes can enhance the ability of policymakers and stakeholders to make informed decisions by generating robust information on water sources, e.g., glacier, snow, rain, or groundwater, on evaporation and precipitation cycles, on groundwater recharge, and on spring shed management. Water isotope tracking also provides information on transboundary water flow dynamics, which can otherwise be difficult to obtain reliably.
3. There exists a need to establish a unified definition of flood resilience in the literature. A proposed definition is the capacity of a system to return to its normal function in the shortest time possible after being affected by flood hazards. This definition clarifies the role of resilience management, which improves upon risk management by going further to acknowledge potential system failures and fostering the ability to absorb, recover from, and adapt to extreme, unpredictable floods.
4. Topographical and hydrographical modeling was shown to be a robust methodology for simulating complex hydrological processes. As a case study, simulation results were used to provide thorough feedback on a proposed bridge construction. However, mathematical modelling alone cannot be used to determine how sediment in a water body changes over time, and physical models must be used in tandem to provide accurate predictions as the effects of climate change increase in scope and intensity.
5. Machine learning classification algorithms have been demonstrated as effective tools for drawing upon vast resources of satellite data. As shown in the session, minimal amounts of survey data can be used to extrapolate estimates for the depth at each point across an entire body of water. However, machine learning, as applied to climate change research, must be used cautiously, as machine learning algorithms are only as robust as the data they are trained on and the underlying statistical assumptions of the chosen algorithm(s).

WC-10 RISK AND NEW APPROACHES TO CLIMATE RESILIENCE

4. Utility of Artificial Intelligence and Geospatial Tools for Decision Making.
5. Vulnerability of Water Bodies, Spring, Glaciers etc. due to Climate Change.
6. Participatory Precision Water Management for Ensuring Water Security.

DATE: SEPTEMBER 18, 2024 TIME: 16:00 TO 17:30 HRS.

Chair: Dr. Parveen Gupta, Scientist, Space Application Centre (ISRO)
Co-Chair: Dr. Shresth Tayal, Head Water Resources, DHI-India

Recommendations:

- ▶ With growing populations and urbanisation, water challenges such as increased demand, leakages, and flood risks are becoming more pressing. Integration of technology is important for solving policy issues. The role of AI, and GeoAI techniques have potential for application in monsoon variability that affects water recharge and availability, dam safety, river flow forecasting, river ecosystem management, water distribution, water quality analysis and management, water purification, supply and management.
- ▶ Artificial Intelligence and Machine Learning can improve the accuracy of predictions and optimise processes. There is a need to automate water management to enhance operational efficiency, increase cost savings by reducing labour cost, and increase energy savings to improve climate resilience.
- ▶ Different sets of technologies need to be utilised to make water systems climate resilient.
 - This can help in planning reservoir operations and flood mitigation efforts. Incorporation of isotopic and geochemical techniques should be used in studying river basin hydrology and microclimate aspects in humid tropics.
 - By combining thermal satellite data with SCADA systems, irrigation agencies can closely monitor and manage water distribution, ensuring better water productivity and reduced wastage.
 - AI-driven flood intelligence applications, and integrated hydrological and hydrodynamic models enhance the accuracy of flood predictions and to improve preparedness in flood-prone regions.
 - Monitoring water productivity from satellites is the future. Using mobile phone apps is crucial to enhance participation.
- ▶ The community-driven approach is crucial for climate resilience. Collective action to implement artificial recharge structures for groundwater sustainability under Atal Bhujal Yojana has demonstrated improved community resilience to water scarcity. This needs to be replicated at a larger scale.
- ▶ There are significant challenges including ethical considerations in data sharing between state and central agencies that need to be considered.

WC-11 GROUND WATER SUSTAINABILITY AND MANAGEMENT.

1. Ground Water Assessment — Tools & Techniques
2. Challenges in Sustainable Management of Ground Water
3. Water Security Plans at Local Level.

DATE: SEPTEMBER 18, 2024 TIME: 14:15 TO 15:45 HRS.

Chair: Shri SK Ambast, Chairman, CGWB

Co-Chair: Shri Sushil Gupta, Former Chairman, CGWB

Recommendations:

- **Promoting indigenous innovative technologies for ground water level monitoring:** Use of indigenous low-cost tools like sonar-based applications and IoT devices for groundwater monitoring needs to be promoted. These tools are efficient, non-invasive, fast, and cost effective.
- **Prioritise database Integration and application of machine learning in modelling and prediction:** Integration of databases from various projects and schemes, and utilization of this data in groundwater studies, is needed to address existing data gaps. Utilize advanced techniques such as machine learning for rainfall prediction and prediction of water resources availability.
- **Utilize advanced geophysical techniques for high resolution mapping:** Promote use of advanced geophysical methods such as Heliborne Transient Electromagnetic surveys for high-resolution aquifer mapping and identification of potential groundwater zones/sites for artificial recharge even at village level.
- **Development of aquifer-specific management plans:** Formulate targeted strategies for different aquifers based on their unique characteristics and challenges.

WC-12 GROUND WATER SUSTAINABILITY AND MANAGEMENT.

4. Ground Water Quality Related Challenges and Solutions
5. Ground Water Management Plans

DATE: SEPTEMBER 18, 2024 TIME: 16:00 TO 17:30 HRS.

Chair: Shri Dushyant Nariala, Principal Secretary, Irrigation and Waterways, Government of West Bengal
Co-Chair: Dr. Dipankar Saha, Ex. Member, CGWB

Recommendations:

- It was pointed out that though there are a lot of policy interventions and investments happening to improve groundwater levels and augment groundwater resources, there is not much progress related to initiatives and investments for groundwater quality management and remediation. Towards this end following recommendations emerged:
- Scope of Water Quality monitoring needs to be widened both in terms of sources of water (like water bodies, reservoirs etc.) and constituents (including micro-plastics, pharmaceutical residues, fertilisers, pesticides and other emerging pollutants)
- Regulatory Framework for prevention of groundwater contamination needs to be evolved.
- Area specific plans for groundwater quality management needs to be devised.
- Strategies to prevent seawater intrusion in coastal areas need to be developed, considering factors such as groundwater extraction rates and potential sea-level rise.



WC 13: WATER GOVERNANCE AND FINANCING

1. Water Infrastructures — Financing and Operation & Maintenance Models.
2. Role of Policy in Water Security.
3. Convergence of Various Stakeholders in Water Sector.

DATE: SEPTEMBER 19, 2024 TIME: 09:30 TO 11:00 HRS.

Chair: Ms. Sumila Gulyani, Practice Manager-Water, The World Bank
Co-Chair: Shri S S Vaseeharan General Manager, NABARD

Recommendations:

Rethink and Strengthen Water Governance

- One proposal is to realign governance boundaries to natural river basins /sub-basins/watersheds for better coordination. If not feasible, use River basins/sub-basins/Watersheds as basis for planning and implementation of all water initiatives. Involve all stakeholders in the river basin/sub-basin/watersheds.
- Involve communities to strengthen accountability of water agencies and enhance ownership of water programs.
- Strengthen capacity and accountability of water agencies and incentivise them to deliver improved services
- Use water audit and emerging technologies for monitoring and disclosure of key data. Use technology for improved operations and results from water resources.

Water Finance

- Governments need to increase spending on water - not only for Capex but also for O&M. Adopt lifecycle approach to financing. Adequate O&M financing can ensure that design life is reached and often extended.
- Collect some user fees to incentivise responsible use of water (reduced demand of water) and finance O&M
- Make water agencies bankable through predictable government financing and user charges
- Use PPPs and Blue and Green credits to increase financing
- Globally only 2% of water finance is coming from the private sector. This needs to increase dramatically to cover financing needs.

WC-14 WATER GOVERNANCE AND FINANCING

4. Beneficiaries' Participation in Water Planning and Management
5. Role of Women in Management of Water Resources
6. Social Equity and Inclusion in Water Sector

DATE: SEPTEMBER 19, 2024 TIME: 11:15 TO 12:45 HRS.

Chair: Mrs. Veena Khanduri, Executive Secretary-cum-Country Coordinator, India Water Partnership (IWP)
Co-Chair: Ms. Anupama Madhok, Director & Editor, Advance Water Digest Pvt. Ltd.

Recommendations:

1. Naganadhi River Rejuvenation by Women Workers of Tamil Nadu

- **Community Engagement:** Empower rural women through technical training and leadership roles to ensure long-term sustainability of river rejuvenation efforts.
- **Capacity Building:** Provide women with technical skills in water management, enabling them to contribute actively and enhance agricultural productivity.
- **Replication:** Expand the model to other river rejuvenation projects across Tamil Nadu and other states to scale the impact of community-driven water management.
- **Job Creation:** Continue to involve women in water-related projects through programs like MGNREGA to provide employment and promote economic independence.

2. Convergent Action and Community Participation in Water Planning and Management

- **Multi-Departmental Convergence:** Foster collaboration between various departments and community organizations to ensure coordinated efforts in water management.
- **Community Ownership:** Promote community participation through Water Users Committees (WUCs) and Jal Mitras to build local ownership of water resources.
- **Capacity Building:** Strengthen training programs for local stakeholders to improve the operation and maintenance of Piped Water Supply Schemes (PWSS).
- **Disaster Resilience:** Focus on building climate-resilient water infrastructures to withstand frequent floods and water-related challenges in Assam.

3. Women Leadership for Effective Water Management and Community Resilience

- **Policy Advocacy:** Encourage policies that integrate women in water management decision-making processes, both at the national and grassroots levels.
- **Training and Capacity Building:** Focus on building leadership skills among women to promote their participation in community water management projects.
- **Economic Empowerment:** Develop entrepreneurship opportunities for women in water-related sectors to improve their economic status.
- **Collaboration:** Foster partnerships between local governments, NGOs, and international organizations to support women-led water management initiatives.

4. Towards Effective Governance in Irrigation Management for Enhancing People's Participation

- **Participatory Governance:** Strengthen Water User Associations (WUAs) by decentralizing decision-making and empowering local farmers to manage irrigation systems.
- **Traditional Knowledge:** Incorporate traditional water management practices, like the Dong Bandh system, into modern irrigation governance to enhance community participation and sustainability.
- **Financial Sustainability:** Ensure that water cess and levies collected are transparently used for irrigation maintenance and repairs, linking funds directly to water infrastructure projects.
- **Equitable Water Distribution:** Address water distribution issues, particularly at the tail-end of irrigation systems, to ensure fair access for all farmers.

These recommendations highlight the importance of decentralizing decision-making, fostering partnerships across various levels, and integrating traditional knowledge to enhance the efficiency of modern water governance structures. A particular focus is placed on empowering women and marginalized communities to lead water management initiatives, thereby ensuring equitable access to resources, strengthening disaster resilience, and promoting long-term sustainability. The lessons from both modern and traditional systems provide valuable insights for creating inclusive, community-driven approaches that address the complex challenges of water management in India and beyond.

WC-15 WATER GOVERNANCE AND FINANCING

7. Harnessing Traditional Knowledge for Water Conservation.
8. Institutional Water Regulation Mechanism

DATE: SEPTEMBER 19, 2024 TIME: 13:45 TO 15:15 HRS.

Chair: Shri G. Asok Kumar, IAS, Water Expert and former DG, NMCG

Co-chair: Dr. Swayamprabha Das, Lead, Policy Planning, Development Alternatives

Recommendations:

1. Protect, revive, and restore traditional water systems to reduce the risks from climate induced water insecurity, given the urgency of addressing water security and climate resilience has never been more pressing.
2. Establish special Ground Water monitoring mechanism of all the stepwells at a national level.
3. Formalise and establish integrated studies and planning taking into account the 2700 step wells mapped and their aquifer systems.
4. Document and share Traditional Knowledge for efficient water conservation practices around community structures, specially connected with religious places like Temples, Gurudwaras, and others.
5. Promote the association between traditional and modern scientific knowledge to address water related challenges.
6. Restore heritage structures and augment rainwater harvesting and conservation through national campaigns, like 'Catch the Rain', to enable recharging of the groundwater and ensure water security.
7. Ensure community participation at the planning and implementation level, and organise multi stakeholder consultation at all level as part of Government programmes and initiatives.
8. Promote sustainable tourism around stepwells and tradition water bodies to conserve these heritage sites, promote cultural tourism and generate revenue for long term maintenance and support livelihoods of the local community.
9. Scale up the initiatives on transportation of silt by the farmers to their farms from these traditional ponds that improves soil health and productivity.
10. Support and sustain financing for revival and rejuvenation of traditional water structures through innovative financing mechanism for water & biodiversity conservation to achieve the 2030 Agenda.
11. Include key traditional water harvesting structures, from across the country, in the UNESCO heritage list and include in the National Heritage conservation list, as areas of cultural heritage and tourism.

WC-16 WATER RELATED DISASTERS AND ITS MANAGEMENT.

1. Glacial Lake Outburst Flood Risks and Mitigation
2. Challenges in Management of Floods & Droughts

DATE: SEPTEMBER 19, 2024 TIME: 15:30 TO 17:00 HRS.

Chair: Prof. D.S. Arya, Department of Hydrology, IIT Roorkee
Co-Chair: Sh. D.P. Mathuria, C.E. (POD), CWC

Recommendations:

- 1) Conduct Glacial Lake Outburst Flood (GLOF) risk assessment studies for vulnerable catchments considering climate change, and establish early warning systems and contingency plans to minimize impacts.
- 2) Develop urban drainage coefficients tables for various regions through comprehensive studies to facilitate accurate runoff estimation in urbanized catchments.
- 3) Enhance flood forecasting and response by expanding hydro-meteorological observation networks, upgrading discharge measuring equipment, integrating upstream flow data, leveraging advanced technologies, and fostering collaborative management practices and communication strategies.
- 4) Create a mechanism of coordination among different agencies and stakeholders for flood disaster risk preparedness.
- 5) Organizations should adopt advanced data-driven models (ANN, LSTM, BLSTM) for improved flood forecasting and monitor hydrologic parameters at sub-daily scales to support effective modeling approaches.
- 6) Mainstream wetlands as natural solutions for climate change mitigation and disaster risk
- 7) Utilize statistical modeling approaches to compute design rainfall depth, which can serve as input for peak flood estimation when stream flow data is unavailable.
- 8) Update the National Drought Manual to incorporate climate change assessments and adaptations, ensuring a comprehensive response to drought challenges.

WC 17 & 18 WATER RELATED DISASTER AND ITS MANAGEMENT.

3. National Disaster Managements Policies and Action Plan.
4. Risk to Water Infrastructure due to Hydrological Changes in view of Climate Change and its Management.
5. Coastal Area Management
6. Contingency Plans and Post-Disaster Management Interventions for Smallholder Agriculture.

DATE: SEPTEMBER 9, 2024 TIME: 13:45 TO 15:15 HRS.

Chair: Shri A. S Goel; Member (RM) CWC

Co-Chair: Dr Pratap Singh, Vice Presiden, RMSI, New Delhi

Recommendations:

1. Trend Analysis of Hydrometeorological Parameters

Conduct trend analysis for rainfall, temperature, and humidity at both existing and proposed industrial sites.

2. Impact of Climate Change on Design Floods

Assess the impact of climate change on design flood levels for various hydraulic structures, including those in industrial areas.

3. Flood Inundation Modeling

Perform flood inundation modeling using high-resolution digital terrain data, incorporating existing hydraulic structures for large river basins.

4. Identification of Vulnerable Coastal Areas

Identify coastal areas highly vulnerable to seawater intrusion and recommend suitable, cost-effective nature-based solutions to mitigate salinity effects on soil and groundwater.

5. Modeling of Flood and Erosion Processes

Model flood and erosion processes in large river basins like the Ganga and Brahmaputra, and develop mitigation plans to reduce the risks from flooding and sedimentation.



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