Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development and Ganga Rejuvenation

सत्यमेव जयते

Azadi Ka Amrit Mahotsav

7th IWW 2022

7th INDIA WATER WEEK 2022

1 - 5 November 2022

India Expo Centre, Greater Noida

RECOMMENDATIONS

INDIA'S INTERNATIONAL WATER RESOURCES EVENT

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Director General, Member Secretary,
Organising Committee 7th IWW-2022
National Water Development Agency
Department of WR, RD&GR
Ministry of Jal Shakti | Government of India

PREFACE

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

The 7th India Water Week-2022 (IWW-2022) the seventh in the series was organized during 01-05 November, 2022 at India Expo Centre, Greater Noida with theme "Water Security for Sustainable Development with Equity". The main theme was discussed during the conference in 10 Seminars, 10 Panel Discussions, 9 Ministry Events and 12 Side Events.

More than 2000 delegates from India & abroad participated in the IWW-2022. About 80 delegates from 28 countries participated in the conference. Denmark, Finland and Singapore were the Partner Countries. There were 9 Partner States viz: Odisha, Rajasthan, Karnataka, Madhya Pradesh, Kerala, Maharashtra, Uttar Pradesh, Goa and Delhi.

I would like to acknowledge the contribution and guidance of Shri Pankaj Kumar, Secretary, MoWR, RD & GR and Chairman of the Organizing Committee; Ms. Debashree Mukherjee, Special Secretary, MoWR, RD & GR; Shri R.K. Gupta, the then Chairman, CWC & Chairman of the Scientific Committee of IWW-2022 and Shri K. Vohra, Chairman, CWC.

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

The recommendations emerged during IWW-2022 are presented here and would be adequately useful for policy framing and implementation of user's agencies, stakeholders and general public. I hope all concerned would duly consider the Recommendations of the Conference for their appropriate implementation.

(Bhopal Singh)

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INAUGURATION OF INDIA WATER WEEK 2022

CULTURAL EVENT

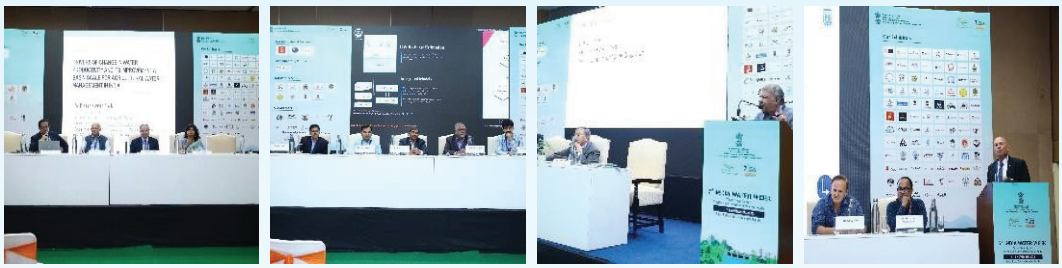
GLIMPSE OF THE EVENT

Participation

2000+ Delegates | 80 Foreign delegates from 28 countries | 200 Papers, 100 presentations | 100 Exhibitors | 3 Partner Countries | 17 Sponsors | 9 Partner States

Plenary Session

Seminars - 10



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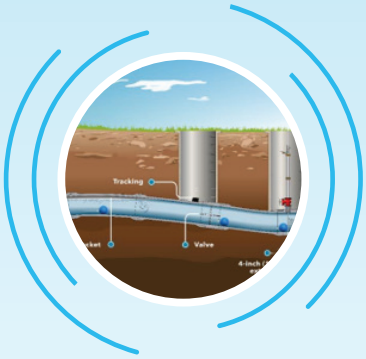
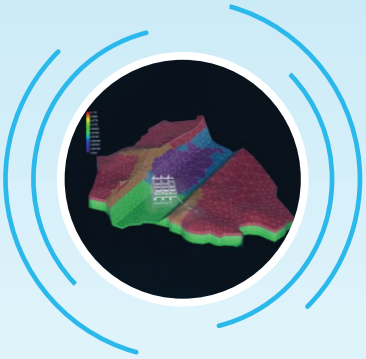
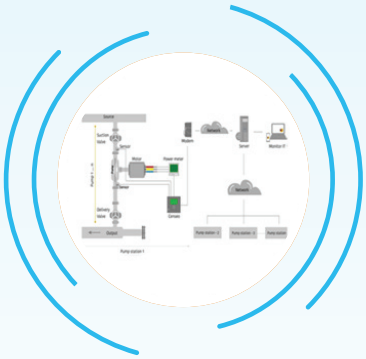
INNOVATION AND TECHNOLOGY SHOWCASED



Smart Ball Technology to identify leakages in the pipe network

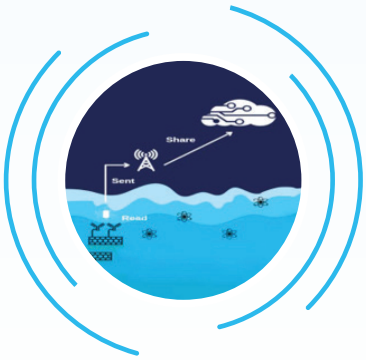


3D unstructured Mesh based Software to simulate flow, contaminants, groundwater age & heat transport



Comprehensive pump performance and condition monitoring platform using thermodynamic principle

Drone with Artificial Intelligence based Pilot system for autonomous navigation



Low cost technology for water quality monitoring based on carbon nanotubes technology

Hydraulic isolation Structure for assured supply to tail-ender

VALEDICTORY SESSION OF "7th INDIA WATER WEEK-2022"

KEY RECOMMENDATIONS OF "7th INDIA WATER WEEK-2022"

- In order to achieve and sustain water & food security, India needs to invest more in water infrastructure;
- Integration of supply side augmentation and demand management is the key to sustainable agriculture and economic growth;
- Effective and efficient management of ground-water through stakeholder participation is required for sustaining the aquifer in healthy condition;
- Institutional Strengthening and capacity build-ing critical to sustain investments targeted at achieving universal access to drinking water and sanitation;
- Enhanced storage, better prediction of extreme events and efficient utilization are the most effective adaptation strategies for addressing the impact of climate change;
- Inter Basin Transfer of water from surplus basin to deficit region is an effective measure for sup-ply side augmentation;
- Demand side management along with enhance-ment of water use efficiency, incorporating mod-ern technologies and innovations is essential for meeting the water needs of economic growth;
- Micro initiatives to be taken up at the local level to address the issues and challenges in the water sector;
- Water quality is a major challenge which need to be addressed in a holistic manner;
- Presence of trace & toxic materials in river water needs to be addressed adequately using modern techniques;
- Institutions and incentives are critical to bring together Stakeholders for Integrated Water Re-sources Management;
- Recycling and reuse of waste water need to be up scaled for supply side augmentation of water resources;
- Findings of R&D to be disseminated appropriate-ly to the masses in order to address the grass-root issues and challenges;
- Active participation of panchayats, water user associations, local youths, self-help groups to be ensured in decision making and dissemination of Govt. programs;
- Role of media and civil society organization needs to be enhanced to promote water literacy for masses particularly farmers;
- Sustainable urban planning and management of water through "know better, plan better and implement better" approach;
- Fluctuations in water availability can be reduced though various structural interventions, localized farm solutions, laser levelling of land etc.;
- Application of Artificial Intelligence and Machine Learning to be promoted for better forecasting floods & droughts and positioning of relief oper-ations;
- Unified Water Resource Information System enables better management, better governance of water resources, leading to a better water use efficiency;
- Protecting and maintaining river flow regimes by providing adequate environmental flows to be considered as a critical aspect of planning of River Valley Projects;
- A compressive framework needs to be developed that shall allow convergence of all the domains and shall facilitate generation of options keeping into focus the sustainability and environmental issues;
- Training and capacity building of the commu-nity should be regular activity for making them self-sufficient of ground water;
- Significant changes in climate viz. variation in temperature and rainfall patterns is the key rea-son affecting agriculture globally
- Need of media coverage, dedicated budget and simplified language for general public

SEMINARS

S-1: SUSTAINABLE AGRICULTURE AND WATER MANAGEMENT - KEY TO ECONOMIC GROWTH *(02.11.2022)*

Water is the most critical resource for development. The effects of this resource can be felt not only in agriculture, but in areas such as industrial and economic development and, most critically, on the environment. India's burgeoning population is facing a water crisis, fuelled by unregulated and unplanned exploitation and a "use and discard" policy. Water as a resource in agriculture is also reaching a tipping point with the constant challenge to feed and hydrate the ever-increasing population. One estimate is that agricultural production needs to be scaled up to double by 2050. With as much as 80% of freshwater being consumed for agriculture, we must ensure that water resources are efficiently used to achieve social, environmental, and economic benefits. To improve the quality of our economic development, the pattern of economic development should be transformed to regulate economic growth and expand the scale, reducing water consumption, improving pollutant emission control technology, and making full use of water resources to provide evidence for a reasonable water resource management policy. Schemes such as Per Drop More Crop focuses on scientific methods to increase the yields by focusing on micro-irrigation, water storages & harvesting structures, groundwater development & recharge, water conveyance & water lifting structures. Precision farming is an approach to farm management that uses information technology (IT) to ensure that crops and soil receive exactly what they need for optimum health and productivity. It not only helps to utilize full resources, but also reduce investment, decrease pollution of the environment and get the most of social and economic efficiency. Thus, water saved in agriculture can be used in other more economically remunerative activities like industrial production, precision farming makes farm products be produced in standards and batches. Although the contribution of agriculture to economy is only 14%, but it provides employment to more than half of the population in India. With the increasing pressure of population, ensuring sustainability of agriculture has become more and more challenging. Water management is key to ensure sustainability of agriculture, which in turn will boost the economic development. Further methods such as Deficit Irrigation in conjunction with simulated soil water balance and crop water productivity modelling can be a value decision support tool. Deficit Irrigation can be useful in reducing the water requirement without much decrease in yield of crop. This will help in increasing water availability for rainfed areas as well. As we know that the mean productivity of rainfed area is about 1.1 tonne per ha compared to 2.8 tonne per hectare of irrigated area. Therefore, bringing more area under irrigation by means of improving efficiency of irrigation will help in economic development.

Chair: Dr. Vivek Kapadia, Director (Civil), SSNNL
Co-Chair: Dr. Man Singh, Project Director, IARI

Recommendations:

- Integration of supply side augmentation and demand management practices is key to sustainable agriculture and economic growth of farmers/country. More focus has to be given on demand side management using efficient irrigation techniques.
- A fast developing and sub-tropical country like India should invest more in water infrastructure to raise the per capita storage that could lead to improved access and use of water, water environment and institutional capabilities. In this regard policy reforms shall be required.
- For India, which is characterized by huge regional variation in water resource endowment and a big mismatch between water availability and water demands, achieving water security for agricultural growth would require transferring water from water-rich regions (that are land-scarce) to water-scarce regions (that are rich in arable land) to enhance the utilization of water for agriculture production.
- Sustainable agriculture and consequent inclusive economic growth shall support progress in human development, poverty reduction; food security, improved livelihoods & nutrition; and water security.
- To harmonize the nexus between water-energy-food under changing climate scenario, reallocation of crop areas and introduction of water and energy smart agronomy and improvement in irrigation practices are essential.

- Diversification by reallocation of crop areas to promote ecologically compliant cropping would require pricing policy support, as is being extended to rice and wheat, for ensuring level playing field.
- Pricing of electricity closer to the cost of supply may not be feasible due to prevailing competitive subsidy politics, but there is still a scope to link it with installation of energy efficient pumping sets, solarized micro-irrigation, and out scaling of new agro-technologies.
- There is a need to increase the investment in research on development of crops suitable for future climate and precision agriculture. Use of high resolution spatial and temporal data may be helpful to inform farmers and target interventions.
- It is essential to establish online platforms/dash boards to assimilate knowledge and data, share success stories, obtain feedbacks of sustainable agriculture practices.
- Advance inflow forecast, review of reservoir rule curve to optimise hydropower as well as irrigation uses shall ensure more benefits from water storage projects.

S-2: CHALLENGES FOR SUSTAINABILITY OF GROUND WATER RESOURCES

(02.11.2022)

Chair: Shri Sunil Kumar, Chairman, CGWB
Co-Chair: Shri Nanda Kumaran P, Ex. Chairman, CGWB

Recommendations:

- Optimization of water pumping rate is needed for having good quality water throughout the year resulting in sustainable use of groundwater resources.
- Portion of river bed filtration and groundwater directly related to quality of water and Groundwater plays a crucial role in socio-economic development of the society.
- Adoption of more micro irrigation resulting in less water requirement on demand side.
- Effective and efficient management of groundwater is required for sustaining the aquifer in healthy condition.
- Identify water recharge potential zone using various available data (7 layers) and then artificial water recharge structure can be constructed in such potential zone for maximum benefit.
- There are many challenges in managing ground water such as high groundwater reliance, variation in ground water use due to this one of situation can not fit to every scenario.
- There is a need to set standards to recharge groundwater and need for implementation of regulations on use of groundwater was also emphasized.
- It was the shared view to take on the challenges in management of groundwater use i.e Exploitation of water resources, contamination of ground water.
- A holistic approach for management of all water resources including ground water and the need for increasing water use efficiency to tackle challenges is required.

S-3: IMPACT OF CLIMATE CHANGE AND ADAPTATION STRATEGIES

(02.11.2022)

Chair: Shri M Gopalakrishnan, Ex. Secretary General, ICID
Co-Chair: Shri B P Yadav, Head Hydrology, IMD

Recommendations:

- Current issue of climate change can be addressed at the root level when the Gram Panchayat, State and Central Govts., Judiciary and civil society work together by linking inter-sectoral effects on various measures of interventions.
- It has been observed that more focus on improving water conservation methods and water use efficiency is required. More storages are required to be constructed.
- Co-ordination between among Govt. departments to engage experts across various sectors in devising water policies is the need of the hour so that avoidable duplication is assured.
- There is an urgent need to develop a National Technical Platform for dissemination of information related to various climate change indices to all the stakeholders.
- Funds allocated to various departments under different Schemes for combating climate change should be properly integrated.
- Improvement in existing weather forecasting systems and ensemble meteorological and hydrological forecast is required for timely action to counter impacts of floods and droughts.
- Development of new tools to predict activities arising out of climate change and exchange of information requiring the source through cooperation of all concerned agencies, national as well as international, should be encouraged. Public Private Participation should be well supported.
- In-depth research is required to access the potential change in the climate for near future and more precise mitigation measures should be designed to overcome it with enhance data input.
- Involvement of NGOs, Start-ups and various other agencies in tackling issues arising due to climate change needs to be encouraged.

S-4: QUALITY CHALLENGES IN WATER SECTOR

(02.11.2022)

Chair: Shri Rajiv Ranjan Mishra, Ex. DG, NMCG
Co-Chair: Shri Prashant Gargava, Member Secretary, CPCB

Recommendations:

- Presence of trace & toxic materials in river water needs to be seriously addressed.
- Modernization of WQ measurement essentially required along with real time monitoring and inclusion of Machine Learning, data analysis etc. Some of these could be useful to monitor health of wetlands/water-bodies located in remote and vulnerable areas such as those located within or in vicinity of industrial clusters.
- Role of micro plastic in river system needs to be given proper attention.
- Efforts should be made for development of robust WQ Index.
- The impact of river water quality on concrete structures needs further exploration.

S-5: DOVETAILING THE MICRO AND MACRO INTERVENTION FOR WATER MANAGEMENT *(02.11.2022)*

Chair: Dr BRK Pillai, Member, KRMB

Recommendations:

- Performance based contract linked with reduction of water losses for maintenance of city domestic distribution network is the need of the hour.
- Rainwater Harvesting in urban areas has the potential to supplement the domestic water requirements.
- Inter Basin Transfer of water from surplus basin to deficit basin is an important supply side initiative in current water resources scenario of the country. Intervention needs to be planned keeping in view the current infrastructure with maximizing spatial technology.
- Enabling the local community and its engagement (eg. Shramadhan) is required to address the social and technical challenges related to water management. The grass root community helps in effective solution for any local problem such as encroachment and quality issues. For urban area interventions, also community participation is needed from planning till implementation.
- Pressurized Irrigation Network (PIN) along with SCADA operation as demonstrated in Mohanpura & Kundalia Irrigation projects in Madhya Pradesh shows more than double the area being irrigated now as compared to open canal system; also there is an increasing in crop productivity. Such system should be encouraged appropriately.

S-6: EMERGING TECHNOLOGICAL SOLUTIONS FOR EFFICIENT WATER MANAGEMENT *(03.11.2022)*

Chair: Dr. Man Singh, Project Director, IARI
Co-Chair: Dr. C T Dhanya, Associate Professor, IIT Delhi

Recommendations:

- Various innovative technologies are available for leak detection in pipe flow (Smart Ball) technique, assessing conveyance efficiency in canals by ADCP can be implemented.
- Assessing pump efficiency in lift schemes is very important as a marginal increase in pump efficiency can save a lot of water as well as energy.
- SCADA system may be adopted in irrigation systems for Canal automation operations.
- Maintaining of data bank is equally important for solution of water elated issues.

S-7: MANAGING WATER RELATED DISASTER-FLOOD AND DROUGHT *(04.11.2022)*

Chair: Prof. R Nagarajan, Professor, CSRE, IIT-Bombay
Co-Chair: Shri M K Srinivas, Chairman, GFCC

Recommendations:

- The success rate of forecasting using mathematical optimization is at an acceptable level. Rule curve-based approach needs to be evaluated and to be updated as per current scenario.
- Flood Forecasting being a non-structural measure, focus should on matching the flood pattern rather than matching flood peaks for executing administrative measures during a flood event.
- Apart from traditional method of forecasting (inflow and level forecast), it is the need of the hour to enhance forecasting tool for inundation forecast as well.
- Decision support system for managing water related disasters highlighted, adaptive management practices enabling a proactive response.
- Dam related hazard potential classification based on physical condition of dam structure, reservoir and downstream side settlements, agriculture, transport infrastructure structure etc. helps in identifying vulnerability in the event of failure of dams. This relevant information can be shared with different stakeholders and with relief operators at the time of event.
- Flood prediction using an Artificial Intelligence System and Machine Learning process appears to be exciting, however, availability of data and frequency of data is the drawback in the approach.
- Usages of higher speed computer power offer better accuracy and forecast lead time which is essential for flood forecasting and relief activity.

S-8: ESTABLISHING A COLLABORATIVE WATER GOVERNANCE REGIME

(04.11.2022)

Chair: Dr. Alok Rawat, Former Secretary, DoWR,RD&GR
Co-Chair: Dr. Syamal Kumar Sarkar, Senior Director, Water Resources, TERI

Recommendations:

- Water security globally is increasingly becoming one of the major causes of concern.
- The trend is on increasing number of conflicts on trans-boundary rivers, at regional/bilateral/intra-state levels.
- The recent Ken- Betwa interlinking river project and similar projects in future would have a positive impact on groundwater scenario in concerned areas.
- Better and energy efficient usage of saline water would be of immense help in checking the ingress of saline water into fresh water aquifers. A reference was made about Singapore Water Project and Minsari River Basin Project in Gujarat showing the road map for future.

S-9: WATER FOR ENVIRONMENT AND LIVELIHOOD

(04.11.2022)

Chair: Shri Mukesh Kumar Sinha, Chairman, GRMB
Co-Chair: Shri Rishi Srivastava, Chief Engineer, BPMO, CWC

Recommendations:

- The increasing demand of food grains and already stressed resources necessitates improvement in agricultural efficiency. Improvement in water use efficiency and technological intervention in irrigation in tandem with socio-economic factors are key for agricultural efficiency. However, Agriculture intensification can lead to complex issues. Accordingly, improvement in agricultural efficiency should be coupled with sustainable use of resources to minimize adverse effect on environment.
- Protecting and maintaining river flow regimes by providing adequate environmental flows should be a critical aspect of planning of River Valley Projects. River stretches in higher reaches where there is no fish (fishless zone) also require environmental flow to performs certain essential ecological functions. There are stretches where specialized vegetation grows along the banks of rivers known as the river's riparian zone which are critical to the health of rivers in Indian rivers the hydraulic rating cum habitat simulation appears to be good.
- The ground water extraction for irrigation has increased manifold due to construction of borewells. The exploitation of ground water at this rate will jeopardize the livelihood of farmers in future.
- Assessment of effects of water Resources projects on Environment and social components is crucial. This assessment will enlighten us about the achievements and mistakes we have made in the past and will guide us to course correction in future. More projects should be taken up for Post project Environment Impact Assessment studies including social impact assessment in future. The projects for which pre project EIA studies has been done should also be taken up for post project assessments.
- Fluoride plays a dual role in human health. Low fluoride concentration strengthens tooth enamel and prevents caries, tooth decay, tooth loss and cavities while excess intake can cause dental and skeletal fluorosis and other health issues. Fluoride in groundwater is a global problem effecting more than 300 million people in 29 countries. Safe drinking water must be ensured under Jal Jeevan Misson program of Ministry of Jal Shakti.
- Government of India has initiated the flagship programme "Namami Gange" in June 2014 for rejuvenating the river Ganges managed and implemented by the National Mission for Clean Ganga (NMCG). Many International partners are also working for infrastructure projects (mainly for municipal sewerage and industrial effluent management systems) in the Ganga basin. For the development of specific, appropriate, and well targeted measures for fighting pollution and sustaining the rejuvenation of the river, reliable (quality assured) water monitoring data are needed to map concrete pollution sources and determine the respective quality and quantity of pollutants. However, today the quality of the analytic data required for the assessment and the monitoring of the water quality of the river Ganga is insufficient. The main reasons are a) deficient coordination of the assessment and analysis of data by the environmental authorities on both state and central level, b) the lack of a water monitoring strategy and c) inadequate equipment and lack of trained personnel in the central and regional laboratories responsible for monitoring water quality in the Ganga states. This significant gap in the availability of reliable water quality data also poses a bottleneck for scientific analysis and policymaking.

S-10: REUSE & RECYCLE OF WASTEWATER FOR WATER RESILIENCE & WATER MARKET *(02.11.2022)*

Chair: Prof A. A. Kazmi, Dept. of Civil Engg., IIT Roorkee
Co-Chair: Shri Ajay Gupta, Member (Drainage), Delhi Jal Board

Recommendations:

- There should be clear strategies for reuse of wastewater and all wastewater reuse strategies should be backed by the data.
- We need more technological interventions and community participation to promote wastewater reuse.
- We do have technological interventions and knowledge base but we need financing and better coordination in the involved organisations for taking reuse of wastewater further.
- Use of treated wastewater should also promote for construction purposes, however there is financial constraint and also there is no acceptability in the society and needs to be pushed through proper advocacy.
- This needed to be backed through building by laws.
- We need to change the narrative of wastewater management while we continue to improve on wastewater collection and treatment. We need to have futuristic plan on wastewater reuse, recycle and resources recovery and mainstream wastewater reuse governance in our country.
- We should declare wastewater as resource.
- The total resource recovery model should be implemented for recycling water, gas, and sludge.
- Incentives should be given to the existing industries for setting up the ZLD (Zero Liquid Discharge) plants to facilitate and motivate them to meet environmental regulations.
- Enablement of a supportive policy environment is required to put all the aspirations on ground. It may include the awareness of stakeholders including Government bodies, prospective bulk consumers, financial institutions, innovative financing in wastewater recycling & reuse, and proper risk sharing, etc.
- The regulatory frameworks is required to move the existing usage of freshwater for certain identified industrial processes compulsorily to recycled water.
- Focus should be on comprehensive and inclusive planning covering efficient collection of sewage, transportation with minimum losses and suitable treatment along with the distribution network for supply area.
- The industries are already showing acceptance and working towards adopting Zero Liquid Discharge (ZLD).
- For the farming community there are possibilities of a lot of misgivings and they may not accept it readily, so we need more awareness campaigns and advocacy.
- Community is the most significant part of water management. It is the end-user and needs to be guided and involved well in order to achieve a balance in our approach.
- The National Water Policy, if publicised well, will further enhance the acceptability of treated wastewater reuse at all levels.

PANEL DISCUSSION

PD 1: STRATEGIES FOR DEMAND AND SUPPLY SIDE MANAGEMENT

(02.11.2022)

Chair: Shri Avinash Mishra, Advisor, NITI Aayog

Recommendations:

- Keeping in view the challenges of water sector, both supply side and demand side management interventions or a combination of both approaches are needed.
- Demand side water management is essentially required for meeting the water need of country. Success of strategy for demand side water management depends on the capacity building and sustainable behavioural change. Peer learning and experience sharing is a key ingredient.
- Intervention like Catchment area treatment, control of evaporation, use of pipe distribution network, regular maintenance of infrastructure, use of micro irrigation, Participatory Irrigation Management (PIM), use of renewable source of energy in agriculture have been successfully implemented in water management and improvement of efficiency.
- Metering and charging water supply for industrial as well as domestic purpose can induce water saving behaviour in user.

PD 2: ROLE OF WATER IN ACHIEVING SUSTAINABLE DEVELOPMENT GOALS *(02.11.2022)*

Chair: Shri Sriram Vedire, Advisor, DoWR,RD&GR, MoJS

Recommendations:

- The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future.
- State level setup for policy implementation needs to be strengthened up to district and village level for satisfactory implementation of water sector reforms.
- Reuse of waste water from sewage effluent treatment is one area which requires more focus now.
- Waste water should be treated as resource keeping its huge quantity and potential to cater to various demands. Sewage treatment plants(STPs) should be termed as Water Recovery Plants.

PD 3: WATER EDUCATION, PUBLIC AWARENESS AND ROLE OF MEDIA *(03.11.2022)*

Chair: Prof. S. K. Maheshwari, IIM-Ahmedabad
Co-Chair: Dr. Rajendra Poddar, Director, WALMI, Dharwad

Recommendations:

- Needs to have communication strategies to bring behavioural changes for achieving the goal of water conservation.
- Media must have consistency, content, coverage and trust.
- Media needs to connect with various stakeholders from Govt to grass root level.
- The technical language related to water sector needs to be simplified for better dissemination of knowledge even at the grass-root level.
- There should be budget earmarked specially for the purpose of research in water sector and dissemination of it's outcome to the masses.
- For mass water education school teachers should be targetted as students listen more to them than even their parents.
- There is a need of having well known personalities as Brand Ambassador of water.
- Three principles for effective communication i.e. Ethos, Pathos, and Logos as given by Aristotle needs to be utilised in water sector awareness programs.

Ethos - Developing trust, Pathos - Using emotions, Logos-Talking in terms of Logic

- Water resources projects needs to be more accessible to general public.

PD 4: DECENTRALISED SOLUTIONS FOR WATER MANAGEMENT

(03.11.2022)

Chair: Ms. Anu Garg, Additional Chief Secretary, WRD, Govt. of Odisha
Co- Chair: Ms. Archana Varma, Mission Director, National Water Mission

Recommendations:

- Community based approach with entrepreneurial / technological effort will help in better management of water which will be cost effective, inclusive and would require less energy.
- Some of the decentralized solutions tried and can be implemented elsewhere is through training and participation of local youth and also through Self Help Groups (SHGs). Creation of Paani Panchayat will also help in better management of water resources. However, there is need to require go beyond technology/ engineering as technology cannot be the only solution. Community participation, Political thought, traditional management methods are also required along with technology solutions for better management of water resources at decentralized level.
- Impetus from Central Government in form of policy/ solution is also required.
- Waste water should also be considered as source of water for its reuse in agriculture, industrial and other means. Technologies have been developed for waste-water recycle and reuse at source which can address waste water discharge problem at local level. Similar decentralized solutions/ systems provide an opportunity to local communities for better water management at lower investment cost.
- Promoting use of Solar energy for irrigation through various central government schemes like PM-KUSUM, which in turn will make farms self-reliant and restrict migration of the marginal farmers.
- Farmers are the largest consumer of water in India, thereby use of micro-irrigation in agriculture especially in water-stressed area/region would play vital role in better management of water resources in India.
- One of the Goals of National Water Mission (NWM) is to increase water use efficiency by 20% and same should be achieved as soon as possible in coordination with Bureau of Energy Efficiency which in turn would make more water available and can play important role in water management at various levels.
- A balanced approach at Policy level along with new technology solutions is the need of the hour for decentralized water management.

PD 5: ROLE OF CIVIL SOCIETY IN EFFICIENT WATER MANAGEMENT

(03.11.2022)

Chair: Shri A. B. Pandya, Secretary General, ICID

Recommendations:

- Civil Society Organizations (CSO's) have contributed very significantly to water management in local, State and National contexts in the country. They are doing a very good job presently and in future their role is expected to become even more important.
- Civil Society organizations (CSO's) are best suited as partner for efficient water management in India as it requires interaction with communities at individual level. Further, Indian Society is beset with gross inequalities. There are many segments of society who cannot effective advocate for their rights themselves. For such segments, CSO's can act as bridge between government and that community leading to overall development of whole society.
- In Indian context, the relationship between Government and CSO's have very much improved over time. Now, the relationship between Government and CSO's is seen as collaborative and not combative.
- The major strengths of CSO's are flexibility, innovation in approach and capacity to mobilize communities. The major challenges before CSO's is that due to financial constraints, they cannot deliver results at large scale.
- Wherever close coordination between Government and SO's has been achieved, the desired goals have been accomplished for example Ramganaga Catchment Area work under Namami Gange Project. However, mechanism of partnership between Government and CSO's should be institutional so that it is long lasting and does not diminish with time.
- CSO's should be involved in Water Resources Project from Decision making, planning, execution and post execution. CSO's have to play a role of harbinger of change. Their role is critical for getting approval of community. However, CSO's must also be aware of the overall picture as well and should not act as partisan in their approach.
- Finance is one major hurdle for effective functioning of NGO's. Whereas the Government does support CSO's but more is required to be done.
- Industry also has to play its role in financing CSO's. Funding under Corporate Social Responsibility (CSR) is not adequate. Industry should support CSO's as knowledge partner in a symbiotic relationship for overall efficient management of water resources.

PD 6: CHALLENGES IN URBAN WATER PLANNING AND MANAGEMENT

(04.11.2022)

Chair: Shri Rajendra Kumar Agrawal, Advisor, Sahayata Samajik Sanstha Bhilai, Chhattisgarh

Recommendations:

- Sustainable planning and management of water through "know better, plan better and implement better" approach.
- Catch, store and use your water through better roof top water collection mechanism, underground storage tanks and avoiding back-to-back construction of buildings
- Optimum storage and use of storm water
- Recycle and reuse of sewage water
- Availability of Efficient and Robust Framework by laying out separate Lines for Storm water collection and Separate lines for bath and kitchen water collection
- Supply of decided quantity of water with quality to the end user.
- Water resources should be managed in an integrated manner, i.e., Integrated Water Resources management (IWRM) approach should be followed.
- Single Authority for water related issues.
- User end management of water.

PD 7: CONVERGING TOWARDS NATIONAL PERSPECTIVE - IBWT *(04.11.2022)*

Chair: Shri Sriram Vedire, Advisor, DoWR,RD&GR, MoJS

Recommendations:

- Considering uneven distribution of water and ever increasing demand from growing population and regional imbalances in water availability, inter-basin water transfer is need of the hour. The interlinking of rivers may address the chronic drought in water scarce regions.
- Implementation of ILR projects depends mainly upon consensus among concerned States. The panel noted that the co-operation between partner States (Madhya Pradesh & Uttar Pradesh) for development of Ken-Betwa link project as a progressive step forward.
- Long term strategic vision for water diversion from surplus basins to deficit basins that would simultaneously satisfy social, economic & environmental demands with equity was stressed.
- Restructuring of NWDA in to National Interlinking of Rivers Authority (NIRA) would help in transforming a Planning and Investigation agency to an implementing body and promote ILR programme for the benefit of Nation as a whole.

PD 8: AGRICULTURESUSTAINABILITY UNDER UNFORESEEN CIRCUMSTANCES *(04.11.2022)*

Chair: Ms. Mio Oka, Director, SAER, ADB

Recommendations:

- Significant changes in climate viz. variation in temperature and rainfall patterns, is the key reason affecting agriculture globally.
- Fluctuations in water availability can be reduced though various structural interventions such as creation of rainwater harvesting structures; interlinking of rivers, laser levelling of land etc.
- The other measures may include non-structural interventions such as use of climate resilient seeds, training of farmers, water supply and demand side management etc.
- Localised farm solutions, technological development both mechanical and digital may also bring agriculture sustainability to mitigate effects of unforeseen circumstances.

PD 9: ROLE OF HYDROPOWER FOR ENERGY SECURITY

(04.11.2022)

Chair: Shri M.A.K.P. Singh, Member (Hydro), CEA

Recommendations:

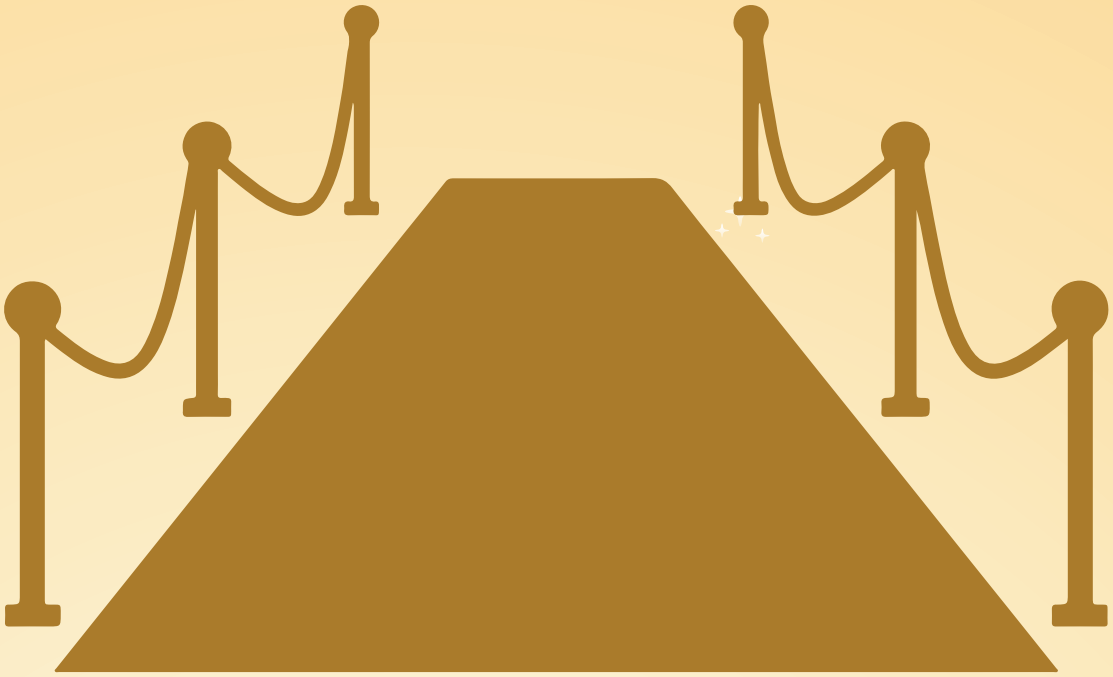
- The basic aim of energy security for a nation is to reduce its dependency on imported energy sources for its economic growth. Energy Security is significant to the economic transformation, prosperity and well-being of humankind.
- In the past, India's energy security has been narrow in its approach, mainly aimed at managing supply. But now, its quest for energy security could be seen under the framework of the four A's, which is to make energy accessible to all the sections and sectors at an affordable price in a socially and politically acceptable carbon-controlled environment.
- Hydropower, though having only 11.5 % of total installed capacity, contributes 13.32% of generation, doesn't suffer from any fuel supply constraints, reduces carbon emissions and serves a host of ancillary grid support benefits through peaking power, inertia support, fast ramping, black start etc.
- As Hydropower is clean energy hence its construction can be ramped up to achieve India's long-term goal of reaching net zero by 2070. For example, the focus can be shifted towards a Floating Solar Power Plant on the Dam Reservoir, Pumped Storage Project (PSP), etc.
- Also, it is desirable to have a holistic view of all issues regarding Hydropower (like Rehabilitation and Resettlement, Environmental Issues, etc.) & efforts should be made in a well-coordinated manner between all the stakeholders to resolve them & formulate policies/ framework regarding the same and thus giving impetus to the energy security of India.
- Energy security will become tied to grid security in decarbonized, deeply electrified energy systems.
- Because of its flexibility, ability to store energy, and grid supportive characteristics, including natural inertia and high short circuit current contribution, hydropower is critical to ensuring grid security under very high levels of variable renewable energy in India.
- Hydropower is the enabler for grid and energy security in the deeply decarbonized energy system in India.

PD 10: ALIGNING WITH NATURE WHILE ENSURING WATER SECURITY – CHALLENGES AND OPPORTUNITY *(05.11.2022)*

Chair: Prof. A. K. Gosain, Civil Engineering Deptt., IIT, Delhi

Recommendations:

- A new age scientific approach with intense research and field data needs to be adopted to evolve new methodology to keep the optimum balance between ecology, environment, local social aspects as observed in Farakka Barrage by creating passage for Hilsa fish through existing navigation lock.
- Water Poverty Index (WPI) could be a comprehensive and interdisciplinary tool linking physical availability of water with critical social economic variables reflecting Water Poverty for efficient water resource Management.
- A robust monitoring mechanism with scientific approved technology needs to be placed to measure the long term spatial & temporal variation in environment to understand changes which will help in formulating long term policies at local and national level.
- A comprehensive framework needs to be developed that shall allow convergence of all the domains and shall facilitate generation of options keeping into focus the sustainability and environmental issues and shall thus also help in stakeholder engagement to identify the preferred option(s).



EVENT BY MINISTRIES

M-5: PMKSY+ CAD & WM SCHEMES *(04.11.2022)*

Chair -Dr. M K Sinha, Chairman, GRMB
Co-Chair - 1. Shri Avinash Mishra, Advisor, NITI Aayog 2. Dr. B R K Pillai, Member, KRMB
3. Shri A. S. Goel, Commissioner, SPR

Recommendations:

- With increasing pressure on water resources, it is imperative that DoWR,RD & GR take concerted efforts in this direction. The Pradhan Mantri Krishi Sinchai Yojana (PMKSY) gives a good opportunity to enhance physical access of water on farm and expand cultivable area under assured irrigation, improve on-farm water use efficiency, introduce sustainable water conservation practices, etc.
- Increasing water use efficiency to cover more area under assured irrigation from the finite water available. This will ensure that the water reaches the tail-end farmers and the benefits of the irrigation project are reaped by all the targeted beneficiaries.
- All out efforts should be met to promote micro irrigation and dovetailing the Per Drop More Crop scheme with the PMKSY-AIBP/CAD&WM and other schemes.
- Emphasis should be given on command area development works and participatory irrigation management practices. The issues and apprehensions of famers should be properly addressed through policy interventions.
- Promotion of piped distribution network, canal automation and ERM projects under PMKSY.
- Meticulous and detailed planning at DPR preparation stage should be made to avoid any surprises at implementation stage.
- Reuse of treated water should be promoted.
- Water metering should be promoted for proper management of water use.

M-6: DAM SAFETY MANAGEMENT *(04.11.2022)*

Chair: Mr. J. Chandrashekhar Iyer, Member (D&R), CWC & Chairman, NDSA
Co-Chair: Mr. Anand Mohan, JS (RD&PP), DoWR, RD&GR, MoJS

Recommendations:

- Adequate Funds to be earmarked by State Govts. for maintenance of the Dams.
- Dam Safety Units, in States to be equipped with adequate number of officials having experience in dam safety activities.
- Regularly pre & post monsoon inspections to be carried out with timely remedial/rehabilitation measures executed.
- EAP and O&M manual to be prepared for each specified dams within 5 years. Comprehensive Safety Review also to be carried out.
- Provide minimum instrumentation at all the dams.
- Till all regulations are finalized by NDSA, existing guidelines as published by CWC during DRIP- I Scheme may be referred.
- So far, Two Dam Safety Rehabilitation Programme completed and third is going on. The benefits obtained from the Dam Safety Programme will facilitate implementation of Dam Safety Act. Specially, uniform dam safety guidelines /standards; Capacity building & Institutional strengthening.

M-7: NATIONAL HYDROLOGY PROJECT AND ITS IMPACT ON WATER RESOURCES MANAGEMENT IN THE COUNTRY *(04.11.2022)*

Chair: Mr. Anand Mohan, JS (RD&PP), DoWR, RD&GR, MoJS

Recommendations:

- There is a strong need to enhance Hydro-network stations in the country to capture water level of reservoirs, rivers, groundwater level and rainfall. Water Resources Data stored in a common central portal will enable water managers of different water sectors to identify issues and manage water resources.
- Commissioning of Real Time Data Acquisition System (RTDAS) in states under National Hydrology Project has been successful in monitoring surface and groundwater level data at high frequency for better management of water resources within the states and in states where basin cut across neighboring states.
- NHP has enabled states to enhance their Hydro-monitoring network and resolve state specific issues based on the several thematic studies (flood forecasting, Integrated Reservoir Operation, Groundwater Pollution studies etc.) carried out.
- The need for NHP advance was emphasized to sustain the momentum created by NHP for better planning and efficient management of water resources (surface and groundwater) in the country.

M-8: ATAL BHUJAL YOJANA AND NAQUIM *(05.11.2022)*

Chair: Shri Sunil Kumar, Chairman, CGWB
Co-Chair: Shri Pratul Saxena, Project Director, Atal Bhujal Yojana

Recommendations (Atal Bhujal Yojana):

- Ground water is a precious, natural, and invisible resource. Its spatial distribution varies depending its occurrence and movement in different hydrogeological conditions. Understanding this aspect of groundwater is, therefore, necessary for its sustainable development and efficient management.
- Over the past few decades, significant work has been done in the Country to enhance availability of water through supply side interventions; however, not much attention was given to its efficient management. Though the past endeavours have contributed to enhancement of groundwater resources, it is now time to shift the focus on demand side management of groundwater by adopting efficient practices, primarily for irrigation, as agriculture is a major water consumer.
- Many initiatives taken up by people through their active participation has revealed that groundwater can be best managed by involving the local community. Making them aware and informed about their own water resource will help them to understand and manage it efficiently.
- A community informed about science of hydrology and hydrogeology can take better decisions to manage their own ground water. Efforts should, therefore, be made to train them for monitoring of ground water levels, quality, rainfall and other hydrological parameters.
- Training and capacity building of the community should be a regular activity for making them self-sufficient for management of groundwater.
- Women empowerment plays a crucial role in the sustainable management of water.

Recommendations (NAQUIM):

- The outputs of National Aquifer Mapping and Management Program (NAQUIM) are being used for planning ground water management by many agencies. The success stories presented in the workshop show that there is huge potential for use of NAQUIM studies. Agencies involved in ground water management may take steps to make best use of the outputs.
- For better use of these outputs it is necessary to popularize it and sharing at various levels to enhanced. Efforts should be made to ensure that the usable information should reach the user agencies.
- For the next course of NAQUIM studies (NAQUIM 2.0), efforts should be made to provide management plans at finer levels (say village or gram panchayat). The outputs should be designed in a manner that users at ground level should also be able to use them effectively.

M-9: "PARTNERSHIP WITH COMMUNITY (PAN-CHAYATI RAJ INSTITUTES, SELF HELP GROUPS AND NON-GOVERNMENT ORGANIZATIONS) FOR WATER CONSERVATION & MANAGEMENT (EVENT BY NWM) *(05.11.2022)*

Session Title: "Rural Water Supply: Addressing challenges of access, quality and service delivery & safe management of Black & Grey Water"

Chair: Shri Suneel Kumar Arora, Advisor (C&M), National Water Mission

Recommendations:

- While there are a few examples of Gram Panchayats (GPs) delivering good service delivery, some with support from civil society organizations, there is a need to scaleup the same to the 6.5 lakh GPs across the country. Failing this, the service delivery might not be as envisaged and citizens would be deprived of planned benefits. There is a need for deep-diving into this issue and come up appropriate policy and measures to strengthen capacity of GPs for O&M and service delivery, across the country. The experience and capacity of local NGOs can be roped in for the same.
- Partnership model of collaboration between Government and CSOs/CSRs is emerging in the country. The Aga Khan Foundation, the Tata Trusts are some examples. These partners have access to resources and are able to bring the same to the partnerships, that can last longer than a traditional model. In a 'traditional model' NGOs are hired at district / block level and depend on financing from the project and have limitations in their stay and experimentation. There is a need to explore more partnership models and bring them on a common multi-stakeholder platform to strengthen the outreach support to GPs and also experiment with innovations.
- Water Quality impacts of health of the consumers and also affects the overall development. Delivering quality water through FHTs is also aim of the JJM. However, due to several reasons, some pockets within the country are facing water quality problems and this needs to be addressed. One way is to formulate a district level coordination committee to regularly review the water quality and health angle and undertake appropriate interventions to mitigate the adverse risks. More research is also needed for understanding the link between water quality-malnutrition-stunting, to enable appropriate policy and action.
- Source sustainability is a key issue for designed service delivery. Most sources are groundwater dependent. On average, across India, agriculture consumes more than 80% of groundwater resources adversely impacting overall sustainability of source sustainability. Spot protection/ recharging of drinking water source might not be sustainable in long term. Hence, there is a need to integrate overall groundwater sustainability through approaches like watershed treatment, as necessary.

Session Title: "Groundwater Governance & Management: Achieving Water Security at Scale through collaborative efforts"

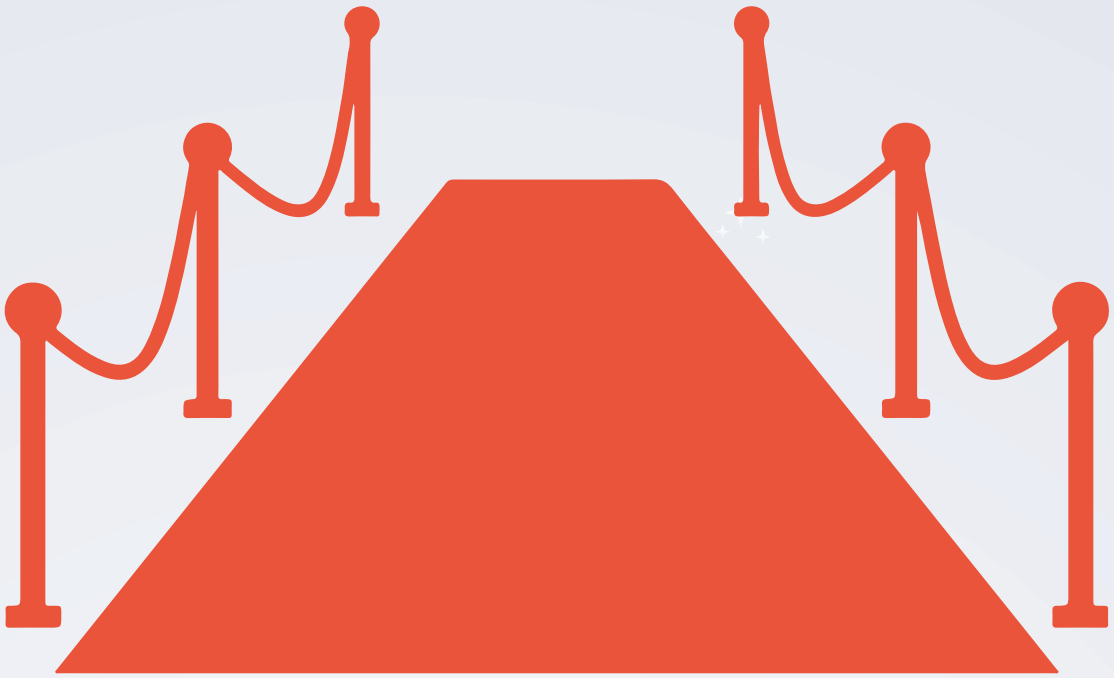
Chair: Shri Anand Agarwal, Member, CGWB

Recommendations:

- For ensuring sustainability of JJM, there is an urgent and serious need to focus on groundwater management, which demands investments commensurate with what the Govt is putting for creating physical infrastructure.
- Groundwater management or management of any common pool resource needs community participation at scale, for which the role of NGOs is imperative for community mobilisation, capacity building, water budgeting, data collection and usage. This can be done in partnerships with NGOs – CGWB – academic institutions, which can be formalised through policy.
- Policies and program guidelines should recognise the role of NGOs that institutionalises the GO-NGO partnerships in a meaningful way and also for the long term. It should not instrumentalise the role of NGOs and equal partnerships should be built based on trust.
- Groundwater management is not a one-time effort and needs to be done year on year based on rainfall and other factors. There is a need for policy to identify the institutions and service providers (Jal sevaks, sevikas, Jaldoots, Bhujal Jankars, Jal yodhhas etc) that are part/ linked to a permanent formal structure like PRIs,

right incentives and skills should be identified for the service providers along with appropriate mechanisms for accountability. There needs to be a formal registry of service providers, which can enable multiple ministries and programs to identify the same service providers on a continuous basis and also help in building the capacities of the same people as well as recognise their efforts through certification. Policy needs to have a serious look at how managing commons can be integrated as a service as a part of the overall goal of JJM.

- It is well accepted that agriculture is the biggest consumer of groundwater and hence the biggest externality to drinking water security. Hence policies and program guidelines should enshrine an integrated approach to management that includes supply augmentation, demand management, rainwater harvesting, grey/waste-water treatment in a scientific manner.
- There is a need to ease convergence between Government departments related to drinking water, water resource, agriculture, energy, forests, rural development and Panchayati Raj, urban development for effective planning and execution of groundwater management at scale. A single plan at the GP/ village level could unify the planning, allocations and monitoring process across all departments, where data and technology platforms can act as enablers.



EVENT BY INTERNATIONAL ORGANISATIONS (SIDE EVENTS)

SE-1: WATER SECURITY OF INDIA (EVENT BY ICID AND INCID)

(01-02 NOV, 2022)

Session 1 (A)
Chair: Prof Asit Biswas, Distinguished Visiting Professor, University of Glasgow, UK
Co-Chair: Sh. A B Pandya, Secretary General, ICID

Session 1 (B)
Chair: Prof Asit Biswas, Distinguished Visiting Professor, University of Glasgow, UK
Co- Chair: Sh. A B Pandya, Secretary General, ICID

Session 2 (A)
Chair: Sh. M K Srinivas, Chairman, GFCC
Co-Chair: Sh. A K Kharya, Chief Engineer, CWC

Session 2 (B)
Chair: Sh. J C Iyer, Member (D&R), CWC
Co-Chair: Sh. M K Srinivas, Chairman, GFCC

Session 3 (A)
Chair: Sh. S M Husain, Former Chairman, CWC
Co-Chair: Sh. S K Haldar, Former Chairman, CWC

Session 3 (B)
Chair: Sh. K Vohra, Member (WP&P), CWC

Recommendations (Atal Bhujal Yojana):

- New ERM proposals shall necessary have modernization components. All new projects under the techno-economical stage should have specific focus on water use efficiency.
- Participatory Irrigation Management Act and WUAs can be real agents of change in rejuvenation of our rivers. To overcome reluctance for formation of WUAs, the Capacity Development programme for WUAs and farmers, on a large scale, is the need of the hour.
- Construct new ponds and rejuvenate existing ponds/ lakes in every district within each meteorological sub-division. At least five to 10 ponds of significant storage capacity be constructed in each district.
- Urban Management plan of the city should go hand in hand with the Water improvement plan.
- A detailed understanding of the system (surface water-ground water interactions, wetland restoration, irrigation efficient techniques, wetland-river relationships) critical in deciding on the actions needed for rejuvenation.
- The assessment of WUE of the irrigation projects in the country is a massive work for which present institutional capacity is inadequate. There is a strong need of developing a cadre of independent Water Auditors, having appropriate skillset who can be engaged by the Project Authorities for undertaking data collection, analysis and studies and to recommend the appropriate measures for increasing the efficiency which may be basis for ERM projects. The cadre of Water Auditors may also be developed, separately, for undertaking efficiency studies of industries and municipal corporations.
- Water-related disasters should be a national planning priority given that their frequency and magnitude is increasing.
- Water security risks to be managed at different spatial scales: from within the household to community, town, city, basin and region.
- Nature-based solutions, such as wetland restoration, mangrove conservation, and preserving flood plains can increase water availability and quality, and reduce the risks from water-related disasters. They can also play a dual role in tackling climate change, supporting both mitigation and adaptation outcomes.
- Water resources Management and the Flood/Drought Management must go hand in hand, with Integrated Approach.
- Proper plan to be evolved for building the Learning Curve for the WRD personnel to counter the inherent lack of capacity.

- Set up a national level coordination mechanism where stakeholders can participate in the water governance process.
- WALMI should be supported with adequate financial resources. Each WALMI should be organically connected with India NPIM/CADWM - CWC/NWA and should also have linkages with International PIM.
- Need to develop a linkage mechanism between the various institutes involved in capacity building and training in water sector. This will promote synergy of efforts with sharing of knowledge and expertise, while avoiding duplicity of efforts. We also need a well knitted programme for creating a pool of Trainers in the Water sector, which may include Certification courses, Faculty Development Programs etc.

SE-2: INNOVATIVE SOLUTIONS FOR SUSTAINABLE AGRICULTURAL WATER MANAGEMENT (EVENT BY IWMI)

(02 NOVEMBER, 2022)

Chair: Dr. Mark Smith (DG, IWMI) and Shri SN Bhaskar (ADG, ICAR)

Recommendations:

- **Sustainable groundwater irrigation:** Speakers emphasized the importance of groundwater for irrigation in India. However, unfettered abstraction is causing widespread depletion and there is a need to find sustainable solutions.
- 75 % of MGNREGA funds are spent on natural resource management works, can be used for sustainable groundwater management by enhancing storage.
- Solar Irrigation, increasingly being expanded across India, can pave a way for cleaner (replacing diesel fuel), cheaper and sustainable groundwater abstraction.
- **Development of irrigation command areas and improving irrigation efficiency:** Speakers discussed and focused on improving irrigation efficiency in the canal command areas.
- Irrigation efficiency in command areas is relatively low, and must be improved for efficient use of created infrastructure to increase CCA. At the same irrigation canals in many areas also add significantly to groundwater recharge, which is conjunctively used in the command area, and should be considered in assessments. Speakers mentioned and emphasized the importance of several initiatives such as PKMKSY-AIBP, PMKSY-CAD, PMKSY-PDMC, NWM "Sahi Fasal" and state initiatives (e.g., 'Mera Pani Meri Virasat', 'Pani Bachao Paise Kamao') for achieving this goal. National typology framework presented to identify and select the best water management interventions for improving irrigation coverage and efficiency.
- Speakers also emphasized the need for integrating water risk management in all plans. Floods and drought risks will stretch the capacity of developed infrastructure and resources. At the same time, irrigation and water management interventions in agriculture are key to climate adaptation. Thus, to develop resilience and effective adaptation, risk monitoring and mitigation should be inbuilt into new projects and programs.

SE-4: HIGH LEVEL POLICY DIALOGUE ON ACCELERATING SDG 6 THROUGH MULTI-STAKEHOLDER PARTNERSHIPS (EVENT BY INDIA WATER FOUNDATION)

(02.11.2022)

Chair: Shri Gajendra Singh Shekhawat, Hon'ble Union Minister, MoJS

Recommendations:

- Plan, execution, and success need the participation of all key stakeholders.
- River basin planning works best when an appropriate institutional framework is in place.
- Because of the extended healing period following stress in lakes, prevention and preparation is far more beneficial than restoration.
- Effective water management must address the entire hydrological cycle: surface and subsurface waters cannot be managed independently of the ecosystems on which they rely.
- Good water management necessitates maintaining a balance between groundwater pumping and aquifer recharge.
- The potential benefits of collaborative water resource management can act as accelerators for larger regional collaboration, economic integration and development, and even conflict avoidance.
- Economic analysis can help make the case for international river cooperation by identifying and measuring the potential incremental benefits of cooperation, determining the distribution of benefits among riparian's, and assessing the feasibility and fairness of alternative management and investment scenarios.
- The participation of government officials is important for galvanizing local political support for advocacy efforts and increasing trust in research findings. Trust is earned via sharing of decision-making authority and the willingness of bureaucratic administrations to negotiate.
- Way to address resource management and resource allocation needs to move from sectoral silo approach to systems approach thereby taking integrating all the affected sectors and stakeholders and also being cognizant of cross sectoral synergies and trade-offs.
- There should be exchange of inter-regional data and knowledge for proper monitoring and tracking of global targets.
- India's requirement of funds for various needs including the infrastructure development and capacity building are huge, which cannot be met by external funds. However, various international funding agencies not only brings concessional funds but also knowledge assistance and successful models based on their various global experiences which can be tailored to the Indian conditions.

SE-6: ON-FARM WATER MANAGEMENT FOR FUTURE WATER SECURITY (EVENT BY IWRS) *(03.11.2022)*

Chair: Shri Kushvinder Vohra, President, IWRS, Member (WP&P), CWC, New Delhi
Co-Chair: Shri Ashok Kumar Kharya, Chief Engineer (EMO), CWC, New Delhi

Recommendations:

- With on-farm water management, productivity can increase, the quality of soil increases, environmental damage is reduced, and water conservation can be achieved.
- On-farm development is user-based (farmers), and Water resources management is facility based like the canal, dams, etc.
- On-farm development is how to manage water below the outlet. It depends on the active participation of local farmers and Water Users Associations and to be supported by the Government Officials.
- In the canal command area, awareness among farmers for regular maintenance of the watercourse is required.
- There is a strong need for capacity building programme for Water Users Associations, farmers and the Government functionaries in respect of participatory irrigation management.
- Farmers should follow the weather advisory given by Gramin Krishi Mousam Seva (GKMS) for efficient irrigation water management.

SE-7: SPECIAL SESSION FOR YOUNG PROFESSIONALS *(03.11.2022)*

Chair: Dr. Sudhir Kumar, Director, NIH, Roorkee
Co-Chair: Dr. R.P. Pandey, Scientist G, NIH, Roorkee

Recommendations:

Water Resources & Hydrologic Extremes

- There is a pressing need to strengthen the flood forecasting network in the country for enhancing the effectiveness of the flood management activities.
- Global Precipitation Estimates can be used for supplementing the ground based observation, however, prior to their application it is essential that they are evaluated using robust statistical methods so that the best suited alternative can be put to use for achieving the regional water security through informed decision making.
- Web-based Integrated hydrological models need to be developed for modelling of complex hydrological processes. Such techniques can provide better framework to enable quick data preparation and dissemination of the model outputs.
- The point data sets need to be preferred over the gridded meteorological data sets for assessment of the hydrologic extremes.

Water pollution and remediation

- Landfill leachate management has become essential for sustainable groundwater resource management and ensuring clean water and sanitation for achieving sustainable development goals (SDG) 6.
- Vermifiltration as an efficient decentralized wastewater treatment could contribute to achieving three SDGs, i.e., to increase water availability (SDG 6), enhance human health worldwide (SDG 3), and reduce the environmental impact of wastewater (SDG 11).
- Thermal hydrolysis is an efficient technology to recover energy-rich biogas from municipal sludge and convert it into Class A biosolid, i.e., a pathogen-free fertilizer rich in NPK and micronutrients.
- Nature-based wastewater treatment through constructed wetlands need to be considered for improving water quality and reducing gaseous greenhouse pollutants.

SE-9: INDIA-EU WATER PARTNERSHIP *(4.11.2022)*

Chair: Shri Ashok Kumar Kharya, Chief Engineer (EMO), CWC, New Delhi
Co-Chair: Kamilla Kristensen Rai, Counsellor (Sustainable Urbanisation, Water, Air Pollution), Delegation of the European Union to India

Recommendations:

- IEWP Action will support the facilitated implementation of key measures in the Tapi Basin (Programme of Measures- PoM) through development of up to 15 problem statements, which will then be transferred into business cases. The related stakeholder discussions will be done through a Solution Forum. These business cases will be presented to relevant clusters of the EU small-medium enterprises, Indian water authorities and financing organisations to possibly develop mutually profitable business collaborations between EU and India.
- Horizon 2020 water projects will develop and demonstrate energy efficient and cost-effective technologies relevant for the Indian water sector.
- To boost-up technological and socially oriented innovations in the water sector there is a strong need for setting up of dedicated incubation centre which may be named as "Jal Shakti Incubation Centre".
- IEWP Action will serve as a platform to support the dissemination of the relevant technical recommendations from the Horizon 2020 and also flag these within the planned Solution Forum. The IEWP Action aims to flag the learnings from Horizon 2020 Projects to the Indian partners and EU businesses for a possible market uptake.
- The major focus of the partnership would be for capacity building in all the four thematic areas.

ORGANISER

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