INDIAN WATER WORKS ASSOCIATION, MUMBAI CENTRE

IWWA MC YouTube - https://www.youtube.com/channel/UCyV5ztX7fI4Fv6ksP7m_Emg

DROPLET

VOLUME-1 • ISSUE-1 • APRIL-MAY 2026

www.iwwamumbai.info

CONTENTS

From Chairman Desk…

It is indeed a great pleasure in re-launching the Droplet, the NEWS bulletin of IWWA Mumbai Centre, an interface medium with all fellow members. On behalf of IWWA Mumbai Centre we express our sincere thanks to Er. Shirish Uchagaonkar and Dr. Nitin Mukadam who came forward on our appeals to shoulder these responsibilities. Besides, views from the editors, we shall be covering combinations of features like; research article, information on the Events - past & forthcoming, Announcements, NEWS / Innovations, memories and Management committee introductions. I sincerely request all the Mumbai Centre members to come forward, contribute your valuable additions and suggestions to improve the Droplet. We shall be developing utilities to make the Droplet reach to each IWWA Mumbai Centre members through email and also exploring to post it on the WhatsApp.

We, IWWA Mumbai Centre, recently successfully convened 58th IWWA Convention at CSN. More than 1000 delegates participated, around 110 commercial and 8 NGO stall showcased their products, works, etc., in the World of Exhibition organized alongside. The Convention spread over 3 days with 30 veterans offering the key note address and 60 researches presenting their technical papers in the two additional parallel sessions.

We shall be organizing a seminar at IIT Bombay on "on Urban Water - Issues & Solutions". There are many more activities in store. We shall keep you posted on it…..

From Hon. Secretary Desk…

Droplet is the bimonthly news bulletin of the Mumbai Centre and we are glad to start to publish it again.

For the past year and a half, our committee members have been fully dedicated to planning and executing the 58th IWWA Convention, hosted Mumbai Centre. The convention, held at Manthan Hall, MIT University in Chhatrapati Sambhajinagar, was a grand and highly successful mega-event. This milestone was achieved under the exceptional leadership of our Centre's Chairperson, Er. Manisha Palande (Chief Engineer, Maharashtra Jeevan Pradhikaran). It is a moment of immense pride for all Mumbai Centre members that Er. Manisha Palande has now taken charge as the President of IWWA, making history as the very first lady president of the organization.

Following the success of this mega-event, a new team of office bearers has assumed charge, with a vibrant lineup of events scheduled for the upcoming year. Furthermore, since the Annual Report is only published once a year, we will be regularly dispatching the Droplet news bulletin bimonthly to keep all members connected and informed.

In this issue, for Expert Article, we have provided *Abridged Version of Modak Memorial Lecture of 58th IWWA Convention, delivered by Dr. Prasad Modak* on " Designing Under Uncertainty : Building Water Security for Tomorrow". We shall soon include a dedicated Students' Corner in the forthcoming release of Droplets to showcase their research projects work.

I extend my warmest greetings to everyone and wish you all a season of abundant, happy rains across India.

Editorial

India has traditionally been an agricultural economy and the agrarian share stands reduced to 18.2% of India GDP owing to rise in the Industrial and Services sector. However, the agriculture remains a vital economic pillar providing primary livelihood support to about 42% of country's population. As such, water becomes a fundamental asset for India's economy supporting about 50% of country's economic value addition and employing 70% of the work force. However, India faces severe water management risks.

This year of 2026 has so far proved to be one of the hottest in the recent past, primarily, due to global warming and developing of El Nino with ocean temperatures in the Pacific already surpassing the benchmarks of previous Super events. As such, it has become one of the strongest and the most disruptive climate-events in, over a century. Some climate models suggest that this event could rival the devastating 1876-1878 Super El Nino threatening extreme weather, global heat waves and droughts. The damaging effects of greenhouse gases' emissions leave decadal effect which are literally falling on deaf ears of the populace at large, giving rise to El Nino phenomena

The experts have, time and again, been warning of potential rainfall deficit, below normal rainfall and prolonged dry spells in Central and North West India severely impacting kharif sowing, driving up food inflation and straining power grids. However, there has been no respite in the large scale burning of fossil fuels and massive deforestation.

It can be observed that the nature has already given the warning but are we really taking it seriously? Are we going to change our habits of over spending the water usage and coolly neglecting the warning call of the nature? Remember friends, ultimately we are answerable to the future generations. We as engineers, scientists and legislators have to take call from here and work on water conservation, reduce depletion of freshwater sources and develop recycling and reuse by deploying newer and sophisticated technologies to achieve water security that will be climate change resilient.

Designing Under Uncertainty: Building Water Security for Tomorrow

Dr. Prasad Modak

Abridged Version : Modak Memorial Lecture, 58Th IWWA Convention
(For Full article, Please visit https://iwwamumbai.info/modak-memorial-lecture/)

Climate change is no longer a distant risk — it is reshaping hydrological cycles, intensifying floods and droughts, and amplifying vulnerabilities in India's water systems. Uncertainty has become the new normal: rainfall patterns are erratic, demand forecasts volatile, and regulatory frameworks rapidly evolving. Designing for tomorrow therefore begins with acknowledging that climate stress and uncertainty form the baseline of all water planning.

In this context, water security must be redefined. The sector cannot depend solely on conventional freshwater withdrawals. Instead, it must view used water treatment facilities as tomorrow's production facilities. Plants that generate high-quality reclaimed water, operate water supply system with renewable energy and extract nutrients and resources from used water. Such facilities cannot be fixed endpoints but adaptive systems that help utilities navigate uncertainty and reduce dependence on vulnerable freshwater sources.

This keynote will examine how climate stress-testing of water systems must become a design imperative under uncertainty, ensuring that infrastructure remains robust across multiple futures. It will highlight water reuse and circular approaches can serve as the backbone of water security, reducing exposure to unpredictable freshwater supplies. The talk will also explore the role of digital tools, from IoT sensors to digital twins, in enabling predictive performance, and how we need to reflect climate change in framing PPP contracts. Across these experiences, a consistent lesson emerges: technical solutions alone do not deliver resilience. Designing for future requires institutions capable of learning, adjusting, and making decisions under uncertainty.

Uncertainty as the New Design Baseline

Climate change is no longer a distant risk for India's water sector; it is already reshaping how water systems perform. Hydrological cycles are becoming more volatile, floods and droughts are more frequent,

Groundwater recharge less predictable, and operational vulnerabilities more acute across urban, industrial, and agricultural systems. These changes are increasingly abrupt and nonlinear. As a result, many assumptions underpinning conventional water infrastructure design such as stable rainfall, predictable demand growth, and gradual regulatory change are no longer reliable.

Reuse didn't Function as a Crisis Response in Chennai During 2019 "Day Zero" crisis, although waste water reuse existed in limited industrial applications, it did not function as a meaningful emergency supply option or large scale water substitution.

Cape Town - Reuse as a Post-Crisis Resilience Strategy: During 2017-18 drought, the city approached "Day Zero" waste water reuse was not deployed as a frontline crises intervention.

Western Corridor (Australia) - Case of Strategic Recycled Water Supply:
Recycled water scheme in Southeast Queensland, Australia was developed in response to prolonged drought & climate variability affecting the region's water security.

Melbourne - Explicit Climate Stress - Testing as a Design Imperative: Following a Millennium drought, water supply strategies were evaluated against multiple climate futures. This led to diversified interventions such as demand management, recycled water, desalination and adaptive operating rules.

Nashville - Digital Twin Enabling Adaptive Water Operations: Metro Water Services [MWS] in Nashville, USA has real time sensor data with hydraulic models. By linking modelling outputs directly to day-to-day decision making, the digital twin supports proactive interventions rather than post event response.

PPP Models under Climate Stress: Conventional Public-Private Partnership [PPP] contracts, which lock in performance obligations, tariffs, technology choices at financial closure, are poorly equipped to absorb such deep uncertainty. Under climate stress, PPP must evolve from rigid risk-transfer instruments into adaptive contractual frameworks that explicitly recognize uncertainty, enable periodic re calibration and priorities service continuity over contractual certainty.

Institutional Capacity: Institutional & Political rigidity possess a greater threat to water security than climate uncertainty itself. Institutional capable of learning, financial institutions to focus rather from short term bankability to long term resilience. For Governments, governing under uncertainty requires accepting that policies, standards and investments will need revision because conditions changed.

Design for continuity is important than certainty

Redefining Water Security under Climate Stress

Traditional definitions of water security focus primarily on availability, i.e. securing sufficient freshwater to meet projected demand. Under climate stress, this framing is inadequate. Reliability, variability, energy dependence, financial exposure, and institutional capacity are now equally critical.

Water security must therefore be redefined as the ability of systems to deliver acceptable services across a range of plausible futures, rather than under a single forecast. This reframing shift attention from maximizing supply to minimizing exposure to hydrological, regulatory, financial, and social uncertainty.

From Wastewater Treatment to Water Production Systems

One of the most important conceptual shifts required is to reimagine wastewater treatment plants as strategic production assets rather than end-of-pipe compliance facilities. Used water is inherently more climate-resilient than surface sources because its availability is linked to human activity rather than rainfall. Facilities that generate high-quality reclaimed water, recover energy and nutrients, and integrate renewable power reduce dependence on vulnerable freshwater withdrawals.

But the prominence of reuse in this paper should not be read as advocacy for a single technical solution. Rather, reuse serves as a diagnostic lens, revealing how infrastructure performs when uncertainty is explicitly acknowledged. Its effectiveness depends less on treatment

Appeal:

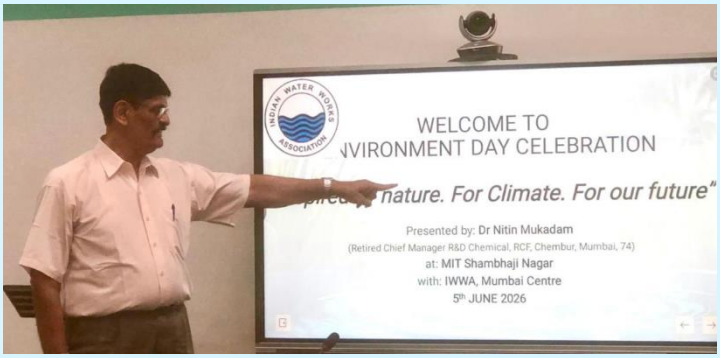
IWWA Mumbai Centre members are requested to update their Mobile Numbers and email addresses to enable us to post activities & events timely by the Centre. Kindly propagate this appeals to all the members. Pl share updated details at iwwamc@gmail.com.

NEWS ROOM

Events:

World Environment Day - 5th June 2026 was celebrated jointly with IWWA Sambhajinagar Centre and MIT University at Chatrapati Sambhajinagar.

Dr. Nitin Mukadam delivered a lecture on this occasion.

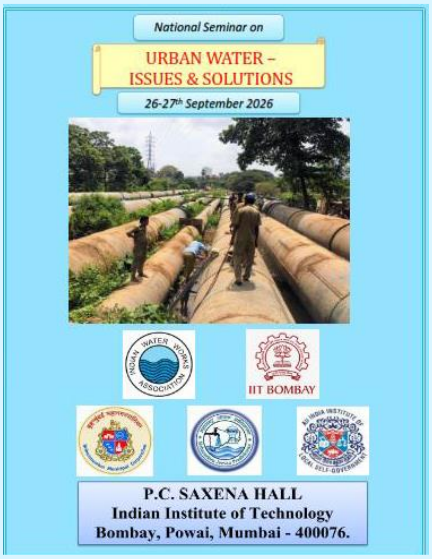


Forth Coming:

National Seminar on “URBAN WATER –ISSUES & SOLUTIONS” on 26-27TH SEPTEMBER 2026 in association with IIT Bombay, BMC, MJP and AIILSG at P. C. Saxena Hall, IIT Bombay.

Kindly Visit,

https://iwwamumbai.info/national-seminar-urban-water-issues-solutions/



WATER

USE LESS to USE MORE

World Environment Day Celebration - 5th June 2026