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भारत सरकार
MINISTRY OF HOUSING AND URBAN AFFAIRS
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WASH INSTITUTE

Proceedings

National Knowledge Workshop

Advancing Safely Managed Sanitation in Urban Areas

Swachh Bharat Mission 2.0

19th - 20th November, 2024 | Lucknow, Uttar Pradesh

ACKNOWLEDGEMENTS

We at WASH Institute extend our sincere gratitude to the Government of Uttar Pradesh for hosting the National Knowledge Workshop for SBM 2.0 on the occasion of World Toilet Day 2024.

The Workshop owes much of its success to the presence and direction of Smt. Roopa Mishra, Mission Director SBM 2.0, Joint Secretary – MoHUA; Shri. Manoj Kumar Singh, Chief Secretary – GoUP; Shri. Amrit Abhijat, Principal Secretary, Urban Development Department, GoUP; Shri. V. K. Chaurasia, Joint Advisor – CPHEEO; and their respective teams. We deeply appreciate their leadership and support in making the Workshop, held in Lucknow on the 19th and 20th of November 2024, a resounding success.

We are also thankful to our donor entities – USAID and the Bill & Melinda Gates Foundation – for their continued support in mobilizing efforts towards organizing this impactful event. Our heartfelt thanks also go to the various State representatives who enriched the Workshop with their presence, contextual perspectives, and valuable learnings.

A special mention to the WASH Institute team for their active collaboration and effort in the smooth planning and execution of the event. Additionally, we extend our appreciation to the team that supported the setting up of the exhibition, which showcased our efforts and analysis through innovative solutions and technologies. Their hard work and creativity played a key role in enhancing the overall experience of the event.

Together, all these contributions have made the National Knowledge Workshop a meaningful platform for exchange, learning, and collaboration towards achieving the goals of SBM 2.0.

CONTENTS

I. Brief about the Workshop

The National Knowledge Workshop on Advancing Safely Managed Sanitation in Urban Areas under Swachh Bharat Mission – Urban 2.0 aimed at assembling sector experts and state-level functionaries on a single platform, in a bid to share experiences and ensure cross-learning. The Workshop intended to catalyse the SBM-U 2.0 initiatives; Used Water Management, Toilet 2.0 and Manhole to Machine hole across all ULBs; appreciate the progress made by various states thus far; and share lessons with those ULBs catching up on the Mission's objectives.

The Workshop delved into themes such as:

i. Toilets for all;
ii. Manhole to Machine Hole – SafaiMitra Suraksha;
iii. Safely Managed Sanitation: Transition from ODF to ODF++;
iv. Experience sharing by States - Planning and DPR preparation;
v. Experience sharing by States - Procurement of implementation agency and progress monitoring
vi. Technology selection and treatment standards
vii. Project financing, Recycle & Reuse

Each curated session intended to equip decision-makers with knowledge of possible approaches; technologies under SBM-U 2.0; and case studies of successful UWM models to inspire momentum toward ODF++ and Water+ milestones. The initiative of establishing SafaiMitra Surakshit Shehar (Safe workplaces/cities for sanitation workers) has garnered the attention and effort of several states, leading to schemes and initiatives that aid the lives and livelihoods of sanitary workers. The experiences shared during the workshop illuminated actionable pathways for all Urban Local Bodies (ULBs) to adopt and refine, bringing them closer to the overarching goal of Advancing Safely Managed Sanitation in Urban Areas.

II. Participant Details

More than 415 key state-level functionaries from 26 states participated in the workshop. State Mission Directors from 6 states, Municipal Commissioners, Chief Engineers, Superintending Engineers, Executive Engineers, and other technical personnel formed the core of the participants. In addition, State Secretaries, Nodal Officers, representatives of state sanitation initiatives, consultants, and research associates from various organisations/institutions registered for the workshop. This profile of participants brought a broad range of perspectives to the discussions. A detailed list of participants is presented towards the end of this document.

III. Session wise Proceedings

Opening Ceremony and Inaugural Sessions

The workshop was inaugurated by eminent dignitaries, including:

- Shri. Tokhan Sahu, Hon'ble Minister of State, Housing & Urban Affairs, MoHUA.
- Shri Arvind Kumar Sharma, Hon'ble Minister of Urban Development, Government of Uttar Pradesh.
- Shri Rakesh Rathore Guru, Hon'ble Minister of State, Urban Development, Government of Uttar Pradesh.
- His Excellency Eric Garcetti, US Ambassador to India.
- Mr. Steve Olive, Mission Director, USAID.
- Mr. Alkesh Wadhwani, Director Bill and Melinda Gates Foundation.
- Senior officials from MoHUA, Government of Uttar Pradesh (GoUP), and representatives from various partner organizations, including Sulabh International, Hindustan Unilever (HUL), and sector experts.

Welcome Address, Shri. Anuj Kumar Jha, SMD, SBMU, GoUP

The Workshop commenced with a warm welcome extended by the State Mission Directorate, Uttar Pradesh. The address acknowledged the presence of esteemed dignitaries. The occasion, aligned with World Toilet Day 2024, was highlighted as an opportunity to reflect on the progress of the Swachh Bharat Mission Urban, recommit to achieving inclusive sanitation, and foster collaboration and innovation. Participants were encouraged to collaborate and contribute to strengthening sustainable, inclusive, and resilient sanitation systems that align with the nation's vision of a cleaner and healthier urban future.

Address by Hon'ble Union Minister for Housing & Urban Affairs

Through a virtual address, Hon'ble Union Minister Shri Manohar Lal Khattar emphasized the critical need for safe sanitation practices, especially for India's urban and migrant populations. Highlighting the Prime Minister's vision, he reiterated that cleanliness is a continuous commitment, not a one-time task. The Minister announced the launch of the 5-Week Clean Toilets Campaign 2024 to improve the cleanliness and maintenance of public toilets nationwide. He also set the ambitious target of achieving 100% sanitation by 2026, acknowledging that only 30% of Urban Local Bodies (ULBs) are currently certified as ODF++. The Minister acknowledged the collaborative efforts of government bodies, NGOs, and partner organizations such as USAID, the Bill & Melinda Gates Foundation (BMGF), and the WASH Institute, which have been instrumental in the success of SBM initiatives.

Remarks by Lead Partner: USAID Mission for India and Bhutan – Mr. Steve Olive, Mission Director

The address emphasized the significance of World Toilet Day as a moment to reaffirm the shared commitment to safe sanitation and healthier communities in India and globally. The speaker highlighted that water security and sanitation are key priorities for the U.S. government, with USAID working in over 40 countries to improve access to these essential services.

Reflecting on the partnership with the Ministry of Housing and Urban Affairs (MoHUA) under the Swachh Bharat Mission (SBM) since 2015, the address showcased achievements in resilient infrastructure, private sector engagement, and innovative solutions. Key examples included:

- Mobile septage treatment units in Kerala, developed with the WASH Institute, which proved invaluable during crises like landslides, demonstrating their potential for densely populated areas like Uttar Pradesh.
- Nature-based wastewater treatment systems by entrepreneurs like Smita, supported by USAID and the Toilet Board Coalition Accelerator Program, which convert sewage into reusable water.

The speaker emphasized USAID's commitment to inclusivity, highlighting efforts to support sanitation workers, ensure gender equity through women-led enterprises like pink toilets, and promote participatory approaches for equitable solutions. The address ended, urging attendees to draw inspiration from showcased innovations and continue scaling India's sanitation achievements globally.

Remarks by Lead Partner: Bill & Melinda Gates Foundation – Mr. Alkesh Wadhwani, Director

The remarks began by commending the Government of India and MoHUA for the transformative progress under the Swachh Bharat Mission (SBM) in enhancing sanitation, public health, and women's dignity. The speaker shared a visionary idea of a reinvented toilet—a compact, self-contained system designed to treat faecal sludge directly at the household level, like how home appliances like washing machines or refrigerators have transformed everyday tasks. This concept aims to eliminate the need for large-scale sewage treatment plants and extensive sewer networks, making sanitation solutions more accessible, efficient, and manageable, particularly in areas where traditional infrastructure is difficult to implement. Highlighting USAID's collaboration, the Foundation emphasized its support for key initiatives, including FSM, used water management, and the National Alliance on FSSM, which brings together 30 organizations to advance safely managed sanitation.

Looking ahead, the Foundation pledged continued support for SBM 2.0, emphasizing sanitation innovations, strategic communication, and monitoring. The address celebrated the collective effort in transforming lives and building a healthier, equitable future.

UP Sanitation Journey: Shri Amrit Abhijat, Principal Secretary of Urban Development, Government of Uttar Pradesh

Highlighted several key factors contributing to the UP state's successful sanitation journey. The integration of technology played a pivotal role, with mechanization and outsourcing mechanisms

being extensively used to ensure clean cities and achieve ODF++ status. The DCCC initiative by the Chief Minister significantly advanced the mission, supporting large-scale efforts across the state. The state's efforts also incorporated strong partnerships with organizations like Sulabh International and the Civil Society Organizations, enhancing collaboration and expertise in sanitation management. The introduction of a systematic review process by the Chief Minister during festivals also contributed significantly towards ensuring cleanliness levels and maintaining high standards for toilets. The speaker highlighted a case from Gorakhpur in UP, noting the significant achievement of no reported Japanese Encephalitis (JE) cases this year, after it was a major issue in the past, marking a significant achievement in public health and sanitation efforts. The state's achievements were recognized as a model of success, with monitoring by the Government of India further ensuring progress. While acknowledging the long road ahead, the speaker emphasized that achieving the mission's ultimate goals remains central to Uttar Pradesh's ongoing practices.

Access to Safe Sanitation - National Perspective: Ms. Roopa Mishra, Joint Secretary and National Mission Director, SBM-U, MoHUA

Acknowledged the visionary leadership of the Hon'ble Prime Minister, whose call to action in 2014 catalyzed the nation's efforts toward sanitation reform, culminating in a decade of celebrated progress. The transition from SBM Phase 1 to SBM 2.0 marks a shift from ensuring access to sanitation to sustaining gains, strengthening urban systems, adopting scientific waste management practices, and fostering a people-led movement supported by innovative technologies.

Briefed on the key initiatives to be launched during the workshop including the **Clean Toilet Challenge 2024,** a nationwide effort to assess and upgrade public and community toilets, with ULBs leading retrofitting efforts and caretakers being recognized. **Public-Private Partnerships with Hindustan Unilever Limited (HUL) and Sulabh International** will focus on community toilet models for slums and high-footfall urban areas respectively. Additionally, **Innovative Toilet Designs** will address urban challenges like space and water availability. Completion of state planning for ODF++, with sanctioned funds to support implementation; Innovative technologies, including multi-storied sewage treatment plants and on-site sanitation solutions, driven by the National Faecal Sludge and Septage Management (FSSM) Policy were highlighted. India's alignment with the Sustainable Development Goals (SDGs) was emphasized, with Uttar Pradesh encouraged to lead in piloting SBM 2.0 initiatives. Recognizing Uttar Pradesh's commendable progress, the state was urged to pilot flagship initiatives like the Clean Toilet Challenge and women-led sanitation models, inspiring other states to follow suit. The speaker expressed confidence in the collective capability to meet SBM 2.0's goals and thanked the Government of Uttar Pradesh, ULBs, and partners for their support.

Remarks by His Excellency Eric Garcetti, Ambassador of the United States of America to the Republic of India

His excellency, the U.S. Ambassador, highlighted the transformative power of safe sanitation as a fundamental human right and an enabler of health, dignity, and opportunity. He celebrated the deep and historic partnership between India and the United States, which has gone beyond collaboration to create scalable, impactful solutions in agriculture, women's empowerment, climate action, and sanitation. The Ambassador praised initiatives like Swachh Bharat, which has inspired global action and demonstrated India's leadership in addressing sanitation challenges. Emphasised how access to safe and dignified sanitation facilities, especially for

women and girls, can lead to improved health, better educational outcomes, increased workforce participation, and broader societal progress.

Drawing from personal experiences in Los Angeles, shared innovative efforts to address water scarcity and homelessness, such as a program to recycle 100% of wastewater by 2035 and mobile hygiene stations for vulnerable populations. He highlighted how rebranding and community education turned public perception from scepticism to support, showcasing the power of public engagement in driving change. Also, applauded Indian innovators like Ashwani Agarwal, whose Humble Toilet—crafted from recycled plastic—offers a sustainable, cost-effective, and eco-friendly solution to sanitation challenges. By addressing both plastic waste and water conservation, this innovation exemplifies the power of ingenuity and collaboration in solving pressing global issues.

The address concluded with a call to action, urging continued India-U.S. collaboration to ensure access to safe water and sanitation for all. Reaffirmed that sanitation is not just about infrastructure but about recognizing the shared humanity of all individuals. By building on innovation and partnership, both nations can create a future where sanitation becomes the foundation for dignity, equity, and opportunity worldwide.

Major Initiatives Launched

Several impactful initiatives were launched during the inaugural session to reinforce SBM 2.0's objectives of innovation, inclusivity, and data-driven approaches:

1. **Clean Toilets Campaign 2024 (5-Week Long Campaign from November 19 – December 25, 2024):** Aimed at transforming over 70,000 community and public toilets through enhanced cleaning, maintenance, and beautification efforts.
2. **Strategic Partnerships**
    - **MoU with Hindustan Unilever (HUL):** Focused on a Public-Private Partnership (PPP) model for managing community toilets.
    - **MoU with Sulabh International:** For developing toilets in high-footfall areas.
3. **Advisory Launches:**
    - Type Designs for STPs in Small & Medium Towns.
    - Faecal Sludge and Septage Management (FSSM) Guidelines.
    - Feasibility Analysis of Multi-Storey STPs.
4. **Public Toilet Design and Accessibility Tools:**
    - Launch of a coffee table book titled **"Not Just a Toilet"**, showcasing diverse, universally accessible, and inclusive designs for 25 public toilets across 13 cities.

Address by Shri Arvind Kumar Sharma, Hon'ble Minister of Urban Development, Government of Uttar Pradesh

The Hon'ble Minister addressed challenges specific to Uttar Pradesh and shared details of technological interventions such as GIS mapping, monitoring tools, and command-and-control centers. Reflecting on India's cultural heritage, he emphasized the importance of dignity for sanitation workers and advocated for equipping them with protective gear, PPE kits and facilitating access to welfare schemes like Pradhan Mantri Awas Yojana and Ayushman Bharat.

Address by Shri Tokhan Sahu, Hon'ble Minister of State, Ministry of Housing and Urban Affairs

The Hon'ble Minister of State emphasized the achievements of SBM 2.0, which has declared over 4,000 cities ODF+ and more than 1,500 cities ODF++. He highlighted the mission's role in significantly improving the lives of women by providing them with safe and accessible sanitation facilities. The Minister reaffirmed the Government of India's commitment to universal access to safe sanitation.

Ms. Anita Meena, Director, MoHUA, extended vote of thanks to the esteemed dignitaries, participants speakers, key government officials.

DAY 1

Session 1: Toilets for All

Moderated by Shri Akshay Rout, Fmr. DG, SBM-G

Session 1.1: Clean Toilet Campaign – 2024

Speaker: Shri Akshay Rout, Fmr. DG, SBM-G

This session focused on the toilet revolution in India and the achievements of the past decade, highlighting the success of the Clean Toilet Campaign 2023. He detailed on the campaign idea behind the Clean Toilet Campaign 2024 and the primary objective of the campaign-

- ✓ Five-week intensive cleanliness, maintenance & beautification drive across all toilets from 19th Nov -25th Dec (Good Governance Day)
- ✓ ALL CTs, PTs and urinals, of SBM or not, must come to distinctively better condition by end of campaign.
- ✓ Transformation of all Community and Public Toilets (about 70,000+)

Components of Clean Toilet Campaign 2024

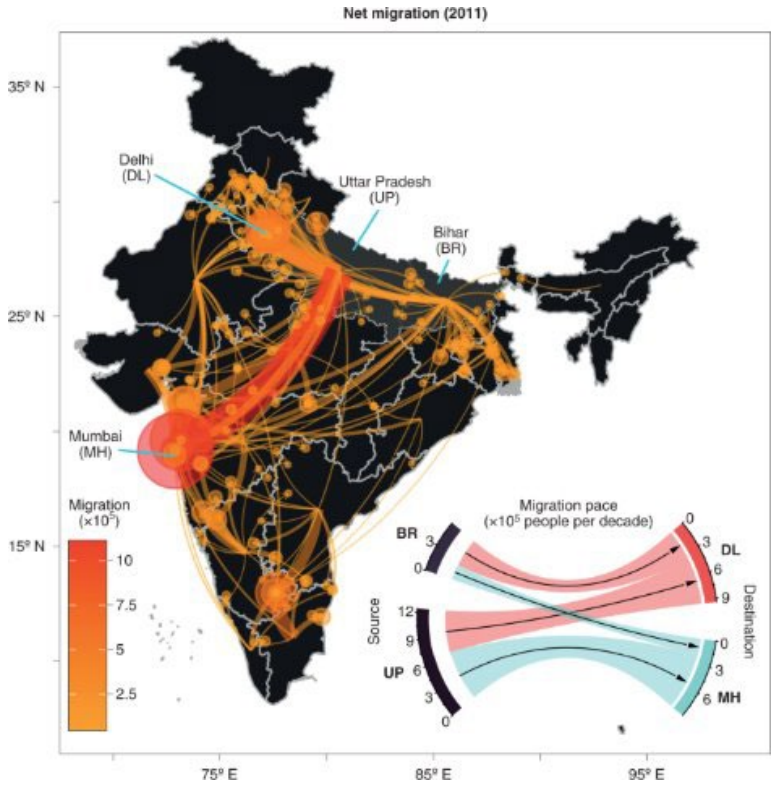
1	Transparent Evaluation *Are your public & community toilets usable?*	4	Accountability for Toilet *Ownership of all toilet operations at all levels and in demonstrative manner*
2	Corrective Action *Swift implementation of necessary repairs and improvements for CTs and PTs*	5	Public Feedback *Enabling real-time citizen feedback to drive action in toilet management*
3	Operations & Maintenance *Ensuring consistent upkeep & functionality of toilets through structured management*	6	Footfall Mapping *To gauge the average footfall across toilet facilities: a check on usefulness and appeal*

Session 1.2: Urban migration and access to toilets

Speaker: Ms. Divya Varma, Co-founder, Work Fair and Free

The session began with giving key insights on the Migration Patterns and Drivers, as reflected in the map below. It further highlighted the challenges faced by migrant workers in urban areas, particularly in relation to housing, sanitation, and urban planning. It highlighted migration patterns, noting that migrants predominantly move from northern and eastern states to industrial hubs in the west and south of India, driven by factors like climate change, poverty, and economic opportunities. The session emphasized the gendered burdens women face due to limited toilet access, that vulnerable groups, including Adivasis, Dalits, and Muslims, are disproportionately affected due to social and economic hierarchies. The session underscored the need for better

urban planning to address dynamic migration patterns and the importance of empowering local bodies to cater to migrant needs.



Innovative solutions were discussed, including a case study from Ahmedabad, where mobile toilets were installed through collective action, offering a scalable model for providing sanitation in migrant settlements. It was emphasized that employers should be held accountable for providing essential amenities to migrant workers, and entrepreneurs could play a role in deploying innovative sanitation solutions, like mobile units.

The session concluded with several recommendations, including-

- Conducting surveys to enumerate migrant settlements,
- Adopting dynamic urban planning frameworks,
- Empowering local bodies to address migrant-specific needs, and
- Ensuring that sanitation policies under Swachh Bharat Mission explicitly cater to migrant communities.

It also stressed the importance of recognizing migrants as integral urban citizens and advocating for gender-sensitive, inclusive planning and policies that address the needs of women and other vulnerable groups. Political and institutional representation for migrants was also highlighted as crucial for ensuring their voices are heard in urban policy-making.

Session 1.3: Suvidha Toilets - A community driven aspirational sanitation model

Speaker: Shri Prashanth Venkatesh, Marketing Director, HUL

The global challenge of urbanization and its impact on public sanitation was discussed, with a focus on the fact that this issue is not unique to India but affects cities around the world. As urban

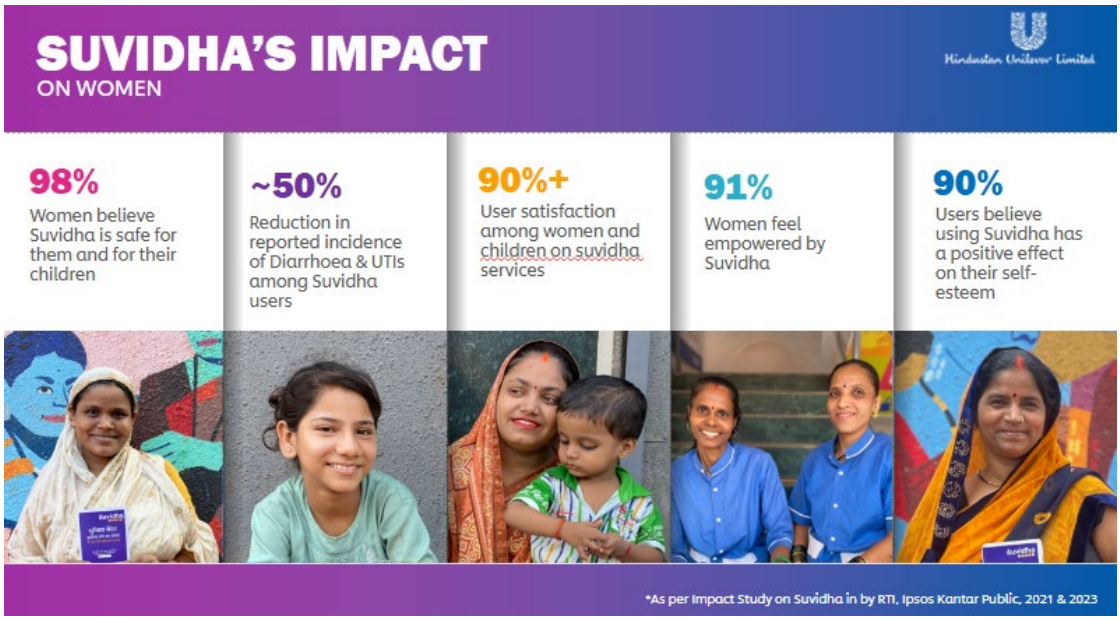
areas expand, maintaining public toilets has become a significant concern. While capital expenditure (CAPEX) is typically not the problem, inadequate maintenance often leads to a vicious cycle.

About the Suvidha Project:

The Suvidha project, launched in 2016, is a public-private partnership between Hindustan Unilever (HUL), the Government of India, and other corporate partners. The project aims to address the pressing urban sanitation challenges by providing a comprehensive model that includes not just toilets but also drinking water, showers, and laundromat services. Focusing on sustainability, the centers are powered by solar energy, feature water-saving technologies, and incorporate greywater treatment systems.

Impact:

- ✓ The Suvidha centers, which have expanded to 18 locations across Mumbai—including 4 centers in Dharavi—serve over 500,000 people monthly. These centers have been designed to meet the needs of a diverse user base, ensuring accessibility, hygiene, and safety for everyone, including children, the elderly, and people with disabilities. One of the key achievements of the project is that it has become self-sustaining after just six months of operation.
- ✓ User satisfaction is high, with 95% of users reporting that the facilities are clean and safe.
- ✓ Significant impact on public health, particularly by reducing incidents of diarrheal diseases and urinary tract infections (UTIs), which are especially prevalent among women.
- ✓ Positively affected mental well-being and self-esteem, showcasing the broader benefits of clean and reliable sanitation facilities.



Key Learnings:

- ✓ **Design for Accessibility and Safety-**The Suvidha centers are designed to be accessible and safe for all users, including children, the elderly, and people with disabilities. The facilities are well-lit and secure, even at night, addressing safety concerns and illegal activities.
- ✓ **Community Engagement-**Over 300 women have been trained as community champions to educate locals on sanitation and encourage upkeep of the facilities. This has fostered a sense of ownership and contributed to the project's success.
- ✓ **Partnerships and Collaboration-**Strong public-private partnerships with local authorities and corporate partners have been key to scaling and sustaining the project.
- ✓ **Value-for-Money Services-**The pay-per-use model, with 95% of families renewing monthly passes via digital payment methods (such as UPI, WhatsApp), demonstrates that people are willing to pay for reliable, well-maintained sanitation services.

The Suvidha project serves as an inspiring example of how public-private partnerships, community-driven models, and innovative design can address the pressing issue of urban sanitation. The session provided valuable lessons on the importance of patience, perseverance, and inclusive planning in scaling such initiatives.

Session 1.4: Public toilets at pilgrim sites and large footfall areas

Speaker: Shri Sudhakar S Kini, Chief Architect, Sulabh International

The session focused on the architectural and operational challenges of designing public toilets in high-footfall areas, particularly at pilgrim sites. Key insights into accommodating increasing user demand while integrating sustainable solutions such as water recycling and biogas generation were shared.

A toilet facility designed for a pilgrim site, Shirdi, in Maharashtra in 1992, initially catering to 25,000 users/day, was upgraded over decades to accommodate 200,000 users during peak events. The toilet facility uses biogas digesters for energy, water recycling for green landscaping, and modular toilet designs for scalable upgrades.

Sulabh Toilet at Sankul during non-peak and peak season witnessing huge footfall.

Key Learnings:

- ✓ High footfall sites require forward-thinking design that considers future expansion and operational flexibility.
- ✓ Stakeholder collaboration, including urban planners, local governments, and heritage departments, is critical for success.
- ✓ Adoption of hybrid architectural styles that blend contemporary aesthetics with local or heritage-inspired elements.
- ✓ Introduction of "Loo Cafes": Public toilet facilities integrated with small cafés managed by local organizations, creating a self-sustaining economic model.
- ✓ Reimagining old facilities for modern demands, such as upgrading 30-year-old blocks with improved infrastructure and eco-friendly features.

The session highlighted the critical role of architects and planners in addressing the unique sanitation challenges at high-footfall areas. The insights shared reinforce the need for innovative, sustainable, and inclusive solutions to meet India's growing demand for public sanitation services.

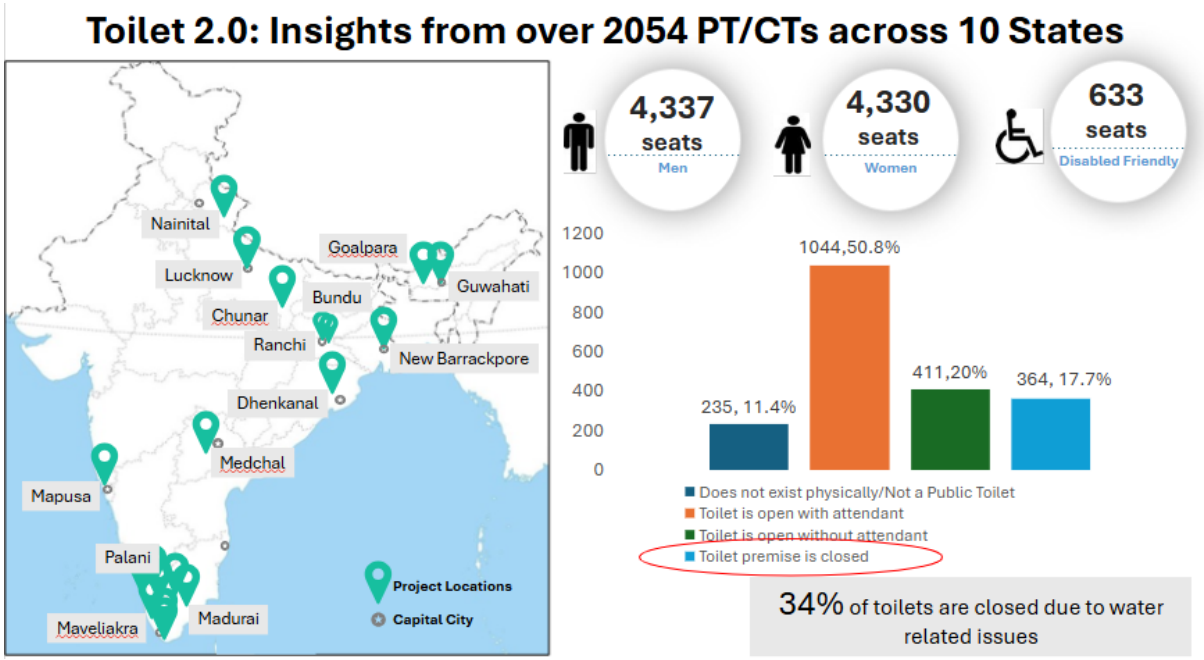
Session 1.5: Models in sustainable O&M of CT/PT

Speaker: Shri Sasanka Velidandla, Director, WASH Institute

This workshop highlights five key themes in the context of "Toilets 2.0" or aspirational toilets:

1. **Access to Toilets:** Ensuring toilets are accessible, disability-friendly, and gender-sensitive.
2. **Sustainable O&M (Operations and Maintenance):** Focused on maintaining toilets in a sustainable manner, which is the subject of the discussion today.
3. **Technology-Integrated Toilets:** Incorporating technologies such as sensors in toilets to improve maintenance and reduce costs.
4. **People's Toilets**: Design-intensive toilets, like the Suvidha Toilet model, which focus on user needs and local context.
5. **Partnerships:** Strong partnerships, such as the collaboration seen in Suvidha, are crucial for scaling successful sanitation models.

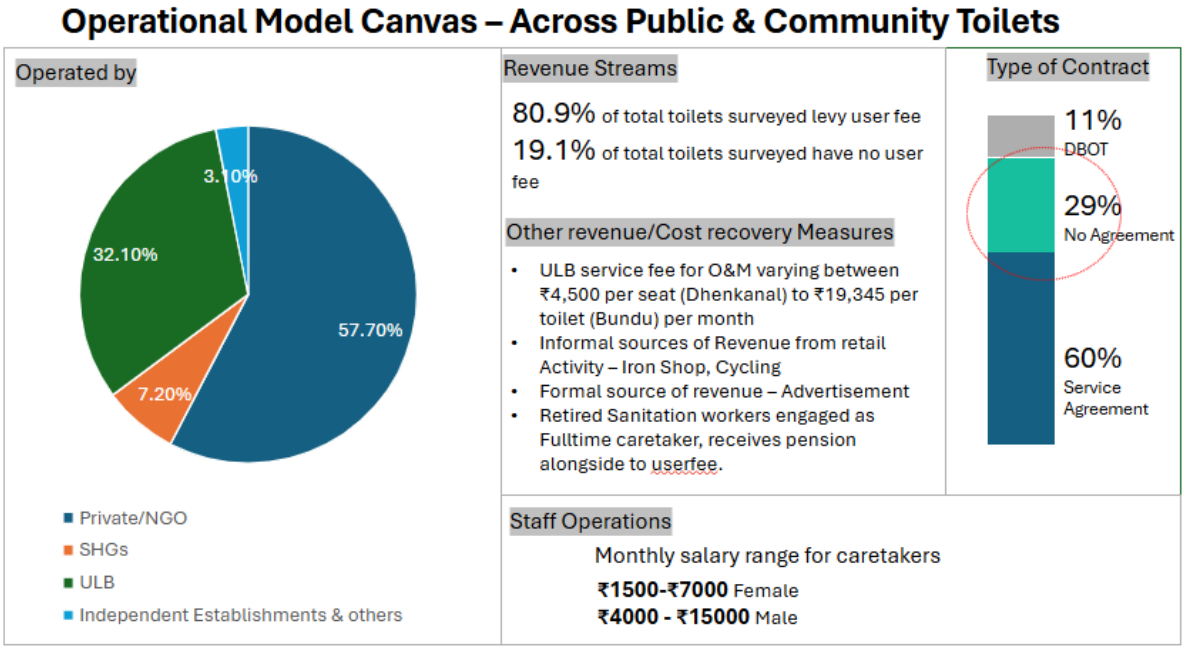
A survey was conducted across 14 towns and entire Kerala State to better assess the conditions of the existing public conveniences and learn the reasons for their respective success and limitations from various perspectives.



In a survey of around 1,200 toilets across 14 towns, key findings include:

- **34% of toilets are closed due to water-related issues**: This points to basic infrastructure challenges, such as lack of water supply or irregular water availability.
- **Private companies and NGOs run most toilets**, with Urban Local Bodies (ULBs) managing the second-largest share. A strong correlation exists between the entity managing the toilet and its cleanliness.
- **30% of privately operated toilets lack proper contracts**: Many toilets in privately run facilities are managed without formal agreements, leading to inconsistent service quality and lack of clear expectations.

- **Salary disparities for caretakers**: There is a distinct pay gap between male and female caretakers for similar work, which should be considered in future design systems.

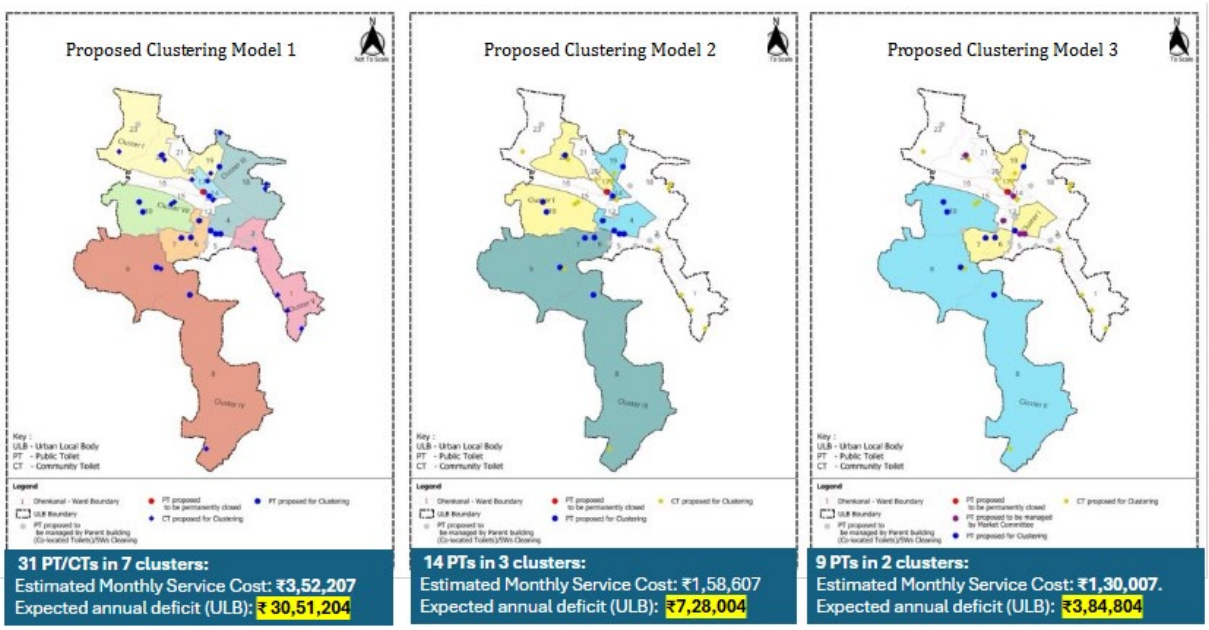


Different O&M Models

Various models of sustainable O&M observed across 14 towns were discussed, including:

- **No user fee Model (Odisha):** Toilets are provided as a free public service, funded by the municipalities. The success of this model varies depending on the municipality's ability to manage costs.
- **Managed by Individual Entrepreneur (Champion's Model):** In Chunar, UP, an individual entrepreneur manages the toilet, earning from user fees. This model is common but tends to be low-paying for the caretakers.
- **Market Committee Model:** Market committees or private institutions take ownership of toilets, pooling funds from local shops to cover the costs, including caretaker salaries, as observed in New Barrackpore.
- **ULB-Employed Caretaker Model:** In small towns like Chunar and Medchal, ULBs directly employ caretakers and provide a salary with a variable pay component based on user fees.
- **User Fee-Based Model:** This model relies entirely on user fees for toilet usage. In the towns studied, a cluster approach is adopted, where 10-20 toilets are grouped and handed over to a single operator. This allows the operator to achieve economies of scale and break even. Various cluster models (as illustrated in the figure below) have been proposed to Dhenkanal Municipality to optimize operational costs and ensure the long-term sustainability of these facilities.

Proposed Clustering of Toilets, Dhenkanal Municipality



- **Public Toilet and Space for Renting out:** Small spaces can either be rented out to generate revenue or given to small business owners like ironing, utensil shops, etc. In this case, the shop owner takes care of the toilet and doesn't pay any rent, which ensures sustainable O&M of toilets.

Different O&M Model: Public Toilet and Ironing Shop in Medchal

Aspect	Details
Year of Operation	2021
Daily Average Footfall	• 30-50 • Peak footfall goes to 70-80 people
Role of ULB	Major repairs, water supply, electricity and desludging
Role of Operator	PT operations including purchase of consumables and cleaning
Monthly Revenue from user fee	₹4000-₹5000
Monthly Revenue from Iron shop	₹20,000-₹24,000
Monthly Cost incurred for O&M of PT	₹2000-₹3000

- **Monitoring of PT/CT:** For periodic monitoring, a survey questionnaire, designed to take under 10 minutes, captures critical information like facility usage, water availability, waste management, and user satisfaction. Regular monitoring will ensure data transparency, highlight areas needing intervention, and improve service delivery over

time. To monitor public and community toilets (PT/CT) effectively, ULBs can utilise the questionnaire focusing on key aspects such as cleanliness, functionality, and service adequacy.

Session 1.6: Experience sharing on promoting toilet facilities in slums

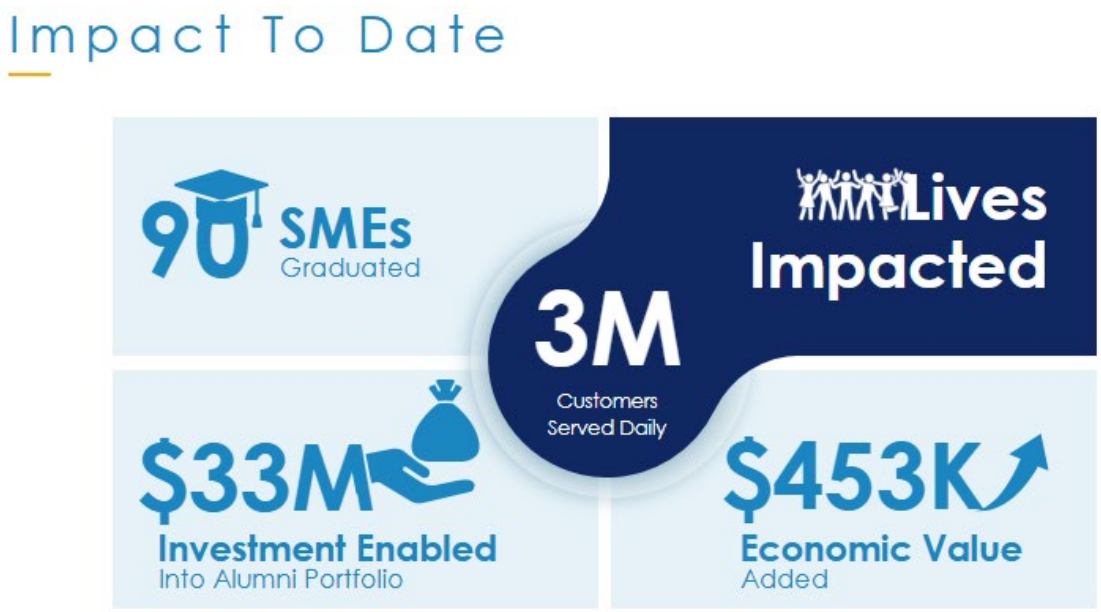
Speaker: Shri Vignesh Radhakrishnan, Manager, Toilet Board Coalition

The session focused on addressing the global sanitation crisis, where 3.5 billion people still lack safely managed sanitation. A market-based approach, referred to as the "sanitation economy," offers a solution, potentially reaching 1 billion people.

- ✓ The Toilet Board Coalition accelerates sanitation businesses globally to address this challenge, aiming to support 1,000 businesses by 2030.
- ✓ Founded in 2015, the Toilet Board Coalition is a membership-based non-profit organization, with founding members Unilever, Kimberly-Clark, and Lixil, committed to driving business solutions to the sanitation crisis. Public finance alone cannot solve the issue, but the collaboration of businesses can.

The Toilet Board Coalition's accelerator program, supported by USAID, ACOFAR, and other donors, has become a proven tool for scaling sanitation businesses. The accelerator focuses on a value chain encompassing access, collection, transportation, treatment, digital sanitation, and reuse.

- ✓ To date, 90 SMEs globally have graduated from the program, impacting 3 million customers daily and unlocking $33 million in investments.
- ✓ In India, 33 SMEs have successfully graduated, with notable examples such as IP Toilet, a semi-automatic toilet system in Maharashtra and Ahmedabad, Silvery Nanos, a toilet spray addressing women's hygiene issues, and Lutel, a network of market-based toilets offering a café reimbursement model.



Looking ahead, the Toilet Board Coalition is launching a **Reverse Pitch Series in Q1 2025** to connect corporates, NGOs, and governments with SMEs to collaboratively address sanitation challenges.

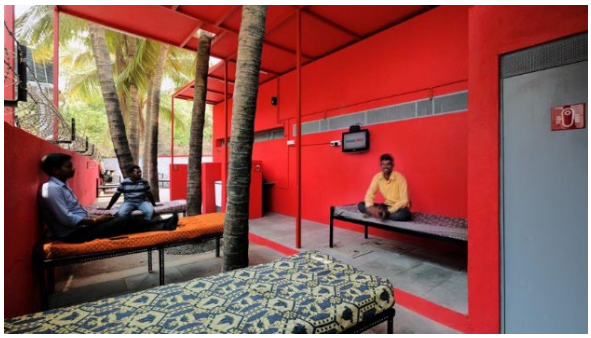
Session 1.7: Case studies of Designed Public Toilets

Speaker: Rohan Chavan Architects

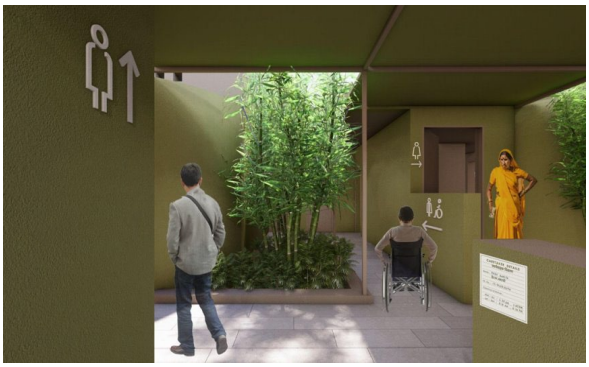
- ✓ The session focused on transforming the concept of public toilets from a purely functional necessity to a thoughtful and dignified experience, driven by the **philosophy of "respite and release."** Rather than simply providing a space for bodily relief, public toilets are being reimagined as spaces that offer dignity, comfort, and respect.
- ✓ A total of 12 prototypes designs of public and community toilets built across India, emphasizing the use of locally available materials, sustainability, and revenue-generating elements for long-term viability. to create a welcoming, aesthetically pleasing environment that serves both physical and psychological needs were showcased.
- ✓ Many designs incorporate spaces for small businesses (e.g., tea stalls, cafes, or retail) to generate income, supporting the long-term maintenance and sustainability of these facilities.

Some of these protypes include:

Bombay-Goa Highway (2018): A toilet designed for both public use and truck drivers, incorporating a café-like space and enhancing the fuel station's business.



Bundu (Community Toilet): A model featuring dual access points with a central revenue-generating component, enhancing sustainability.



Ranchi (Bamboo-Inspired Toilets): Toilets incorporating bamboo courtyards to create a natural, respectful environment.

Madurai (Pavilion Toilet and Transit Areas): Toilets designed for transit spaces, offering bathing facilities and community spaces for pilgrims and travellers.

Mavelikara (Local Architecture-Inspired Design): A toilet modelled after local architecture, with sloping roofs and laterite walls, ensuring accessibility for all.

The session concluded with the idea that when public toilets are designed with care and consideration, they can offer more than just a functional space. They can become places that respect users' dignity, provide comfort, and contribute to the wellbeing of the community. Thoughtfully designed public facilities can transform a necessity into a meaningful part of public infrastructure.

Session 2: "Manhole to Machine Hole" – SafaiMitra Suraksha

Moderated by Shri. Rohit Kakkar, Deputy Advisor – CPHEEO

Session 2.1: Financing mechanization and empowering sanitation workers towards entrepreneurship

Speaker: Shri P. K. Singh, MD, NSKFDC

National Safai Karamcharis Finance & Development Corporation(NSKFDC) incorporated in 1997 is an apex body under the Ministry of Social Justice and Empowerment, Govt. of India for Safai Karamcharis. The organisation is implements various loan and non-loan based schemes for socio economic upliftment of its target group including NAMASTE Scheme, Micro Finance Scheme Women' Loan Schemes, VISVAS, Swachhata Udyami Yojna, etc.

The loan schemes of NSKFDC include:

Pay & Use Toilet Scheme: Maximum amount of upto Rs.25.00 lacs for setting up of a unit of 10 seater toilet to individual beneficiaries/ self-help groups.

National Action for Mechanized Sanitation Eco-System (NAMASTE):

- Focused on profiling sewer and septic tank workers, waste pickers and manual scavengers across 4,800+ ULBs in India.
- Data collection via the Namaste app and portal includes workers' personal, family, and income details.
- Provision of skill training approved by the Ministry of Skill Development, including a 5-day course with stipends.
- Distribution of PPE kits and establishment of Emergency Response Sanitation Units (ESRUs) in major ULBs for safe sewer entry under exceptional circumstances.
- Ensuring access to government schemes like PMHI for health insurance, providing ₹5 lakhs per annum coverage.
- Promoting sanitation entrepreneurship through affordable credit and a 33% subsidy for procuring sanitation-related vehicles and equipment.

Swachhta Udyami Yojana (SUY):

- Support for individuals and ULBs to procure sanitation equipment and vehicles:
    - ₹5 lakhs upfront capital subsidy and affordable loan terms for individuals.
    - ULBs eligible for credit up to ₹75 lakhs at subsidized interest rates for mechanized cleaning equipment.
- Gap funding provided for setting up solid waste management and Material Recovery Facility (MRF) projects

Impact Stories:

Testimonials from beneficiaries in Ghaziabad, Guntur, Srisila, and Berhampur showcased improved livelihoods through mechanization and credit support under NAMASTE and SUY Schemes.

Desludging Vehicle procured by Sh. Sanjay Kumar under Ghaziabad Municipal

Power rodding machine procured by Shri Adduri Subbarao under Guntur MC, AP.

(i) Mamidala Jamuna
(ii) Tipparam Navya
(iii) Chiluka Aruna
(iv) Jagityala Latha
(v) Merugu Chandrakala under Siricilla MC, Telangana

7 mechanized drain cleaning equipment have been procured by Berhampur Swachhta Bahini (group of 16 core sanitation workers) under SUY.

A waste picker from Nellore District, Andhra Pradesh procured Garbage Tipper under Swachhta Udyami Yojana (SUY) and earning net income of Rs.10,000/- per month Transformation of waste pickers' lives by reducing physical strain and enabling better earnings.

Session 2.2: Innovative mechanization in management of sewer and septic tank

Speaker: Shri Siddik Maniar, Chief Marketing Officer, Maniar & Co

Challenges in Sewer and Septic tank management:

- Manual Scavenging health risks.
- Inefficiencies in Traditional Methods
- Environmental and Regulatory pressures.

Various Innovative Technologies are available at Maniar & Co. which underscore the importance of leveraging technology to transform sanitation systems, fostering safety, dignity, and sustainability. These include:

Manhole Desilting Grab bucket Machine

Jetting Machine

Suction Machine

Trombiman

Recycle Man- India's first Sewerage Water RECYCLING System in Technical Association with CSIR-CMERI (Govt. of India)

Benefits of these innovative machines include–

- ✓ These machines replace manual processes, reducing workers' exposure to hazardous conditions and enhancing their safety.
- ✓ improves operational speed and efficiency, while minimizing human error, ensuring consistent results.
- ✓ The cost savings and long-term return on investment (ROI) come from reduced labor costs and maintenance needs.
- ✓ With eco-friendly features, the machines contribute to sustainability goals, while real-time monitoring systems ensure transparency and adherence to regulations.

Session 2.3: Capacity building for sewer entry professionals

Speaker: Ms. Utkarsha Kavadi, Director AIILSG

The session highlighted the efforts of the All India Institute of Local Self Government (AIILSG), Mumbai and The Regional Centre for Urban & Environmental Studies (RCUES) of in addressing sanitation challenges through research, training, advocacy, and capacity building, with a special focus on sanitation workers.

Capacity Building Initiatives-

- Initiated in June 2019 in partnership with state and local governments.
- Focused on sensitizing ULBs to implement the *Prohibition of Employment as Manual Scavengers and their Rehabilitation Act (2013)*.
- Special Management Unit (SMU) established at AIILSG- Developed training modules, guidelines, and Standard Operating Procedures (SOPs). Provided trainings to ULBs on Safe cleaning of Sewers and Septic Tanks.
- Conducted extensive analysis of workers' and families' challenges.
- Mechanization has improved their quality of life, enabling retirement planning.
- Identified aspirations for skilling in business, management, and entrepreneurship for workers and their families.

State-wide Interventions for Sanitation Workers through Coalition:

Holistic approach for service delivery in WASH by uniting state government, local bodies and development organizations through strategic partnerships and evidence-based upstream advocacy, with support from UNICEF Maharashtra. Formation of the **Maharashtra Urban WASH-ES Coalition** to bring together stakeholders for joint action from policy to implementation. Also, trained master trainers and scaled sanitation worker training across cities.

- **Navi Mumbai Municipal Corporation- Multi-Stakeholder Approaches:** Engagement of sanitation workers and other functionaries of ULB for creating awareness and dissemination of information. Institutionalized ERSU framework, leveraged schemes for worker loans, and sensitized citizens.

- **Mira Bhayandar Municipal Corporation- Approach for Skilling of SWs and their families**: Focused on vocational training for sanitation workers and their families in sectors like healthcare and textiles by engagement of local NGO Hope4Best Foundation.
- **Brihanmumbai Municipal Corporation (BMC)- Approach of Mechanisation**: Adopted mechanization early to MS Act 2013with 90+ vehicles and a systematic cleaning program, with Control Rooms for Complaint Redressal working on 24x7 basis.

Emerging Innovations:

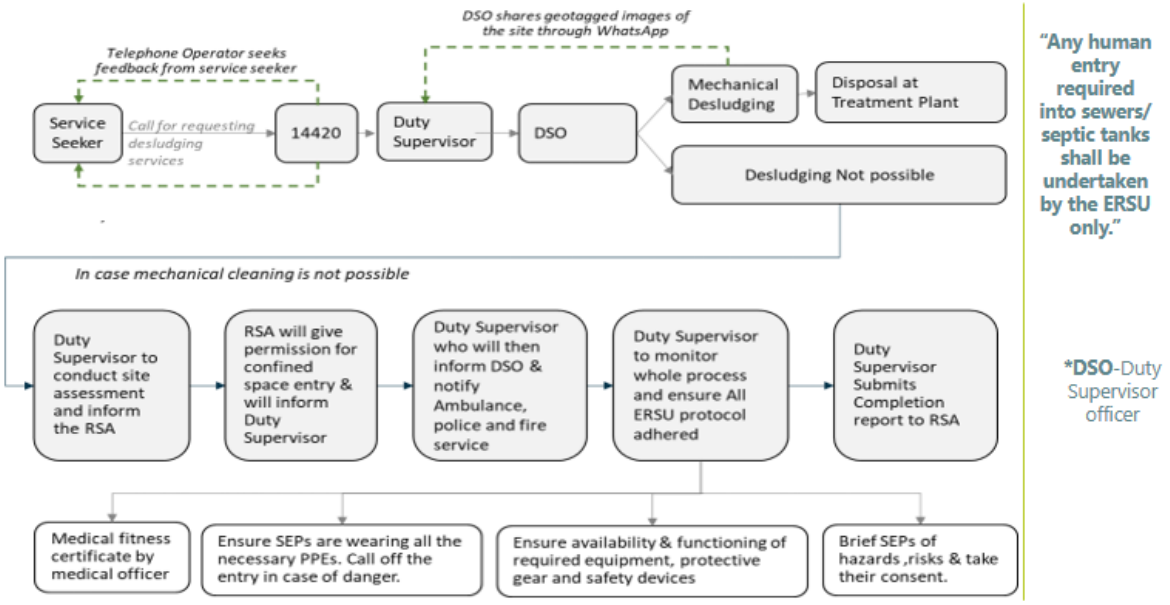
- **WASH Mitra Program Led by UNICEF Maharashtra in collaboration with Development Partners focuses on** Skilling youth and women entrepreneurs to cater to construction and upkeep of WASH infrastructurein via the WASH Mitra app, with 183+ WASH Mitras (40% female) and 70 service providers, earned 6 million profits in 12 months.

Session 2.4: Operationalizing RSA and ERSU

Speaker: Shri Deepak Singhal, EE, Rajasthan

The session focused on Responsible Sanitation Authorities (RSAs) and Emergency Response Sanitation Units (ERSUs), highlighting the framework, operations, challenges, and best practices for ensuring safe and efficient sanitation management.
RSA (Responsible Sanitation Authorities): Operates under the state government with the district collector as the chair. Other stakeholders include local government officials, sanitation experts and community representatives.
ERSU (Emergency Response Sanitation Units): Functions under RSAs, with engineers leading teams of trained sanitation professionals equipped for emergency scenarios. Operationalization of helpline number 14420 by ERSU to receive service requests from service recipients for cleaning of sewer septic tanks. A detailed process flow for the cleaning of sewer line/septic tanks through ERSU is presented in the figure.

Process Flow – Cleaning of Sewer Line/Septic Tanks through ERSU



For effective sanitation management, it is critical to understand the key regulations at national and state levels.

Regulatory Framework Governing ERSU operations

1. **National Sanitation Policies**

   These Policies set the baseline for Sanitation practices, ensuring Public health Protection.

2. **Local Government Regulations**

   Regulations from Local Authorities dictate specific operational standards and practices.

3. **Responsible Sanitation Authority**

   Per month meeting will be organized at district level

4. **Emergency Response Sanitation Unit (ERSU)**

   Per month meeting will be organized at ULB level

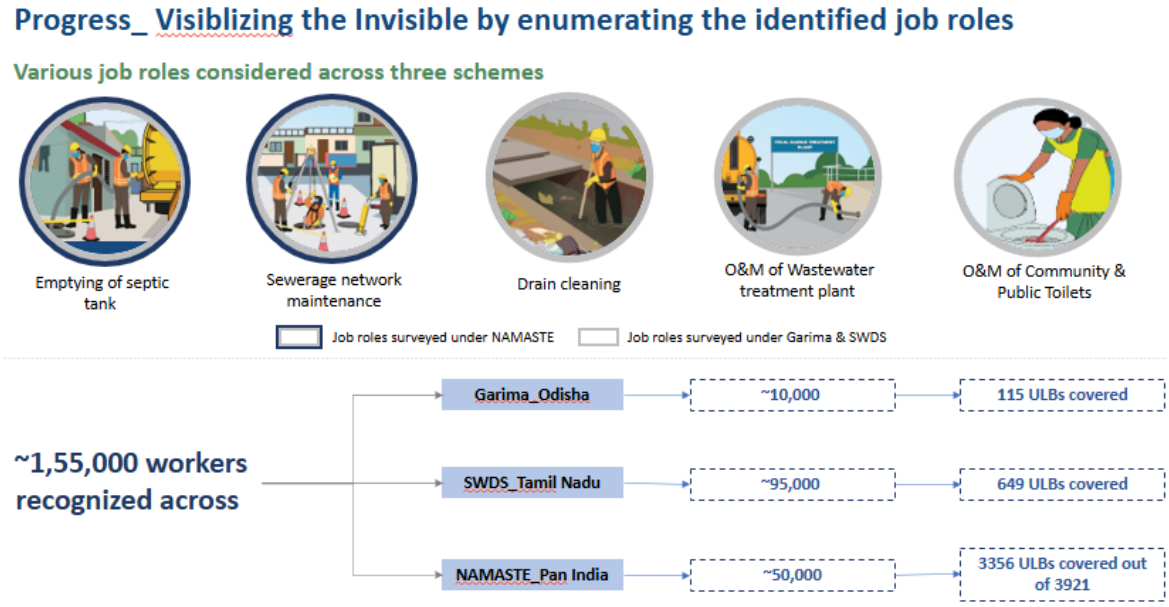
Rajasthan's Initiatives:

- ✓ Deployment of robotic cleaning machines in Rajasthan across 17 ULBs, reducing reliance on manual cleaning and minimizing hazards.
- ✓ Notifications appointing district collectors as RSAs.
- ✓ Identification of Manual Scavengers: 2340 eligible manual scavengers have been rehabilitated and linked with different schemes such as PMJAY, PMAY, IHHL, PMKVY.
- ✓ As on date, 2910 sewer and septic tank cleaning workers have been profiled under the Namaste scheme in the state. Proposals have been submitted for nearly ₹74 lakh for the purchase of safety equipment for sewer workers and tenders have been invited by the Ministry to purchase PPE kits for 1955 sewer workers identified in the State under the NAMASTE Scheme.
- ✓ Capacity-building efforts and compliance monitoring.

Session 2.5: Safety and dignity of sanitation workers

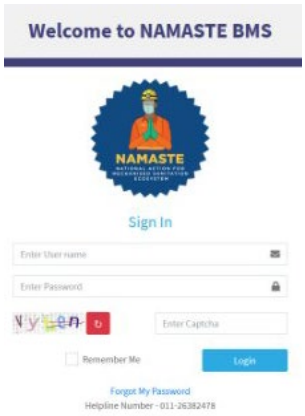
Speaker: Ms. Meghna Malhotra, Dy. Director, UMC

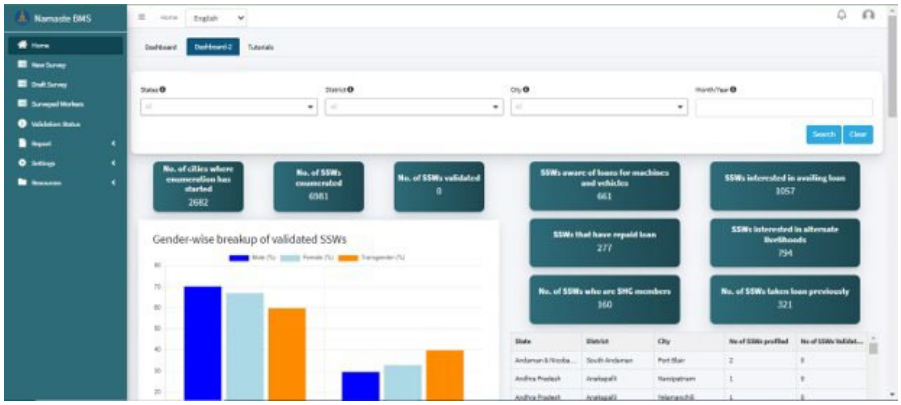
The session emphasized the critical task of profiling sanitation workers to ensure their safety and access to social benefits under schemes like NAMASTE, Garima (Odisha), and the Sanitation Workers Development Scheme (Tamil Nadu).



- Over 1,55,000 sanitation workers across India profiled, focusing on the most hazardous roles: sewer line cleaners (56%) and septic tank cleaners (44%). Around 61,000 workers recognized as Septic tank and Sewer Cleaning Workers.

- A dashboard system enables state and city-level officials to monitor workers and track their access to entitlements like Ayushman Bharat, social security schemes, and scholarships.





Challenges and Observations

- ✓ Only 15% of informal workers have been profiled, particularly critical as 70% of sanitation worker deaths occur in septic tank cleaning.
- ✓ The SSW workforce is predominantly male with 96%, and minimal female representation at 4%.
- ✓ 75% of workers belong to SC/ST communities, often trapped in sanitation work due to intergenerational cycles of poverty.
- ✓ 43% of workers are either uneducated or semi-literate, necessitating practical, pictorial-based skilling methods tailored to their needs.
- ✓ 49% SSW employed by ULBs or parastatal agencies, while 34% work under PSSOs. 43% are permanent while 26% are daily wage earners.
- ✓ Around 50% earn less than ₹10,000 per month and over 70%, do not have medical/health insurance.

Recommendations for Action:

Safety:

- ✓ Establish Emergency Response Sanitation Units (ERSUs) with state-specific SOPs, like Rajasthan and Tamil Nadu.
- ✓ Provide PPE kits and safety devices.
- ✓ SEP Training: Establishment of model training centers and develop tailored- training modules, provide hands-on training using simple, pictorial methodologies suitable for semi-literate workers.

Dignity:

- ✓ Provide lockers, changing rooms, resting lounges for sanitation workers like Garima lounges (in Odisha)

33 Garima lounges across 6 cities in Odisha

- ✓ Skill based recognition and financial safety: Link sanitation work with formal recognition and wages as "skilled" or "highly skilled" roles.
- ✓ Ensure regular health checkups, with databases to track workers' health fitness, particularly for hazardous manual tasks.

Session 2.6: A comprehensive sanitation worker database and dashboard

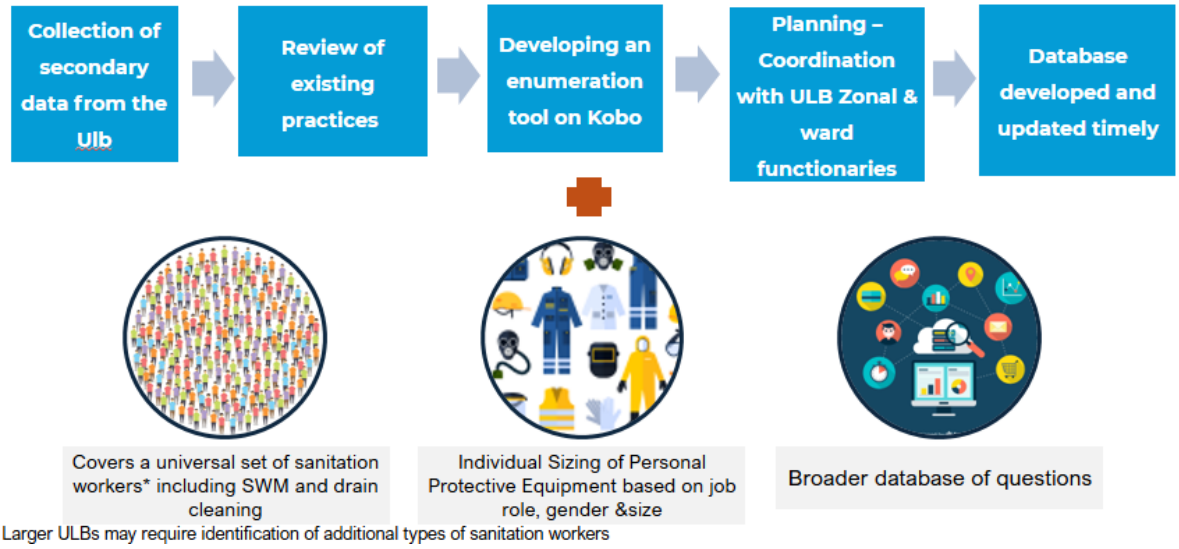
Speaker: Shri Praveen Nagaraj, Director, WASH Institute

The session explored innovative approaches to professionalizing and ensuring the safety of sanitation workers through an integrated dashboard solution, a scalable model developed by WASH Institute. Drawing on projects in 14 towns and scaling efforts in entire Kerala State across 93 towns, the discussion emphasised integrating workforce data, skill assessments, and welfare needs into a comprehensive, live database, highlighting the transformative power of data-driven decision-making for Urban Local Bodies (ULBs).

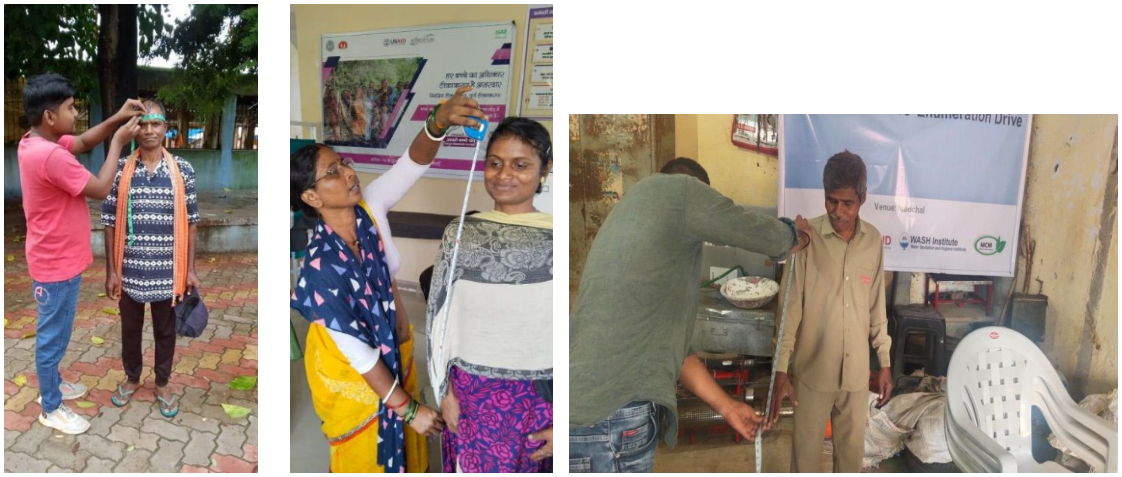
Pilot to Scale:

- Initial work in 14 towns laid the foundation for a scalable model.
- Kerala's success in enumerating sanitation workers and building a dynamic database that tracks worker details, including health records and PPE needs, serves as a state-wide example.

Process adopted for building a professional sanitation service delivery



Enumeration of Sanitation Workers: Measurements for the appropriate PPE



Challenges Addressed:

- Fragmentation of roles and responsibilities across schemes and departments.
- Inadequate PPE adoption due to poor fit and design.
- Lack of a centralized system to manage sanitation workforce data.

Vision for Workforce Professionalization:

- Integration with Welfare Schemes: Adequate mechanization, and linking sanitation workers to welfare benefits ensures holistic support.
- Customized PPE and Skill Development: Provision of properly fitting protective gear and training for diverse job roles enhances safety and efficiency.
- Emergency Response Sanitation Units (ERSUs)- Dedicated teams handle hazardous tasks, minimizing risks associated with manual cleaning.

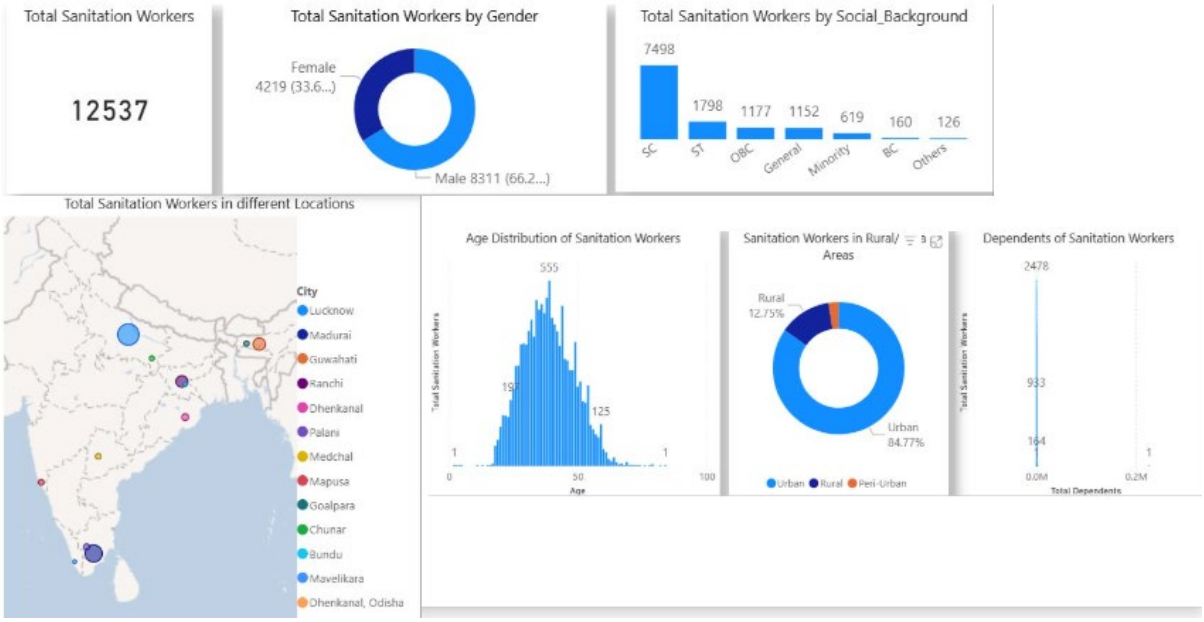
Dashboard Features:

- **Comprehensive Data Capture:** Detailed database capturing Worker demographics, roles, health profiles, welfare benefits, and PPE sizing enables informed decision making.
- **Dynamic Updates:** Real-time tracking and monthly updates to keep data relevant.
- **Actionable Insights:** Facilitates city-level decision-making on training, equipment allocation, and welfare linkages.

Key Outcomes:

- Live dashboards allow city officials to monitor and update data, fostering accountability, improved planning and resource allocation.
- Workers receive tailored PPE, targeted training, and better access to welfare schemes.

Snapshot of Live Dashboard for Sanitation Workers



The session underscored the importance of integrated tools like the sanitation workers dashboard to enhance safety, dignity, and efficiency for sanitation workers. Collaborative efforts between organizations and governments are essential for scaling such initiatives and making cities safe, inclusive, and thriving for all.

Session 2.7: UPYOG Platform Demonstration

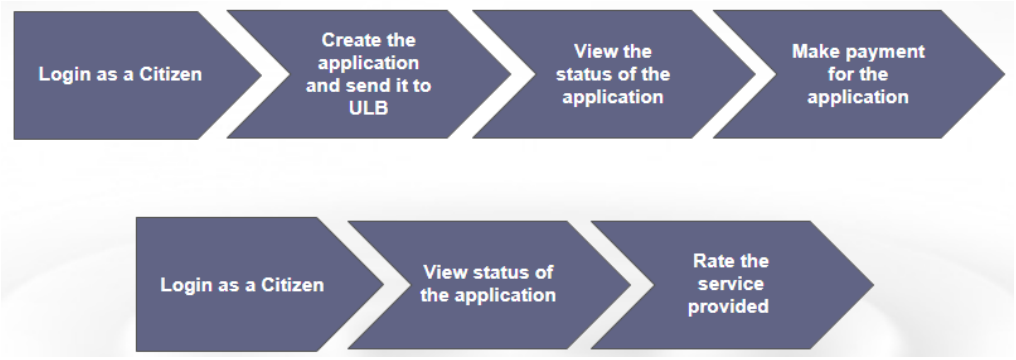
Speaker: Shri Manpreet Singh, Chief Program Officer, NUDM – NIUA

The session centred on the UPYOG Platform, developed under the National Urban Digital Mission (NUDM), which aims to digitalize urban services across India. The platform's functionality, benefits, and scope for replication were elaborated. A significant emphasis was placed on the desludging service module and its integration into the urban ecosystem.

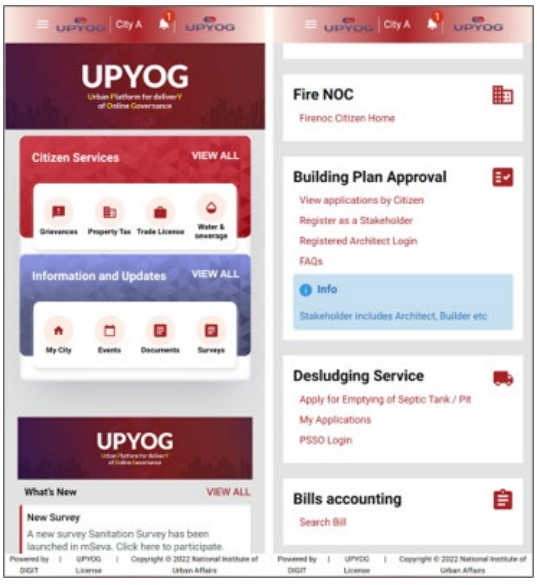
The UPYOG platform is a robust, scalable, and citizen-friendly solution to digitalize urban services, especially sanitation. Under UPYOG platform-

- 14 Urban Services have been developed, including tax payments, trade licenses, grievance redressal, and e-waste management.
- Six additional services are in the pipeline, set to expand to 20 services in the next six months.
- Successful implementation in 22 states (e.g., Kerala, Punjab, Odisha, Uttar Pradesh, Bihar).

Citizen Interface: UPYOG



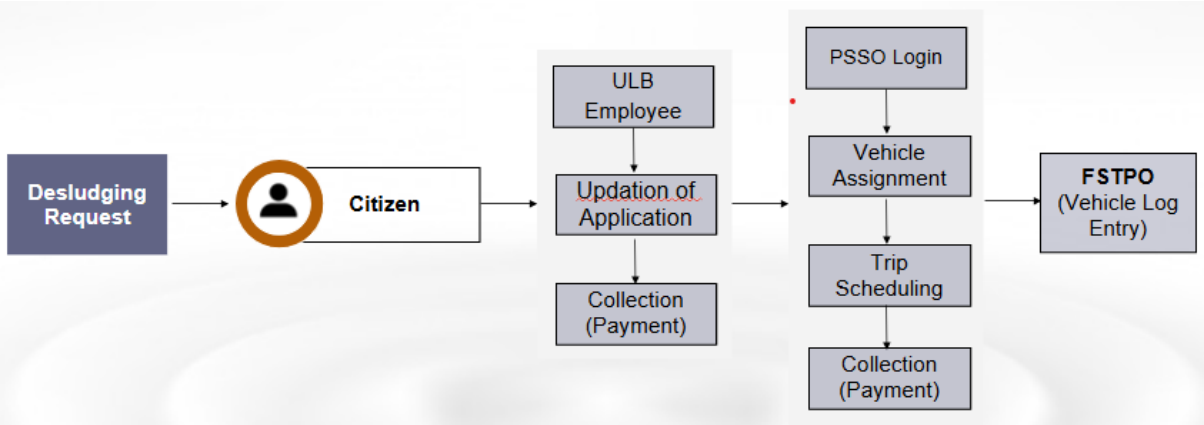
Citizen Login: UPYOG



Focus on Desludging Service under UPYOG:

- Covers the entire value chain: containment, emptying, transportation, treatment, and reuse.
- Citizen-centric approach:
  - Mobile app for requesting desludging services.
  - Integration with Aadhaar and property databases for seamless service delivery.
  - Features like trip scheduling, payment, feedback mechanisms, and real-time status updates.
- Administrative features for ULB officials:
  - Scheduling trips, assigning vehicles, and monitoring service execution.
  - Digitization of processes within FSTPs.

Desludging Service: Workflow



Upcoming Features and Value Addition to the System:

- ✓ **QR Code:** Faster processing for registering request for septic tank cleaning via QR code scanning and one-click payments.
- ✓ **Feedback Loop:** Mechanisms to ensure citizen satisfaction and operational safety.
- ✓ **New Modules:** Solid waste management and sanitation worker ID services are under development.
- ✓ Sending bulk messages/notification for the event to make aware about the new service
- ✓ Citizen can mark the request as an urgent/priority request.
- ✓ Treatment Quality Monitoring

States are encouraged to adopt and integrate this platform into their operations to improve service delivery and public satisfaction.

Session 3: Safely Managed Sanitation: Transition from ODF to ODF++

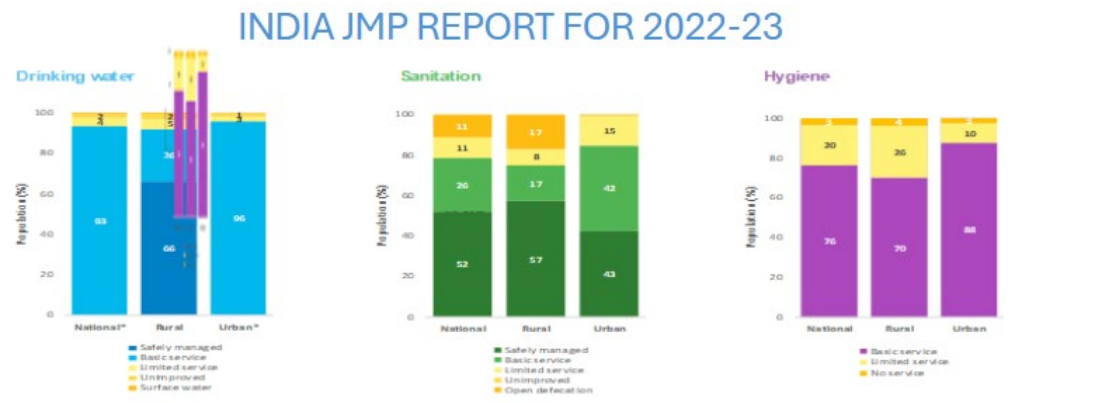
Session 3.1: India's Journey to ODF++ and Safely Managed Sanitation as per JMP protocol

Speaker: Ms. Koushiki Banerjee, WASH Officer, UNICEF

The session focused on India's journey towards achieving ODF++ (Open Defecation Free and Safely Managed Sanitation) in alignment with the Joint Monitoring Program (JMP) protocols, which are integral to reporting on SDG 6.

- JMP, a collaboration between WHO and UNICEF, tracks global progress on water, sanitation, and hygiene (WASH) and reports data back to the United Nations.
- JMP defines safely managed sanitation as the use of improved toilet facilities that are not shared and ensure safe treatment of excreta either in situ or through removal and treatment off-site.

1. **Importance of Data Collection**: Accurate data on faecal sludge management (FSM) is critical to report on safely managed sanitation. This includes monitoring toilet emptying, sludge transportation, and treatment processes. Current data gaps, particularly at the state and ULB levels, are a challenge.
2. **India's Progress**: India's JMP report shows, as of 2022, 52% of the population nationally has access to safely managed sanitation, with urban areas at 43%. However, only 14% of faecal sludge is reported as treated, indicating a need for improved data or implementation.



India	Drinking water			Sanitation			Hygiene		
	National* 2022	Rural 2022	Urban* 2022	National 2022	Rural 2022	Urban 2022	National 2022	Rural 2022	Urban 2022
Safely managed	-	66	-	52	57	43	-	-	-
Basic service	93	26	96	26	17	42	76	70	88
Limited service	4	5	3	11	8	15	20	26	10
Unimproved	2	2	1	0	0	0	-	-	-
No service	1	1	0	11	17	1	3	4	3

3. **Pilot Initiatives**: UNICEF piloted capacity-building initiatives in 4 States- Assam, Jharkhand, Madhya Pradesh, and Chhattisgarh, focusing on FSM policies, sanitation worker management, capacity building and monitoring and knowledge management.

4. **Digital Solutions**: The partnership of UNICEF with UPYOG and NUDM resulted in the development of an integrated monitoring application. This platform supports data collection at household, ULB, and FSTP levels, tailored to state-specific requirements.

Key Takeaways:

- ✓ UNICEF is custodian of reporting back on SDG Targets of 6.1 and 6.2 for sanitation and Water in India.
- ✓ Ministries and state governments must align with global JMP indicators while enhancing FSM monitoring. Any State-specific surveys should embed globally recognized sanitation indicators to bridge data gaps.

Session 3.2: Swachhatam Portal: Comprehensive Database for Safe Sanitation

Speaker: Shri Rahul Singh, NPMU, SBM-U

Swachhatam Portal is a single source of Sanitation data for SBMU, which serves as a vital tool for ULBs and the National Mission, aiding decision-making, reporting, and performance evaluations for sanitation.

The Swachh Survekshan 2024 indicators and ODF/ODF+/ODF++ and Water+indicators are a part of the Swachhatam Portal.

Indicator as per Swachh Survekshan -2024 Toolkit

Sanitation
Connection to sewerage, septic tank, twin pit, etc.
Cleanliness of CT, PT, Urinals & feedback
Availability of separate functional & clean toilets in schools for boys & girls
FSTP/STP capacity
Faecal sludge & sewage treatment
Safe disposal of liquid waste in schools
Safaimitra Suraksha - Adequate machines & equipment
Safaimitra Suraksha - Adequate workforce
Safaimitra Suraksha - Notifications & complaint resolution
Safaimitra Suraksha - 24X7 helpline & awareness campaigns
Safaimitra Suraksha - Capacity building, safety & welfare

Snapshot of ODF 2024 indicators

Parameters Assessed as per Toolkit

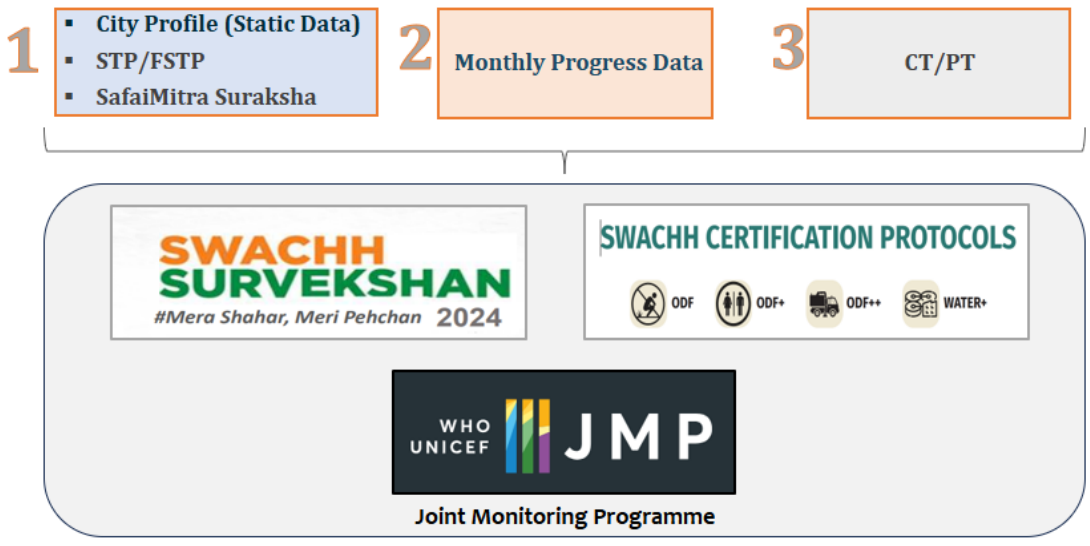
ODF+
Community & Public Toilets
- Functionality and usability of CT/PT
- O&M arrangements in place

ODF++
Faecal Sludge Management
- Safe containment, collection, transport and disposal
- Adequate manpower & equipment's for operations
- Grievance redressal

Water+
Recycle & Reuse of Used Water
- Treatment and maximum reuse of used water
- Recovery of O&M costs
- Details of RSA and ERSU

- **Relevance for ULBs:** The Swachh Surveys Ranking, particularly in areas of sanitation, used water management, and Safai Mitra-related data, relies heavily on the portal. For ODF and ODF++ Certifications, the portal serves as the primary source for data related to CT/PT functionality, faecal sludge and septage collection, treatment mechanisms, and transport systems.
- **Support for National and Global Goals:** The portal now integrates JMP-aligned indicators to track and evaluate the safe sanitation status of cities.

Sanitation & UWM Data- Swachhatam Portal



- **Simplified Documentation:** Data processes are streamlined, with third-party evaluators relying entirely on portal updates.

- **Data Modules:** The portal offers a range of modules where ULBs can update and analyze data related to sanitation infrastructure, waste management, and Safai Mitra safety equipment. These modules help ULBs track progress, identify gaps, and take informed decisions.

ULBs are urged to update data regularly to improve rankings, achieve certifications, and contribute to national and global sanitation goals.

DAY 2

USED WATER MANAGEMENT UNDER SBM 2.0: DPR PREPARATION

Welcome and Day 2 Plan by Shri Sasanka Velidandla, Director, WASH

Shri. Sasanka Velidandla, Director, Government Advisory, WASH Institute

The speaker welcomed the gathering on Day 2 of the National Knowledge Workshop on Advancing Safely Managed Sanitation in Urban Areas. His address set a collaborative tone for the day's discussions, emphasizing the critical role of knowledge sharing and innovation in Used Water Management.

Introductory remarks on Used Water Management under SBM-U 2.0 by Roopa Mishra

Ms. Roopa Mishra, JS & MD, SBM-U, MoHUA

The Joint Secretary highlighted key insights for advancing sanitation initiatives under missions like AMRUT and Swachh Bharat Mission. Emphasizing holistic implementation, the address underscored the need for context-specific technological solutions and managerial clarity, citing Punjab and Madhya Pradesh as examples where local realities dictated different approaches.

The importance of administrative and technical synergy was highlighted, with Arunachal Pradesh's success in community-driven land pooling serving as a model. Platforms like State High-Powered Committees (SHPCs) were recommended to align efforts in land identification, technical planning, and administrative facilitation.

Robust master planning was noted as a cornerstone of success, with examples like Punjab's focus on trunk lines and Odisha's phased FSM approach demonstrating scalable and sustainable strategies. Standardization in DPR specifications and capacity building were emphasized as crucial for reducing dependency on urban local bodies and ensuring project consistency.

Private sector engagement was identified as a critical driver, with Punjab's proactive contractor engagement serving as a best practice. Data-driven monitoring tools like the SWAM portal and timely reporting were stressed to ensure functional outcomes. Additionally, the transition to Just-In-Time payments under SNA and SNSP frameworks was acknowledged as a financial efficiency milestone requiring meticulous planning.

In closing, the Joint Secretary urged states to expedite project execution with a focus on sustainable outcomes, pledging ministry support through guidance and knowledge-sharing. The session reinforced the collective commitment to achieving transformative sanitation goals within the remaining timeframe.

Session 4: Experience sharing by States - Planning and DPR preparation

Moderator: Dr. V. K. Chaurasia, Advisor, CPHEEO

Session 4.1: Approach to Used Water Management and status of DPR preparation by states.

Speaker: Dr.V.K. Chaurasia, Advisor, CPHEEO

The speaker introduced the focus of the session on experience sharing by states and cities. Themes for the session included the following:

- Expediting DPR preparation.
- Streamlining procurement processes.
- Addressing technology-related confusion and standardization issues.
- Emphasizing project financing and circular economy opportunities (e.g., recycling and reuse).

The following were the Key focus areas for discussion :

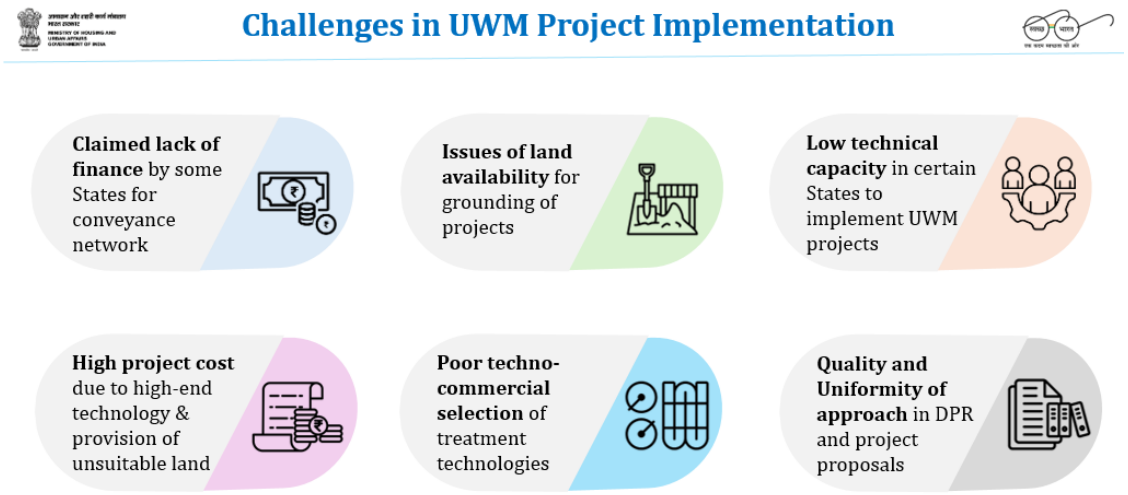
1. **DPR Preparation**:
   - Expediting preparation and addressing issues such as lack of clarity in standards.
   - Ensuring adequate land availability and selecting appropriate technologies.
2. **Procurement and Tendering**:
   - Sharing successful tender models and documents from states like Andhra Pradesh and Punjab.
   - Addressing challenges in tendering and ensuring faster procurement.
3. **Funding and Circular Economy**:
   - Exploring financing options, including the Urban Infrastructure Development Fund (UIDF), which now offers ₹20,000 crore annually at low interest rates.
   - Promoting recycling and reuse initiatives as part of circular economy efforts.

Treatment projects – Tendering & Implementation Status

Total Approved Projects	DPRs Approved	Tendered Projects
3,855 (in 28 States)	345 (8 States)	408

State Name	% DPR Approved
Andhra Pradesh	100.00%
Arunachal Pradesh	100.00%
Punjab	96.43%
Madhya Pradesh	57.30%
Rajasthan	27.40%
Chhattisgarh	8.75%
Karnataka	2.79%

State Name	% Tendering of Projects
Andhra Pradesh	100.00%
Punjab	100.00%
Puducherry	100.00%
Tripura	100.00%
Madhya Pradesh	31%
Gujarat	26%
Assam	16.28%



Used Water Treatment Standards

- Variation in treatment standards among States = lack of clarity over adoption

BOD = 30 mg/L	BOD = 10 mg/L
Tamil Nadu, Andhra Pradesh, Odisha, Chhattisgarh, Nagaland	Haryana, Kerala, Chandigarh, West Bengal

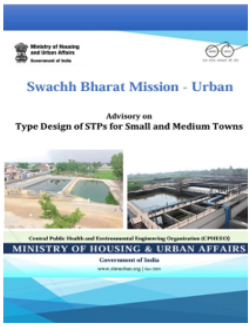
- Lack of treatment standards over reuse of treated used water
- Lack of treatment standards of bio-solids
- Hon'ble NGT directions on treatment standards

The following solutions were proposed to overcome the above-mentioned challenges.

1. Expedite DPR preparation by ensuring the availability of model tender documents and sharing best practices across states, and encouraging states to use standardized approaches for uniformity.
2. Promote sustainable projects by selecting cost-effective, less mechanized technologies for smaller towns and utilizing suitable land near towns to reduce costs.
3. Encourage cross-learning through sharing successful practices in DPR preparation, tendering, and project implementation. Learning from states like Andhra Pradesh and Punjab, which have achieved 100% tendering for projects.
4. Address financing needs through UIDF and similar funds to support construction and network strengthening.

Documentation – Advisories & Guidelines

- ✓ Advisory on Faecal Sludge and Septage Management in Small and Medium Towns
- ✓ Advisory on Type Design of STPs in Small and Medium Towns
- ✓ Advisory on Multi-Storey Sewage Treatment Plants (Feasibility Analysis)



Conclusion and Way Forward

- ✓ States are encouraged to use advisory guidelines for technology selection and cost reduction and focus on safely managed sanitation, aligning with ODF++ goals.
- ✓ Examples from successful implementations (e.g., Madhya Pradesh and Punjab) to serve as models for others.
- ✓ All states to prioritize DPR preparation, tendering, and implementation in the next phase.

Session 4.2 Experience Sharing by States: Punjab

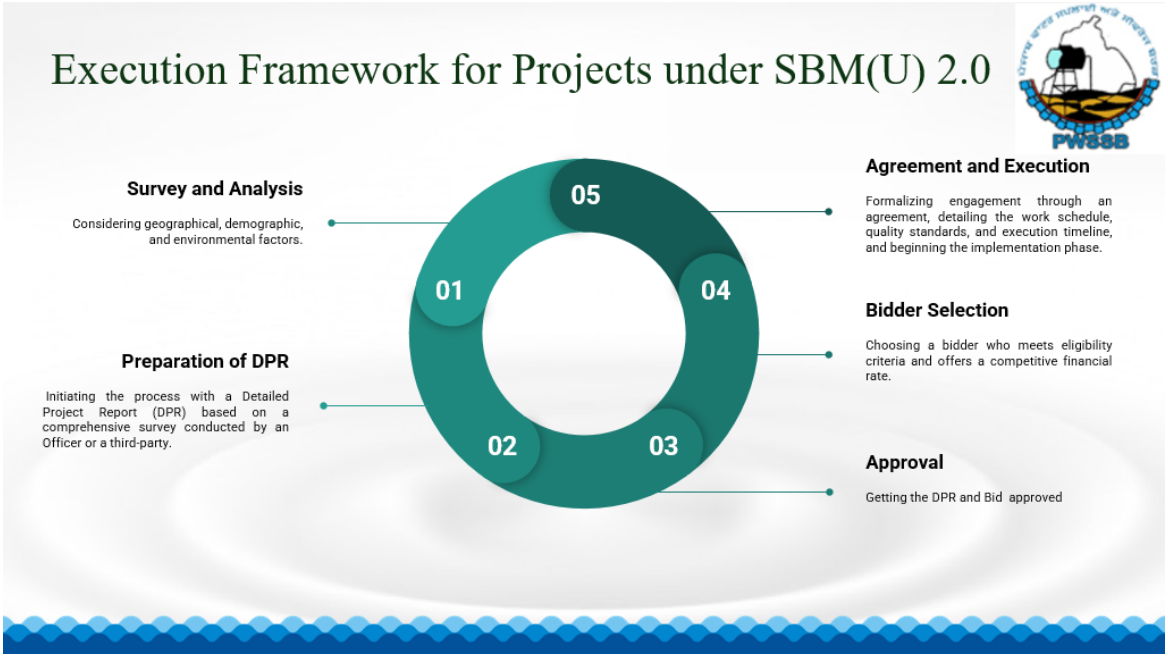
Speaker: Shri. Jitin Vasudeva, Executive Engineer, Punjab Water Supply & Sewerage Board

The speaker started by appreciating the MoHUA for the shift in terminology from **"Wastewater Management"** to **"Used Water Management"**, which aligns with reducing mental barriers like "toilet to tap," as the Ambassador had mentioned in Day 1 of the Workshop, yesterday.

An Overview of Punjab's Journey in Used Water Management-

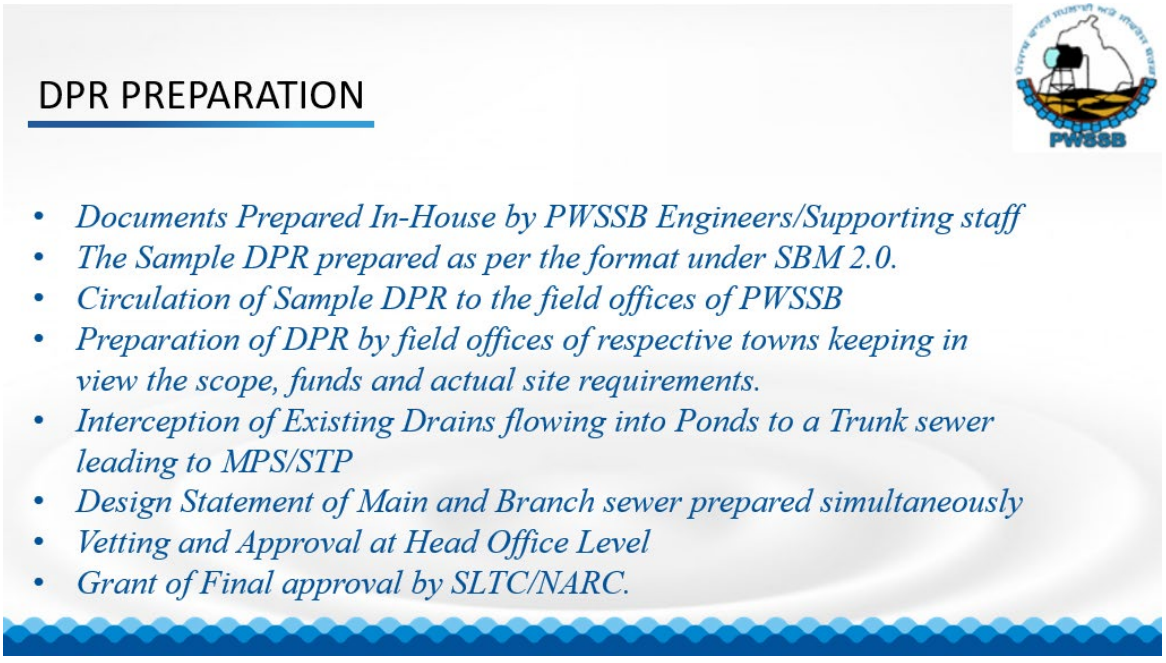
1. Punjab identified 150 ULBs for used water management.
    - 56 ULBs under SBM 2.0 prioritized due to lack of sewerage systems (SE) and STPs.
    - Proposed a sewer network of 195 km and STP capacity averaging 3–4 MLD per ULB.

2. 54 DPRs prepared, 39 tendered, and 26 already awarded.



For the execution framework, the speaker mentioned that focus will be on the **Survey and Planning stage** to reduce execution challenges and delays.

DPR Preparation Process



Innovative Approaches in Punjab

1. **Addressing non-existing sewer networks** which focused on tapping water bodies (e.g., ponds in ULBs). Also, designed comprehensive sewer networks, ensuring future scalability without relaying pipelines.

2. **Case Study - Bilga ULB (15,000 population)**: Tapped 8 ponds with a comprehensive sewer network. Installed screening chambers to manage dry and wet weather flows effectively.
3. **Turnkey Tender Approach**: Combined STP, FSTP, SE network, and reuse water projects into single contracts (EPC model). Enabled joint venture tenders to encourage broader participation.

Challenges and Solutions

1. **Challenges Identified**:
    - Land issues: Legal complications, public resistance, and sludge disposal concerns.
    - Budget limitations: Need for funds for trunk sewers after SBM implementation.
    - Perception issues: Concerns about odour affecting land value.
2. **Proposed Solutions**:
    - Collaboration with PEDAs to install solar plants on STPs for energy efficiency.
    - Continued Ministry support to fund trunk sewer networks and address constraints.

Key Achievements

1. Punjab successfully tendered and awarded 26 projects under SBM 2.0.
2. First-time initiatives:
    - Screening chambers for ponds to STPs.
    - Standardized DPR preparation, reducing delays and errors.
    - Integration of STPs, sewer networks, and water reuse in a single turnkey contract.
3. Shift towards sustainable operations with plans for solar installations on STP rooftops.

Conclusion and Recommendations

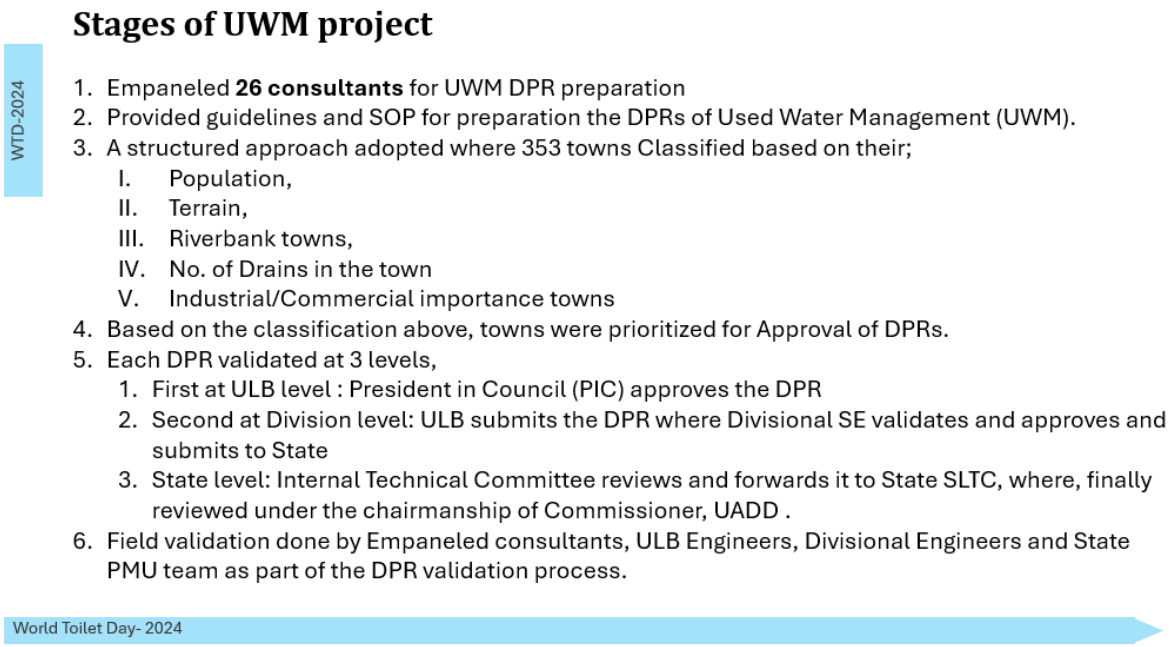
1. Focus on proper site selection, realistic timelines, and standardized processes to ensure project success.
2. Request for continued Ministry support for trunk sewer funding and O&M improvements.
3. Utilize innovative practices, such as integrated contracts and solar energy, for sustainable project execution.

Session 4.3: Experience Sharing by States: Madhya Pradesh

Speaker: Shri. R.R.Jaroliya, Superintending Engineer, Directorate Of Urban Administration & Development, Madhya Pradesh.

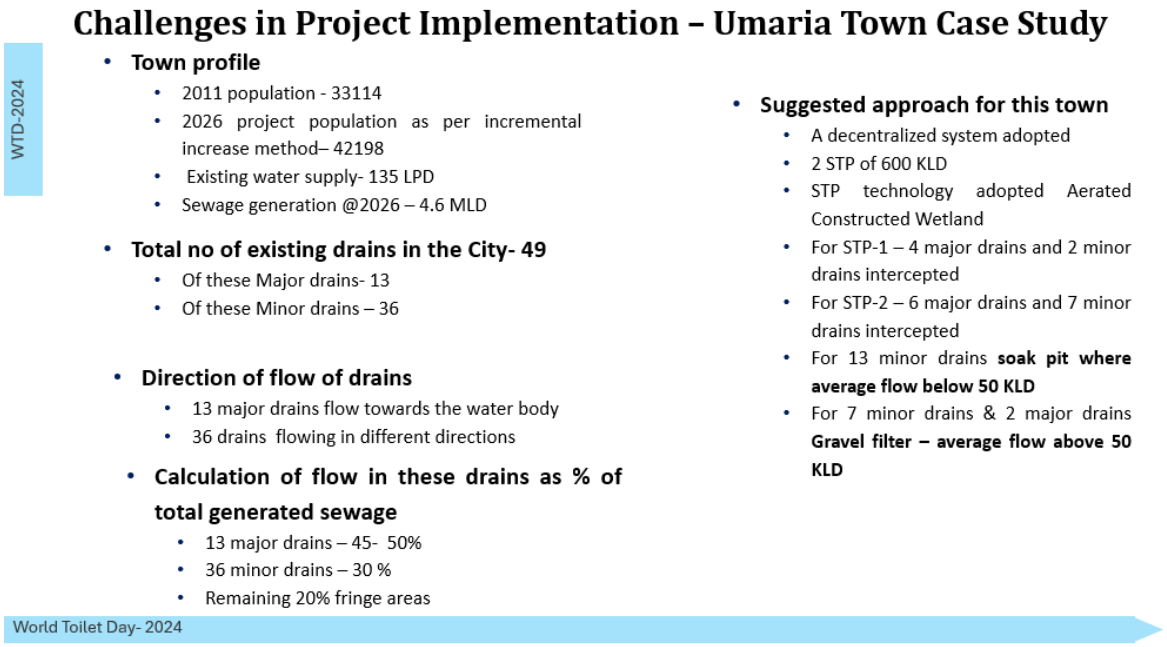
Key Project Overview

1. **Scope of the Project**:
    - Focus on used water management, including ULB sewer networks and STPs.
    - Integration of urban development and drainage management systems.
2. **Coverage**:
    - Total of **353 inter-town projects** planned and Population coverage allocated at **4,59,000**.



3. **Funding and Approvals**:
    - Financial management involves consultants and contractors.
    - Central and state funding allocations for key components such as DPR preparation and project execution.
4. **Current Progress**: **178 projects** identified, with **20% work initiated**. Surveys have begun in select locations.

Challenges and Observations



Geographical and Environmental Issues:

- Presence of major and minor drains in urban and riverbank towns.
- Geographical challenges include drains flowing in different directions.

DPR Challenges:

- Validation of data and integration with on-ground realities.
- Ensuring alignment with local resources, constraints, and state-level priorities.

DPR Preparation and Technical Framework

1. **Consultant and Expert Collaboration**:
   - Consultants from institutions like IIT Indore, NIT Bhopal, NIT Suratkal, and NEERI engaged.
   - Experts from water resource and irrigation departments consulted for technical insights.
2. **Field Visits and Validation**:
   - ULB-level field visits conducted to validate the first draft of DPRs.
   - Selection of suitable methods for Interception and diversion of drains and for the construction and management of STPs.
3. **Technology Integration**: Explored **low-cost treatment technologies** for potential use based on the consultation with over 20 technology providers across India.

4. **Adopted Technologies**: Interception and Diversion (I&D) methods and Construction of STPs aligned with innovative treatment technologies.

Next Steps and Recommendations

1. **Stakeholder Involvement**:
    - State PMU and divisional engineers to provide continued support.
    - Engagement with local bodies for resource management and implementation.
2. **Focus on Freezing the Approach**:
    - Standardize methodologies to streamline execution.
    - Address site-specific challenges for smoother progress.
3. **Finalization of DPRs**:
    - Assess draft versions with expert inputs before final approval.
    - Ensure cost-effectiveness while maintaining technical robustness.

Session 4.4: Experience Sharing by States: Arunachal Pradesh

Speaker: Shri. Hano Takka, SMD, Arunachal Pradesh

Shri. Hano Takka started by emphasizing the state's unique geographical and logistical challenges. As the easternmost state of India with a hilly and challenging terrain, Arunachal covers a geographical area of **84,000 square kilometres,** equivalent to five smaller Northeastern states combined (excluding Assam and Tripura), with the ULB populations ranging from 4,000 to 25,000.

1. **Implementation of Used Water Management project:**
    - **27 urban towns** identified for project implementation.
    - Includes **14 FSTPs (Faecal Sludge Treatment Plants)** and **13 STPs (Sewage Treatment Plants)**.
2. **DPR (Detailed Project Report) Preparation**:
    - Consultants hired due to limited local expertise in the domain.
    - Preparation process spanned **8 months**, including hydrological studies, topographical surveys and analysis of current used water discharge and collection systems.
    - Sparse population contributed to higher DPR preparation costs.

Challenges and Solutions

- ✓ Key challenges included prolonged travel times of 2-3 days between locations, which affected project timelines. In Arunachal Pradesh, the absence of government-owned land and the prevalence of dense forests made it challenging to identify feasible sites for STPs, necessitating extensive negotiations with private landowners.
- ✓ To mitigate challenges, teams were strategically divided into four zones—Northern, Eastern, Central, and Southern—allowing for better time and energy management during DPR preparation. Additionally, regular consultations with CPHEEO provided essential technical advice and support to streamline the process.

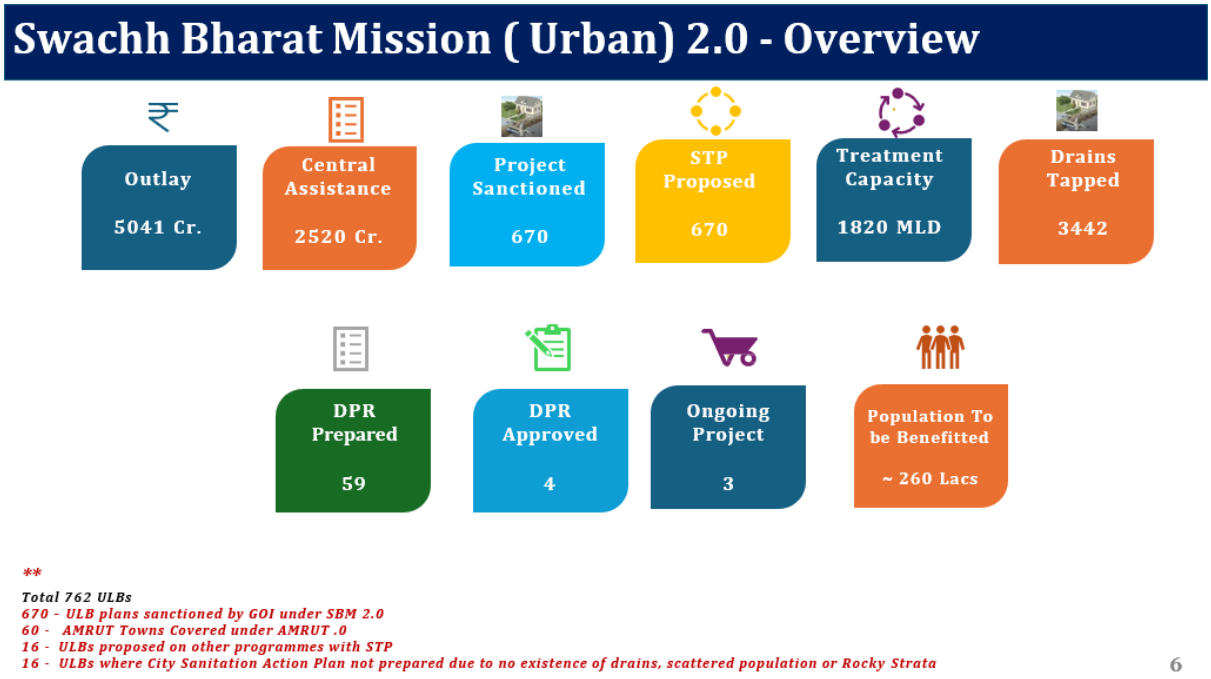
Key Takeaways and Recommendations

- ✓ The current focus is on preparation of the RFP (Request for Proposal) and engaging consultants to draft RFPs in EPC mode.
- ✓ The experience of DPR preparation and implementation in Arunachal Pradesh offers valuable learnings for other Northeastern and hilly states, providing a framework to address challenges related to terrain and land ownership, thereby expediting progress.
- ✓ To ensure smooth project implementation and vendor participation, there is an urgent need for gap funding to bridge financial shortfalls and achieve project success.

Session 4.5: Experience Sharing by States: Uttar Pradesh

Speaker: Shri. Sanjay Gautam, Chief Engineer, Uttar Pradesh Jal Nigam (Urban)

Current Status in Uttar Pradesh:



Household Coverage Summary – Sewerage

Total No of Households including Slums - 81 Lacs

Households Covered with Sewer Connections before AMRUT 2.0 : 22.90 Lacs

Sewer Coverage Before AMRUT 2.0 : 28% (For 60 AMRUT Towns)

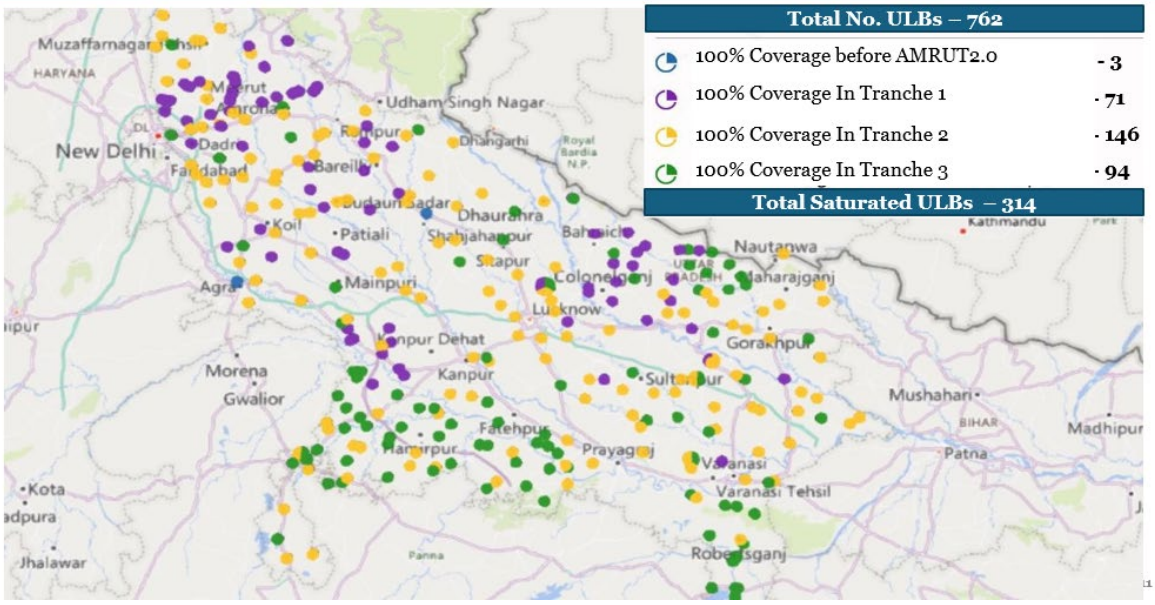
New House sewer connections Proposed Under AMRUT 2.0(Tranche 1,2&3) : 5 Lacs

Total Households covered with house sewer connections after AMRUT2.0 : 27.90 Lacs

Water Supply Coverage after AMRUT 2.0 : 35 % (For 60 AMRUT Towns)

10

100% W/S Coverage Status – Post implementation of Tranche 1, 2 & 3



Water Supply in ULBs:

- 314 ULBs to achieve 100% water supply coverage after AMRUT.
- Post-implementation, 135 LPCD water supply expected, generating significant wastewater requiring expanded sewerage systems.

Challenges Faced:

- Lack of technical staff in ULBs to manage and maintain projects.
- Limited understanding of pollution control and waste management.

- Issues with private operators indiscriminately disposing of septage in rivers, open lands, or water bodies.
- Difficulty in acquiring suitable land for DPR projects.
- Sewer pipelines often span 3-4 km from ULBs to STPs, increasing costs and complexity.

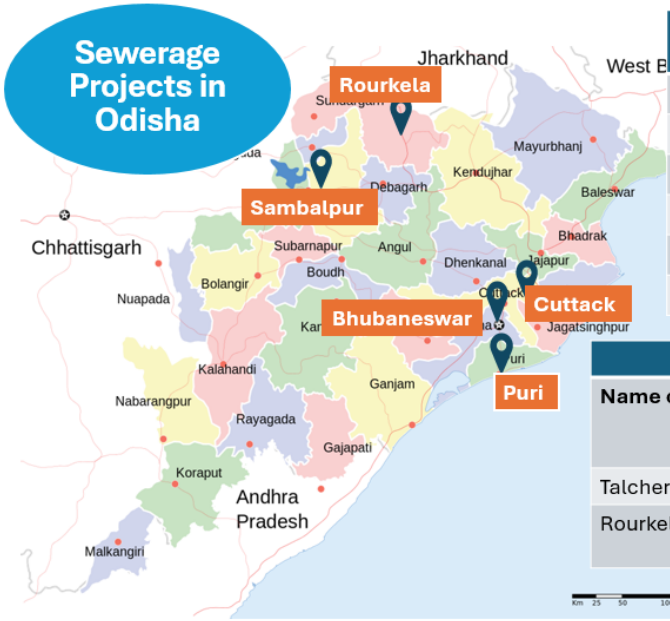
Future Focus:

- Addressing challenges in manpower, awareness, and land acquisition.

Session 4.6: Experience Sharing by States: Odisha

Speaker: Shri. Binay Kumar Dash, Additional Secretary to Government & Additional Mission Director, SBM (Urban), Housing & Urban Development Department

The speaker provided an overview of Wastewater Management in non-AMRUT cities, highlighting that out of 115 Urban Local Bodies (ULBs), 106 falls under this category. The assessed wastewater capacity is 335 MLD, with indirect drainage (INDD) lengths calculated. Standardization of desludging operations has been implemented through the empanelment of agencies at state and ULB levels, with machine sizes ranging from 500 to 5,000 litres to address challenges such as narrow roads in old towns.



Name of City	Nos. of STP	Total Capacity in MLD
Bhubaneswar	5	183.5
Cuttack	3	85
Puri	2	25
Rourkela	1	40
Sambalpur	1	40
Total	12	373.5

I&D with WWTPs			
Name of ULB	**No. of WWTP**	**Capacity of WWTP in MLD**	**Status**
Talcher	1	2	operational
Rourkela	2	8 & 1	Tender under finalization

- ✓ The mission has an allocation of ₹990 crores, including a ₹495 crore central share, with ₹120 crores received so far for 45 towns where land for FSTPs/STPs is available. DPR preparation and tendering have been completed for all 115 ULBs, paving the way for the planned construction of FSTPs.
- ✓ A total of 120 FSTPs with a 2.87 MLD capacity were built, serving urban and rural areas within 40 km of ULB boundaries. Private operators, initially penalized for improper disposal, were later regulated through registration and empanelment at fixed rates, fostering better collaboration.
- ✓ Innovative approaches to wastewater management include establishing FSTPs in non-sewered areas of AMRUT cities and medium towns to prevent open disposal of

blackwater. For greywater, interventions are implemented at four levels: household-level soak pits for on-site treatment, street-level land-based soak pit systems, community-level treatment systems for neighbourhoods, and wetland-based treatment systems at the outfall level.

Pilot Projects and Expansion Plans:

- **Pilot Success:** Implemented in 10-11 cities with plans for expansion to 45 cities. Example: Dhenkanal site transformed into a wetland and beautified from a former garbage point.
- **Survey and Analysis:** Comprehensive studies conducted in cities like Jayanagar to identify needs and plan outfall-level greywater management for remaining untreated water.

1. **Challenges Faced:**
    - **Enforcement:** Educating and sensitizing the public, penalizing non-compliance.
    - **Land Acquisition:** Identifying and acquiring feasible land for greywater projects.
    - **Integration with Existing Systems:** Streamlining solid waste and greywater systems.
2. **Community Involvement and Capacity Building:**
    - Training women self-help groups, transgender communities, and local SHGs for STP/FSTP operations.
    - Operational steps displayed on walls for easy understanding.
    - Partnerships with rural blocks to extend urban infrastructure to neighbouring areas.

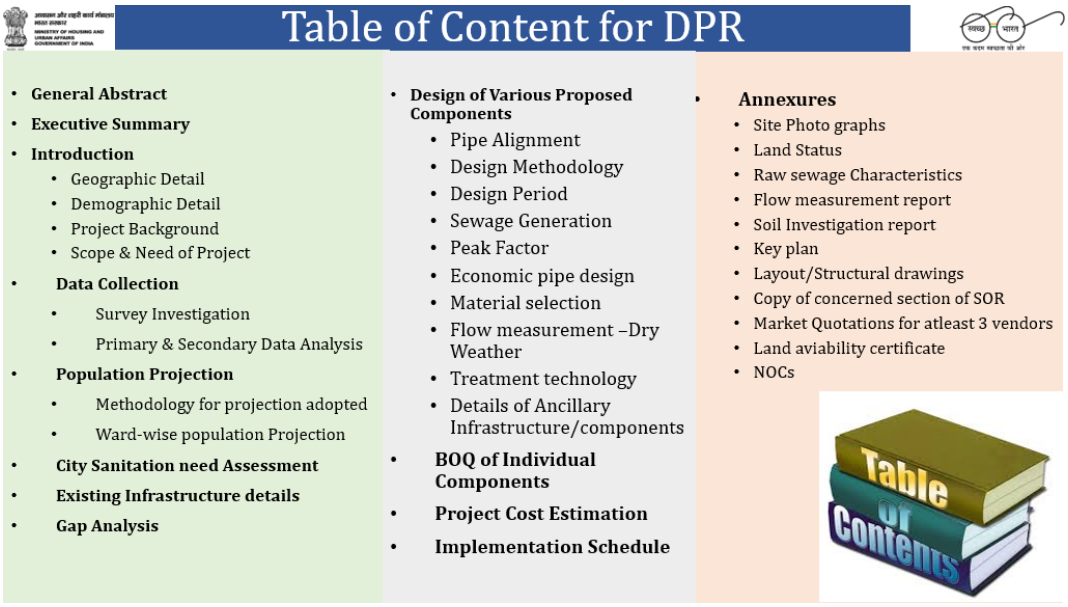
3. **Future Focus:**
    - **Greywater Management:** Emphasis on increasing intervention in rural and urban areas.
    - **Learning and Documentation:** Plans to document successful practices and share them nationally for replication in similar towns.
- Expediting DPR approvals and project execution to meet vision goals.

Session 4.7: Model DPR

Speaker: Shri. Satish Kumar, Assistant Advisor, CPHEEO

1. **Major Observations from Submitted DPRs**:
    - Many DPRs propose fully mechanized treatment processes. While not opposed to this approach, considerations for ULB operational capacity, end-use, and feasibility are necessary.
    - Missing details on **existing infrastructure** and its integration with proposed projects.
    - **Design periods** often exceed the SBM funding limit of 2026, requiring additional state or external funding.
    - Non-compliance with SBM guidelines, e.g., using conventional networks in class two towns and alternative approaches in suburban areas.
    - Overestimation of inlet and outlet parameters, such as using 350 mg/L for BOD (standard is 250 mg/L) or unnecessarily stringent norms like 10 mg/L for irrigation purposes.
    - **Ancillary component costs** are disproportionately high in some cases.

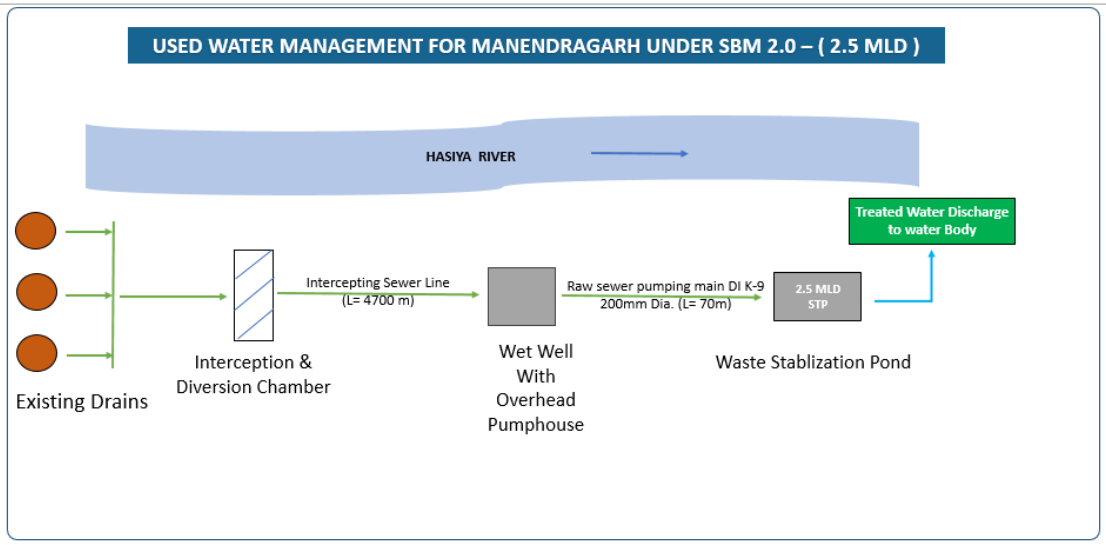
Components of a Typical DPR:



2. **Case Study: Model DPR for Manindra Town**:

The city, with a projected population growth from 33,000 (2011) to 42,000 (2026) and an area of 8.62 sq. km (22 wards), is planning a cost-effective sewage management system. Divided into two zones, it proposes stabilization ponds with 3 MLD capacity STPs (2.5 MLD and 0.5 MLD), supported by a 4.7 km sewer network, at an estimated cost of ₹9.65 crore. Optimizations in pipeline material (DI K9 pipes) and manhole spacing (currently 30 m) could further reduce costs, showcasing a practical and scalable approach.

Schematic Diagram



Key Learnings from SBM Experience:

- No single standardized approach for sewage management universally fits all scenarios.
- Faecal Sludge Treatment Plants (FSTPs) manage only 1–2% of sludge and are purely demand-based. These are not a complete or permanent solution for used water management, especially with non-standard septic tank designs.

Session 5: Experience Sharing by States - Procurement of Implementation Agency and Progress Monitoring

Moderator: Shri Rohit Kakkar, Deputy Advisor, CPHEEO

1.Integrated Approach

- Technology & Management: Successful missions require a blend of technological solutions and managerial efficiency.
- State-Specific Needs: Local conditions must drive decisions. For example, Punjab's higher sewerage network (79%) vs. Madhya Pradesh's lower coverage (48%) necessitates different strategies.

2. Land and Planning

- Land Challenges: Land acquisition is a significant bottleneck. Success stories like Arunachal Pradesh show how effective community engagement can create land pools.
- Master Planning: Long-term, ground-reality-driven plans must align administrative and technical teams. Punjab's trunk-line approach was highlighted as a replicable model.

3. Standardization and Capacity Building

- Learning from States: States like Punjab, Odisha, and Maharashtra have achieved results through standardization and knowledge sharing.
- Templates and Guidelines: Clear templates reduce complexity for urban local bodies (ULBs) with limited capacity.

4. Role of the Private Sector

- Engagement: Private sector involvement is critical for implementation. Confidence-building forums with private contractors should be established.
- Expanding Contractor Base: Encourage contractors from related sectors (e.g., Jal Mission, Water Resources) to enter urban sanitation projects.

5. Data and Monitoring

- Data Reporting: Accurate and timely data reporting on the SWAM portal is vital. Despite developed infrastructure, urban India lags behind rural India in mapped data.
- Continuous Monitoring: Modules like GMIS must be utilized for project tracking, certification, and compliance with Sustainable Development Goals (SDGs).

6. Financial Management

- Just-In-Time Payments: The shift to Just-In-Time payments (SNSP) ensures funds are utilized efficiently, but states must adapt quickly to the new system.
- State-Level Accounting Cells: Establish dedicated finance teams to manage payment cycles and raise bills promptly.

7. Cross-Learning and Knowledge Sharing

- Field Visits and Cataloguing: Facilitate field visits to exemplary cities for practical insights.
- Interactive Platforms: Regular workshops and forums for cross-state knowledge exchange.

8. Moving Beyond Toilets

- Focus on non-sewered sanitation and post-toilet-flush value chains to address urban challenges, especially in smaller cities.

Call to Action

- Expedite approvals, engage with technical and private stakeholders, and ensure prompt reporting.
- States must shift focus from rankings to sustainable, functional outcomes.

Session 5.1: Madhya Pradesh

Speaker: Shri. R.R. Jaroliya, Superintending Engineer, Directorate Of Urban Administration & Development, Madhya Pradesh.

Challenges in Procurement and Tendering

1. **Tender Volume:** A total of 1,778 tenders issued, but progress hindered by challenges in finalizing bids.
2. **Big Players' Disinterest:**
    - Major contractors avoid participating due to high O&M (Operation and Maintenance) costs and complex eligibility criteria.
    - Reliance on smaller agencies with limited capacity and higher costs.
3. **Experience Requirements:**
    - Criteria for eligible technology providers:
        - Proven track record in core equipment for wastewater treatment.
        - A minimum of 2 years of successful operation of an STP with at least 30% proposed capacity in government or public sector.
    - Lead partner must have a minimum 51% share in joint ventures, while the secondary partner must contribute at least 26%. Both partners must meet 100% qualification criteria collectively.
4. **Economic Viability and O&M Costs:**
    - High O&M costs perceived as a deterrent.
    - Concerns about scalability and sustainability for smaller agencies in light of increasing population demands.

Technological Considerations

1. **Preferred Technologies:**
    - SVR, MBR, and RBM technologies highlighted for STP construction.
    - Alternative energy sources are encouraged to reduce O&M costs.
2. **Design Parameters:**
    - Outflow standards must adhere to treated water quality benchmarks.
    - Incorporation of energy-efficient designs in pumping stations, especially for distances exceeding 20 kilometres.

Implementation Challenges and Solutions

1. **Liability Period:**
    - Current five-year liability period adds significant cost to projects, raising concerns about contractors' financial burden.
    - Debate on whether liability periods could be shortened without compromising project accountability.
2. **Role of Smaller Contractors:**
    - Lack of experience and capacity among smaller contractors poses risks to project quality and timelines.
    - Exploring structured handholding, capacity building, and partnerships to strengthen smaller players.
3. **Scalability of Solutions:**
    - Long-term population growth impacts necessitate scalable and modular solutions for STPs and pumping stations.

Way Forward

1. **Streamlining Procurement:**
    - Simplify tender conditions to attract more bidders, including big players.
    - Create flexibility in eligibility criteria to enable broader participation without compromising quality.
2. **Focus on Cost Optimization:**
    - Optimize designs to balance high-capacity systems with lower energy and O&M costs.
    - Leverage alternative energy solutions for energy-intensive components like pumping stations.
3. **Enhancing Technology Adoption:**
    - Mandate proven, scalable technologies in tenders.

- Ensure alignment of technologies with outlet parameters and treatment standards.

4. **Knowledge Sharing:**
    - Learn from states with successful models in procurement and implementation.
    - Establish forums for technology providers and contractors to share experiences and best practices.

Call to Action

Stakeholders must address tender challenges collaboratively by focusing on simplifying processes, incentivizing participation, and adopting sustainable, energy-efficient technologies. Practical solutions for scalability and cost efficiency will be critical in ensuring the success of the wastewater treatment mission.

Session 5.2: Gujarat

Speaker : Shri.Pranav Dholiya, Technical Manager, GUDM

The session focuses on how Gujarat efficiently manages and monitors urban development projects. The state operates through well-defined institutional structures and strategies, ensuring timely execution and quality maintenance of projects under various schemes.

Wastewater Management Progress

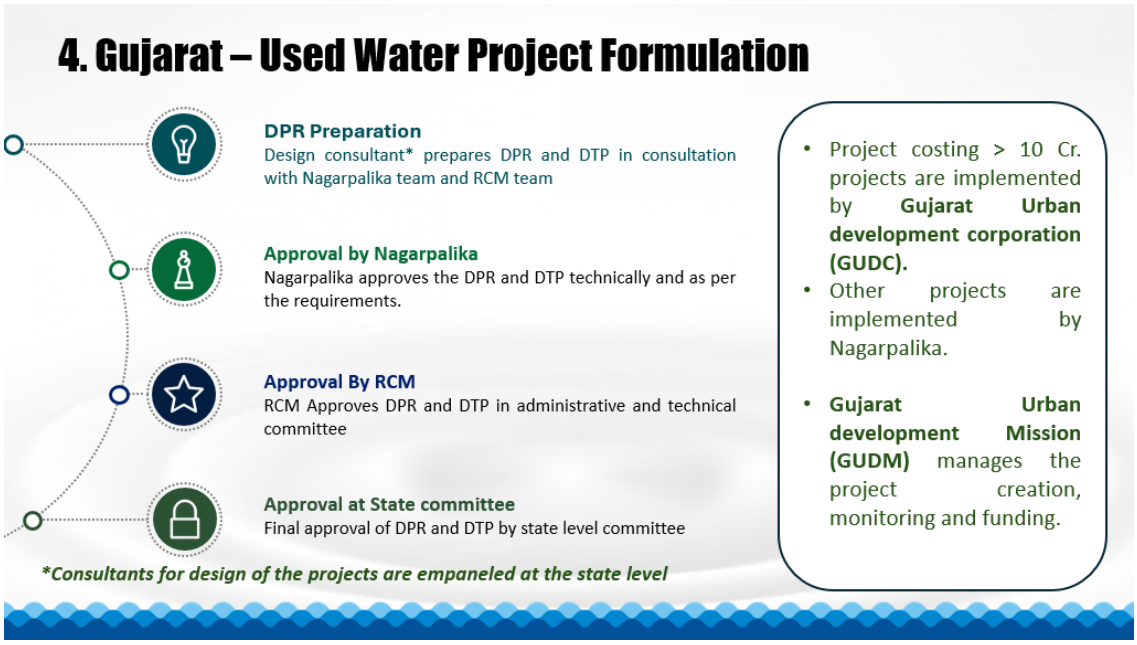
- **Current Status:** Total wastewater generated and treated is regularly assessed. Reuse initiatives under the Swachh Bharat Mission (SBM) involve 13 STPs, with 4 under construction and 9 in the tendering stages.
- **IND Projects:** These projects have been implemented across 31 ULBs, with 4 completed and 27 still in progress.
- **Additional Initiatives:** De-sludging machines are being procured through SBM and CSR funding, with the use of state and central schemes to enhance wastewater management facilities.
- **AMRUT Mission:** A total of 171 liquid waste management projects worth ₹9,380 crores have been initiated, with 123 under construction and 48 in planning stages.
- **Innovative JBAK Scheme:** This scheme provides ₹7,000 per household for sewer line connections, funded through municipalities.

Project Approval Process

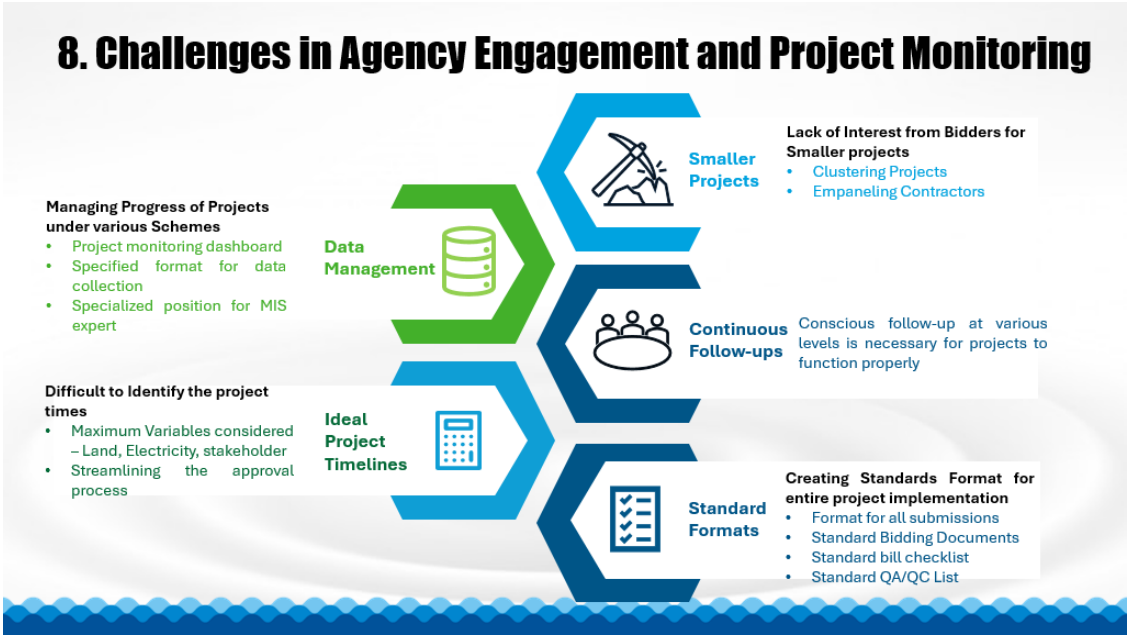
1. **Preparation and Approval:**
    - DPRs prepared and vetted by administrative and political bodies within municipalities.

- Projects approved by Regional Commissioners for projects under ₹10 crores; and by state-level committees for projects over ₹10 crores.

2. **Execution:**
   - Small projects executed by municipalities.
   - Larger projects managed by GUDC or GWSSB for technical expertise and resource-intensive requirements.



Monitoring Mechanisms include monthly reviews led by the Chief Secretary and weekly reviews by the Principal Secretary to address bottlenecks. A unified dashboard provides real-time project updates, integrating data from all state and central schemes. Gujarat's dedicated Land Cell, chaired by the Principal Secretary, facilitates land acquisition, with biweekly meetings to resolve issues efficiently.



Proposed Solutions:

- **Empanelment of Contractors:** Contractors pre-approved for regional projects, reducing reliance on tendering.
- **Bundling Smaller Projects:** Combines projects into single tenders to attract bidders.
- **Standardization:** State-level Standard Building Document (SBD) includes mandatory and flexible modules for urban projects, expediting processes.

Quality Assurance and Financial Control:

These are ensured through standardized checklists and data forms that guarantee accurate billing and reporting. Quality assurance (QA) and quality control (QC) processes are integrated into the project workflows. Additionally, third-party audits are conducted to enforce strict quality checks during the execution phases, ensuring the projects meet the required standards.

Conclusion

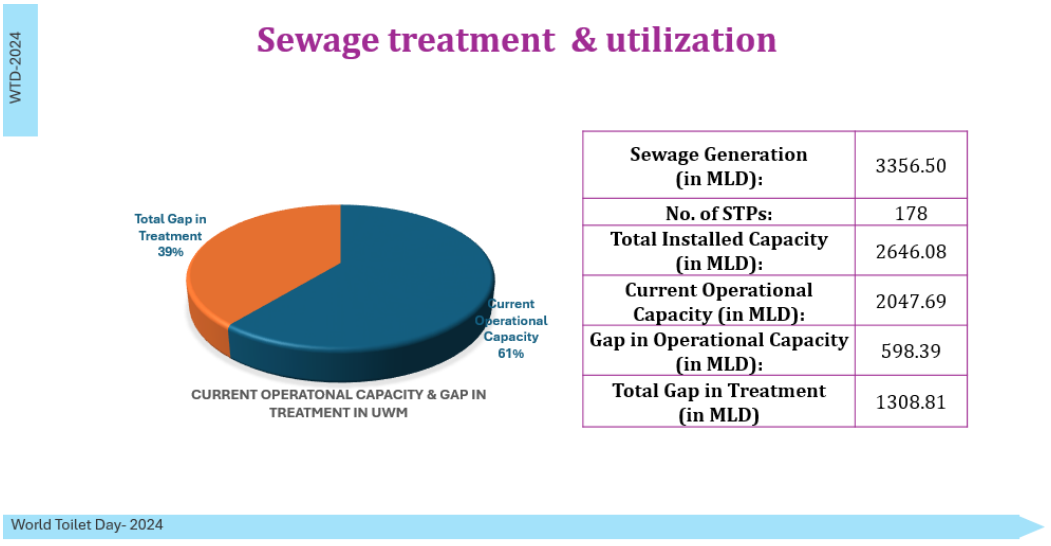
Gujarat's structured approach, supported by vertical integration of administrative bodies, advanced monitoring tools, and proactive solutions, ensures effective project execution. Challenges are addressed through innovative measures like bundling, empanelment, and real-time monitoring. Continuous reviews by high-level authorities further strengthen the state's mission to enhance urban infrastructure.

Session 5.3: Karnataka

Speaker: Shri.C.Karthikeyan, Project Management Expert, Karnataka Urban Infrastructure Development & Finance Corporation

Urban Local Bodies (ULBs) and Current Challenges

- Karnataka has 317 ULBs, with 287 ULBs having a population of less than 1 lakh (2011 census), which are the primary targets under the Swachh Bharat Urban 2.0 initiative.



Utilization of ₹1,919 crore from the NGT Environmental Compensation Fund for used water management in ULBs (excluding Bengaluru).

Strategic Approaches

1. **Small ULBs (<30,000 population):** 110 FSTPs (Faecal Sludge Treatment Plants) planned.
2. **Mid to Large ULBs (>1 lakh population):** Infrastructure upgrades and repairs in 20 ULBs.
3. **New Systems:**
    - Greenfield sewerage systems in 7 ULBs.
    - Connection of missing links and household service connections in 27 ULBs.
4. **Funding Integration:** *SBM Urban Fund* and *Environmental Compensation Fund* converged for project financing.

WTD-2024

UWM Components under SBM(U)-2.0

UWM Components	Total No. of ULBs	Total Units	Approved Cost (in Crore)
Sewage Treatment Plants	268	927.25 MLD	1359.04
Interception and Diversion Drains (I&D)	275	1666 km	833.00
Cesspool Vehicles	140	147 Vehicles	35.28
Sewer Cleaning Vehicles	73	73 Vehicles	25.55

World Toilet Day- 2024

Procurement and Implementation

WTD-2024

Steps - Procuring PDMC/ Work Contracts

Tender Publication:
- Issuing tenders through KPP Portal, Publish in atleast one National & State wide News paper

Pre-Bid Conference:
- Conduct meetings to clarify on project details & scope to prospective bidders

Technical Assessment:
- Tender Evaluation Committee evaluates proposals
- TSC verifies & recommends Technical bids for consideration of SLTC – ACS(UDD)

Financial Assessment:
- Bid approval by SHPC – ACS(GoK)

Contract Award:
- Award of contract through KPP Portal & LoA issued

Contract Finalization:
- Agreements signed with project milestones, payment terms, LD etc.

World Toilet Day- 2024

- **PDMC (Project Development and Management Consultants):** The PDMC was appointed to handle both design and supervision aspects of the project. Their responsibilities include preparing Detailed Project Reports (DPR), managing bids, overseeing construction, and monitoring progress. The team is composed of a diverse group of experts, including engineers, managers, and support staff.

- **Contractor Engagement:** Contractors are engaged on a DBOT basis through the e-Procurement Portal under the KTPP Act. Eligibility criteria include turnover, project-specific experience, liquid assets, and credit facilities, with provisions for joint ventures (max two partners, lead having 50% stake) and subcontracting for specialized tasks. The procurement process involves advertising through national and state platforms, pre-bid conferences, evaluation of technical bids by committees, and final contract awards and agreements executed online.

- Procurement faces challenges such as small contract sizes in smaller ULBs, labor reluctance to work in sewerage environments, and public resistance due to restricted access during construction. Solutions include clustering tenders, like combining projects across multiple ULBs (e.g., four ULBs in Mysuru district), and holding frequent contractor conferences for feedback and coordination.

Monitoring and Implementation Mechanisms

Monitoring Systems:

1. **Digital Dashboard:**
    - Enhanced customization planned with ₹3 crore approved under SBM 2.0 for capacity building.
    - To be implemented via Karnataka Municipal Data Society (KMDS).
2. **On-Site Inspections:** Regular inspections by executive engineers across Karnataka's four revenue divisions.
3. **Reporting Mechanism:** Standardized formats for progress and quality reports.

Stakeholder Engagement:

- ULBs involved from DPR preparation to tendering and implementation.
- Inputs sought from local councils and MLAs.
- Grievances addressed via an Integrated Public Grievance Redressal System.

Project Oversight:

- **Technical Scrutiny Committees:** Include internal and external experts.
- **District-Level Coordination Committees:** Headed by district commissioners to resolve land and inter-departmental issues.
- **Real-Time Monitoring:** Online continuous emission monitoring systems (CEMS) used for larger projects.
-

Data and Contract Management:

- Development of an integrated **contract management module** to track milestones, progress, billing, and payments.
- Focus on reliable data collection for effective project monitoring.

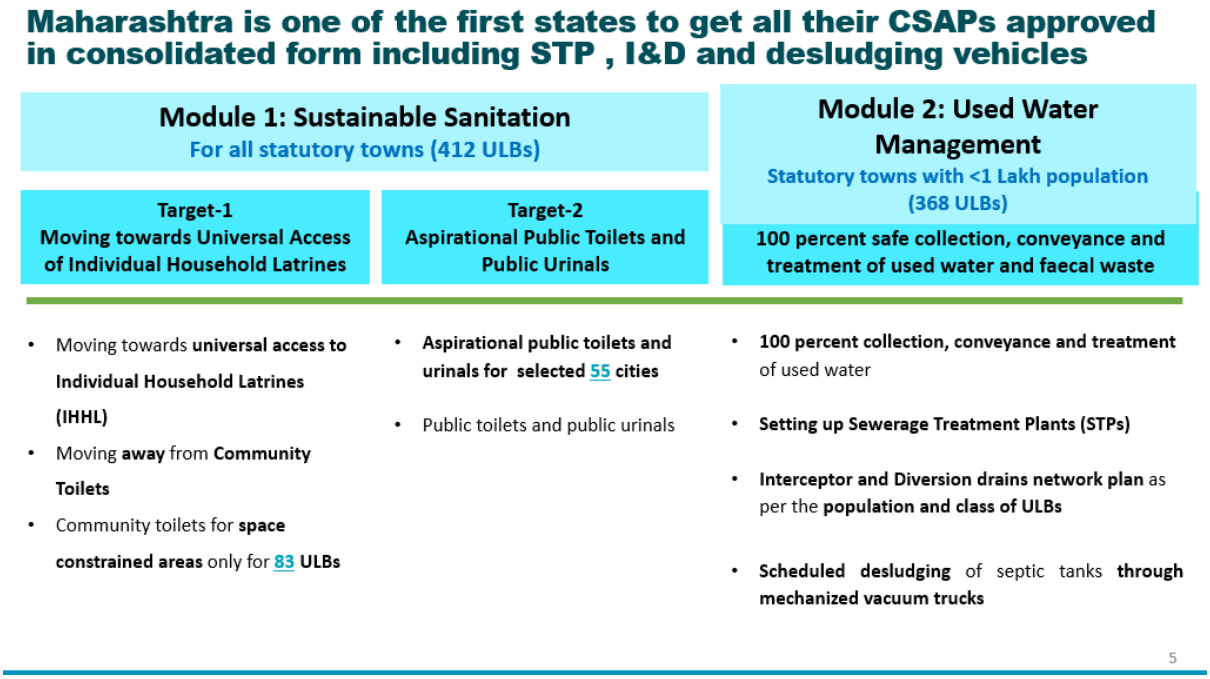
Conclusion: Karnataka has laid a robust foundation for wastewater management under SBM 2.0, integrating innovative funding and monitoring strategies to overcome challenges and ensure successful project execution.

Session 5.4: Maharashtra

Speaker : Jigisha Jaiswal, Wash Sector Professional. Senior Research Associate, Urban Development

Overview of Urban Local Bodies (ULBs)

- 412 ULBs across six divisions, serving 60+ million urban population.
- 368 ULBs have populations under 1 lakh, with all cities having City Sanitation Action Plans (CSAPs) approved.



Urban Sanitation Strategy:

- Cities >50,000 population: Focused on 100% sewerage network coverage and STP construction.
- Cities 20,000-50,000 population: Mixed approach with sewerage networks in key areas and closed/interceptor drains for other zones.
- Cities <20,000 population: Focused on converting open drains into closed drains, building interceptor drains, and small-scale STPs

DPR (Detailed Project Report) Preparation

- **24 agencies empanelled** for UWM DPR preparation.
- **8 DPRs approved** and **21 under review**, with **4-6 projects** in the implementation stage.
- **DPR preparation process**:
    - Validated by ULBs.
    - Reviewed by the **State Technical Committee** and approved by the **State High Powered Committee**.
    - Ground verification conducted to ensure alignment with actual conditions.

Centralized Procurement for Equipment

- **State-level procurement** for **desludging equipment, suction vehicles, and jetting machines**.
    - Economies of scale achieved through **bulk purchase**.
    - Simplified **maintenance logistics** with larger service providers.

Implementation Process

1. **UWM Projects**:
    - Active in 6 cities with STPs and Interceptor drains in implementation.
    - ULBs lead RFP preparation, tendering, and contractor selection.
    - Some cities, like Pune, have already disbursed second instalments to contractors.

UWM Maharashtra Project Status

Sl. No.	ULB Name	Project Status (STP)	Project Status (I&D)
1	CHOPADA	First Instalment released; Work Order Given to Contractor	First Instalment released and , Work Order Given to Contractor
2	PANCHGANI	Second Instalment released , Under Construction	NA
3	RAHIMATPUR	First Instalment released; Work Order Given to Contractor	First Instalment released; Work Order Given to Contractor
4	SHIRDI	NA	First Instalment released; Work Order Given to Contractor
5	VITA	First Instalment released; Work Order Given to Contractor	First Instalment released; Work Order Given to Contractor
6	WAI	First Instalment released; Work Order Given to Contractor	First Instalment released; Work Order Given to Contractor

2. **Decentralized Approach**:
    - Emphasis on ULB autonomy for project management.

Challenges

1. **Higher costs**: Higher costs arose from increased material prices due to revised rates and geographic conditions. Additionally, nature-based treatment systems, requiring larger land areas, were as expensive as conventional MBBR technologies.
2. **Funding mismatch**: The estimated lengths of interceptor drains in CSAPs exceeded actual requirements, leading to funding gaps for the construction of STPs.

UWM Maharashtra – Implementation Issues

No.	Issue	Requirement
1	For STPs, cost approved by MoHUA: Rs 1.17 Crore per MLD, preparing DPRs the cost is in excess due to: I. The Schedule of Rates (SoR) 2023-24 of the technical sanctioning agency i.e. Maharashtra Jeevan Pradhikaran (MJP) are increased as of year 2020-21 II. Geographical Conditions III. Project Management Consultancy Charges (PMC), Technical Sanction (TS) charges and GST charges	Approve cost of Rs. 1.6 to 1.8 Crore per MLD for STPs
2	For I&D the approved cost: Rs.50 lakhs/km preparing the DPRs the cost is in excess due to I. Components like diversion mechanisms like weirs, mechanical screens, and pumping stations are part of the I&D network. II. The Schedule of Rates (SoR) 2023-24 of the technical sanctioning agency i.e. Maharashtra Jeevan Pradhikaran (MJP) are increased as of year 2020-21 III. Project Management Consultancy Charges (PMC), Technical Sanction (TS) charges and GST charges	Approve as per the actual geographical conditions and slopes for the I&D component within each specific ULB, as outlined in the CSAP, rather than adhering to a fixed per kilometer cost.
3	Nature based technology also has high cost as compared to MBBR or similar technologies And they also require higher footprint area	

Request MoHUA to consider the available pool of funding for the given ULB must be permissible to be interchangeable as per the local context for the components under UWM.

Requests and Recommendations

1. **Flexible funding**:
    - Allow ULBs to reallocate funds between STPs and Interceptor drains based on actual requirements.
2. **Support for nature-based technologies**:
    - Address cost and land footprint challenges for their adoption.

Session 5.5: Contractor's Perspective on Challenges in Urban Water Management and Sanitation Projects

Speaker: Shri. Pavan Kulkarni, Director, ESTPL, Madhya Pradesh

Key Role of Contractors

- ✓ **Execution of Infrastructure Projects**: Provide essential technical expertise and specialized skills for complex infrastructure projects, delivering innovative and cost-effective solutions for large-scale implementations, particularly in line with SBM 2.
- ✓ **Alignment with Objectives**: Contribute to grey and black water management, ensuring wastewater treatment before discharging into water bodies. Also, must align with the SDG 2030 goals, supporting institutional strengthening and sustainability.
- ✓ **Adherence to Standards and Maintenance:** Contractors ensure quality construction by adhering to regulatory standards. They are also responsible for maintenance and monitoring during the Defect Liability Period (DLP) and manage ongoing operations through long-term contracts.

Implementation Challenges

1. **Land and Site Accessibility**:
    - Sites often lack accessible roads for heavy vehicles, causing delays.
    - Legal clearances for non-government land delay handovers to contractors.
2. **Infrastructure Support**:
    - Sites often lack electrical connections, delaying the start of work.
    - Timely approvals for site-specific designs and structural drawings are crucial but often delayed.
3. **Financial Constraints**:
    - Delays in bill processing impact cash flow. Projects typically involve 4-5 RA bills, but delayed clearance of the first bill affects subsequent work.
    - Cost escalations due to delays are often not accommodated.
4. **Resource and Regulatory Challenges**:
    - Reliance on local labor requires additional training, adding time and cost.
    - Delays in obtaining permits affect timelines.
    - Inefficient coordination between authorities and contractors causes setbacks.
5. **Site-Specific Issues**:
    - Hidden infrastructure like high-tension lines can lead to long delays (e.g., South Mumbai case).

- Flood risks and unsuitable sites lead to re-planning and increased costs (e.g., Soyat Kalan project).

Site Specific Challenges: Soyat Kalan

- Site selected by consultant was having flood risk challenge and slope issue
- Considering the new site needs two I&D. from one of the I&D topography do not allow gravity flow.
- Pumping is required along with a sufficient intake well/sump

Solution: We are planning to have local elevated (3 meter) tank and localised pumping. Further flow by gravity to STP equalization tank is being planned. This will help in avoiding unnecessary large pumps and capacity of intake well.

6. **Technology and Safety Considerations**:
   - Adapting labor to advanced technologies can be challenging.
   - Need for consistent safety measures and accident mitigation plans.

Planning and initiation of a project by ESTPL

Survey and Layout at site

Levelling and Excavation

Steel Binding for Raft

Recommendations

- ✓ **Improved Planning and Engagement**: Address site-specific challenges at the DPR preparation stage. Increase stakeholder involvement, including ULBs, designers, and technology providers.

- ✓ **Environmentally Friendly Technologies**: Focus **on low-carbon, eco-friendly solutions** to meet sustainability goals.
- ✓ **Technology-Specific Operation**: Optimize manpower based on technology requirements to reduce operational costs.
- ✓ **Timely Support from Authorities**: Expedite land clearance, permits, and approvals to align project timelines. Also, ensure prompt processing of payments to maintain steady progress.
- ✓ **Stakeholder Conflict Management**: Establish open communication channels to resolve issues quickly.

Key Takeaways

- Projects require detailed planning, with site-specific issues addressed during the DPR stage.
- Contractors need timely support from authorities, including funding and infrastructure provisioning.
- Operational efficiency and stakeholder satisfaction hinge on aligning expectations with practical challenges on the ground.

This comprehensive perspective highlights the critical role contractors play and the systemic changes needed to achieve timely and cost-effective project delivery.

Session 6: Technology Selection and Treatment Standards

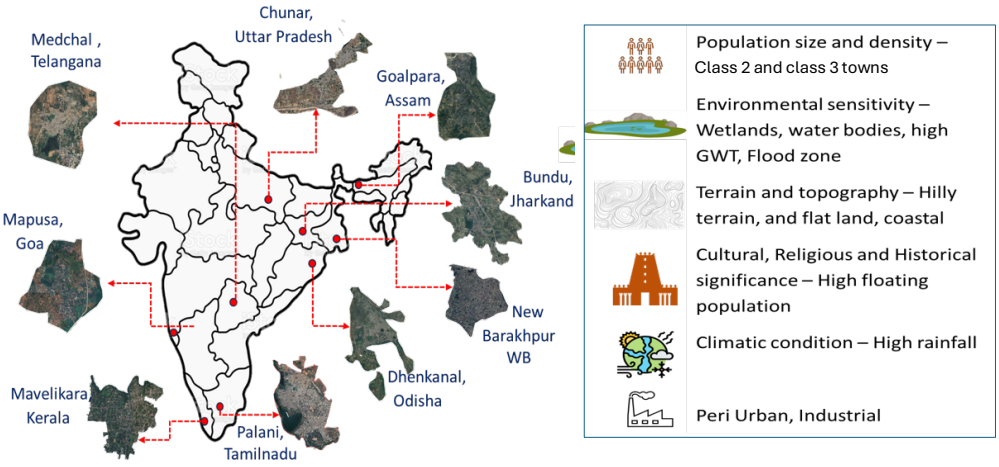
Moderator: Dr. V. K. Chaurasia, CPHEEO

Session 6.1: Case Studies in UWM

Speaker: Shri. Rajesh Pai, Senior Technical Advisor, Wash Institute

- The session focused on wastewater management across 14 towns with a goal to treat 100% of wastewater to prevent discharge into water bodies. A detailed case study of Chunar, Uttar Pradesh, under Swachh Bharat Mission 2 was discussed during the session.

Used Water Management Planning for 9 towns



Used Water Management Planning for 9 towns

Town	State	City Characteristics	Population-2011	Area of town, Sq. km	Density
Bundu	Jharkhand	Large no of waterbodies and farmlands	21,054	10.68	4 out of 13 wards densely populated.
Mavelikara	Kerala	High ground water table, densely populated town	26,421	14.58	2 out of 28 wards are dense. 4 wards with medium density.
Chunar	Uttar Pradesh	Bank of Ganga town, flood prone zone	37,227	8.65	9 out of 25 wards densely populated.
Mapusa	Goa	Tourist area, large no of water bodies	39,980	11.09	7 out of 20 wards densely populated.
Medchal	Telangana	Fast developing town near to capital	41,244	35.44	10 out of 23 wards densely populated.
Goalpara	Assam	Flood prone zone, large number of water bodies and farmlands	53,430	12.5	4 out of 19 wards are densely populated
Dhenkanal	Odisha	Discontinuous hills	67,414	30.76	6 out of 23 wards densely populated.
Palani	Tamil Nadu	Religious town with high floating population	70,467	7.53	Very high density in all wards
New Barrackpore	West Bengal	Peri Urban area- Adjacent to Kolkata	76,846	4.03	All wards have uniform density

Key Insights and Data from Chunar: Located between the Ganga and Jeru rivers, with varying elevation and rocky soil in parts. Population: 37,000 (2011 Census). 95% of households have piped water, reducing groundwater dependence. 97% have sealed septic tanks, but wastewater discharges into drains due to a lack of soak pits. Greywater is similarly discharged into drains. There are 22 drains with endpoints across the town. The majority of wastewater has a BOD level under 100, contrary to higher design assumptions.

Planning Framework and Solutions:

- ✓ **Methodology and Approach**: The methodology encompassed systematic data collection, including topographic surveys, assessment of land availability, identification of water bodies, and mapping of drain endpoints. This data was analyzed to identify feasible solutions while addressing environmental and resource constraints. Key solutions included an immediate focus on drain-based interventions for wastewater flow management, adaptability for future sewer system integration, and decentralized wastewater management systems for fringe or developing areas.

UWM Planning for Chunar Town

Data	Particulars
Town Profile	• Town- Chunar, District- Mirzapur, State- Uttar Pradesh • Class of Town- 3 • Area of town- 8.65 Sq.km • No of wards- 25
Population data	• 37185 population and 3916 HH as per 2011 census • Average Population Density -4300 person/Sq.Km • Min and Max ward density - 775 and 63972 persons/Sq.Km
Spatial data	• Min and Max Elevation - 64.6 m & 131 m above MSL • Water Bodies (lakes) - There are no lakes / ponds in Chunar • Water bodies (rivers) - Chunar is on the banks of Ganga. Jargu, a tributary of Ganga also flows by the side of Chunar • Town & Ward Boundary- Available
Hydrogeological and climatic information	• Dominant soil types – Alluvium soil
	Water table • Pre-monsoon- 5 to 45 m below GL • Post-monsoon – 3 to 15.5 m below GL
	• Annual average temperature – 9°C - 43°C • Annual average rainfall – 1110 mm • Monsoon season End of the June to mid - October

- ✓ **Implementation Design**: Projects were categorized into centralized and decentralized wastewater treatment systems. Existing resources, such as a 10,000 L/day feacal sludge treatment plant (FSTP), were leveraged, with provisions for expansion to accommodate future urban development.

- ✓ **Supporting Tools and Resources**: A comprehensive technology pool offered technical options for treatment systems, including nature-based and on-site solutions. Training resources comprised 38 e-learning and physical modules for municipalities, addressing aspects such as wastewater measurement and planning. Additionally, detailed guidelines, booklets, and survey tools were developed to assist towns in replicating this structured planning framework.

Existing UWM Infrastructure

Details of UWM infrastructure	
Type of UWM Infrastructure	FSTP
Capacity	10 KLD
Technology	Planted Drying Bed
Location of FSTP	25° 6'2.43"N; 82°52'5.56"E
Year of commissioning	June 2021
Operation and Maintenance	Awarded for 5 years since commissioning
No of daily trips	2-3 loads of 3.5 KL each

Units / componentsof FSTP

Screen chamber → Planted drying bed → Collection tank → Settler → Anaerobic Fiter → Planted Gravel Filter → Polishing Pond

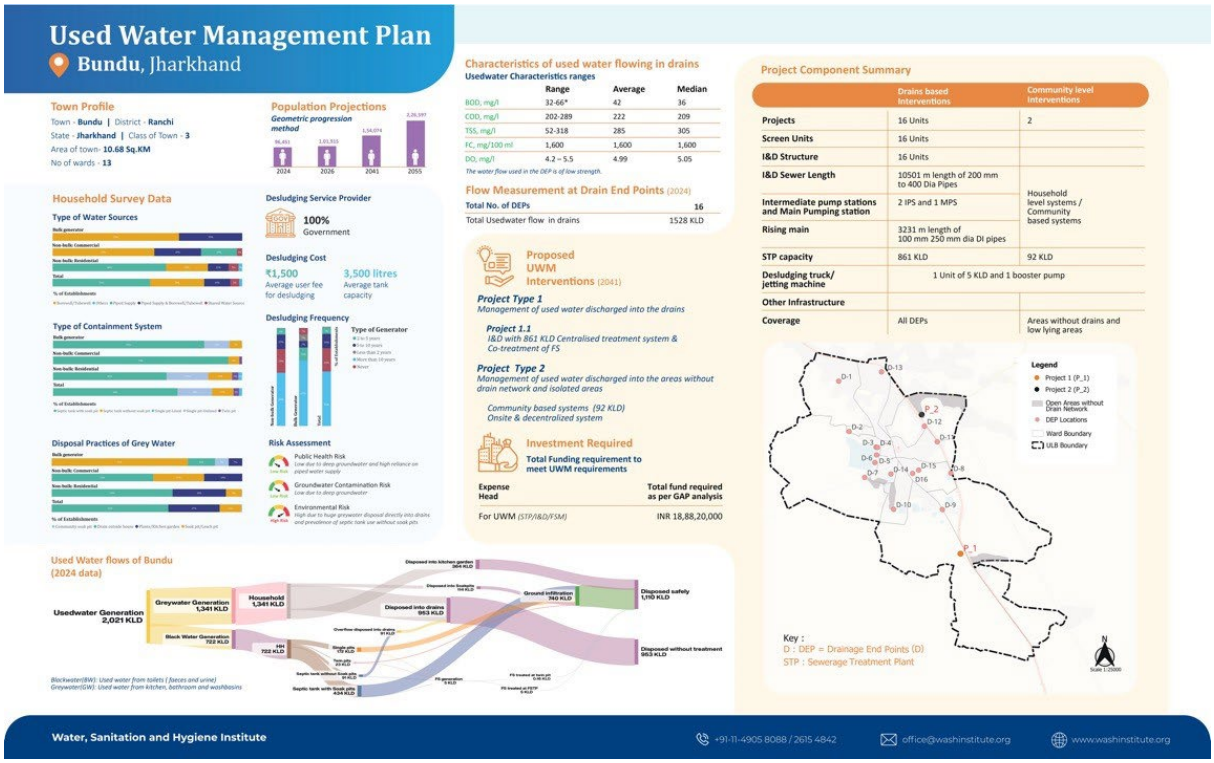
Data Interpretation and Gap Assessment

Risk Analysis based on Water Supply and UWM Practice

Ground water Depth	Water supply	Containment/Black water disposal*	Containment/Grey water disposal*	Risk to Public Health	Intervention	
> 10 m	Any HH on ground water	Any	Any	**Low risk**	IN1	Low Risk
Any	All HH on municipal water supply	Any	Any	**Low risk**	IN1	
< 10 m	Majority HH (>90%) on municipal water supply	> 90% septic tanks without soak pit	< 10% soak pit or kitchen garden	**Low risk**	IN1	Low Risk
< 10 m	> 10% HH on ground water	> 10% single/twin pits and septic tanks with soak pit	> 10% soak pit or kitchen garden	**High risk**	IN2	
< 10 m	> 10% HH on ground water	> 90% septic tanks without soak pit	> 90% disposed in drains	**Low risk**	IN1	High Risk

Intervention	Blackwater	Greywater
Intervention 1 (IN1)	Maintain status quo for percolation systems (BW - Single pits, twin pits, Septic tank with soak pits) .	Maintain status quo for kitchen gardens
	Implement appropriate treatment system for used water in drains and/or sewer	Maintain status quo for percolation systems (GW -Soak pits/Leach pits)
	Periodical de-sludging of single pits, twin pits and septic tanks and FS treatment	Implement appropriate treatment system for used water in drains and/or sewer
	Periodical maintenance of drains/sewer	Periodical maintenance of drains/sewer
Intervention 2 (IN2)*	Implement pipe-based network with appropriate treatment system	Implement pipe-based network with appropriate treatment system

The methodology implemented in Chunar is a replicable model that balances immediate needs with future scalability. Detailed data, risk analysis, and a mix of centralized and decentralized approaches ensure practical, sustainable solutions for small towns. Another proposed UWM Plan for Bundu town is presented below.



Session 6.2: I&D Planning and Implementation Approach To UWM

Speaker: Shri. Pravin Kumar Garg, NMCG

The speaker highlighted the evolution and implementation of Interception and Diversion (I&D) and Sewage Treatment Plant (STP) systems within the Namami Gange program, emphasizing their role in urban wastewater management:

The speaker traced the development of I&D and STP systems from the Ganga Action Plan Phase I (1985) to the Namami Gange program, which integrates river regeneration with cost-effective pollution abatement strategies:

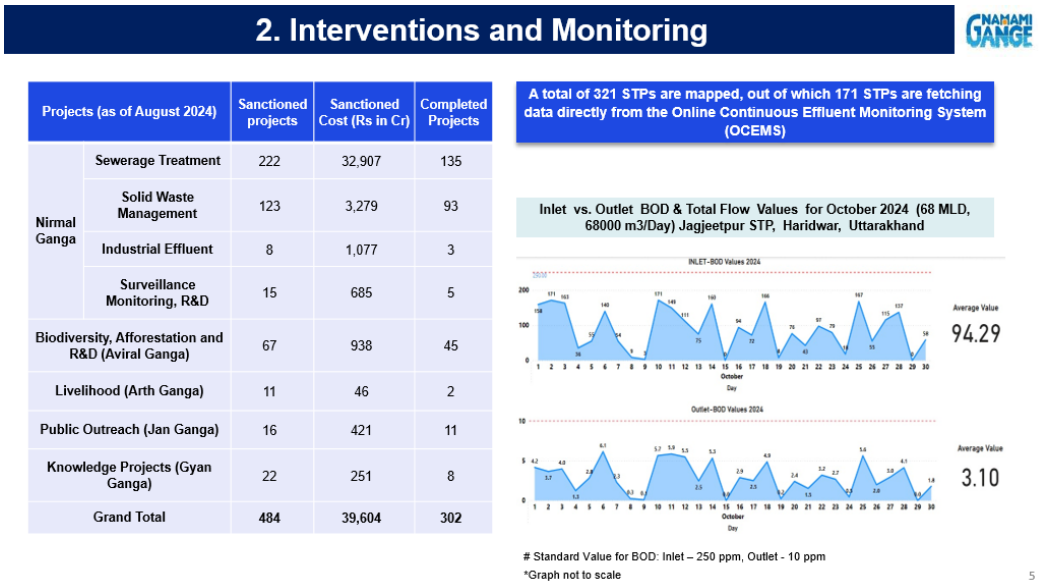
- **Ganga Action Plan Phase I (1985):**
  Initiated I&D and STP systems, marking the first step in addressing river pollution.
- **National Ganga River Basin Authority (NGRBA):**
  Introduced comprehensive sewer networks alongside STPs to enhance pollution control.
- **Namami Gange Program:**
  Positioned as a holistic river regeneration mission integrating quick and cost-effective pollution abatement measures with economic development through the Arth Ganga initiative.

Program Objectives

- Adopt a river-centric perspective addressing pollution abatement, continuous river flow, and ecological health.
- Promote economic development through Arth Ganga, generating livelihoods for riverbank communities.

Implementation Insights

- Enhanced monitoring of STPs has been a key focus, with 321 STPs currently under observation and 171 equipped with Online Continuous Monitoring Systems (OCMS), targeting 100% OCMS coverage in the Ganga Basin by March 2024. Real-time feedback mechanisms, including CCTV monitoring, ensure transparency and public accountability



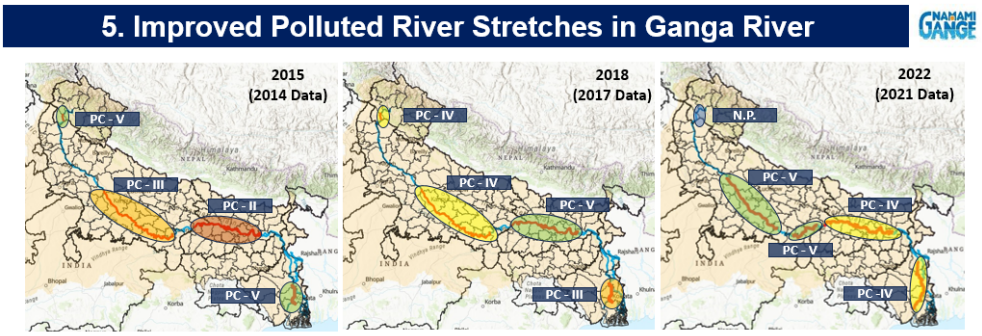
The system provides immediate relief by intercepting and diverting drains with minimal interventions, offering cost efficiency as it requires significantly lower investment compared to comprehensive sewer networks. Additionally, the assets achieve approximately 70% utilization from Day 1, unlike the 20–30% typical for sewer projects. This approach is particularly effective in densely populated, older urban areas, offering site-specific flexibility while also preventing solid waste discharge into rivers.

Challenges and Adaptive Strategies

- Implementation Delays: Urban sewer network projects often face delays due to infrastructure and logistical constraints.
- Integration Needs: Seamlessly combining I&D-STP systems with sewer projects under programs like AMRUT and SBM Urban to achieve long-term goals.

Case Studies and Outcomes

1. Haridwar:
    - 22 drains tapped within 18 months.
    - STP capacity expanded, achieving zero untreated drain outflows.
    - Sewer networks now being developed under additional funding.
2. Water Quality Improvements:
    - Measured through key parameters like BOD across five states.
    - Consistent improvements observed in all regions since 2018.



State	Polluted River Stretches with Priority Category		
	2015	2018	2022
Uttarakhand	V	IV	Not Polluted
	Haridwar to Sultanpur(4.2 - 5.8 mg/l BOD)	Haridwar to Sultanpur (6.6 mg/l BOD)	(< 3 mg/l BOD)
Uttar Pradesh	III	IV	V
	Kannauj to Varanasi (3.8 - 16.9 mg/l BOD)	Kannauj to Varanasi (3.5– 8.8 mg/l BOD)	Farrukabad to Allahabad and Mirzapur to Ghazipur (6.0 mg/l BOD)
Bihar	II	V	IV
	Buxar to Bhagalpur (7.8 - 27 mg/l BOD)	Buxar to Bhagalpur(3.2 - 4.2 mg/l BOD)	Buxar to Bhagalpur(7.9 mg/l BOD)
West Bengal	V	III	IV
	Triveni to Diamond Harbour (3.1 - 5.8 mg/l BOD)	Triveni to Diamond Harbour (5 – 12.2 mg/l BOD)	Behrampur To Haldia (8.0 mg/l BOD)

Priority	Criteria
I	BOD > 30 mg/l
II	BOD : 20-30 mg/l
III	BOD : 10-20 mg /l
IV	BOD : 6-10 mg/l
V	BOD : 3-6 mg / l
Desirable (< 3mg/l BOD)	

As per reports on Polluted River Stretches For Restoration Of Water Quality 2015, 2018, and 2022 by CPCB

11

Holistic and Adaptive Approach:

I&D-STP systems offer an impactful interim solution while comprehensive sewer networks are gradually developed. Continued integration of funding from AMRUT, SBM Urban, and Finance Commission grants ensures sustainable implementation.

Shri Garg concluded by emphasizing the adaptability and cost-effectiveness of I&D-STP systems, especially in older urban areas, as part of a holistic urban wastewater management strategy.

Session 6.3: Presentation on Treatment Standards for UWM

Speaker: Dr. V.K. Chaurasia, Advisor, CPHEEO

The session explored the complexities of wastewater treatment standards, their impact on technology selection, cost escalation, and project delays, and emphasized the need for a balanced and practical approach tailored to urban and rural contexts.

Current Standards and Challenges

India's wastewater treatment standards have evolved from the 1986 benchmarks to the 2017 MoEFCC standards, which recommend BOD 20 for metro cities and BOD 30 for others. However, stricter standards such as BOD <10, advocated by the National Green Tribunal (NGT), have sparked debates over feasibility, cost, and practicality. The Supreme Court and inter-ministerial bodies are deliberating graded standards that address varying requirements for urban, rural, and critically polluted areas.

Global Comparisons and Practices

Global wastewater treatment standards vary based on climatic and regional needs, offering lessons for India. For instance, China enforces BOD 10 in critical zones and BOD 20–30 elsewhere, while the EU allows BOD 25 in colder regions. Jordan and Palestine adopt differential standards based on end-uses such as agriculture and horticulture, and Israel transitioned to BOD 10 to address issues in drip irrigation.

Cost and Resource Implications

Stricter standards like BOD <10 significantly increase costs and energy consumption. For example, in Mumbai, reducing BOD from 20 to <10 raised project costs from ₹10,000 crore to ₹18,000 crore. Additionally, over-treatment can deplete nutrients beneficial for agriculture and horticulture, resulting in inefficiencies.

Practical Considerations for India

India must prioritize practical and context-specific solutions. Treatment levels should align with intended usage, such as agriculture, marine discharge, or irrigation, rather than enforcing uniform high standards. With 50% of untreated sewage having BOD levels around 250, the primary focus should be on addressing untreated sewage, which poses a greater environmental challenge, rather than upgrading already functional systems.

Policy Recommendations

- ✓ **Differential Standards**: Establish region- and use-specific standards to reflect local needs.
- ✓ **Balanced Treatment Approach:** Promote primary and secondary treatment universally before transitioning to tertiary systems.
- ✓ **Reuse-Oriented Standards**: Develop standards facilitating reuse, such as irrigation and groundwater recharge, while minimizing unnecessary costs.
- ✓ **Resource Prioritization**: Focus on untreated sewage and optimize existing capacity rather than mandating uniform stricter standards.

Way Forward

To prevent delays in project implementation, especially in preparing Detailed Project Reports (DPRs), clarity must be provided by adhering to practical, field-applicable standards, such as BOD 30 for smaller towns. Inter-ministerial collaboration should continue to develop a graded and adaptable approach, aligning with global best practices. The emphasis should remain on addressing untreated sewage and bridging capacity utilization gaps while ensuring that policy frameworks encourage sustainable and cost-effective wastewater management.

Session 6.4: Advisory on Type Design of STPs For Small & Medium Towns

Speakers: Dr. Ashfaque Jafari, Professor of Civil Engineering, Technical Advisor, and Dr. S M Subhani, MD, NCPE

The session presented a study aimed at identifying cost-effective wastewater treatment technologies for small and medium towns, considering factors like capacity, land availability, and operational feasibility. The findings were contextualized within ongoing initiatives under SBM 2.0 Urban and AMRUT 2.0, which have enabled wastewater treatment facilities across 4,500+ Urban Local Bodies (ULBs), including smaller towns.

- Under SBM 2.0 and AMRUT 2.0, wastewater treatment facilities are designed for 70% of the current population, with provisions for future expansion. The focus is on enabling sustainable wastewater management for small and medium towns.

- The study evaluated 10 wastewater treatment technologies, including four nature-based solutions (e.g., waste stabilization ponds) and four mechanized technologies such as SBR. The design considerations included- Latitude, elevation, temperature, and Influent BOD of 250 mg/L (accounting for mixed wastewater) and effluent standards of BOD ≤30 mg/L, adhering to CPHEEO guidelines.

DESIGN (INFLUENT) PARAMETERS

The design of unit processes in a used water treatment plant requires inputs in the form of site characteristics – Latitude, altitude and temperature, per capita water supply, peak factor and influent characteristics. Some of the design parameters used in the present study are listed below..

S. No.	Design input parameter	Source	Value
1	Latitude	NRSC Portal	21.14° N
2	Elevation	NRSC Portal	310 m
3	Lowest average winter temperature	IMD	14.5° C
4	Highest average Summer temperature	IMD	29.5° C
5	Per capita water supply	CPHEEO Manual	135 lpcd
6	Peak factor	CPHEEO Manual	3.00
7	Influent BOD	CPHEEO Manual	250 mg/l
8	Influent COD	CPHEEO Manual	425 mg/l
9	Influent Ammoniacal Nitrogen	CPHEEO Manual	32.5 mg/l
10	Influent TSS	CPHEEO Manual	375 mg/l

- The study included standardized components such as wet wells, coarse and fine screens, grit chambers, primary/secondary settling tanks, and chlorination units. Nature-based solutions, such as stabilization ponds, were highlighted for their low energy and maintenance requirements but noted to require more land. Comprehensive layouts were prepared to estimate accurate land area needs for each technology.

Cost Analysis Framework

The cost analysis employed a Life Cycle Cost Analysis (LCCA) framework, incorporating:

- **Capital Costs (CapEx):** Structures, electromechanical equipment, and land costs (ranging from ₹0 for government land to ₹1 crore per acre).
- **Operational Costs (OpEx):** Manpower, energy (₹8/kWh), consumables (e.g., chlorine), repairs, and laboratory expenses.
- **Assumptions:** A project life of 15 years with a 10% interest and escalation rate. The analysis evaluated three STP capacities: 1 MLD, 2 MLD, and 5 MLD.

Results and Recommendations:

Cost Findings:

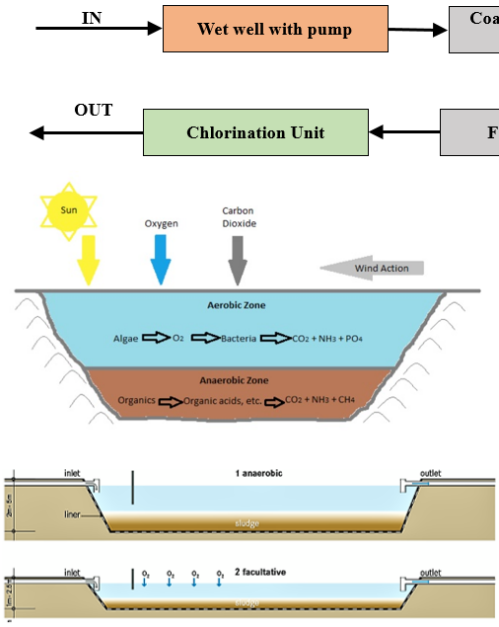
- Waste Stabilization Ponds (WSPs) are the most cost-effective for capacities up to 5 MLD if land costs are ≤₹25 lakh/acre.

- For higher land costs (>₹50 lakh/acre), mechanized options like Bio-Tower (BIOT) become more viable for 1–2 MLD capacities.
- Sequencing Batch Reactors (SBRs) and similar technologies are preferable for 5 MLD capacities where land is expensive.

Technology Preference by Land Availability:

- Low Land Cost (<₹25 lakh/acre): WSPs (anaerobic + facultative ponds).
- Medium Land Cost (₹25–50 lakh/acre): BIOT for small STPs (1–2 MLD).
- High Land Cost (>₹50 lakh/acre): Mechanized options for larger capacities (≥5 MLD).

Design of Waste Stabilization Ponds – Anaerobic + Facultative



References for Design

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3. 'Waste Stabilization Ponds and Constructed Wetlands Design Manual', S. Kayombo, T.S.A. Mbwette, J.H.Y. Katima, University of Dar es Salaam and N. Ladegaard, S.E. Jorgensen, Danish University of Pharmaceutical Sciences Section of Environmental Chemistry, Copenhagen, Denmark.
4. Wastewater Treatment for Pollution Control and Reuse, third edition, Soli J Arceivala and Shyam R Asolekar, Mc Graw Hill Education, 2007.

UASB Reactor + Aerated Facultative Pond

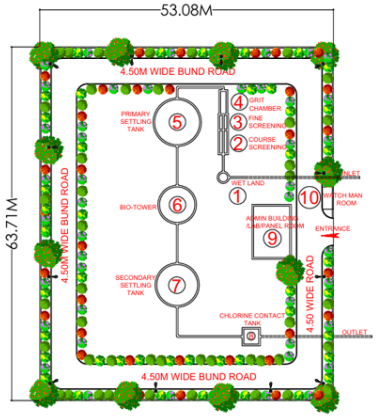
Component	Capacity		
	1 MLD`	2 MLD	5 MLD
UASB Reactor Details			
No. of UASB reactors	1	1	1
L (m)	13	18.5	29
B (m)	6.5	9.5	14.5
D (m)	5.5	5.5	5.5
Aerated Facultative Pond			
No. of ponds	2	2	2
L (m)	72	102	161
B (m)	18	25	40
D (m)	3.5	3.5	3.5

Bio Tower

Component	Capacity		
	1 MLD`	2 MLD	5 MLD
Primary Settling Tank			
No. of tanks	1	1	1
Diameter (m)	8.75	12.50	19.50
Side water depth (m)	3.25	3.25	3.25
Bio tower			
No. of Towers	1	1	1
Diameters (m)	7.0	10.0	16.0
Depth (m)	6.0	6.0	6.0
Secondary Settling Tank			
No. of tanks	1	1	1
Diameter (m)	8.0	11.5	18.0
Side water depth (m)	2.70	2.70	2.70

Anaerobic Pond + Aerated Facultative Pond

Capacity MLD	Component	No. of ponds	Length (m)	Width (B)	Depth (D)
1	Anaerobic Pond	1	32.0	16.0	6.0
	Aerated Facultative Pond	2	86	22	3.5
2	Anaerobic Pond	1	45.0	22.5	6.0
	Aerated Facultative Pond	2	122	30.5	3.5
5	Anaerobic Pond	2	50.0	25.0	6.0
	Facultative Pond – Primary	2	193	48	3.5



Decision-Making Tool

The study introduced a nomogram as a decision-support tool, providing a graphical representation of life cycle costs for STP capacities. The tool enables precise technology selection for capacities beyond standard increments (e.g., 1.5 MLD, 2.2 MLD).

Recommendations

- ✓ **Primary Recommendation**: For small towns under SBM 2.0, WSPs are the most cost-effective option, given adequate land availability and their low operational requirements.
- ✓ Policy Implications:
  - Promote nature-based solutions to reduce energy and maintenance costs.
  - Adopt mechanized options only for high-capacity STPs or areas with high land costs.
  - Leverage the nomogram for data-driven decision-making in technology selection.

This session underscored the importance of tailored wastewater treatment solutions, balancing cost-effectiveness, land availability, and operational feasibility for sustainable urban development.

Session 6.5: Multi-storey STPs feasibility and Green House Solar Dryer

Session 6.5.1: Multi-Storey STP Feasibility Analysis

Speaker: Dr. Barjinder Bhalla, Senior UWM Expert, RITES Ltd

Context and Need

The session highlighted the pressing need for innovative wastewater treatment solutions in response to rapid urbanization and land scarcity in metropolitan areas. Multi-story Sewage Treatment Plants (STPs), designed vertically either above or below ground, were presented as a viable alternative to conventional STPs, especially in high-density urban settings. Below-ground designs were emphasized for their potential to repurpose surface areas for ecological parks or recreational spaces.

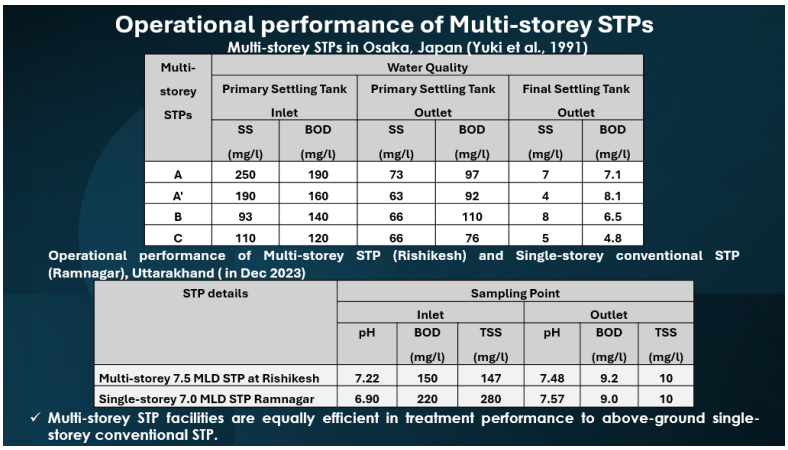
Objectives of the Study

The speaker outlined the objectives of the feasibility study, which included:

1. Addressing concerns about the feasibility, costs, and operational efficiency of multi-story STPs.
2. Comparing land usage and construction costs with conventional STPs.
3. Evaluating the ability of multi-story STPs to meet regulatory effluent standards.

Global and Indian Adoption of Multi-Story STPs

- Global Example: Countries like Japan have successfully implemented multi-story STPs. Example: Osaka, Japan (1991) demonstrated a 46% reduction in land use through multi-story designs.
- Indian Examples: Functional multi-story STPs in Rishikesh and Pune Cantonment Board. Ongoing mega-projects in Delhi and Mumbai (Dharavi) indicate growing interest in this approach.



Operational performance of Multi-storey STPs

Multi-storey STPs in Osaka, Japan (Yuki et al., 1991)

Multi-storey STPs	Water Quality					
	Primary Settling Tank Inlet		Primary Settling Tank Outlet		Final Settling Tank Outlet	
	SS (mg/l)	BOD (mg/l)	SS (mg/l)	BOD (mg/l)	SS (mg/l)	BOD (mg/l)
A	250	190	73	97	7	7.1
A'	190	160	63	92	4	8.1
B	93	140	66	110	8	6.5
C	110	120	66	76	5	4.8

Operational performance of Multi-storey STP (Rishikesh) and Single-storey conventional STP (Ramnagar), Uttarakhand (in Dec 2023)

STP details	Sampling Point					
	Inlet			Outlet		
	pH	BOD (mg/l)	TSS (mg/l)	pH	BOD (mg/l)	TSS (mg/l)
Multi-storey 7.5 MLD STP at Rishikesh	7.22	150	147	7.48	9.2	10
Single-storey 7.0 MLD STP Ramnagar	6.90	220	280	7.57	9.0	10

✓ Multi-storey STP facilities are equally efficient in treatment performance to above-ground single-storey conventional STP.

Findings and Insights

Land Use Efficiency

Multi-story STPs significantly reduce land requirements compared to conventional designs, making them particularly suitable for urban areas with limited space. For example, Osaka's multi-story STP reduced land use by 46%, from 164 m^2 to 76 m^2. Similarly, the Pune Cantonment Board's 20 MLD plant demonstrated nearly 50% land savings compared to traditional STPs.

Cost Analysis

The cost analysis revealed that while multi-story STPs incur higher initial construction costs due to structural reinforcements like retaining walls, these are balanced by substantial savings in land acquisition costs. Operational costs, on the other hand, remain comparable to conventional STPs when managed effectively, making multi-story STPs economically viable over their lifecycle.Performance Metrics:

Performance Metrics

Multi-story STPs consistently meet regulatory effluent quality standards. Case studies, such as the Rishikesh facility, have demonstrated successful compliance with these standards, ensuring environmental sustainability and regulatory alignment.

Ecological and Urban Benefits

Underground multi-story STPs offer the added advantage of repurposing surface areas into ecological or recreational spaces, such as biodiversity parks. These designs also provide scalability, allowing vertical space optimization for capacity expansion, thus integrating wastewater management with urban development goals.

Challenges Identified

- **Higher Initial Investment:** Advanced design and structural requirements increase upfront costs.
- **Design Complexity:** Specialized engineering is needed for load-bearing structures, ventilation, and safety.
- **Technical Expertise**: Operation and maintenance require skilled personnel and advanced technology.

Recommendations

- ✓ Adopt Multi-Story STPs in Metropolitan Areas: Prioritize regions with severe land constraints, and traditional STPs are not feasible.
- ✓ Leverage Global Best Practices: Utilize international case studies to refine designs and implementation strategies.
- ✓ Focus on Sustainability: Align projects with urban sustainability goals, emphasizing land optimization and ecological benefits.
- ✓ Policy Support and Funding: : Encourage adoption through urban development policies and financial incentives for advanced wastewater solutions.

Session 6.5.2: Promoting Off-Take of Treated Sewage Sludge by Enhanced Moisture Removal and Pathogens Eradication in Solar Greenhouse Dryers

Speaker: Sanjay Raut, Joint General Manager, RITES, Team Leader & UWM Expert, SBM- Urban 2.0

Treated sewage sludge (SES) management is faced with several challenges, including high moisture content and the presence of pathogens, both of which increase handling, transportation costs, and present health risks. Conventional drying beds, while common, have limitations such as long drying times, odor issues, and lower community acceptance. These challenges necessitate the exploration of innovative technologies that can address both moisture removal and pathogen eradication efficiently. The session aimed to promote the use of solar greenhouse dryers as a viable solution for overcoming these issues.

Solar Greenhouse Dryer: Working principle

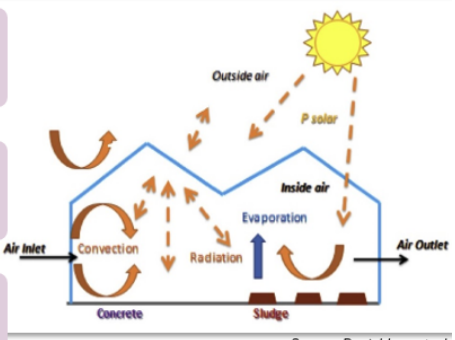
Sludge is dried using solar radiation under controlled conditions inside the greenhouse.

The solar radiation, humidity and the temperature determine the amount of **water evaporated** in SGHD.

Rate of evaporation enhanced due to **increased area of heat capture** and raising temperature up to 70^{0}C inside SGHD

Vents and turbo-ventilators are provided **to exhaust saturated air** from inside thus increasing the rate of evaporation

Humidity and Temperature inside SGHD is monitored/controlled on real time through sensors by removing the humidity and hot air using exhaust fans/vents



Source: Daniel Jung et. al.

Average temperature increase inside SGHD shall be in the range of **12^{0}C to 20^{0}C** (without any mechanization), subject to weather conditions and optimized design.

Principle of Solar Greenhouse Dryers

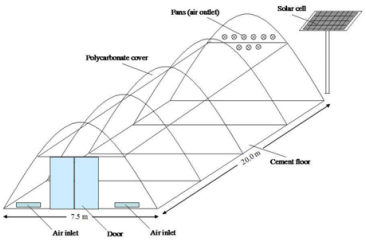
Solar greenhouse dryers operate by utilizing solar radiation to evaporate moisture from sewage sludge. The process involves controlling temperature and humidity within the drying unit, ensuring that the moisture content is efficiently reduced. Turbo ventilators and exhaust fans are incorporated into the design to facilitate proper airflow, while real-time monitoring systems track temperature and humidity levels to optimize the drying process. Larger heat capture areas and effective ventilation help to speed up evaporation, making the drying process both faster and more energy-efficient.

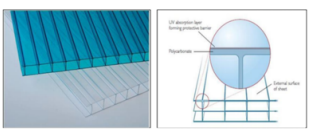
Design for Solar Greenhouse Dryers

The design of solar greenhouse dryers is critical for ensuring maximum efficiency. Key design elements include an east-to-west orientation to maximize sunlight exposure and a parabolic shape that enhances the capture of solar radiation while minimizing wind load. Multi-layer UV-coated polycarbonate sheets are used to improve heat retention and radiation transmission. Additionally, the height at the center is maintained between 2.4 to 3 meters, and proper sealing is implemented to minimize thermal losses. Solar PV modules are utilized to power the ventilation systems and fans during the day, making the system both energy-efficient and self-sustaining.

Design of Solar Greenhouse Dryer

- **Orientation of the structure:** East-West for absorbing maximum sun light
- **Parabolic shape** preferred due to better transmission of solar radiations and reduce wind load
- Use of **multi-layered polycarbonate** sheet coated both sides with at least 50-micron UV protective coat transmits maximum solar radiation
- The **height of SGHD** is kept 2.4 m to 3.0 m to get maximum efficiency
- SGHD shall be sealed from all sides properly
- **Solar PV module** is to be installed to operate exhaust fans using solar power during daytime





Design of Solar Greenhouse Dryer (Contd..)

Tentative Area Requirement for 10 TPD SGHD

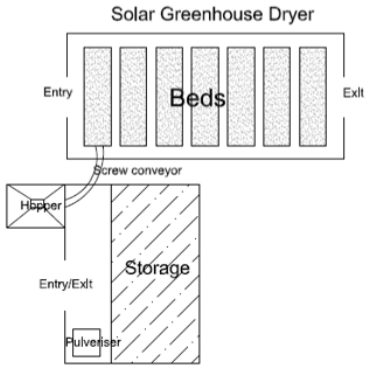
Particular(s)	Area (sq m)
Solar Greenhouse Dryer	434
Pulveriser Unit + Screw Conveyor + Storage (3 month)	250
Total Area for SGHD Facility	684

- Provide separate space for Office, Toilet and Security room

Design Calculations:

Sludge quantity – 10 TPD
Ambient Temperature - 30^{0}C
Sludge height - 30 cm

- Temperature inside SGHD - 45^{0}C (30^{0}C + 15^{0}C)
- Drying time required for pathogen inactivation - 7 days
- Number of beds - 8 nos (7+1)
- Kept area for circulation inside SGHD (1m along both side & 2m from front and back side)



Typical Layout Plan for 10 TPD SGHD

Estimated cost : Rs 52 Lakh

Operational Parameters and Efficiency

- Temperature and Drying Time Relationship:
  - Pathogen eradication depends on temperature and duration (inversely proportional):
    - At 70°C, pathogens can be eradicated in 20 minutes.
    - At 45°C, drying takes around 7 days.
  - As per US EPA norms, 70°C for 30 minutes achieves pathogen eradication (Class A standards).
- Drying Bed Design:
  - Sludge height: Maximum 30 cm.
  - Typical drying time: 7 days, requiring 8 drying beds for a 10 TPD plant.

Cost and Area Requirements

For a 10 TPD plant, the required area for solar greenhouse dryers is approximately 434 square meters.

Operation and Maintenance for Maximum Efficiency:

- Best Practices:
  - Regular turning and mixing of sludge (every 1–2 days) to maintain uniform drying.
  - Cleaning polycarbonate sheets 2–3 times a month using water and soft cloth (avoid dry rubbing).

    - Perform cleaning and maintenance in the early morning or late evening to minimize disruption.

- Monitoring: Real-time monitoring of temperature and humidity is essential to maintain drying efficiency.

Utilization of Dried Biosolids:

- **Applications:**
    - As a soil supplement or soil enhancer in agriculture and gardening due to its high nutrient content.
    - Compliance with EPA Class A specifications ensures safety and effectiveness.
- **Environmental Benefits:** Reduces landfill waste and contributes to improving soil quality and promotes sustainable agricultural practices.

Way Forward

- ✓ The solar greenhouse dryer is a cost-effective and sustainable solution for SES drying, addressing pathogen removal and moisture reduction efficiently.
- ✓ The advisory aims to provide guidelines for implementing this technology at scale across states and UTs.
- ✓ Suggestions and feedback from stakeholders will further enhance this framework for broader adoption.

Session 7: Project Financing, Recycle & Reuse

Moderator: Shri Sathish Kumar, Technical Officer, CPHEEO

Session 7.1: Preparing bankable projects for UWM - sharing experience from Indian cities

Speaker: Ms. Sujatha Srikumar, Finance Advisor, USAID-WASHFIN Activity

The session emphasized the importance of bankability in urban water management (UWM) projects, highlighting the gap between project viability and securing adequate financing. While many urban projects struggle to generate sufficient revenues, proper structuring and preparation can enable financing through diverse sources such as capital markets, banking channels, and PPP models.

About WASH FIN 2 Project

Overall Goal	Demonstrate that deliberate upstream preparation support to WASH service providers can enhance existing capital market opportunities to leverage repayable finance and improve governance and performance.
Primary Activities	1. Enabling Environment Assessment 2. Upstream Preparation for Municipal, Green, or Pooled Bonds 3. WASH SME Access to Finance and On-Demand Activities 4. Knowledge Management
Start Date	March, 2024
End Date	November, 2026
LOP Target Results	INR 600 crores mobilized for WASH projects, 6 WASH Institutions strengthened, 3,60,000 people benefit from improvements

Key Takeaways:

- Many UWM projects are not inherently viable due to inadequate revenue generation, especially in sectors like sewage management.
- Projects can still achieve financial closure through blended financing approaches combining grants, borrowings, user charges, and PPPs.
- Creditworthiness is fundamental to project bankability, involving improved governance, financial management, and operational efficiency. It ensures timely interest and principal repayment, crucial for attracting investments.
- Strategic use of grants, structured contributions, and market-driven solutions like industrial-grade wastewater reuse can enhance project viability.
- Robustness of demand assessment and levy of appropriate user charges key to improving bankability of project and sustainability of municipal finances.
- Hybrid Annuity Model is an appropriate model for implementing such projects as it ensures sustainability.

Experience with PPPs in the Wastewater Sector

✓ MAHAGENCO Wastewater Reuse Project, Nagpur –

- Single end user, MAHAGENCO entered a MoU with Nagpur Municipal Corporation to offtake 110 MLD of treated wastewater from Nagpur Municipal Corporation
- Hybrid financing: 50% JNNURM grant, 20% municipal contribution, and 30% by the end-user (MAHAGENCO).
- Demonstrated viability through structured financing and a large off-taker agreement.

✓ Wastewater Treatment PPP Project in Mathura under National Mission for Clean Ganga

- National Mission for Clean Ganga (NMCG) signed a concession agreement with Uttar Pradesh Jal Nigam and M/s EIEL Mathura Infra Engineers Pvt. Ltd., a joint venture between M/s Enviro Infra Engineers and M/s Microtransmission Systems for the construction, operation and management of a 60 MLD sewerage treatment plant at a capital cost of INR 240 crores.
- Under the Hybrid Annuity Model, 40% of the capital costs is to be paid by NMCG to the private developer (M/s EIEL Mathura Infra Engineers Pvt. Ltd.) on the completion of construction while the remaining 60% of the project cost was to be paid as annuities and O&M payments linked to performance of the STP.

✓ Ghaziabad Nagar Nigam (GNN) Green Municipal Bond Issue

- GNN is the first ULB to launch Green Municipal Bonds in India
- Raised ₹150 crores via municipal bonds supported by property tax revenues.
- Leveraged AMRUT incentives to lower borrowing costs, later transitioning to a hybrid PPP model.
- Project catered to industrial clusters using STP-treated water, creating a self-sustaining ecosystem.

Policy and Market Dynamics:

- Guidelines mandate treated wastewater usage in power projects and industrial setups, encouraging the development of such initiatives.
- The importance of annuity-based models and incentivized bond issuances for financial sustainability was underscored.

Leveraging innovative financing models, addressing governance and operational inefficiencies, and integrating market demands can significantly enhance project bankability, paving the way for sustainable urban development.

Session 7.2: Gujarat roadmap on recycle and reuse

Speaker: Shri Naveen Saini, Water & Wastewater Mgmt. Expert, GUDM

The session provided an overview of Gujarat's initiatives, Policy of Treated Wastewater Reuse, and infrastructure related to the reuse of treated wastewater.

Current Wastewater Treatment Status in Gujarat:

- Gujarat generates 4,638 MLD of wastewater. The state has an installed treatment capacity of 5,692 MLD across 204 STPs, with 48 STPs under construction and two more planned for completion by 2027.
- Of the treated 4,107 MLD, 1,206 MLD is being reused for purposes such as industry, agriculture, and municipal uses. Projects are planned for reusing an additional 1,272 MLD of treated wastewater.

Gujarat's Policy of Treated Wastewater Reuse

The policy emphasizes the strategic reuse of treated wastewater to address water scarcity and promote sustainable practices. The policy has three main objectives:

- Achieve **70% reuse of treated wastewater by December 2025**, reducing reliance on fresh water for non-potable uses.
- Ensure **reuse of 25% of fresh water consumption,** conserving resources for drinking and other critical applications.
- **Realize 100% reuse of treated wastewater by 2030,** making wastewater a key resource for water sustainability.

Mandated Usage of treated wastewater – Non-Potable

Recent policy amendments include:

- ✓ A government resolution (GR) issued on November 19, 2024, prohibits the reuse of raw sewage, ensuring only treated wastewater is utilized.
- ✓ The cost of secondary treated water is fixed at 20% of prevailing fresh water rates, incentivizing adoption by industries and municipalities.

Operational Reuse Projects in Gujarat

Surat Municipal Corporation - 3 Operational Projects , 330 MLD treated wastewater Reuse generating INR 12.49 Cr. per month as revenue

Gandhidham Anjar Nagarpalika- STP managed on PPP mode – Welspun India Pvt Ltd, 23 MLD treated wastewater reuse

- ✓ Hiring of an agency to identify, plan and implement treated wastewater projects across the city in the designated zones. The scope includes infrastructure evaluation, financial analysis, DPR preparation, stakeholder consultation and project management consultancy service to ensure sustainable and revenue generating wastewater management solutions.

Challenges

- Wastewater Management: Need for effective reuse plans to minimize treated water disposal.
- Groundwater Dependency: Low interest from industries and agriculture due to access to groundwater.
- Competitive Pricing: Difficulty in reaching pricing agreements with treated water users.

Opportunities

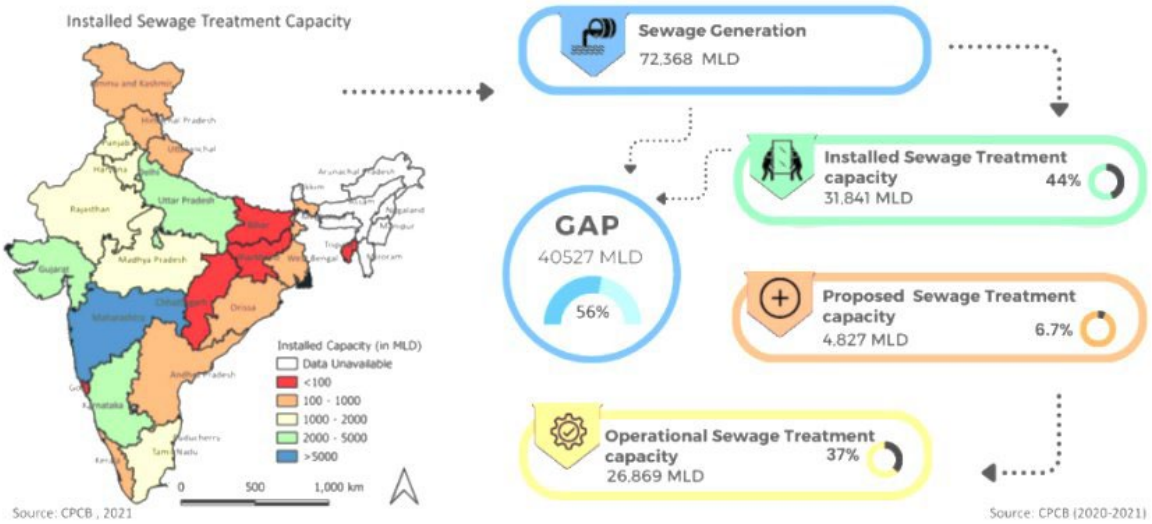
- Revenue Generation: Municipalities can sell treated wastewater to industries, power plants, and agriculture, establishing a self-sustaining water management model.
- Wastewater Reuse: Effective treatment and reuse can alleviate water stress and lower environmental pollution.
- Sustainable Industrial Practices: Promoting water-efficient practices in industries to reduce freshwater dependence.

The reuse of treated wastewater presents substantial opportunities for Gujarat, supported by robust policies, infrastructure, and planned projects. However, challenges such as logistical costs and sectoral prioritization need focused attention to achieve the state's ambitious reuse targets by 2025 and 2030.

Session 7.3: Reuse of treated sewage by various cities

Speaker: Shri Faraz Ahmed, Deputy Program Manager, CSE

The discussion highlighted India's current wastewater scenario, emphasizing a significant gap between sewage generation (72,368 MLD) and treatment capacity (operational: 26,000 MLD). Despite various policies like the National Framework on Safe Reuse of Treated Wastewater (2022), implementation challenges persist at both national and state levels. Key insights from a CSC study in 16 cities across 7 states revealed limited reuse confined to a few cities and sectors, with agriculture, lake rejuvenation, and industry being the primary beneficiaries.



Challenges Identified:

- ✓ Lack of stakeholder mapping and role clarity in project execution.
- ✓ Mismatch between large STPs and local demand centres, leading to high conveyance costs.
- ✓ Only 17% of treated capacity meets reuse standards due to outdated infrastructure.
- ✓ Absence of tailored reuse standards for diverse applications.

Some State specific practices to scale up reuse of treated wastewater

Tanker filling treated wastewater to be supplied for construction purpose in Gurugram, Haryana

Treated wastewater used by farmer form irrigation in Kurukshetra, Haryana

Shallow aquifer recharge using treated wastewater in Bengaluru rural, Karnataka

Canal irrigation using treated wastewater in Dhandupura, Uttar Pradesh

Treated wastewater for revival of Anasagar lake in Ajmer, Rajasthan.

Recommendations:

- ✓ Develop dedicated timelines and action plans to monitor progress effectively.
- ✓ Prioritize local treatment and reuse systems to minimize water transport costs.
- ✓ Establish state-specific policies through public engagement to ensure equity and sustainability.
- ✓ Define re-use priorities and action plans. Strengthen STP infrastructure and compliance with reuse standards.
- ✓ Define an effective governance model with clear stakeholder roles.

CSC Contributions:

- ✓ Launch of the “Waste to Worth” report on India’s urban water crisis.
- ✓ Guidance notes for prioritizing treated wastewater reuse in Uttar Pradesh.
- ✓ Development of a city-level template for reuse, released during Ganga Utsav 2023.

WASH Institute's Mobile Treatment Unit (MTU) at the Workshop

WASH Institute's Mobile Treatment Unit (MTU) was showcased at the workshop, demonstrating its innovative approach designed to address the challenges of Faecal Sludge Management (FSM) in areas where conventional treatment facilities are unavailable or not feasible. This state-of-the-art mobile unit is equipped to safely treat faecal sludge on-site, ensuring proper disposal and minimizing environmental risks. The MTU is a versatile, on-the-go solution designed to enhance waste treatment and management.

His Excellency, U.S. Ambassador Eric Garcetti, along with the USAID team, visited and appreciated the Mobile Treatment Unit (MTU) developed by WASH Institute

Exhibition at National Workshop

Gallery Exhibit

The event also showcased an engaging exhibition showcasing the 10 years journey of SBMU and the three key components of SBM2.0: Toilet 2.0, Used Water Management (UWM), and Manhole to Machine hole (M2M)-

- Toilet 2.0 exhibit featured findings town specific findings from 14 towns project, sustainable business models to ensure the long-term functionality and maintenance of public and community toilet facilities, monitoring tool designed to track cleanliness levels and overall performance of public toilets, guidelines to site public toilets to ensure user accessibility and 25 site specific aspirational public toilet designs from 13 cities across 9 States thereby making holistic sanitation solutions that are more inclusive and user-friendly. The exhibit also featured interactive and educational games focused on dos and don'ts of toilet operations and maintenance (O&M), efficient management practices and Toilet Monitoring systems.

- Manhole to Machine Hole showcased a Safaimitra Resource Management System to help local governments enumerate sanitation workers, provide them identification, and record their PPE requirements based on their work, gender, and size. The objective is to professionalise the workforce, ensure use of PPEs and train and upskill Safaimitras in a thriving and safe environment.

- Used Water Management (UWM) exhibit showcased case studies from the 9 towns surveyed dunder the 14 towns project, a new approach and methodology for used water management in small and medium towns to help towns achieve 100% UWM with right mix of solutions.




Together, these components are brought to life through immersive experiences, including VR-based toilet designs, interactive dashboards such as the Toilet Tracker and Safaimitra Resource Management System, and digital exhibits, demonstrating SBM 2.0's commitment to revolutionizing urban sanitation.

Stalls

The workshop featured a variety of stalls showcasing innovative solutions in the water, sanitation, and hygiene sectors. A total of 12 stalls were showcased at the National Workshop . The USAID and partners displayed collaborative projects for improving sanitation. HUL highlighted the Suvidha Complex model for accessible sanitation, and UNICEF introduced the FSSM IT Framework for better waste management. The UP Government showcased the WooLoo sanitation solution, the "One City One Operator" project, showcase of Bandicoot Sewer Cleaning robotic machine and other state-led initiatives. CURE exhibited a smart urban governance tool, toilet design case studies, and the SaMMaN Framework, while BMGF showcased their reinvented toilets for sustainable sanitation. Suwasi demonstrated their support to central and state governments, and Sulabh International highlighted their initiatives in public toilets through models of public toilets and hygiene education. Karam presented safety equipment for sanitation workers, emphasizing worker protection in hazardous environments.

USAID & Partners Stall at the Exhibition

KARAM showcasing safety equipment for sanitation worker

UNICEF India stall at the National Knowledge Workshop

Sulabh exhibiting public toilet models at the Workshop

List of Participants

S.No.	Name	State
1	Atit Kumar Jaiswal	Assam
2	Giri Shankar Hazarika	Assam
3	Qamre Alam	Bihar
4	Rajesh Kumar tiwari	Bihar
5	Jyot Prakash	Bihar
6	Anurag Yadav	Chandigarh
7	Angrez Singh	Chandigarh
8	Ramesh Singh	Chhattisgarh
9	Mr Mohan Kumar Jha	Delhi
10	Manasmita Pattnaik	Delhi
11	Rohit Kakkar	Delhi
12	Dr Pravin Kumar	Delhi
13	Diwakar	Delhi
14	Dr. V K Chaurasia	Delhi
15	Sanjeev Shekhar jha	Delhi
16	Abha kumar	Delhi
17	Kumar Dilip	Delhi
18	Ajay kumar	Delhi
19	Rahul barnabas	Delhi
20	Bouvi kumar	Delhi
21	Sutirtha sahariah	Delhi
22	Ayan Chakraborty	Delhi
23	Sathish Kumar	Delhi
24	Barjinder Bhalla	Delhi
25	Abesh Dasgupta	Delhi
26	Jawed Ahmad	Delhi
27	Prabhat Kumar Singh	Delhi
28	Pankaj jain	Delhi
29	Manpreet Singh	Delhi
30	Aditya	Delhi
31	N P Singh	Delhi
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35	Radhey Shyam tyagi	Delhi
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41	Siddik Maniar	Gujarat
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44	Akshay jain	Haryana
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46	Rajendra Chauhan	Himachal Pradesh
47	Ritesh Saini	Himachal Pradesh
48	Arun kumar	Jammu and Kashmir
49	Rajeev girdhar	Jammu and Kashmir
50	Dr. Devansh Yadav	Jammu and Kashmir
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52	Souritra Bajpayee	Jharkhand
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WASH Academy
No.1/20 Kathiranampatti Pirivu,
Reddiarchatram, Dindigul 624 622,
Tamil Nadu Tel: +91 451 2554214
Email: courses@washinstitute.org

Finance Office
42, Vasant Enclave, Vasant Vihar,
New Delhi 110 057, India.
Tel: +91 11 - 26154842 / 49058088
Email: office@washinstitute.org

Program Office
FPAI Bhawan, Third Floor, Sector IV, RK Puram,
New Delhi 110 022, India.
Tel: +91 11 35507328
Email: program@washinstitute.org

Project Office

Kothi No. 38, B Block Market, G.T Road, New **Amritsar**, **Punjab** 143 001.

No.218,2nd Floor pillakamma Nagar Chikkajala, Chikkajala Post, **Bangalore North**, **Karnataka** 562 157.

H.No.7-210 First Floor, Besides Pragathi School, Irivendi Road, Sarapaka - 507 128, Bhurgampadu Mandal, **Bhadradri Kothagudem**, **Telangana**.

i) No.7, 1st floor, Boopathinayagam Street, Old Puducherry road, Egattur Village Road, Sholinganallur, **Chennai**, **Tamilnadu** 600 119.
ii) No.44/43, Pachaiyappas college Hostel road, Chetpet, **Chennai**, **Tamilnadu** 600031.

H. No: 3-195, 4th Floor, NDR Complex, Near ITC Flyover Bridge, Opp. Saibaba Temple, Anaparthi, **East Godavari**, **Andhra Pradesh** 533 342.

House no. 291, Golden Colony, Fatehgarh Churian, Tehsil: Ajnala, Amritsar, **Gurudaspur**, **Punjab** 143 515.

D.No. 3-219, NH16, Vemagiri Village, Near Weigh bridge, **Kadiyam** Mandal, **East Godavari**, Andrapradesh 533 125.

First Floor, Plot No 94, Banki Road, Devasis Nagar, Hindaun City, **Karauli**, **Rajasthan** 322 230.

Parama Apartment, 3, Government Colony, 1st Floor Flat Number 201, Sodepur **Kolkata**, **West Bengal**.

No.35, Second Floor, LIC Colony 2nd Street, Kulamangalam Main Road, **Madurai**, **Tamilnadu** 625 014.

No.60/22. Arunodaya Nilaya, Opp to Police Quarter's, Maruti Extension, **Malur Town**, **Kolar**, **Karnataka** 563 130.

No.604/754, BRM College Road, Madhopur, P.O: Basudevpur, **Munger**, **Bihar** 811 202.

D-301 (7), East Avenue Apartment, Vill- Sarfabad, Sector 73, **Noida**, **Uttar Pradesh** 201 304.

20/1 Eswari Nagar,Viralimali, **Pudhukottai**, **Tamilnadu** 621 316.

4/130 C, 4/130 D, South Car Street, Thiruppullani, Kilakarai (TK) **Ramanathapuram**, **Tamilnadu** 623532.

Rajeev Tangri House, First Floor Lane-1, Ankit ViharNavada Road, **Saharanpur**, **Uttar Pradesh** 247 001.

H no 1065C, Bazar para, **Uleberia**, Howrah, **West Bengal** 711 316.

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