Global South Academic Conclave

WASH and Climate Linkages

21st – 23rd February 2025

CEPT University | Ahmedabad

REPORT

CWAS CENTER FOR WATER AND SANITATION CRDF CEPT UNIVERSITY | CEPT UNIVERSITY FACULTY OF PLANNING | Gates Foundation | viega foundation

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Conclave Summary

Climate change induced events, such as intense heat waves, erratic rainfall, floods, droughts, are on the rise globally. These events disrupt the delivery of essential services such as water and sanitation and disproportionately impact vulnerable and marginalized population. Moreover, the provision of these services also contributes to the release of Greenhouse Gases (GHGs), further exacerbating climate change. There have been ongoing discussions, debates and research on these complex interlinkages worldwide. In an effort to convene these global voices and foster collective thinking towards inclusive and sustainable solutions, the Center for Water and Sanitation (CWAS) at CEPT Research and Development Foundation (CRDF), CEPT University has been organizing the Global South Academic Conclave (GSAC) on Climate and WASH linkages since 2024.

February 21st to 23rd 2025 marked the second edition of the conclave organised by CWAS, in collaboration with the CRDF and the Faculty of Planning at CEPT University with support from the Gates Foundation and Viega Foundation. The conclave was a great success, with over 430 in-person participants and more than 750 virtual attendees from 21 countries.

The conclave included seven keynote addresses and four panel discussions led by eminent researchers and practitioners from India and abroad. Additionally, nine technical sessions comprised 50 presentations covering critical themes such as monitoring WASH outcomes, governance and financing for climate-resilient WASH, inclusive and climate-resilient water and sanitation systems and technological innovations in water and sanitation service delivery. A poster exhibition accompanied the technical sessions, showcasing work by several participants, including students from CEPT University. A significant highlight of the conclave was the celebration of the 15-year journey of the Performance Assessment Systems (PAS) program which is now implemented in 1000+ cities in five states of India.

Over the three days, the event facilitated an enriching exchange of ideas and experiences between academia, researchers and practitioners, fostering an environment of cross-learning. Participants underscored the deep interconnections between climate change and WASH, emphasizing that these linkages have yet to receive adequate attention in the global climate discourse. With uncertainties surrounding commitments from the Global North, participants unanimously advocated for developing indigenous technical and financial solutions tailored to local contexts. They emphasized the importance of community-driven approaches, advocating for active community involvement in planning, implementation and monitoring services to build climate-resilient communities.

A consensus emerged on the need to shift towards off-grid, decentralized water and sanitation service provision to reduce capital costs and enhance efficiency. To strengthen financial sustainability, recommendations included improving municipal financial autonomy and GST transfers to local bodies, increasing shares in state and national taxes, leveraging capital markets through instruments like municipal and green bonds and enhancing cities' creditworthiness.

Building upon last year's GSAC, which underscored the need for more research and evidence on the WASH-climate linkages, this year's conclave was more assertive in its recognition of these interconnections. It suggested practical approaches and tools to address the challenges, reinforcing the urgency of integrating WASH within the broader climate resilience agenda.

Key takeaways from GSAC

A. Policy & Governance

1. Climate-resilient WASH is central to global adaptation, yet under-prioritized in policies and finance. A common framework of climate-resilient WASH is essential for aligning national policies, unlocking climate finance, standardizing monitoring and promoting global coordination.
2. Monitoring systems like PAS has improved transparency, equity and accountability in the urban service delivery. It should further deepen focus on climate resilience and water security and expand its scope into creditworthiness and ESG evaluation.
3. Need to integrate WASH into broader urban planning and infrastructure projects, ensuring informal settlements are not left behind. This should be backed by strong governance and institutional coordination.

B. Finance & Equity

1. Climate financing and policies disproportionately favour mitigation over adaptation, leaving informal settlement vulnerable to its impacts. It is thus critical to rebalance the focus.
2. There is need for decentralized and flexible financing models with public–private collaboration and strong municipal capacity to improve WASH outcomes.
3. To ensure equitable and resilient urban development, it is important to leverage government investments effectively by building implementation capacity, regional collaboration and sustainable water management practices.

C. Technology & Innovation

1. Need to transform WASH service delivery with innovative and decentralized technologies that are inclusive, affordable and market-creating.
2. Adopt nature-based and innovative solutions such as groundwater recharge, rainwater harvesting, and climate-resilient water supply systems in rural/urban areas for long-term water security.

D. Community & Localised Approaches

1. Empower communities with localized strategies through structured business planning, granular data use and active engagement to ensure equity and sustainability.
2. Advance decentralized, people-centric models for water harvesting, wastewater reuse and pollution control by integrating adaptation and mitigation approaches.

Inaugural Session

The conclave was inaugurated by leadership of CEPT University, CRDF, Gates Foundation and Viega foundation, with a symbolic gesture of watering the plants to represent environmental commitment. The opening session set the tone for the event by underscoring the importance of addressing water and sanitation challenges in the context of urbanization and climate change. It highlighted the significance of research, policy engagement, capacity building and global collaboration, particularly from the perspective of the Global South. The session also reinforced the vital role of academic institutions and long-term partnerships among various sectoral organizations in shaping discourse and driving locally grounded, innovative solutions.

The conclave was inaugurated by the leadership of CEPT University, CRDF and the Faculty of Planning, including Mr. Barjor Mehta (President, CEPT University), Dr. Suren Vakil (Vice-Chairperson, CRDF, CEPT University), Dr. Meera Mehta (Center Head, CWAS, CRDF, CEPT University), Dr. Salini Sinha (Dean, Faculty of Planning, CEPT University), Ms. Marina Supriyono (WASH Advisor, Viega Foundation) and Ms. Sakshi Gudwani (Senior Program Officer, Gates Foundation). The dignitaries commenced the session by watering plants, symbolizing their commitment to environmental protection.

Ms. Shalini Sinha welcomed the participants of the conclave on behalf of the Faculty of Planning. **She emphasized that the conclave is significant, as it focuses on the crucial area of water and sanitation in the context of urbanization and climate change and as it brings together professionals, researchers and academia from across the globe to deliberate on these pressing concerns.** She highlighted the strong practice connect of academia at CEPT which students largely benefit from. She discussed about the programs at CEPT University's Faculty of Planning and its recognition as the Center for Excellence in Urban Planning and Design and to lead the India hub of Global Sanitation Graduate School. She mentioned about the ongoing knowledge partnership with UNICEF for studios and Directed Research Projects (DRP). She also recognised the support from the student volunteers and the Faculty of Planning for the conclave. She reiterated the importance of the conclave as a vital platform for shaing the diverse experiences from India and Global South.

Ms. Meera Mehta warmly welcomed the participants to Ahmedabad and CEPT University. She introduced the CRDF and CWAS and spoke about its role in hosting this second edition of the conclave. **She emphasized the event's role in fostering global collaboration, particularly from the Global South and encouraged the attendees to engage in meaningful discussions.** She also invited participants to explore Ahmedabad, a UNESCO World Heritage City, alongside the conclave's sessions. She concluded her address by wishing everyone an enriching experience at CEPT University.

Mr. Suren Vakil underscored the crucial role played by CWAS and CRDF in action research and policy influence. **He lauded CWAS's achievements and ongoing programs, such as its PAS program in partnership with the Gates Foundation, its collaboration with state and national governments, including its role as Swachhata Knowledge Partner for the Swachh Bharat Mission, its distinguished list of donors and clients etc.** He highlighted the seven centers housed within CRDF and their approach to integrating research with practice, engaging students through DRPs and ensuring a tangible impact on policy and development. He also appreciated the CWAS team's efforts in working on the ground and collaborating with

the governments of Maharashtra and Gujarat. He mentioned some of their key initiatives, including enabling rainwater harvesting, empowering self-help groups (SHGs), and leveraging AI and Machine Learning (ML) to track WASH systems. He also spoke about the other professional conferences being organised by CEPT University which foster's the culture of knowledge building and cross learning.

Ms. Sakshi Gudwani expressed gratitude for being associated with CEPT and appreciated the organizers. She highlighted the 25-year milestone of the Gates Foundation and its 15-year partnership with CEPT University's CWAS and CRDF Foundation. **She emphasized that sanitation is crucial in the climate conversation, yet it lacks the attention it deserves in global climate narrative. With increasing environmental challenges, the Global South must take the lead in developing solutions tailored to its needs rather than relying on imported approaches.** She asserted that the CEPT's research and evidence-building efforts and that of the conclave are vital to ensure that sanitation remains a priority and that it also helps in shaping policy, securing investments and scaling climate-relevant solutions. She also stressed the importance of training engineers, planners and functionaries, with CEPT University playing a key role in this capacity-building. She also reaffirmed the Gates Foundation's commitment to support CWAS, CEPT and its initiatives, emphasizing the importance of collaboration in advancing sanitation and climate solutions.

Ms. Marino Supriyono expressed gratitude to CWAS, CRDF and CEPT teams for organizing the Conclave and acknowledged that climate change personally impacts all of us in some way. **She shared her concern over the scale and complexity of WASH and climate challenges, emphasizing the worsening crisis due to climate events, that no previous generations have faced. She stressed that climate and WASH are interlinked. She also shared her optimism driven by ongoing efforts, emerging tools and innovative solutions**. She underscored the need for collective action to piece together solutions and praised the conclave's role in fostering learning, collaboration and discourse. **She emphasized that this conclave is unique as it is the only one which focuses on WASH and climate change in the Global South and that the outcomes will be beneficial to both the Global South and North**. She also highlighted the inclusive and inspiring environment of the conclave. She reaffirmed the Viega Foundation's commitment to supporting these critical efforts.

Mr. Barjor Mehta welcomed the attendees to CEPT University, a small yet diverse campus. He also shared with pride the presence of global alumni network across 50 countries, which makes hosting an academic conclave on WASH and climate change a natural fit. **He emphasized importance of academia's role in tackling climate challenges, noting that a once-emerging global consensus on climate change now appears uncertain. He stressed that in these uncertain times, academics must act as custodians of knowledge and solutions, ensuring that when political landscapes shift, they remain key contributors to the conversation.** He concluded his address with gratitude and a warm welcome to all the participants.


Inauguration
Barjor Mehta
(CEPT University)
Shalini Sinha
(FP-CEPT University)
Suren Vakil
(CRDF)
Sakshi Gudwani
(Gates Foundation)
Marina Brueckner-
Supriyono
(Viega Foundation)
Meera Mehta
(CWAS,
CRDF- CEPT University)
Dinesh Mehta
(CWAS,
CRDF - CEPT University)
Global South Academic Conclave - WASH and Climate
Global South
Academic Conclave
WASH and Climate
CEPT

Keynote Addresses

The two-day conclave featured seven esteemed keynote speakers who brought their rich experience and expertise to shape the discourse. Mr. Rick Johnston, with his extensive experience in monitoring WASH at the global level, called for better tracking, financing and common definitions for resilient WASH systems. Ms. Sheela Patel, from her extensive work with the marginalized communities, advocated for their inclusion in climate and development policymaking. Dr. Kala Vairavamoorthy, an internationally recognized water resource management expert, stressed the need for decentralized and innovative sanitation systems led by the Global South. Dr. Sunita Narain, an eminent environmentalist and author, urged systemic governance reforms and community-based approaches to tackle pollution and climate challenges. Mr. Rakesh Mohan, a highly respected economist and policymaker, offered a different perspective on India's stalled urbanization and called for reforms in second-tier cities. Dr. Ashok Khosla, a global environmentalist, emphasized water access inequalities in India and promoted integrated WASH approaches and nature-based solutions. Mr. K. Srinivas, drawing from his long-standing experience with the Government of India, shared the country's progress in the water sector, highlighted the challenges ahead and spoke about the need for innovation and partnerships.

Keynote Address by Mr. Rick Johnston (WHO)

Mr. Rick Johnston, Technical Officer in the unit of Water, Sanitation, Hygiene (WASH) and Health at the World Health Organization (WHO), delivered a keynote address on Climate Resilient WASH at the Conclave. He emphasized the key role that water plays across most climate risks. He highlighted how climate hazards like extreme heat and water scarcity intersect with vulnerabilities and worsen health outcomes. He added that WASH is underrepresented in climate finance and adaptation plans. He called for a common definition and better indicators to track progress. Johnston emphasized targeted interventions, stronger monitoring and scaled-up financing to build adaptive, inclusive and resilient WASH systems globally.

Mr. Johnston started his keynote address with reference to the 2025 Global Risk Report hosted by World Economic Forum which identifies six major challenge groups such as environmental collapse, global power shifts etc. and the associated risks, **with water playing a significant role across most risks.** Climate extremes exacerbate public health and humanitarian challenges, with UNICEF reporting that 75% of its resources now address humanitarian needs, driven largely by extreme weather over the past five years. Affected populations have more than doubled, with a tripling in fragile and conflict-affected states.

He added that climate hazards impact WASH services and health in diverse ways. For example, extreme heat increases water demand, while wildfires in Los Angeles depleted firefighting water. These hazards intersect with vulnerabilities (e.g., socioeconomic status, gender, health) and multipliers (e.g., water scarcity, contamination), amplifying risks like malnutrition, infectious diseases and mental health issues. The IPCC predicts climate change will cause an additional 250,000 deaths annually (2030–2050) from heat stress, undernutrition and diarrhoea.

He emphasized that risk is the intersection of hazard, vulnerability and exposure, leading to shocks, while resilience is the capacity to respond to these shocks, closely linked to adaptation. **He explained that resilience in WASH can range from restoring services to**

pre-shock levels to transforming systems for better future preparedness.

He highlighted the disparity in National Adaptation Plans (NAPs), which prioritize water supply over sanitation and transboundary water management. Similarly, Nationally Determined Contributions (NDCs) under the Paris Agreement do not give sufficient prominence to WASH, despite its estimated contribution of at least 5% to global GHG emissions, primarily through wastewater treatment.

Discussing climate finance, Mr. Johnston noted that 90% of global climate funding is allocated to mitigation, with only about 4% directed to water and sanitation, despite water being central to climate change challenges. However, he pointed to recent progress, such as COP28's thematic adaptation targets, where water and sanitation were prioritized first and an ongoing two-year work program aimed at defining and tracking climate-resilient WASH progress ahead of COP30.

A common definition of climate-resilient WASH is essential for aligning national policies, unlocking climate finance, standardizing monitoring, and promoting global coordination. The definition includes key elements such as anticipating, responding, coping, recovering, adapting and transforming WASH systems. Notably, the Green Climate Fund now includes an annex on sanitation, recognizing its dual potential for mitigation and adaptation.

He outlined a framework for targeting WASH interventions based on vulnerability and climate risk, identifying four key groups:

1. Populations lacking WASH in climate-impacted areas (most vulnerable)
2. Populations lacking WASH in other areas
3. Populations with WASH in climate-impacted areas
4. Populations with WASH in other areas

Different strategies are required for each group to enhance resilience.

WHO and UNICEF, in collaboration with partners, are reviewing climate-resilient WASH indicators. This involves a theoretical framework linking adaptation actions to infrastructure attributes, service functionality and user impacts, while considering various climate hazards. A literature review has identified numerous candidate indicators, though more empirical support is needed, especially for sanitation and hygiene.

He shared the Chennai example, illustrating how rainwater harvesting, advanced treatment and anaerobic digestion can simultaneously enhance resilience and reduce emissions.

During the discussion, participants expressed interest in collaborating to develop scalable indicators at the country level. Mr. Johnston confirmed that existing frameworks are being leveraged to identify relevant indicators and emphasized the need for a common approach to monitoring WASH resilience in the context of climate change.

This address reinforced the critical role of climate-resilient WASH in global climate

adaptation efforts and highlighted opportunities for scaling up financing, monitoring and targeted interventions to build stronger, more resilient systems for the future.

Keynote Address by Ms. Sheela Patel (SPARC)

Sheela Patel is a renowned urban planner and social activist, known for her work at the Society for the Promotion of Area Resource Centres (SPARC). She has been a leading advocate for the rights of the urban poor, particularly those living in informal settlements. Her work focuses on ensuring that marginalized communities have a voice in urban development and climate change policies. Through her efforts, Patel has played a key role in shaping global conversations on sustainable urbanization, social justice and climate resilience.

Ms Sheela Patel's keynote speech focused on the intersection of informality and climate change, emphasizing the **urgent need to transition away from outdated colonial-era urban planning norms**. She critiqued the rigid regulatory frameworks that fail to accommodate the realities of rapid urbanization and informal settlements, which house a significant portion of the population in the Global South.

She highlighted how migration patterns, both within and across countries, are driven by climate-induced disruptions, making informality an inevitable part of urban expansion. She underscored that the current development and climate change strategies often exclude the most vulnerable populations, prioritizing elite-centric solutions instead. A key point she made was the systemic failure in addressing the needs of informal communities, particularly in relation to housing, basic services and climate resilience.

She also expressed concerns about the disconnection between global policy frameworks such as the Sustainable Development Goals (SDGs) and the United Nations Framework Convention on Climate Change (UNFCCC). She emphasized that development cannot be effectively pursued without integrating climate considerations at its core. Furthermore, **she critically assessed international climate negotiations, noting that financing mechanisms disproportionately favor mitigation over adaptation, leaving informal settlements without crucial support.**

She emphasized the urgency of **reforming outdated governance structures to adapt to the realities of informality and climate change**. She pointed out that climate change will drive large-scale migration, with the greatest burden falling on cities in the Global South. Current urban development and climate strategies often neglect the urban poor, focusing instead on elite interests. A major challenge she highlighted was the disproportionate focus on mitigation over adaptation in climate finance, which leaves informal settlements without the necessary resources to build resilience. Patel stressed the need for localized solutions, where communities are empowered to develop their own strategies rather than rely solely on external funding. She also linked climate

change to global wealth inequality and authoritarianism, calling for collective resistance and strategic collaboration. Furthermore, she urged countries in the Global South to proactively address internal migration and climate resilience through national policy and budget planning.

One of the biggest challenges she identified is the persistence of outdated planning and regulatory frameworks that fail to accommodate informal urbanization. She suggested that **policy reforms should integrate informality into urban planning and governance structures.** Another significant challenge is the exclusion of informal settlements from climate strategies. Patel argued that grassroots organizations and informal communities must have a voice in climate negotiations and policymaking. She also criticized the disproportionate focus on climate mitigation over adaptation, which leaves vulnerable communities without financial support. She proposed that international climate finance should be redirected to support adaptation strategies in informal settlements. Wealth inequality and limited access to resources remain major obstacles, with large portions of climate finance benefiting mitigation rather than adaptation. To counter this, she **called for stronger coalitions between local governments, NGOs and grassroots organizations to secure sustainable financing and advocacy for marginalized communities.** Finally, she pointed out that migration policies often ignore urbanization trends, leading to the exclusion of informal settlements from essential services. She advocated for **recognizing informal settlements as legitimate urban components and incorporating them into city-wide sanitation, housing and resilience planning.**

Ms. Sheela Patel's speech was a call to action for inclusive, climate-resilient urban policies that prioritize informal communities. She stressed that without addressing informality, no meaningful progress can be made toward sustainable development or climate resilience. She urged all stakeholders, such as governments, academia, activists, and financial institutions, **to break free from outdated paradigms and embrace transformative policies that recognize the realities of informal urban growth.** The speech concluded with a strong message that informality is not a problem to be eradicated but a reality to be integrated into climate and development policies.

Keynote Address by Mr. Kalanithy Vairavamoorthy (IWA)

Mr. Kala Vairavamoorthy, Executive Director of the International Water Association (IWA), emphasized transforming sanitation delivery with innovative, disruptive, market-creating solutions that can still serve marginalized communities. Drawing inspiration from the energy and telecom sectors, he stressed the need for decentralized sanitation systems. He highlighted advancements in non-sewered sanitation, including new toilet technologies and optimized logistics, while emphasizing the importance of readiness—technological, societal, organizational, and regulatory—for adoption. He urged bold, collaborative action, led by the Global South, to rethink outdated infrastructure.

Mr. Kala Vairavamoorthy commenced his keynote by thanking the organisers of the conclave and emphasised that along with WASH and Sanitation, he would also be talking about the opportunities to rethink and transform the way we deliver sanitation.

He highlighted the United Nation's Water Conference in March 2023 as a landmark event that reviewed the Sustainable Development

Goals (SDGs) and came up with Water Action Agenda, which emphasised ideas and innovations to tackle climate change. He categorised current innovations in WASH sector into two types: 1) sustaining innovations, which are incremental improvements such as automation for operators and 2) efficiency innovations, which aim at cutting costs, such as energy efficient treatment. **But emphasized that what we need are 'market-creating innovations' which are disruptive solutions that also extend services to underserved communities**. Despite efforts, many marginalized communities still lack access to clean water and sanitation. High costs and a lack of accountability deter utilities from expanding services. **True innovation, he emphasized, must prioritize the inclusion of these communities rather than just improving existing services.**

He noted that WASH sector has been slow in adopting transformative innovations compared to other industries. **Drawing parallels with the energy and telecommunications sectors, he pointed out how decentralized and technologically agnostic solutions have successfully reached vulnerable populations.** The transformation of these industries from monopolistic models to competitive, tailored service delivery holds valuable lessons for the water and sanitation sector.

He shared that decentralized or distributed systems offer a more adaptable, cost-effective and rapid approach to sanitation. Unlike centralized systems, which are often hindered by bureaucratic delays and high infrastructure costs, decentralized solutions provide immediate relief to underserved communities. **He added that decentralised systems have better climate resilience. Unlike centralized systems, where failures can have widespread consequences, decentralized models ensure localized disruptions do not impact the entire system.**

To demonstrate the potential of decentralised solutions, he shared example from Oceanhamnen, which integrates back water and food waste processing to generate fuel, while grey water and treated sludge is used as fertilizer and soil conditioner. Such innovations are happening in Global north but have also started emerging in Global South, he shared.

He shared his excitement for the advancements in non-sewered sanitation, an area of innovation that is rapidly evolving with systems designed for resource recovery and reuse. Key developments include new toilet technologies that eliminate the need for sewers or septic tanks while recovering resources like energy and water, the Reinvented Toilet Initiative by the Gates Foundation which has produced over 25 breakthrough technologies and next-generation septic tanks with features like solar heating and sensor-based monitoring. Additionally, sanitation logistics are being optimized through data-driven sludge collection routes and hub-and-spoke treatment models, signalling a major disruption in wastewater management.

He also addressed the challenge of innovation adoption, emphasizing the importance of "readiness" beyond just technological maturity (measured by Technology Readiness Levels or TRLs). **It highlights other critical dimensions: societal readiness (public acceptance and willingness to pay), organizational readiness (utilities' capacity to integrate solutions), and regulatory readiness (supportive laws and policies).** Examples like energy recovery from waste (high readiness across all dimensions) and water reuse (high technological but low societal/regulatory readiness) illustrate how readiness varies. He also shared a broader readiness framework to guide utilities and accelerate adoption.

Finally, he called for a bold action in response to global pressures like climate change and urbanization, noting that most of the existing infrastructure was built in 19th-century and is outdated. While many part of the world are adapting incrementally, the Global South is leading a paradigm shift with decentralized, resilient solutions. He also urged to redefine our approach of water management, draw cross-sector inspiration, and global collaboration to build a sustainable water-wise future.

Keynote Address by Ms. Sunita Narain (CSE)

Ms. Sunita Narain, a renowned environmentalist and director-general of the Centre for Science and Environment (CSE), delivered an insightful keynote address focusing on pressing environmental challenges and the urgent need for sustainable solutions. Her address covered critical topics such as water resource management, pollution control, decentralized wastewater treatment, climate change adaptation and the role of governance in environmental sustainability. She emphasized the necessity of systemic changes and community-driven approaches to secure a better future for upcoming generations.

Ms. Sunita Narain began her speech by addressing the critical issue of water resource management and conservation. She highlighted the depletion of freshwater resources due to over-extraction and climate variability. She provided the example of Rajasthan's traditional water harvesting systems, such as Johads (Percolation ponds) and Baolis (Stepwells), which have been effective in water conservation for centuries. However, she pointed out challenges such as urbanization, groundwater depletion and erratic monsoon patterns. To address these issues, she advocated for a paradigm **shift towards localized water harvesting and integrated watershed management to ensure sustainable water use.**

Pollution control and air quality management were another major focus of her speech. Narain emphasized the alarming rise in air pollution levels in Indian cities, particularly Delhi and Mumbai. She identified vehicular emissions, industrial pollution, and stubble burning as primary contributors to the deteriorating air quality. Despite existing regulations, she discussed the challenges in implementing stringent pollution control measures due to policy gaps and industrial resistance. As a solution, she recommended **a multi-pronged approach, including stricter vehicular emission norms, promotion of electric mobility and stronger enforcement of industrial emission regulations.**

A key aspect of her address was decentralized wastewater treatment, which she emphasized as a crucial strategy to complement centralized sewage systems. She cited the example of Alappuzha in Kerala, where community-led initiatives have successfully managed wastewater using decentralized treatment units. However, she acknowledged **financial constraints and a lack of technical expertise as major challenges in scaling up** such solutions. To overcome these barriers, she advocated for government incentives, capacity building and public-private partnerships to expand decentralized wastewater management.

She also spoke about climate change and resilience building, highlighting its disproportionate impact on marginalized communities, particularly farmers and coastal populations. She pointed to the increasing frequency of extreme weather events, such as cyclones and droughts, as evidence of climate change's growing threat. **Balancing economic growth with environmental sustainability remains a significant challenge**, she noted. To build resilience, she recommended adaptation strategies such as climate-resilient agriculture, mangrove restoration and disaster preparedness programs to mitigate the effects of climate change.

There were questions asked about the role of technology in the WASH sector, Greywater management, the feasibility of co-composting, and climate-responsive sanitation. Sunita Narain emphasized that **technology should be people-centric, addressing real needs rather than deepening social divides, treating Biosolids and SHG involvement as examples of effective innovations**.

On Greywater management, she acknowledged its feasibility in rural areas but opposed dual piping systems due to contamination risks. Regarding co-composting, she explained that **combining carbon-rich compost with nitrogen-rich faecal sludge improves soil health** and mentioned case studies from Nepal. On climate-responsive sanitation, she stressed the need for need-driven policies, ensuring that adaptation and mitigation strategies are integrated rather than treated separately.

She concluded her address by focusing on the role of future generations in shaping a sustainable world. She stressed the importance of young leaders advocating for climate justice and environmental stewardship. She encouraged policy reforms that integrate sustainability into urban planning, agriculture and industry. She also called for increased **investment in renewable energy**, **particularly solar and wind power, to reduce dependence on fossil fuels**. She also urged for enhanced **citizen engagement in environmental decision-making processes to ensure inclusive and effective policies**.

Keynote Address by Mr. Rakesh Mohan (Center for Social and Economic Progress)

Mr. Rakesh Mohan, in his keynote, elaborately discussed India's slowed down rate of urbanisation. He highlighted India's slow urbanization is closely linked to the structure of its manufacturing sector. India's weak transition from agriculture to manufacturing has led to an unusual "ruralisation" of industries, limiting urban job creation. Despite the economic benefits of large cities, weak governance, poor infrastructure and low liveability discourages migration to urban centers. Restrictive industrial policies and high land prices are the other policy missteps resulting to stagnation in urbanisation. He also emphasized the need for better public transport, stronger municipal governance and improved infrastructure to support sustainable urban development. To reshape its urbanization model, India must focus on second- and third-tier cities, encourage labour-intensive industries and implement governance reforms.

Mr. Rakesh Mohan, with his extensive experience in urban development, shared his study over the apparent slowdown in urbanisation. However, he admitted that the absence of the 2021 Census makes it difficult to accurately assess current urbanization patterns and growth rates. Despite being a global phenomenon, India's urbanization remains slow, with significant variations across states.

He stated that one of the primary reasons for this slow growth is the weak transition from agriculture to manufacturing. **Unlike other economies, where industrialization has driven urban expansion, India has witnessed a unique trend, manufacturing industries shifting to rural areas rather than stimulating urban employment.** He added that this ruralisation of manufacturing is an anomaly, rarely seen in major economies.

India has historically been biased against large cities, despite their proven role in driving economic growth through agglomeration economies. **Weak governance, poor infrastructure and low liveability discourage migration to urban centers**. He added that debates persist over India's outdated urban classification criteria. Also, many large villages with populations exceeding 5,000 remain categorized as rural, despite meeting urban characteristics. Experts argue for an update to these definitions to better reflect contemporary realities. However, he favours the traditional census definition due to its consistency.

He highlighted that in comparisons with other countries, urbanization in India lags. While China's urbanization rate, which was like India in 1982, has surged from 20% to 65% today, India remains at just 35–36%, closer to low-income economies. Several policy missteps have contributed to this stagnation. **Until 2010, India reserved 836 labour-intensive industries, such as clothing, footwear and furniture, for small-scale enterprises, limiting the growth of large-scale manufacturing**. Coupled with trade liberalization, this allowed foreign firms to dominate these sectors while restricting domestic industrial expansion.

He shared that low female labour force participation in urban areas has further hindered labour-intensive industries, which historically drove rapid industrialization in East Asia and Bangladesh. **Also, high urban land prices in India, among the highest globally, limit industrial expansion.** Unlike Singapore, Hong Kong, or Dhaka, India has not developed multi-story flatted factories to optimize land use for industrial growth.

Transportation, he added, remains another major challenge. While India has heavily invested in metro systems, these are costly and serve limited populations. Many lower-income groups would benefit more from efficient and well-managed bus networks, which are currently lacking in second- and third-tier cities. Governance issues further compound urban challenges. Municipal bodies suffer from poor staffing, financial constraints and a lack of technical expertise in urban planning, sanitation and transportation. Despite a rise in organized housing projects, property taxes, one of the best revenue sources for local governments, remain underutilized.

To address these challenges, he suggests that India must focus on strengthening second- and third-tier cities to distribute urban growth more evenly. Lessons from global cities like Beijing demonstrate that industrial growth and environmental sustainability can coexist. Infrastructure deficits in sanitation, water supply and transportation must be addressed to improve urban liveability. Encouraging labour-intensive industries in

cities can generate employment opportunities and support economic growth.

In conclusion, India has a unique opportunity to reshape its urbanization model before facing congestion and inefficiencies seen in more developed nations. **By implementing governance reforms, investing in infrastructure and fostering balanced industrial policies, India can ensure its cities become more liveable, productive and sustainable in the coming decades.**

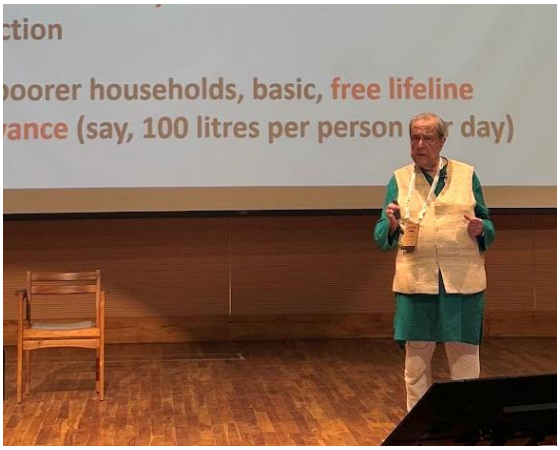
Keynote Address by Dr. Ashok Khosla (Development Alternatives)

In this keynote address, Dr. Ashok Khosla discussed the critical water management related challenges in the urban and rural India. He highlighted the stark inequities in access to water, where the urban poor often pay significantly more than the wealthy. He emphasized the need for an integrated approach to WASH to enhance public well-being. The discussion also covered the benefits of 24/7 water supply in reducing economic burdens and health risks, the impact of climate change on rural water availability and the role of innovative technologies like the Ganga Water Machine. Dr. Khosla stressed the importance of leadership, institutional cooperation and nature-based solutions in addressing India's water crisis.

Dr. Ashok Khosla, in his address, explored pressing water challenges and potential solutions at the local level-including both urban and rural contexts-as well as at the national level. **He began by highlighting the inequality in urban water access, where the urban poor often pay exorbitantly more for water than the rich**. He called for urgent policy reforms to ensure equitable access and emphasized the need to eliminate reliance on informal, high-cost sources.

He underscored the critical role of integrated planning and asserted that water issues cannot be addressed in isolation. **Instead, water, sanitation and health systems must be treated as interconnected components of a single framework.** One of the key priorities, he argued, is the transition from intermittent to continuous water supply. A 24/7 supply is not merely a convenience but a necessity that reduces health risks and coping costs for households. This shift can also enhance overall resource efficiency by minimizing water loss through leakage and misuse.

He also addressed broader challenges of water governance in India. He pointed the need for strong leadership, institutional reform and inter-agency cooperation. **He emphasized that nature-based solutions should be prioritized in wastewater management and efforts to improve water-use efficiency**. These sustainable approaches not only support environmental resilience but also offer long-term economic and social benefits.



Turning to rural areas, he noted that more than 100 million people in rural India face acute water shortages, a crisis exacerbated by climate change. **To build climate-resilient**

water systems, he recommended investing in groundwater recharge, rainwater harvesting and innovative conservation technologies. He highlighted that effective water management strategies, particularly in agriculture, could yield very high returns. Among the promising initiatives he discussed was the Ganga Water Machine, designed to significantly boost water storage and irrigation capacity.

The session concluded with a Q&A segment that delved into practical challenges and potential solutions. In response to concerns about the feasibility and cost of implementing a 24/7 urban water supply, Dr. Khosla explained that with targeted investments in infrastructure, leak reduction and smart metering, such systems are both financially and operationally achievable. When asked about system dynamics modelling, he emphasized its value in assessing threats like pollution, inefficient usage and climate risks, thereby enabling more informed policy decisions. On the issue of rising population pressure on water resources, he stressed the importance of decentralized water conservation, improved governance and technological innovations such as wastewater reuse. He concluded by reaffirming the need for stronger local institutions, equitable pricing mechanisms and integration of environmental considerations into urban development planning to ensure long-term water security.

Keynote Address by Mr. K. Srinivas, Secretary, MoHUA

In this session, Mr. K. Srinivas, Secretary at the Ministry of Housing and Urban Affairs (MoHUA), reflected on the 15-year journey of the PAS project and its collaborative roots. He emphasized India's transformative progress in the urban water sector through flagship programs like AMRUT and Jal Jeevan Mission. Highlighting key challenges such as urbanization, legacy infrastructure and water sustainability, he also outlined the government's vision for regional Centers of Excellence and the need for innovation, partnerships and capacity-building to drive future progress.

Mr. K. Srinivas has been one of the pioneering members who played a key role in initiating the PAS project. In his keynote address, he expressed his joy in witnessing the project's remarkable success and its 15-year milestone. He congratulated all the key members who have contributed to the 15-year journey of PAS.

The second reason for his attendance at the conclave, he mentioned, was that the **Government of India plans to engage and invest in four regional Centers of Excellence at the national level, with CEPT being one of them.** The conclave provided him with an opportunity to engage in meaningful discussions with the participants. He also recalled his firsthand experience of working in Gujarat, emphasizing that the seamless partnership between academia, practitioners, policymakers and the government has been the key driver of the state's success.

He went on to discuss key government initiatives in the WASH sector, their impact, and the pressing challenges ahead. He highlighted two major programs of the

Government of India - Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and the Jal Jeevan Mission (JJM) - as crucial to achieving SDG 6.1. He noted that AMRUT, often perceived as a water program, is equally focused on reforms, innovation and social engagement. He also described JJM as a highly ambitious initiative aimed at ensuring water access on an unprecedented scale.

Over the past decade, India has witnessed a transformative shift in the water sector, driven by bold investments totalling nearly $250 billion across flagship programs: AMRUT (2015 & 2.0 in 2021) - $50 billion, Jal Jeevan Mission (2019) - $50 billion, Namami Gange (Ganga rejuvenation) - $2.35 billion, and Swachh Bharat Abhiyan - $12 billion. **These programs have resulted in millions of new tap and sewer connections, expanded water treatment capacity and significant improvements in public health, particularly benefiting women.**

Addressing key challenges, he identified scaling investments amid rapid urbanization as the first major hurdle. He pointed out that India's urbanization is unconventional, with densification occurring along transport corridors and economic zones, necessitating massive infrastructure investments. The second challenge he highlighted was legacy infrastructure and implementation capacity. He stressed the importance of identifying existing infrastructure and ensuring that previous investments are utilized effectively. He noted that the first three years of AMRUT relied on contractors and many states initially struggled with project planning, tendering and contractor availability, leading to execution delays. Thus, strengthening implementation capacity is crucial.

The third challenge he discussed was water source sustainability and efficient water management. He recommended shifting from city-centric approaches to interconnected regional strategies to address interdependencies across economic, environmental and ecological boundaries. He also advocated for integrated, regional approaches that transcend political and administrative boundaries to ensure equitable resource distribution and sustainable urban development.

He emphasized the need to leverage talent beyond government institutions by engaging academia, consulting firms, and young professionals to address urban challenges effectively. He cited several key initiatives that have already been implemented, such as AMRUT Mitras, TULIP internships and startup integration programs. He also shared the government's vision of establishing regional Centers of Excellence in collaboration with other institutions for research, implementation, internships, apprenticeships and capacity-building programs in partnership with urban local bodies and planning schools. To support this initiative, the government has allocated ₹250 crore per Center as an interest-bearing grant for research, training and practical applications, creating a network of skilled professionals.

To enhance urban infrastructure and service delivery, he highlighted the government's active efforts in leveraging technology, innovation and research. This includes collaborations with premier institutions such as IIT Madras (for AI & robotics in water and sanitation management) and IISc (for borewell and aquifer recharge research), as well as the establishment of the Urban Challenge Fund. He stressed that public funds alone are insufficient and that new avenues for mobilizing finances must be explored.

He further discussed the approach to address the evolving urbanisation pattern in India. **He shared that around 300 districts which can**

improve service quality without urbanization, and there are 70-100 highly urbanised districts which needs further densification. Unlocking underutilized spaces through research can also optimise land use.

He shared that to achieve efficiency in governance, Government of India is adopting progressive deregulation policies. This will also help in accelerate economic growth while maintaining environmental and social balance.

Reflections on PAS@15

This session marked the celebration of 15 years of the Performance Assessment System (PAS) project. The session began with a presentation by Dr. Dinesh Mehta on PAS's fifteen-year journey. This was followed by reflections from key stakeholders, including funders, government officials and partners, who shared insights on its evolution and impact. The session concluded with the official launch of the PAS@15 report which showcases major achievements of the project and outlining future directions.

The session marked the official **launch of the PAS@15 Report,** a commemorative publication capturing 15 years of progress in performance assessment for urban service delivery. The report highlights **key milestones, achievements and challenges** encountered throughout the journey, showcasing the impact of data-driven governance on policy and service improvements.

Prof. Dinesh Mehta initiated the discussion by presenting the 15-year journey of PAS, which began with support from the Gates Foundation for its goal of moving from measurement to improving WASH services. PAS has digitised municipal records, aligned them with national indicators and made them publicly accessible, thereby strengthening transparency and planning. Starting in Gujarat and Maharashtra, it has now expanded to several other states across India and influenced policies, with the Finance Commission adopting Service Level Benchmarks. Beyond data, PAS has trained over 15,000 officials in service management and performance assessment. The structured framework to track cities' progress in WASH has also contributed to monitoring global development goals such as SDG 6, as well as national programs like the Swachh Bharat Mission. With plans to collaborate with the 16th Finance Commission and further institutionalise performance-based urban service delivery, PAS aims to strengthen its role in promoting efficient, accountable and sustainable urban management in India.

Reflections from PAS advisors, funders and partners

Ms. Rachel Cardone from Resilient Water Accelerator recalled being part of the Gates Foundation when the grant for PAS was approved. She reflected on PAS's vision as bold and pioneering and praised its ambitious effort to standardize performance indicators across diverse cities. She commended the team's innovation and commitment to building data-driven frameworks that strengthened governance, rather than taking an isolated

approach to water and sanitation services. She noted that PAS's unique systems approach was key to its long-term impact on urban decision-making. She shared that witnessing PAS's evolution over 15 years was both emotional and deeply inspiring for her.

Mr. Louis Boorstin, who had led the WASH program at the Gates Foundation, shared his high-level perspective on PAS and its alignment with the foundation's core principles. He emphasized that any initiative funded by the foundation had to meet three critical criteria: impact, sustainability and scalability. PAS, he noted, not only met these standards but exceeded expectations by improving lives, ensuring long-term service delivery and expanding significantly across Indian cities. He praised PAS for pioneering a data-driven approach to municipal governance, leading to real and measurable improvements in urban sanitation and service delivery. Reflecting on the grants he had overseen, he regarded PAS as one of the most outstanding and transformative projects, leaving a lasting impact on communities and governance frameworks.

Ms. Sakshi Gudwani from the Gates Foundation reaffirmed Foundation's continued support for PAS, describing the partnership as a valuable learning journey. She praised PAS for embedding equity into its framework early on, ensuring low-income settlements were included in assessments even before data existed to highlight disparities. Commending its scale of reaching over 1,000 cities and 161 million people, she noted PAS's success in turning data into policy and improved sanitation planning. Looking ahead, she hoped PAS would deepen focus on climate and water security and introduce indicators on affordability to address financial equity. She concluded with optimism for PAS@20 and its future contributions to inclusive urban sanitation.

Mr. D.M. Sukthankar, retired IAS officer and former Project Advisory Committee (PAC) member for PAS, recalled being invited by Dr. Meera Mehta and Dr. Dinesh Mehta in 2009 to guide the initiative. He emphasized how PAC meetings fostered collaboration among government officials, academicians and sector experts, shaping PAS into a robust system. From benchmarking, PAS evolved into a tool for evidence-based decision-making, influencing urban local bodies, states and national policy. He highlighted its expanding scope into creditworthiness assessments, ESG evaluations and water security strategies. Expressing optimism, he hoped PAS would continue advancing data-driven urban reforms and gain continued support from future Finance Commissions.

Mr. C.K. Koshi, Retired IAS officer and former PAC member, shared a nostalgic reflection on PAS@15 and expressed pride in being part of its early journey. He praised PAS for pioneering data-driven, evidence-based policymaking focused on service delivery and shifting the focus from infrastructure building to household-level service delivery. He noted its early influence on national missions like Swachh Bharat, Jal Jeevan and AMRUT. Emphasizing PAS's scientific rigor and credible data, he credited it with gaining government trust. He also lauded its role in nurturing future researchers and expressed hope that PAS would evolve into a global center of excellence in water and sanitation which could shape the research across south Asia and beyond.

Mr. I.P. Gautam, former Project Advisory Committee (PAC) member of PAS project, Municipal Commissioner and Principal Secretary, Urban Development Department, Govt. of Gujarat, reflected on PAS's transformative journey in urban governance. He noted how PAS shifted the focus from infrastructure investment to service delivery and accountability. Recalling initial resistance

within government institutions to data sharing, he commended PAS's persistence in promoting transparency and evidence-based policymaking. Its successful integration of SLBs into national programs influenced policy, planning and performance assessments. He praised PAS for pioneering a data-driven model that benefited millions and set new academic and administrative standards. He expressed confidence in PAS's continued evolution toward climate resilience and sustainable, liveable cities.

Ms. Manvita Baradi from UMC and a former partner for implementing PAS in Gujarat reflected on her long-standing association with the initiative, highlighting how PAS transformed urban governance through data-driven decision-making. She recalled early challenges in introducing performance measurement in Gujarat, including resistance from city officials. However, through persistence and collaboration, PAS mainstreamed evidence-based governance, emphasizing service delivery improvements. She praised its granular focus on urban poor settlements, which provided actionable insights and shifted government planning toward equity and inclusivity. She credited PAS's rigorous, transparent methods for laying the foundation for urban reforms and enabling institutions like UMC to scale these learnings to influence national policy.

Ms. Utkarsha Kavadi from RCUES-AIILSG and a former PAS partner in Maharashtra reflected on PAS's transformative impact in the state. She emphasized how it institutionalized performance monitoring and service improvement across urban local bodies. She highlighted the initial challenges in data collection, where crucial service delivery information often resided in officials' minds rather than in official records. Over time, PAS evolved from manual Excel-based reporting to an advanced digital platform, significantly enhancing data accuracy and accessibility. More than a monitoring tool, PAS influenced policy decisions, helping Maharashtra lead in sanitation reforms, including the early

adoption of ODF policies. She credited PAS for enabling data-driven governance that made urban development more responsive, transparent and effective.

Dr. Meera Mehta reflected on PAS's 15-year journey, acknowledging the invaluable support of partners, advisors and stakeholders in its success. She emphasized the importance of looking ahead to ensure PAS continues to grow and evolve over the next 15 years. Encouraging the team to embrace new challenges and innovate, she stressed the need to build on the strong foundation already in place. In her closing remarks, she underscored the importance of continuous learning and improvement to ensure PAS remains a leading force in data-driven urban governance and service delivery.

Panel discussion on Experiences in WASH monitoring

Representing diverse backgrounds - including service regulators, NGOs and research organizations, the panellists shared varied approaches to monitoring WASH services. While regulators emphasized structured business planning, performance monitoring, and licensing to ensure service quality and accountability, other speakers stressed the importance of engaging with communities to generate granular, ground-level data. The discussion collectively highlighted the need for robust regulatory frameworks, inclusive community participation, spatial data integration and climate resilience to strengthen urban WASH systems.

Mr. Patrick Ty from MWSS, Philippines shared their model of privatizing water and wastewater services in Manila through two concessionaires. These concessionaires develop 5-year business plans with annual targets approved by the government, including setting tariffs for safe and affordable WASH services. Monitoring includes regular audits, pressure checks and compliance with water quality standards, along with timely customer feedback. However, social media analysis revealed service gaps, with some areas lacking water for up to 14 days, highlighting the need for continuous improvement and technology updates in the regulatory framework.

Ms. Sujatha Nair from SPAN, Malaysia, shared their journey as a regulator. Earlier, water and sewerage services in Malaysia were managed by local authorities, leading to inconsistencies. To address this, the federal government established an independent regulator, SPAN, which now oversees both systems and service providers. All infrastructure and contractors must meet approved standards and providers are required to obtain licenses. Public providers must submit three-year business plans, which serve as the basis for key performance indicators (KPIs). If KPIs are not met, SPAN may shorten licenses. A key challenge remains the low tariffs, with adjustments linked to meeting operational and investment commitments.

Ms. Helena Allegre from LNEC Portugal shared the evolution of the country's national performance assessment system for water, wastewater and solid waste services. Developed in collaboration with the Portuguese regulator and based on IWA guidelines, the framework was launched in 2004 with a concise set of 20 indicators per service. Updated every 4–5 years, it balances continuity with emerging priorities like climate resilience and circular economy. The audited data is publicly accessible and widely used by policymakers, researchers, and utilities, making it a trusted national reference for improving service delivery and management.

Ms. Meghna Malhotra from UMC shared a different perspective on monitoring services through community engagement. She highlighted the lack of reliable city-level data on slums and slum-like communities, where service levels often vary within the same area. To address this, she described how water and sanitation subcommittees were formed from the Area Level Federations (ALFs) of SHGs registered under NULM. These groups collected granular WASH data, improving accountability, infrastructure ownership and communication with ward officers. Citing the example of the Jal Saathi model of the Government of Odisha, she added that it has further empowered SHG women to act as community liaisons for monitoring water quality, addressing illegal connections, collecting user charges and significantly enhancing citizen satisfaction and service efficiency.

Ms. Pratima Joshi from Shelter Associates focused on the urgent need for Indian cities to invest in granular spatial data at household, slum and city levels for effective urban sanitation planning and monitoring. Relying on NGOs for data is unsustainable; instead, cities should adopt GIS and digital twin technologies, which are already being used globally. From her experience, she added that mapping slums in a city of 1 million can be done within a year at a relatively low cost, yielding high returns by preventing planning errors. Additionally, cities must establish inclusive, regularly updated GIS platforms as municipal assets involving NGOs, academics and citizens. Such systems not only ensure transparency, accountability and continuity but also help create a shared language and understanding of urban infrastructure.

Ms. Sahana Goswami from WRI shared experience in integrating climate resilience into city planning and emphasised the importance of spatial data in understanding climate risks and vulnerabilities. She introduced a climate hazards and vulnerability assessment framework used in developing climate action plans in few Indian cities. She stressed the need to overlay climate risk data with essential services like health, jobs and education to understand cascading impacts. In Solapur, for example, extreme heat (8.5 hours

above 40°C on 50+ days a year) directly affects water needs and system planning. She highlighted a toolkit co-developed with the WASH Institute for small towns, which maps climate hazards across the WASH value chain. She shared a case of Calicut, Kerala, where climate awareness exists, but translating it into implementable, climate-resilient projects remains a key challenge. She concluded by urging regulators to integrate community mapping and climate data into their frameworks for more adaptive, sustainable urban WASH systems.

Panel discussion on Policies and Financing

This panel included experts from diverse background of industries, development sector, academics. Bring their experience and perspectives, they explored the challenges and opportunities in financing, policy implementation, and partnerships in WASH in developing countries.

Mr. Kartikeya Sarabhai from CEE underscored the importance of community-led, culturally rooted and decentralized approaches to address WASH, climate change and urban development challenges. He illustrated this with a WASH initiative of CEE in Assam, where a donor questioned a traditional post-meal handwashing practice due to lack of scientific backing, revealing how rigid, top-down policies can undermine effective local customs. On climate action, he emphasized flexibility, like accepting locally preferred tiled roofs over blindly adopting white roofs in cool-roof projects. Highlighting CEE's success with decentralized plastic waste units, he argued these models are more adaptable than large centralized systems. Mr. Sarabhai also urged better use of local government funds for impactful WASH and climate action. He concluded by calling for programs that trust and empower communities, valuing their knowledge and creativity to drive lasting change.

Mr. Punit Lalbhai from Arvind Limited shared insights from the textile industry, highlighting the critical role policy plays in addressing high water consumption. He emphasized that collaboration with government bodies is essential, citing his company's achievement of zero freshwater use through a partnership with the municipality to utilize treated sewage water. He noted that tackling large-scale water challenges requires coordinated efforts across government, businesses, civil society, academic and local communities and that policies must support such collective action rather than treating industries in isolation. He also stressed the need for creative, context-specific approaches instead of broad, one-size-fits-all policies, advocating for innovative solutions that leverage business and economic momentum to drive meaningful environmental change.

Mr. Srikanth Viswanathan from Janaagraha discussed key reforms needed in policy and financing for climate and urban governance in India. He emphasized the importance of place-based governance, advocating a shift from sectoral approaches to localized, integrated decision-making that prioritizes both people and place. Strengthening local governments is crucial for balancing economic growth, equity, environmental sustainability and democratic engagement. He called for differentiated policies tailored to India's diverse urban landscape, noting that a one-size-fits-all model is ineffective. He cited the Kerala model of integrated rural-urban governance as a

potential solution and stressed the importance of promoting women's leadership at the city level. He also highlighted the need to enhance state capacity through increased staffing, public investment and institutional accountability to ensure equitable and sustainable urban development for all citizens. Overall, he emphasized that without stronger local governance, differentiated urban policies and enhanced state capacity, India risks ineffective implementation of its climate and urban policies.

Ms. Vida Duti from IRC, Ghana emphasized the need for integrated policymaking, stronger inter-ministerial coordination and improved implementation to achieve sustainable development goals, particularly in the water and sanitation sector. She highlighted that Ghana's fragmented governance structure, with overlapping responsibilities across ministries, hampers effective policy execution, an issue which has worsened by the recent dissolution of the Ministry of Sanitation and Water Resources. She stressed the importance of cross-sector collaboration, noting that water and sanitation policies often intersect with environment, energy and local governance requiring coordinated efforts across sectors. She pointed out a persistent gap between policy formulation and implementation, calling for stronger leadership to bridge this divide and ensure that policies are clearly communicated, coordinated and effectively carried out across all levels of government.

Ms. Sujata Srikumar from PowerTech highlighted key challenges and solutions for strengthening municipal finances in India, particularly for urban infrastructure and governance. She emphasized the need for policy reforms to enhance municipal financial autonomy, sustainability and adopt differentiated financial strategies for cities of varying sizes. She shared that while municipal revenues have grown, their financial independence has declined due to policies such as GST replacing octroi. She added that property tax reforms have had limited success, with resistance to rate increases and poor cost recovery for services. She stressed that grant-based financing ignores the diverse financial capacities of cities such as larger cities can issue municipal bonds if incentivized, while smaller cities need alternative models. Municipal borrowing, if encouraged, can improve governance and financial practices. She also added that capital investments often

overlook operations and maintenance which weakens infrastructure over time. She advocated for greater national revenue sharing, especially GST and recognition of municipalities as the third tier of government to ensure a robust, sustainable urban financial system.

To summarise, the panel emphasized the need for decentralized, flexible financing and stronger municipal capacity to improve WASH outcomes. Localized, inclusive approaches supported by women's leadership, public-private collaboration and clear policies are vital. Building trust and coordination among stakeholders ensures sustainable, community-owned solutions that enhance resilience, efficiency and long-term impact in the WASH sector.

Panel discussion on Academic discourse on WASH climate and urban planning

This session explored the linkages between WASH (Water, Sanitation, and Hygiene), climate change, and urban planning, focusing on the challenges posed by rapid urbanization, governance gaps and the need for climate-responsive infrastructure. Experts from various academic institutions shared insights on how water security, sanitation and waste management strategies must evolve to address climate resilience and urban development. The discussion emphasized the role of policy, financing, and institutional collaboration in ensuring sustainable WASH services for growing cities, particularly in the Global South.

Mr. Ashok Kumar from SPA Delhi opened the discussion by emphasizing that urbanization in India is different from Western cities due to the widespread presence of informal settlements. He pointed out that traditional urban planning models often overlook these informal areas, creating gaps in water and sanitation services. He stressed, "Our cities are highly informal, so achieving water security and sustainable development requires a unique approach tailored to urban diversity." He also noted that large infrastructure projects, like industrial corridors and road networks, will further impact water and sanitation demands, making it essential to integrate WASH planning with overall urban development.

Ms. Jaya Saxena from NRSC-ISRO highlighted the increasing impact of large-scale infrastructure projects on urban WASH services. She explained that while projects like industrial corridors and road networks drive economic growth, they also put immense pressure on water resources and sanitation systems. Unfortunately, WASH considerations are often not included in these plans, leading to service gaps.

Ms. Kavita Wankhade from IIHS focused on governance and financial challenges in urban water management. She shared a case study of a planned suburb in Delhi, where residents had to wait more than a decade for piped water due to bureaucratic delays. She explained, "It took court intervention for proper piped water to reach this suburb, 15 years after people moved in. This highlights the severe governance and coordination issues in service delivery." She emphasized the need for stronger institutional cooperation and better financial strategies to ensure timely water and sanitation services.

Ms. Sanskriti Mujumdar from MSU stressed the importance of rethinking traditional waste

and water management approaches, especially considering climate change. She advocated for nature-based solutions like decentralized wastewater treatment and sustainable drainage systems, which can help cities become more resilient. "We need to rethink how we manage water and waste, especially as climate change and rapid urbanization intensify these challenges." She urged policymakers to integrate climate-responsive strategies into urban planning.

Ms. Komli Yenneti from the University of Wolverhampton, UK, reinforced that governance and finance are the two most critical aspects of urban water management. She warned that unless these issues are properly addressed, progress in WASH service delivery will remain slow and fragmented. "If we don't tackle governance and finance, we won't make much progress in urban water management." She emphasized the need for collaboration among engineers, policymakers, and financial experts to develop sustainable solutions.

The session emphasized that sustainable WASH solutions require a holistic approach, integrating policy, finance, governance, and climate resilience into urban planning. As cities continue to expand, investing in equitable water access, proactive infrastructure planning, and institutional collaboration will be essential for addressing growing water security and sanitation challenges.

Technical Sessions

Technical Session 1: Monitoring WASH outcomes and climate

This technical session on 'Monitoring WASH outcomes and Climate' brought together eight researchers and practitioners from South Asia and Latin America to share insights on integrating climate considerations into WASH service delivery and monitoring. Speakers highlighted the growing importance of localized data, community participation and cross-sector coordination to build resilient systems. Some of the studies revealed critical gaps in standard GHG estimation methods, calling for improved models and direct measurement techniques. Innovative digital tools and frameworks were also showcased which provided practical approaches for addressing climate risks.

Ms. Maqsuda Akter from Bangladesh University of Engineering and Technology assessed methane emissions from pit latrines in Bangladesh, emphasizing the influence of groundwater variation and flooding, factors often ignored in standard IPCC calculations. Using groundwater data from 1995–2024 and sanitation usage statistics, she mapped inundation zones and estimated emissions with region-specific correction factors. Findings showed that annual methane emissions amounted to 3,270 kilotons of CO2 equivalent, far lower than IPCC-based estimates. Sensitivity analysis revealed emissions could triple with prolonged inundation. The study underscored the importance of localized data in GHG estimates and recommends seasonal pit maintenance, improved designs and eco-toilets in flood-prone areas.

Mr. Rwitwik Sinha from BORDA South Asia, presented findings on WASH-related GHG emissions in small towns across India, Nepal, and Bangladesh. His study revealed that WASH activities contribute 20–40% of total emissions in these areas, with solid waste, especially legacy waste, as the largest source. In towns like Chintamani and Savar, legacy waste made up over 50% of emissions. He shared how Leh

prevented 12,000 tCO_2e by remediating 100,000 MT of waste in one year. He added that water supply emissions varied due to infrastructure and energy use. The study stressed on challenges faced by municipal bodies, such as dependency on grid electricity and lack of control over energy sources. It called for integrating climate resilience into urban planning through town-specific emission inventories.

Mr. Pablo Morales-Rico from Center for Research and Advanced Studies, Mexico highlighted the need for direct GHG measurements in wastewater treatment plants (WWTPs), especially in the Global South. Using data from Mexican WWTPs, his study revealed major gaps in methane emission estimates based on IPCC Tier 1 and 2 methods. He introduced a simplified Open Flux Chamber (OFC) technique for direct measurement, finding that advanced A2O+MBR systems emitted 60% more GHGs than conventional plants. Locally calibrated methane correction factors doubled estimated emissions. The study urges a shift from default estimation to direct measurement for accurate national inventories and better climate mitigation planning.

Mr. Kapil Dhabu from the International Innovation Corps presented Assam's Jal Jeevan Mission, highlighting the integration of technology and community-led governance in rural water service delivery. Despite sufficient groundwater, the mission initially faced challenges such as low connection coverage and water contamination. Assam adopted decentralized schemes for 300–500 households using deep tube wells and filtration systems. Community involvement, especially through Water User Committees and women's participation, was an important component of the program. Innovations like the 'JJM Brain' platform and the 'Jal Mitra' initiative enabled responsive, data-driven, and locally empowered water management.

Mr. Jay Shah and Ms. Dhwani Sheth from CWAS presented the integration of climate adaptation into the Performance Assessment System (PAS) through the CAP-PAS framework. Operational in 1000+ cities, the framework assesses climate preparedness and proposes adaptive pathways based on city context. It embeds climate considerations into resource management, finance, emergency response, and citizen engagement. Pilots in Surat and Anjar highlighted the importance of localized data and participatory planning, stressing that climate resilience requires ongoing, adaptive efforts in WASH service delivery.

Ms. Jane Thomas from BORDA South Asia shared insights from Chintamani, a small town from Karnataka which is facing severe climate risks and yet is excluded from national climate plans and funding. BORDA introduced a Climate-Sensitive WASH Framework tailored for small towns, covering service levels, climate hazards, preparedness reviews and

GHG emissions. Participatory workshops abd stakeholder consultation identified drought as the key hazard, revealing water stress and sanitation gaps. The initiative emphasized the need for adaptable, locally driven frameworks and highlighted the importance of ground-level consultations over sole reliance on satellite data for accurate planning.

Mr. Mohith Gowda DM from the International Innovation Corps highlighted the serious health impacts of inadequate WASH services, based on their work with the Karnataka State Health Department. The study identified diseases like diarrhoea and respiratory infections linked to poor WASH and emphasized weak coordination between health and WASH sectors. Using SWOT and TOWS analyses, key gaps in capacity and emergency preparedness were revealed. The study recommended stronger local collaboration, shared health-WASH indicators, disaster frameworks, and capacity-building to improve health outcomes.

Mr. Anil Aryal from IWMI presented a rural WASH resilience mapping study across 100 water systems in western Nepal, revealing major climate-related vulnerabilities. Using a participatory, domain-based assessment, the study evaluated community capital, infrastructure, institutional support and WASH management. It found widespread institutional weaknesses and poor system resilience. The study recommended local government-led climate-resilient WASH planning, peer learning between Water User Associations, gender inclusivity and proactive investments in system resilience to reduce future climate-related risks and losses.

Technical Sessions 2: Governance and financing for climate resilient WASH

The technical session on Governance and financing for climate resilient WASH covered the complex intersections of climate change, water governance, disaster resilience, climate finance and social

inclusion. The session included ten studies from South Asia and Africa which highlighted how climate-induced water disasters, urban expansion and inadequate governance exacerbate vulnerabilities in WASH systems, especially for marginalised groups. It emphasized the need for gender-responsive planning, private sector engagement and community-led approaches. Innovative financing mechanisms, such as green bonds and blended finance, were discussed as vital for building adaptive capacity. Studies also underscored the importance of localized data, disaster preparedness and cross-sector collaboration to ensure sustainable and equitable WASH outcomes in a changing climate.

Ms. Shiny Saha from IRC presented her study on the role of the private sector in water service delivery in small towns and rural areas of Bangladesh, highlighting both challenges and opportunities. The study emphasized gaps in public service delivery and the potential for private sector involvement. Key challenges for small and micro entrepreneurs included lack of market research, limited access to green financing, inadequate skills, and weak regulation. The study recommended coordinated efforts among banks, local governments, and development actors to enhance private sector participation in WASH, particularly in climate-vulnerable regions.

Mr. Xerxes Rao from UMC shared how Adaptive Social Protection (ASP) and the convergence between SBM and DAY-NULM are strengthening the livelihoods of the urban poor, particularly women-led SHGs, in India's WASH sector. He emphasized that SHGs, especially those from vulnerable groups such as waste pickers, sanitation workers, and transgender, are better equipped to cope with shocks and crises when engaged in WASH-based livelihoods. Drawing from a study conducted in 10 cities across 6 states, he highlighted the potential for livelihood generation in waste management sector. However, he noted that the absence of state-level policies, technical support, and enabling mechanisms from Urban Local Bodies (ULBs) continues to hinder broader SHG engagement.

Mr. Himanshu Chandra from SPA Bhopal assessed urban development missions such as Smart Cities, SBM 2.0, and AMRUT 2.0 in Uttar Pradesh through a gender and inclusivity lens, focusing on WASH infrastructure in Varanasi and Mirzapur. Based on primary assessments and secondary data, the study found that while service coverage is relatively high in Varanasi, overall citizen satisfaction remains low. Despite ongoing infrastructure development under various schemes in both cities, the desired service levels have not been fully achieved, and the initiatives lack gender-responsive and inclusive approaches. The study also highlighted that female sanitation workers face unfavourable working conditions, underscoring the urgent need for gender-specific policies and improved job security.

Ms. Upasana Yadav and Ms. Saubiya Sareshwala from CWAS presented their work on innovative financing in the WASH sector. They emphasized the need to integrate both adaptive and mitigative measures in WASH planning from a climate change perspective, for which access to climate financing is essential. Despite global recognition of its importance, the actual flow of climate finance remains limited, with only a small fraction allocated to the WASH sector. They highlighted potential local and public funding sources within India and also discussed innovative financing mechanisms such as green bonds, carbon credits, blended finance, CSR contributions, and philanthropic funds to build climate resilience in WASH.

Mr. Akhilesh Ramesh from WASH Institute discussed Kerala's disaster response framework, this study identified critical gaps in waste management post-disasters. The study highlights critical challenges in disaster waste management in Kerala, including the absence of clear protocols, resource constraints, and inadequate stakeholder training. It proposed strategies to integrate climate resilience into WASH services, ensuring sustainable waste disposal in disaster-affected regions. By institutionalizing these strategies and ensuring proper safety protocols, Kerala can build resilience, manage disaster-generated waste more effectively, and achieve sustainable environmental outcomes.

Dr. Ganga Datta Nepal, Vice Chairperson - Policy and Planning Commission, Bagmati Province, Nepal, presented his analysis on the devastating Melamchi River flood in Nepal, highlighting the underlying climatic factors, governance gaps, and the socio-economic impact on affected communities. The session highlighted the need for flood preparedness, early warning systems, and municipal action plans to mitigate climate-induced disasters. It emphasized adaptation, mitigation, and the growing challenge of protecting Himalayan ecosystems amid rising temperatures.

Ms Mehrnaz Amiraslani from Nirma University presented case of Ahmedabad's urban waterbodies, this study explored the ecological degradation of peripheral lakes and ponds due to urbanization. She emphasized that ecological planning must adapted to changing environments, integrating flood mitigation, natural filtration, and cohesive spatial strategies. The study suggests that improved TP schemes, informed by topography and infrastructure data, can prevent waterlogging and enhance resilience. Public spaces designed ecologically can aid stormwater management, benefiting both urban systems and taxpayers.

Dr Dhaarna from NICMAR University, Pune, in her presentation discussed the Water-Energy-Food (WEF) Nexus governance in India, focusing on farmers' inclusivity and climate impacts. Her study brings forth challenges like resource mismanagement, climate change, and policy inefficiencies, emphasizing the need

for integrated governance. Along with this it highlights issues in water scarcity, energy dependency, and agricultural distress. The study proposes sustainable solutions such as decentralized energy sources, improved irrigation, policy coherence, and enhanced supply chain mechanisms for better farmer resilience.

Ms Shiny Saha, from IRC, in her presentation highlights the importance of Gender Equity and Social Inclusion (GESI) in strengthening WASH (Water, Sanitation, and Hygiene) systems. The study point outs, how marginalized communities often lack access to essential services and how integrating GESI into policies, planning, finance, and infrastructure can improve inclusivity. The presentation emphasizes the need for gender-responsive budgeting, representation in decision-making, and context-specific interventions to ensure sustainable and equitable WASH services.

Dr Shilpi Srivastava from BROWN GOLD team, Institute of Development Studies, UK, presented on the link between climate change and sanitation in rapidly urbanizing towns in Asia and Africa from a climate justice perspective. Her study highlights how climate change exacerbates sanitation challenges, creating inequalities, particularly for vulnerable communities like migrant workers, refugees, and informal sanitation workers. She illustrated through case studies from Ethiopia, India, and Nepal, how flooding, droughts, and poor infrastructure impact sanitation access and health risks. The research advocates for bottom-up approaches, citizen science, and circular sanitation innovations to address these interconnected issues.

Technical Sessions 3: Inclusive and climate resilient WASH

The session on Inclusive and Climate-Resilient WASH highlighted the intersection of social inequality and climate vulnerability in WASH service delivery. Speakers shared case studies from South Asia and Africa, emphasizing the need for community-led, gender-responsive and climate-adaptive approaches. Key themes included empowering self-help groups, improving conditions for sanitation workers, inclusive planning for informal settlements and integrating rural-urban service models. Innovative solutions like decentralized treatment, housing retrofits and participatory governance were showcased. The session underscored the importance of policy convergence, local capacity building and financing mechanisms to ensure equitable, sustainable and climate-resilient WASH systems for vulnerable and marginalized populations.

Mr. Anand Gautam from Water Aid Nepal presented the case study of Water Users and Sanitation Committee (WSUC) of Godawari Municipality of Nepal. He discussed the gaps identified through the assessments like coordination of WSUCs with municipality, poor women participation, and lack of capacity to meet the city's safe drinking water targets. Also, emphasized on proper implementation of WASH bill 2080.

Mr. Anurag Anthony from Urban Management Center, Ahmedabad discussed integration of vulnerable communities and WASH facilities in Climate Action of Chennai city. Insights were shared on safe and climate resilient housing for slum dwellers, decentralized water management combating floods, worker centred policies and ecofriendly treatment solutions were few of the parameters for improvement.

Mr. Chirag Patel and Ms. Jinal Chheda from CWAS highted work from the ongoing rural drinking water supply project in Palghar. Seasonal water scarcity, infrastructure gaps, climate vulnerabilities and equity gaps in the villages are being addressed by providing RWH structures, reviving the dysfunctional infrastructures and engaging women SHGs for water quality monitoring.

Mr. Jokastah Kalungu from Small Water Service Providers in Kenya presented his case study and pilot project details on Mukuru Kwanjenga slums and Nairobi. The slum residents were held hostage by the water cartels, costly illegal water connections leading to 80% NRW losses, water contamination were some of the major issues faced. The communities were mobilized, engaged to build and own water services and an inclusive water justice team was formed to monitor the operations.

Mr. Suvajit Dey from National Institute of Urban Affairs presented their study on transformation of water scarcity from governance perspective for Darjeeling. Existing methodology of water governance and management was described and revised framework and policy alignment was suggested.

Ms. Tanya Ahmed from NIUA shared insights from the *Swachh Avum Sugamya Uttarakhand* initiative, which focused on promoting inclusive and climate-resilient sanitation in hilly regions. Through community engagement, capacity strengthening and policy support to the State government, the initiative addressed challenges such as inaccessible infrastructure, gender disparities, and the needs of marginalized groups in accessing sanitation.

Mr. Hariprasad V.M., from CTARA, IIT Bombay, presented his study on how climate change intensifies the challenges faced by sanitation workers working in off-grid sanitation systems in small towns like Alleppey in Kerela. He highlighted that lack of sewer networks and FSTPs forces workers, many of which are migrant, to work in hazardous conditions, especially during extreme weather events. His research highlights the urgent need to integrate worker rights, safety, and climate resilience into sanitation planning to ensure dignified and sustainable services.

Ms. Shruti Joshi from RCUES-AIILSG presented AIILSG's ongoing work in plastic waste management through collaborative, community-led initiatives in Maharashtra. She also shared details of AIILSG's school-based programs in Mumbai for plastic waste collection and localized circular economy models in Pimpri-Chinchwad and Satara involving informal workers and self-help groups (SHGs). Their efforts also include waste audits, real-time air quality monitoring with youth participation, and policy advocacy to strengthen waste systems and promote long-term, sustainable change.

Ms. Samira Shakya from Freshwater Action Network South Asia (FANSA) presented the *Rising for Rights* project, which promotes community-driven monitoring for safely managed sanitation across South Asia, with a focus on marginalized groups. The initiative empowers local communities through social audits, surveys, and capacity-building to influence policy and improve sanitation services. Success stories and structural reforms, such as protective measures for sanitation workers, highlighted the project's impact in advancing inclusive, equitable, and climate-resilient WASH solutions across the region.

Dr. Sanghmitra Acharya from JNU emphasized the need to center the human aspect in WASH service delivery, particularly the sanitation workers who face multiple vulnerabilities due

to informal employment, low wages, and inadequate living conditions. She highlighted how these workers, mostly from marginalized communities, suffer disproportionately, especially during crises like COVID-19, yet remain invisible in policy frameworks. She called for urgent, equity-driven reforms to address these systemic gaps and ensure dignity, safety, and long-term protection for sanitation workers.

Ms. Sheela Patel from SPARC highlighted the importance of a bottom-up approach to retrofitting housing informal settlements, especially those facing extreme heat. She suggested co-creating housing solutions with women and emphasized user-led data, incremental upgrades and micro-level interventions. Using the five A's i.e. affordable, adaptable, accessible, available, and accepted, her approach fostered community ownership and integrated local actors like builders, waste-pickers and officials. She concluded that this method moves away from top-down planning and supports sustainable, inclusive housing solutions for the urban poor who often self-finance their homes.

Ms. Kasturi Joshi and Ms. Gautamee Sayamwar from CWAS presented inclusive FSM models for rural and peri-urban Maharashtra. They proposed two approaches: linking rural areas to nearby urban FSTPs and setting up standalone FSTPs in remote rural areas. They showcased pilots in Satara district which involved engagement with private sector for regular desludging of septic tanks, introducing sanitation taxes for financing service and enabling Rural Local Bodies to plan and manage services. Their work focused on creating cost-effective, scalable and climate-resilient FSM systems through technical support, public-private partnerships, and capacity building of local governments.

Ms. Shreya Pillai from Center for Urban and Regional Excellence presented a community-based WASH study done through a lens of caste, gender, and religion in Bengaluru's informal settlements. She highlighted challenges such as inadequate infrastructure, caste-based exclusion from services and the lack of official recognition for many settlements. The study emphasized how women, particularly from Dalit and minority communities, navigate bureaucracy to claim their rights. It also called for more inclusive planning, participatory governance and better classification of informal settlements beyond rigid government-defined categories to ensure equitable access to WASH services.

Mr. Anil Kumar Roy from CEPT University highlighted the strong link between inadequate WASH services and poor public health in Ahmedabad's slums. He pointed to high rates of diarrheal and vector-borne diseases, poor drainage, limited access to treated water, and high healthcare costs, particularly for low-income women. He argued lack of convergence between government programs like SBM and the National Urban Health Mission. He stressed the need for integrated urban health and sanitation planning, community engagement and convergence across government programs to address health vulnerabilities, especially in slums.

Ms. Abhilasha N from IIHS presented a study on sanitation service delivery in Chennai's urban poor communities. She highlighted issues like poor containment, inadequate desludging, open defecation and weak last-mile delivery. Despite available infrastructure, fragmented governance and lack of interdepartmental coordination hinder effective services in slums. Her team at IIHS has developed a climate-resilient WASH framework, currently being piloted in a slum through a multi-stakeholder, community-centered approach. The study emphasized the importance of integrating infrastructure, behaviour change and local governance to build inclusive and climate-resilient sanitation systems.

Technical Sessions 4: Innovations in technology and service delivery

This technical session on 'Innovations in technology and service delivery' featured 12 presentations which discussed innovative technologies and approaches for strengthening WASH services from climate perspective. Speakers shared experiences from various regions, highlighting the use of clean energy, nature-based solutions, decentralized treatment systems and community-led initiatives. The discussions emphasized the importance of context-specific strategies, integration of urban and rural services and the need for both technological and institutional innovations. Overall, the session illustrated how combining appropriate technology, strong governance and active community participation can lead to more sustainable and resilient WASH services.

Ms. Arwa Bharmal and Mr. Omkar Kane from CWAS shared how small and medium towns in Maharashtra are making WASH systems more climate resilient. Their support in conducting energy audits of water and sanitation infrastructure in the city of Ichalkaranji, Vita, and Karad has helped in identifying pump inefficiencies, leading to its replacement and reduced electricity costs. Solar panels were added to treatment plants, cutting carbon emissions and energy expenses. The team also trained city engineers and promoted a simple energy audit tool, showing how clean energy and smart planning can improve WASH service sustainability.

Mr. Deepchandra Joshi from IIT Madras discussed the challenge of emerging contaminants like pharmaceutical waste and PFAS in wastewater, which are not removed by most treatment plants in India. He highlighted advanced technologies such as membrane and plasma treatment that can effectively clean these pollutants but noted their high cost. To address this, he recommended improved monitoring, stronger regulations, and partnerships with the private sector to manage and reduce such pollution by 2035.

Mr. Remi Kaupp from Container Based Sanitation Alliance spoke about a smart and flexible toilet system called Container-Based

Sanitation (CBS), which is particularly useful in crowded or flood-prone areas. These toilets do not require digging or water and can be relocated when needed. A study conducted in Kenya, South Africa, and Peru showed that CBS functioned effectively even during floods or crises. It offers a safe and practical solution in locations where conventional toilets are difficult to construct.

Mr. Celestin DEFO from University of Ebolowa Celestin shared a study in which two local plants (*Panicum maximum* and *Paspalum polystachyum*) were tested in small, constructed wetland systems to treat wastewater contaminated with nickel. Both plants performed well, removing more than 92% of the pollution. The findings demonstrate that local plant species can offer a low-cost, effective solution for wastewater treatment in resource-constrained African cities

Ms. Utkarsha Kavadi from RCUES-AIILSG explained how Maharashtra is addressing sanitation challenges through Urban-Rural Convergence (URC). She shared that many cities in the State had underutilized FSTPs, while nearby rural areas lacked treatment facilities. URC allows rural areas to access FSTPs in the urban areas, avoiding the need for new infrastructure. This approach improves waste management, reduces costs, and enhances public health. Pilot projects in Indapur and Sangli demonstrated its success, and the model is now being expanded to promote sustainable and cost-effective sanitation services across the state.

Ms. Shruti Pillai from IIT Bombay shared a case from Kerala where community engagement and technology were used to improve sanitation. The initiative involved forming local groups to manage canals and installing a small wastewater treatment system in a low-income area. While the treatment system performed well, the community groups struggled due to political issues and limited support. However, residents of the colony took ownership of the system and some of them were employed to maintain it. The case highlights the need for both strong institutions and active community involvement for long-term success.

Ms Chetana Raghavendra from CIANKI Associates discussed the rejuvenation of water tanks in Kumbakonam, focusing on their ecological and socio-economic importance. She highlighted challenges like urbanization and neglect of sacred water bodies, stressing the need for rainwater harvesting, sewage treatment, and community-driven conservation efforts. The session underscored the historical significance of temple tanks and their role in water conservation, flood control, and local ecosystems. Comprehensive solutions, including regular assessments and policy development, were recommended to preserve these water bodies.

Ms. Priyadarshini Choudhary and Ms Dipti Tanna from CWAS focused on water security solutions for Gujarat's arid regions, specifically Anjar and Gandhidham. They discussed urban flooding, erratic rainfall and over-reliance on distant water sources as some of the issues of these areas. Their solution included geo-hydrological studies leading to implementation of solutions such as rainwater harvesting, groundwater recharge and enhanced community awareness through pilot projects. Long-term monitoring and community involvement were emphasized for sustained water security.

Ms. Ayushi Biswas from Biome Environmental Trust presented a Managed Aquifer Recharge (MAR) project in Devanahalli, Bangalore, which addresses water scarcity issue by using treated wastewater. The project utilized decentralized, low-energy methods to replenish aquifers and improve water quality. By employing shallow filter borewells and open wells, the project helped improve water availability, reduce the supply gap, and emphasized the role of community engagement and continuous monitoring.

Mr. Mostafizur Rahman from Global Water & Sanitation Center focused on the water crisis faced by displaced populations in Southern Bangladesh due to the Myanmar refugee influx. The project addressed poor sanitation and limited clean water access by constructing small dams, renovating reservoirs and establishing water treatment plants. The session emphasized community-driven solutions, integrating multiple water sources and continuous monitoring to improve water security and climate resilience.

Mr. G Ramkumar from RWH - Eco Terrain based Solutions presented a nature-based solution for water scarcity through distributed rainwater harvesting and shallow aquifer recharge. He advocated for utilizing soil's capacity to store freshwater, transforming stormwater drains into recharge systems. Successful examples were shared, including corporate buildings and bottling plants that recharged groundwater. The session emphasized cost-effective, practical approaches to ensure long-term water availability and environmental health

Mr. Tushar Bose from CEPT University Presented an innovative pedagogical approach to teaching water supply and sanitation design at the undergraduate level. They highlighted the use of studio-based courses where students design real-world systems for challenging terrains. By questioning traditional design assumptions and advocating for iterative processes, they emphasized the importance of hands-on learning and context-driven water system solutions

Poster presentations

The 40+ poster presentations at GSAC 2025 showcased a wide range of innovative, context-sensitive and interdisciplinary research and practices in WASH and climate resilience across the Global South. Key themes included faecal sludge management, with case studies from Nepal, India and Rwanda exploring treatment performance, policy processes and emerging technologies such as drying beds and satellite-based GHG monitoring. Many posters emphasized inclusive, climate-resilient WASH approaches, highlighting strategies for vulnerable populations including women, persons with disabilities, slum residents and estate workers. Posters on data and governance introduced decision support tools, baseline assessments and participatory documentation to inform evidence-based planning. Institutional capacity building emerged as a key area, with contributions on competency frameworks, PPPs and financing strategies for sustainable water reuse and desludging operations. Several posters demonstrated the application of nature-based and tech-driven solutions including AI, GIS and remote sensing for sanitation and water resource management. **Collectively, the presentations emphasized the importance of equity, innovation, decentralization and community engagement in achieving climate-resilient WASH systems.** They contributed to meaningful knowledge exchange and highlighted scalable solutions, bridging the gap between policy, research, and practice to strengthen urban and rural water and sanitation governance in the Global South.

The jury for the poster presentations included Prof. Subhrangsu Goswami, Prof. Purvi Chhadva and Prof. Arjun Joshi on Day 1 and Prof. Melissa Smith, Prof. Rajiv Kadam and Prof. Ravi Sannabhadti on Day 2. Based on the assessment of the jury members, following five top poster presenters were recognised and felicitated during the concluding session:

S. No	Presenter	Organization	Title of Poster
1	Rashmita Patel	Urban Management Centre	The Need for Climate-Responsive PPEs for Sanitation Workers: Insights from Odisha's Successful Garima Intervention
2	Nana Kobea Bonso	University for Development Studies	Mapping the Global Research Landscape on Safely Managed Sanitation: A Bibliometric Analysis
3	Harish Dhiwar, Raju Kothangire, Shivani	CWAS, CRDF, CEPT	Climate resilient water services in rural

	Parkhi, Vishal Jadhav	University	Maharashtra
4	Bara Wahbeh	AKYAS Environmental Organization	The Effluent Diversion Unit
5	Shekhar Ramachandran	Jalchakra Innovations LLP	NBS for Waterbody Rejuvenation of Pavi Sadakpur Pond, Loni, Ghaziabad, Uttar Pradesh
6	Mendy Zibuyile Shozi	Bremen Overseas Research and Development Association (BORDA) South Africa	Towards Citywide Inclusive Sanitation: Engineering design and testing of a novel faecal sludge treatment facility for South Africa – A Case Study approach
7	Jacob Abraham	WASH Institute	Urban Rural Convergence in FSSM: A case of Gandhidham and Anjar

Reflections and Vote of Thanks

The concluding session of GSAC 2025 highlighted the event's vibrant energy, thoughtful discussions and meaningful collaborations. Participants shared reflections emphasizing the value of grassroot knowledge, systemic approaches and the importance of continued engagement. Dr. Meera Mehta and Dr. Dinesh Mehta expressed heartfelt gratitude to all participants, speakers and especially the student volunteers and organizing teams whose collective effort made the two-day event a success. They emphasized that the energy, engagement and rich discussions affirmed the relevance of such platforms for dialogue on water, sanitation, climate and equity.

Dr. Dinesh Mehta reflected that the enthusiasm witnessed across the two days reaffirmed the value of organizing such an event. He added that while the focus of this year's conclave was more on the Global South, the future edition will focus on global participation. He also invited feedback and suggestions to improve future editions, reaffirming a commitment to continuous learning and fostering spaces where young professionals, researchers and practitioners can meaningfully engage and innovate.

Annex

Annex 1: List of posters

S. No	Presenter	Organization	Title of Poster
1	Suvajit Dey	National Institute of Urban Affairs	Exploring Water Scarcity from the Lens of Water Governance in the Ridge Town of the Himalayas: From Colonial Legacy to Contemporary Challenges and Future Prospects of Darjeeling
2	Buddha Bajracharya	Environment and Public Health Organization (ENPHO)	Improving Faecal Sludge Treatment in Nepal: Plant Performance and Management Insights.
3	Nana Kobea Bonso	University for Development Studies	Mapping the Global Research Landscape on Safely Managed Sanitation: A Bibliometric Analysis
4	Devika Hemalatha Devi	WASH Institute	Assessing Public Toilet Facilities in Kerala: Establishing Baseline Data for Improved Service Provision
5	Devika Hemalatha Devi	WASH Institute	Enhancing Community Engagement in the NAMASTE Enumeration Process in Kerala
6	Neda Parvin Shaikh	Christ (deemed to be) University	Water Diaries: Using Oral Histories to Document Women's Experiences of Water Scarcity in Mumbai Suburbs
7	Keshab Shrestha	Environment and Public Health Organization (ENPHO)	Engaging health facility staff on national standards raises WASH standards
8	Harshvardhan Nigam	National Institute of Urban Affairs	"Governance, Behavior, and Public-Private Partnerships in Sustainable Solid Waste Management: Insights from Darjeeling
9	Neha G. Patil	NICMAR University	Parametric Assessment of Water-Energy-Food Nexus of India

10	Ayushi Goyal	CEPT University	Advancing towards Inclusive and Climate-Resilient WaSH for Vulnerable Urban Communities in India: The Case of Ahmedabad and Surat
11	Jaya Yadav	Bharati College, University of Delhi	Caste, Climate, and Sanitation: Analysing Film and WASH through an Intersectional Lens
12	Seema Kumari	Northeastern Hill University	Understanding the Accessibility Challenges in Urban sanitation for People with Disabilities in India
13	Baksheesh Sachar	Government of Arunachal Pradesh	Deciphering Policy processes of climate resilient Faecal sludge management in Odisha
14	Kapil Dhabu	International Innovation Corps	Designing a Competency Framework for Water Governance
15	Rashmita Patel	Urban Management Centre	The Need for Climate-Responsive PPEs for Sanitation Workers: Insights from Odisha's Successful Garima Intervention
16	Akhilesh Ramesh	WASH Institute	Study on perception of sewer systems vs septic tank systems in Maradu Municipality of Kerala
17	Siddhi Mehta	Society for Promotion of Area Resource Centers (SPARC)	Sanitation on the edge - Choices in slums amid climate extremes and urban vulnerabilities
18	Saurabh Popli	School of Planning and Architecture, Bhopal	A Case for Mainstreaming Valuation of Ecosystem Services in the Urban Sector
19	Harish Dhiwar, Raju Kothangire, Shivani Parkhi, Vishal Jadhav	CWAS, CRDF, CEPT University	Climate resilient water services in rural Maharashtra
20	Devanshi Shah, Viral Chauhan, Apoorva Bhate	CWAS, CRDF, CEPT University	Capacity building efforts to achieve inclusive sanitation and water security

21	Tharika Fernando	World Vision Lanka	Enhancing Sustainability of- Rural Water Supply in Sri Lanka's Plantation Sector: The Role of Estate Worker Housing Cooperative Societies (EWHCS) as Community-Based Organizations
22	Karan Patil, Aishwarya Makwana	CWAS, CRDF, CEPT University	GHG emissions in sanitation-calculations, monitoring and satellite imaging
23	Prajina Maharjan	Freshwater Action Network South Asia (FANSA)	Investment in WASH Sector in South Asia: A Review from FANSA's lens
24	Harshini Gumudavelly	School of planning and architecture, Vijayawada	Financing Climate-Resilient Urban Water Reuse Infrastructure: A Strategic Framework for Sustainable Water Management
25	Jacob Abraham	WASH Institute	Urban Rural Convergence in FSSM: A case of Gandhidham and Anjar
26	Chanda Mulundu	Lusaka Water Supply and Sanitation Company	Safe Management of Faecal Sludge using enhanced drying on drying beds
27	Manita Rai	Kathmandu University	Kinetics Of Chemical Oxygen Demand (Cod) Removal Of Anaerobic Baffle Reactor At Wastewater Treatment Plant
28	Bara Wahbeh	AKYAS Environmental Organization	The Effluent Diversion Unit
29	Madhukar Swayambhu	Vaidic Srijan LLP	The Case Study of Moradabad Amrit Sarovar
30	Theogene RUSATIRA	Movimento Lotta alla Fame nel Mondo (MLFM Rwanda)	Feacal Sludge Treatment by Vermicomposting Technology
31	Rabindra Upreti	Mahalaxmi Municipality Lalitpur Government of Nepal	Standardization of Septic Tanks in Mahalaxmi Municipality: A Sustainable Approach to

			Wastewater Management
32	Shivani Parkhi	CWAS, CRDF, CEPT University	Exploring Trends and Technological Innovations in WASH Services: Discussing Challenges and Strategies for Improvement
33	Nishi Patel	CEPT University	Analysis the temporal change in River trajectory
34	Mangesh Sonwane	Tata Institute of Social Science Mumbai	Sustainable management of toilet
35	Chandrima Dutta Majumder	IPE Global Ltd	Maximising Capacity Utilisation in Waste Management Practices
36	Mendy Zibuyile Shozi	Bremen Overseas Research and Development Association (BORDA) South Africa	Towards Citywide Inclusive Sanitation: Engineering design and testing of a novel faecal sludge treatment facility for South Africa – A Case Study approach
37	Sheik Mohammed Shibl A	Water, Sanitation and Hygiene Institute	Feasibility for Omniprocessor establishment in Muttathara Sewage Treatment Plant for sludge management, Thiruvananthapuram, Kerala
38	Shekhar Ramachandran	Jalchakra Innovations LLP	NBS for Waterbody Rejuvenation of Pavi Sadakpur Pond, Loni, Ghaziabad, Uttar Pradesh
39	Durba Biswas	ATREE (Ashoka Trust for Research in Ecology and the Environment)	AquaWISE: A Decision Support Tool for Greywater Treatment Solutions in Government Schools in Semi-Arid India
40	Sachin Sahani	National Institute of Urban Affairs	Desludging fee Calculator for the State of Uttarakhand
41	Jenish Kathiriya	CEPT University	Modeling the Impact of the 2024 Flood Event in Vadodara

42	Viral, Devanshi, Sagar, Mayuri	CWAS, CRDF, CEPT University	Innovative and good practices in SWM and wastewater management

Annex 2: Conclave Agenda

Global South Academic Conclave 2025 - WASH and Climate

CWAS - CRDF and Faculty of Planning - CEPT University

with support from Viega Foundation and Gates Foundation

Draft agenda | 21-23 Feb 2025 | CEPT University, Ahmedabad – CFP Building

Time / Room	Sessions
Day 1 – 21 Feb 2025	
8:00 – 9:30	Registration
9:30 – 10:00 BNB Hall	Inauguration - Barjor Mehta, CEPT University - Shalini Sinha, FP-CEPT University - Suren Vakil, CRDF - Sakshi Gudwani, Gates Foundation - Marina Brueckner-Supriyono, Viega Foundation - Meera Mehta, CWAS
10:00 – 11:30 BNB Hall	Reflections on PAS@15 • Presentation - Meera Mehta, CWAS / Dinesh Mehta, CWAS • Launch of PAS@15 Report • Reflections from PAS advisors and partners - D.M. Sukthankar, Retired IAS - Govt. of Maharashtra - C.K. Koshy, Retired IAS - Govt. of Gujarat - IP Gautam, SRFDCL - Louis Boorstin, Osprey Foundation - Rachel Cardone, Resilient Water Accelerator - Sakshi Gudwani, Gates Foundation - Manvita Baradi, UMC - Utkarsha Kavadi, RCUES-AILSG
11:30 – 12:00	Tea and networking break
12:00 – 12:45	Keynote address – Rick Johnston, WHO

BNB Hall	Session introduction – Aasim Mansuri, CWAS				
12:45 – 14:00	Lunch				
14:00 – 15:00 BNB Hall	Panel discussion: Experiences in WASH monitoring - Moderator - Meera Mehta, CWAS - Helena Allegre, Hydraulics & Environment - National Civil Engineering Lab Portugal - Meghna Malhotra, UMC - Patrick Ty, MWSS Philippines - Pratima Joshi, Shelter Associates - Sujatha Nair, SPAN Malaysia - Sahana Goswami, WRI				
15:00 – 15:45 BNB Hall	Keynote address – Sheela Patel, SPARC Session introduction – Dhruv Bhavsar, CWAS				
15:45 – 16:00 BNB Hall	Keynote address – Kalanithy Vairavamoorthy, IWA Session introduction – Aditi Dwivedi, CWAS				
16:00 – 16:15 BNB Hall	NFSSM Alliance – Knowledge Product Launch "Towards Climate Resilient Sanitation Futures"				
16:15 – 16:30	Tea and networking break				
16:30 – 17:45	Technical Session 1.1: Monitoring WASH outcomes Chair: Jignesh Mehta Room: BNB Hall	Technical Session 2.1: Governance and financing for climate resilient WASH Chair: Nitika Bhakuni Room: CFP 202	Technical Session 3.1: Inclusive and climate resilient water systems Chair: Saswat Bandyopadhyay Room: CFP 203	Technical Session 3.2: Inclusive and climate resilient sanitation systems Chair: Sejal Patel Room: CFP 307	Technical Session 4.1: Innovations in technology and water service delivery Chair: Anil Roy Room: CFP 303
17:45 – 19:15	Partner session: Global Water & Sanitation Center (GWSC) Advancing CWIS for	Partner session: Resilient Water Accelerator (RWA) & CWAS Scaling Water Utility Performance and Creditworthiness	Partner session: ADBI Accountability Mechanisms for Inclusive City-Level Public Services in Asia	Partner Session: Global Sanitation Graduate School	Technical session: Poster Presentations and jury Jury: Subhrangsu Goswami, Purvi

	climate resilient service delivery: Lessons from GWSC's Regional Experience Room: CFP 202	Room: CFP 203	Room: CFP 307	Room: CFP 303	Chhadva, Arjun Joshi Location: Exhibition at North Lawn

Day 2 – 22 Feb 2025	
9:00 – 9:30	Registration
9:30 – 9:45 BNB Hall	Welcome and Day 2 Agenda
9:45 – 10:30 BNB Hall	Keynote address – Sunita Narain, CSE Session introduction – Dinesh Mehta, CWAS
10:30 – 11:00	Tea and networking break
11:00 – 12:00 BNB Hall	Panel discussion: Policies and Financing - Moderator - Dinesh Mehta, CWAS - Kartikeya Sarabhai, CEE - Punit Lalbhai, Arvind Limited - Vida Duti, IRC Ghana - Srikanth Viswanathan, Janaagraha - Sujata Srikumar, PowerTec
12:00 – 12:45 BNB Hall	Keynote address – Rakesh Mohan, Centre for Social and Economic Progress Session introduction – Meera Mehta, CWAS
13:00 – 14:00	Lunch
14:00 – 14:45 BNB Hall	Keynote address – Ashok Khosla, Development Alternatives Session introduction – Darshan Parikh
14.45 -15.15 BNB Hall	Keynote address – K. Srinivas, Secretary, Ministry of Housing and Urban Affairs, GoI Session introduction – Dinesh Mehta, CWAS
15.15- 16.15 BNB Hall	Panel discussion: Academic discourse on WASH climate and urban planning - Moderator - Mona Iyer, CEPT University - Ashok Kumar, SPA Delhi - Jaya Saxena, NRSC - ISRO - Kavita Wankhade, IIHS

	- Sanskriti Mujumdar, MSU - Komli Yenneti, University of Wolverhampton UK			
16:15 – 16:30	Tea and networking break			
16:30 – 17:45	Technical Session 1.2 Monitoring emissions in WASH Chair: Melissa Smith Room: CFP 202	Technical Session 2.2 Governance for climate resilient WASH Chair: Rutul Joshi Room: CFP 203	Technical Session 3.3 Inclusive and climate resilient WASH for vulnerable communities Chair: Dhruv Bhavsar Room: CFP 307	Technical Session 4.2: Innovations in technology and sanitation service delivery Chair: Aasim Mansuri Room: CFP 303
17:45 – 19:15	Partner session: NFSSM Alliance Building Bridges from Vulnerability to Resilience: Understanding the Climate-Sanitation Interlinkages Room: CFP 202	Partner session: Climate Rise Alliance Building Resilience: Integrating WASH Systems into the Built Environment Room: CFP 203	Technical session: Poster Presentations and jury Jury: Melissa Smith, Rajiv Kadam, Ravi Sannabhadti Location: Exhibition at North Lawn	
19:15 – 19.45 BNB Hall	Concluding session - Meera Mehta, CWAS / Dinesh Mehta, CWAS			
19.45 onwards	Gala dinner and cultural night			
Day 3 – 23 Feb 2025				
7:00 onwards	Field visits (pre-registration required) Ahmedabad Heritage Walk (7 am – 11 am) Modhera Sun Temple (7 am – 4 pm)			

CENTER FOR WATER AND SANITATION

The Center for Water and Sanitation (CWAS) is a part of CEPT Research and Development Foundation (CRDF) at CEPT University. CWAS undertakes action-research, implementation support, capacity building and advocacy in the field of urban water and sanitation. Acting as a thought catalyst and facilitator, CWAS works closely with all levels of governments - national, state and local to support them in delivering water and sanitation services in an efficient, effective and equitable manner.